USING MOSHELL ON MSRBS Gen1/Gen2

1 RBS6000

1.1 DU platforms

DU Gen1

Based on CPP (Connectivity Packet Platform)
CPP is a platform that provides an
  - **an Execution Environment (with various processor types: MP, BP, SP, XP, DP)**
  - **an Operating System (OSE or Linux)**
  - **an O&M interface (MO-based over CORBA)**
  - **Equipment handling**
  - **TransportNetwork handing (TDM, ATM, IP)**
  - **some Signaling protocols (SS7, SAAL, SCTP, ...).**

CPP is used in MGW/MRS, RNC, RXI, and WCDMA/LTE RBS Generation 1

APPLICATION

| WCDMA RNC/RBS | TD-SDMA RNC/RBS | CDMA2000 BSC/RBS | MGW | LTE RBS | Simulators: corben,3gsim erncsim,mgwsim |

CPP

SS7 (MTP2, MTP3, M3UA, SCC

IP Transport (Eth., IP, UDP, RL

ATM Transport (ATM, TDM, SDH, PDH, AAL, SAAL)

Internal Transport (Network synch, Atm switch, Ethernet switch)

Control (Equipment mgmt, SW loading, System upgrade, O&M, Tracing, Restarts, File system, Operating System, ...)
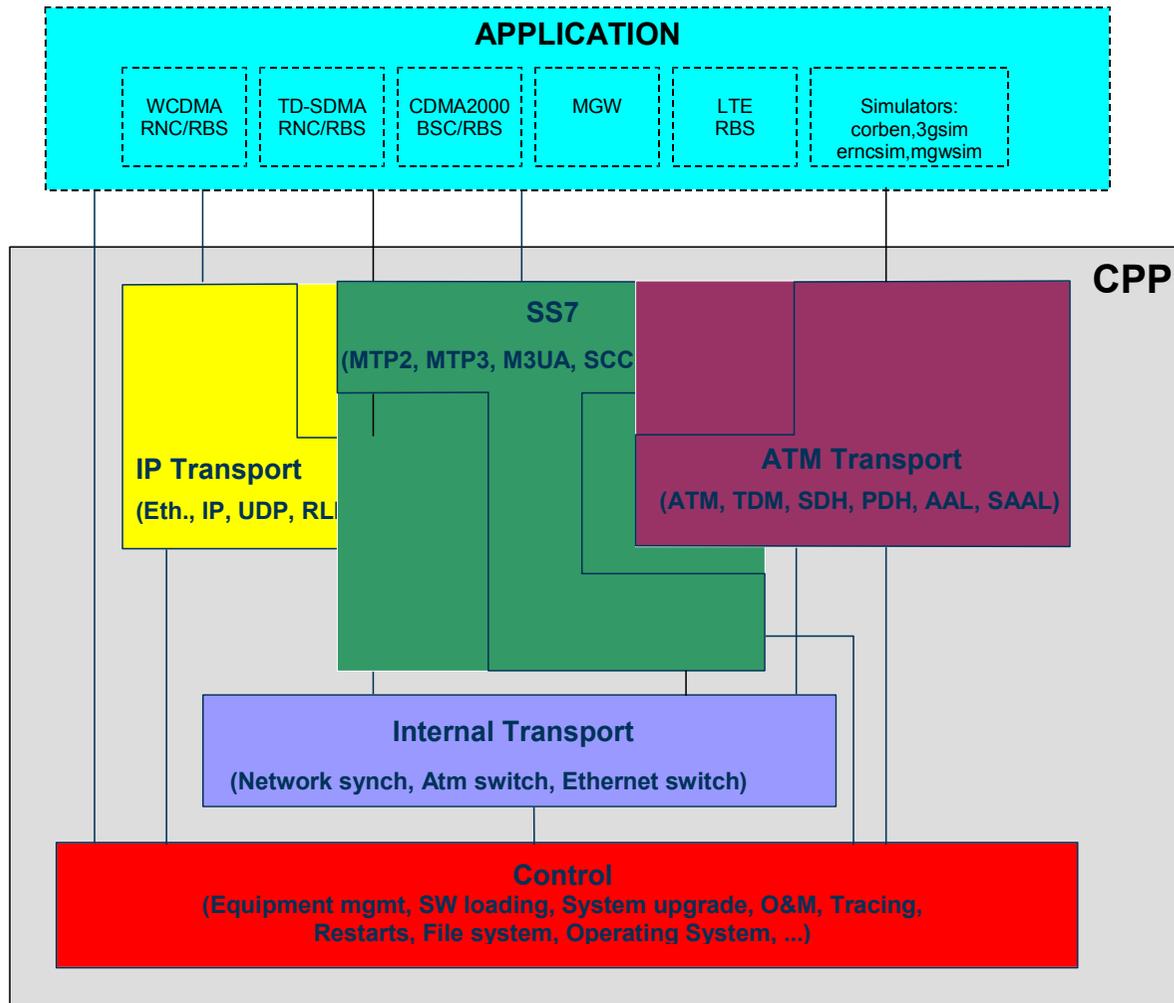
DU Gen2

Based on RCS (RBS Control System)
RCS is a platform that provides
- o **an Execution Environment (with various processor types: MP, DP)**
- o **an Operating System (Linux)**
- o **an O&M interface based on ECIM/COM**
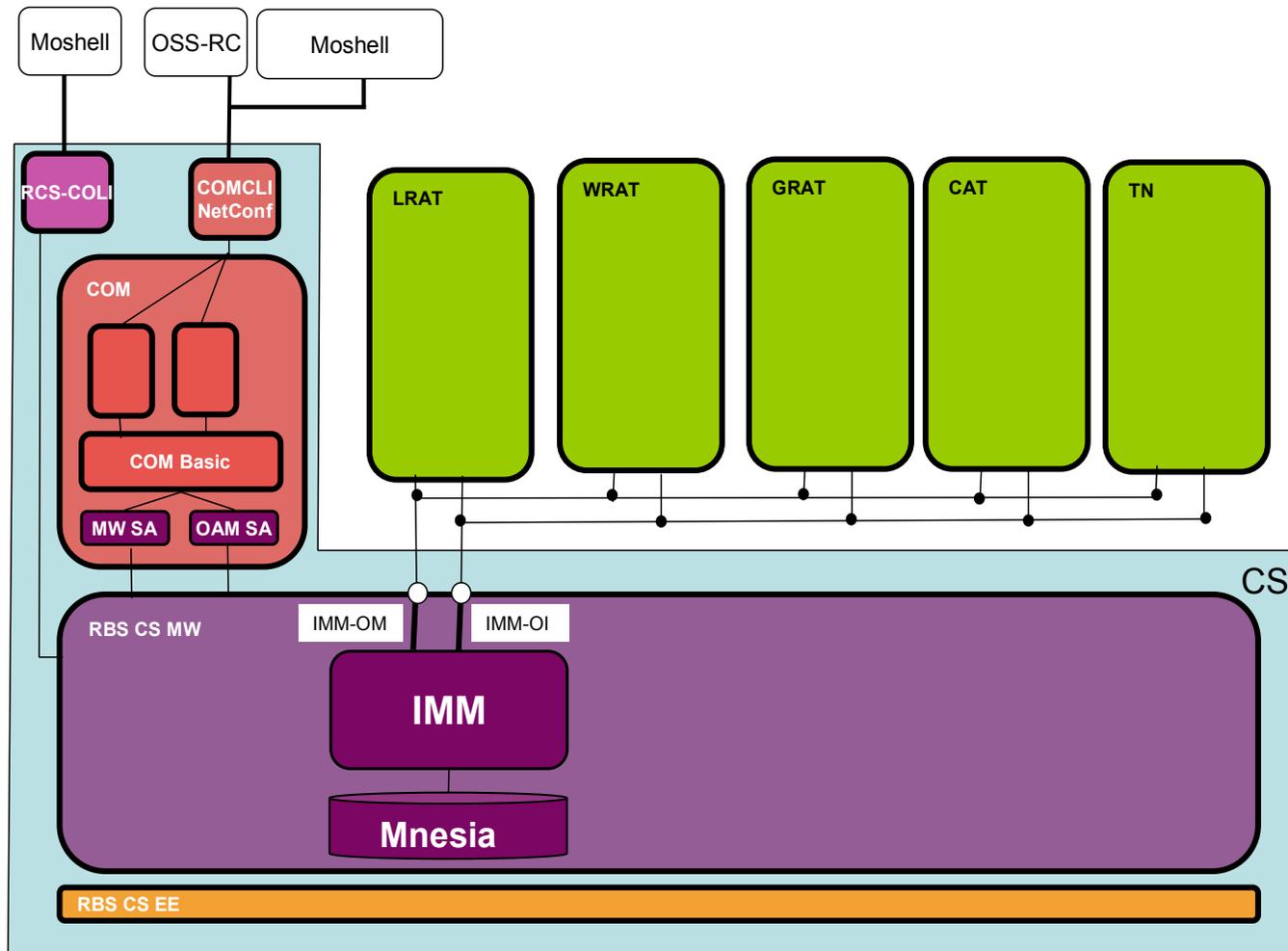
- **RCS: RBS Control System**
  Operating System, SW management, Configuration Management, O&M, ...

- **TN: Transport Network**
  Ethernet, IP, SCTP

- **CAT: Common Architecture Tier**
  Equipment handling, Antenna System, Synchronization, Support System, BB HW, ...

- **GRAT: GSM Radio Access Technology**

- **WRAT: WCDMA Radio Access Technology**

- **LRAT: LTE Radio Access Technology**

Note: RCS uses ECIM/COM for O&M. ECIM/COM are components in CBA

- **CBA (Component Based Architecture): a set of linux-based components that can be used to build a platform for Network Elements**
  CBA was originally developped for Core and IMS nodes (CSCF, MTAS, H2S, EPG, SSR, APG, ...)

- **COM (Common Operation and Maintenance):**

A component in CBA that provides an MO-based O&M interface for Network Elements, using NETCONF and CLI.

- **ECIM (Ericsson Common Information Model):**

The Managed Object Model used in COM. Has some similarities with CPP MOM (eg, supports the same operations get/set/create/delete/action) but most MO classes are different and there are some new data types as well.
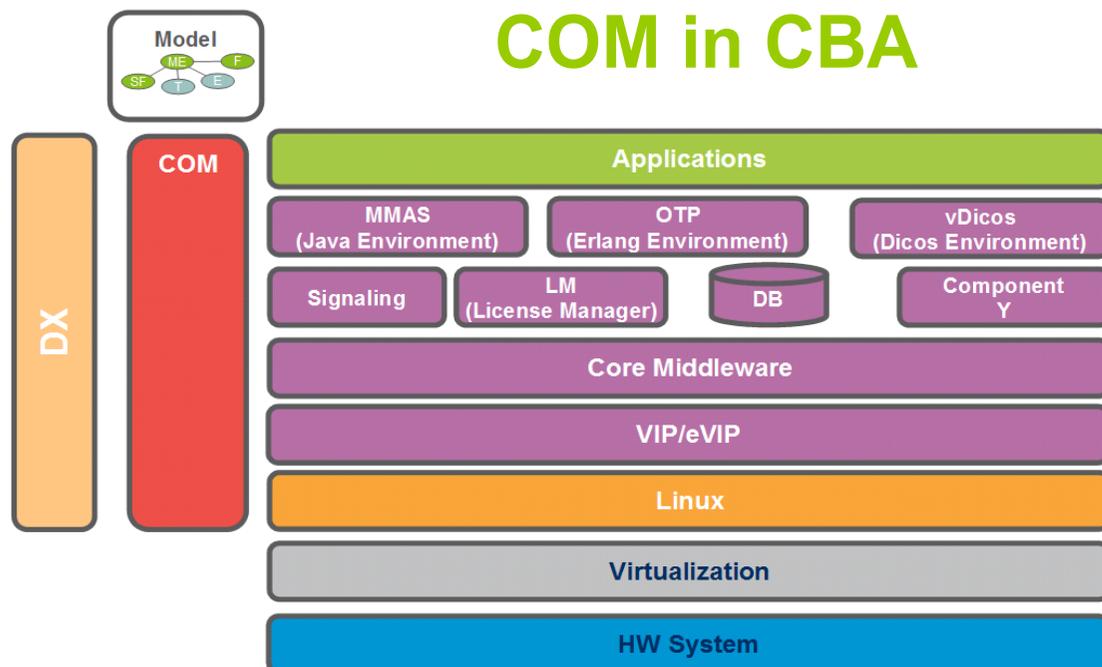
1.2 Node types

Official Name	Other Names	Platform	O&M	MOM Name
DU RadioNode	RBS6000 Gen1	CPP	CPP	WCDMA: RBS_NODE_MODEL LTE: ERBS_NODE_MODEL
Baseband RadioNode	RBS6000 Gen2 MSRBS V2	RCS	ECIM/COM	MSRBS_NODE_MODEL
Baseband T605	TCU04	RCS	ECIM/COM	RCS_NODE_MODEL
Baseband C608		RCS	ECIM/COM	RCS_NODE_MODEL

Official Name	Other Names	Platform	O&M	MOM Name
RBS6401/RBS6402	Pico RBS MSRBS V1	EPIC	ECIM/COM	WCDMA: WPRBS_NODE_MODEL LTE: LPRBS_NODE_MODEL MultiStandard: MPRBS_NODE_MODEL

1.3 HW Subsystems

RBS6000 Gen1 = RBS6000 with <u>DU Gen1</u> (Single Standard)	RBS6000 Gen2 = RBS6000 with <u>DU Gen2</u> (Multi Standa

Note: HW subsystem internal interconnect are primarily for understanding and may not be 100 % correct.

Digital HW Subsystem - RBS6a

Digital HW Subsystem - RBS6b

Radio HW Subsystem

Support system HW Subsystem Note: HW subsystem internal interconnect are primarily for understanding and may not be 100 % correct.
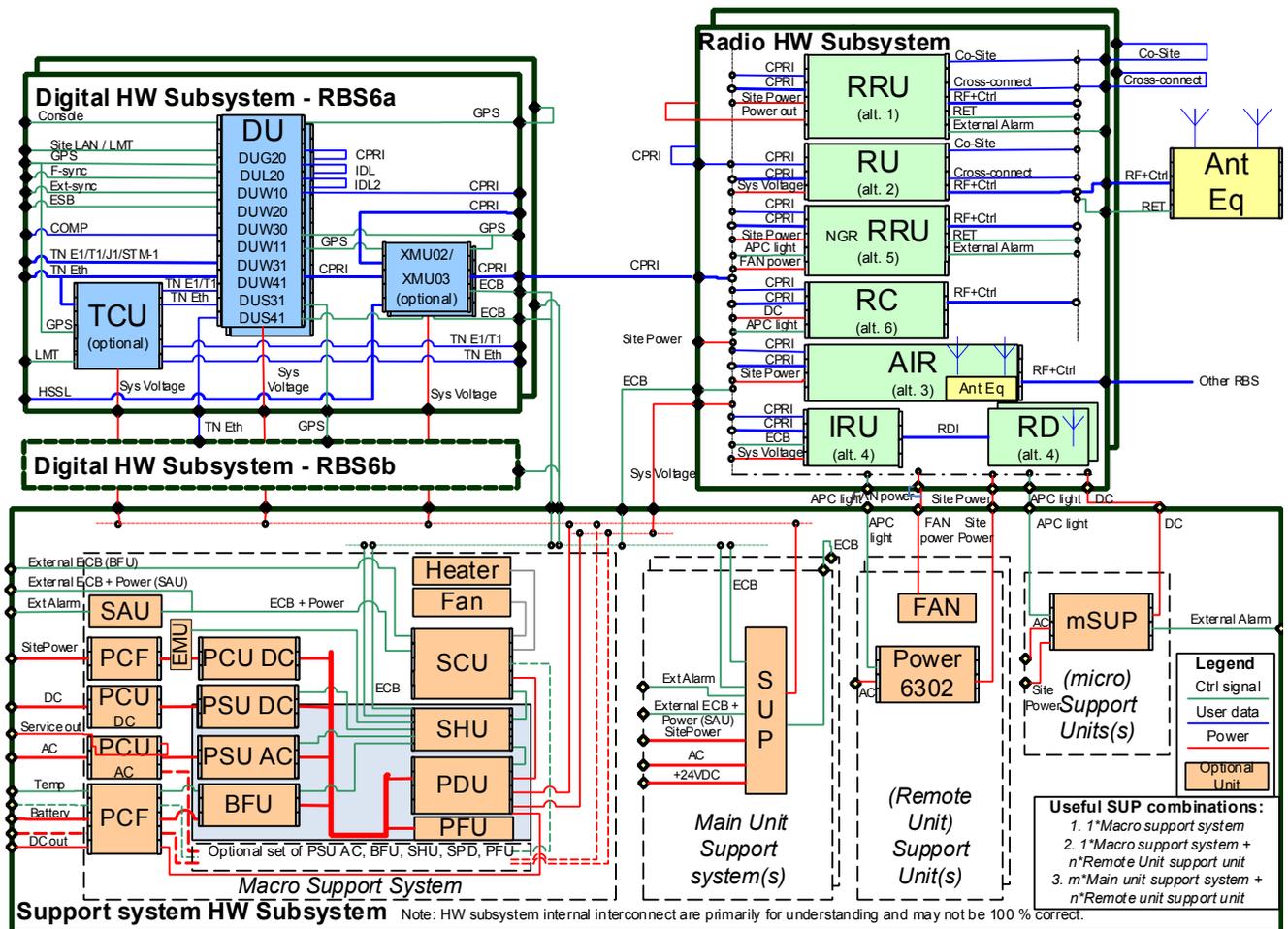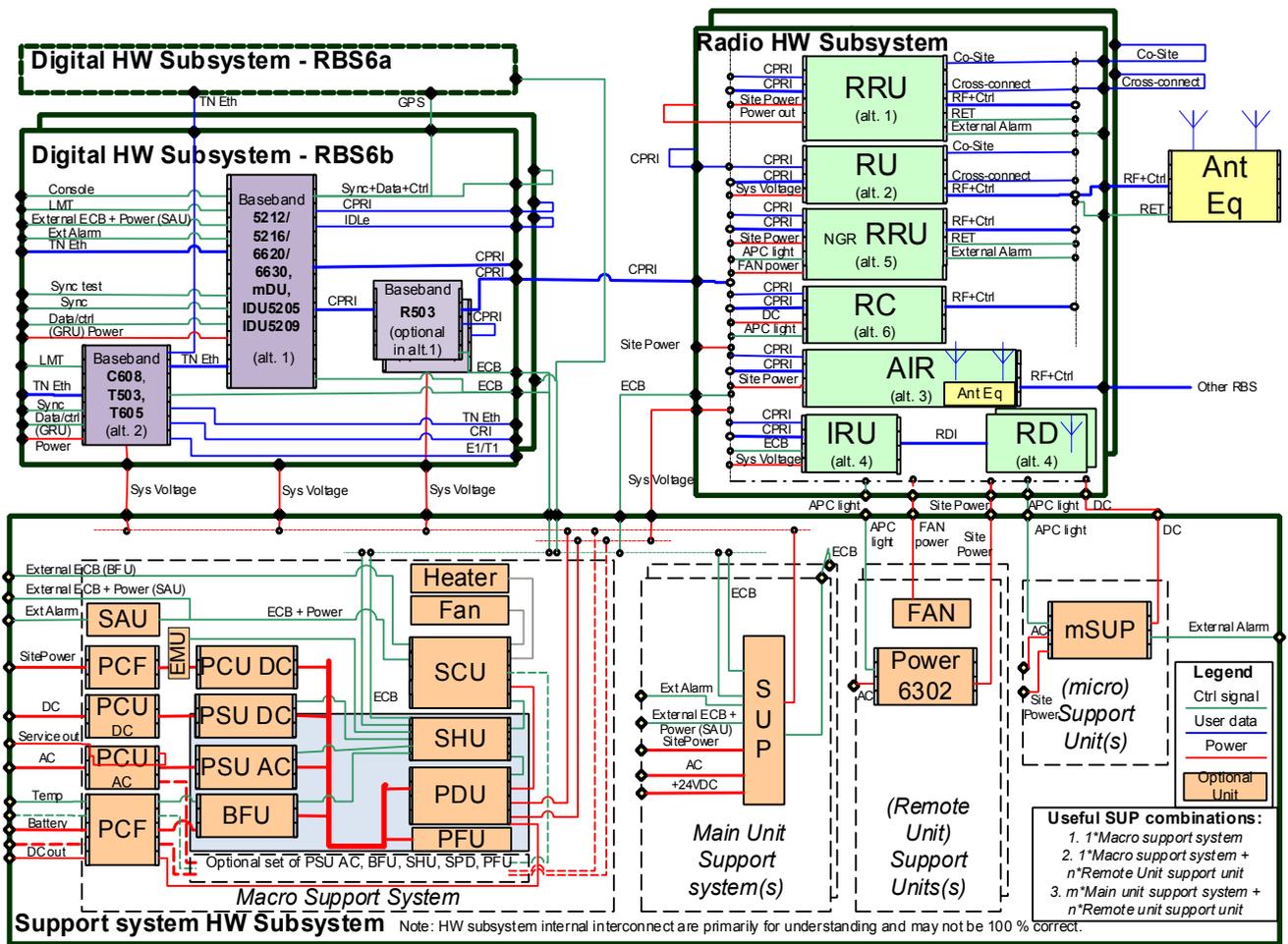
1.3.1 Digital HW

- **TCU: Transport Control Unit -> Transport Network, Synchronization.**
- **XMU: Auxiliary Multiplexing Unit -> CPRI splitter**
- **DU: Digital Unit -> O&M, Traffic Control, Baseband, Transport Network, Synchronization.**
     - **Gen1: Based on CPP Platform. Single Standard.**
     - **Gen2: Based on RCS Platform. Multi Standard.**

Official Name	Other Name	Platform	Comment
DUL20, DUS31, DUS41	**same**	**CPP**	
Baseband 5212	**DUS32**	**RCS/COM**	**1 CPM with 8 cores and 2 EMCA**

Baseband 5216	DUS52	RCS/COM	1 CPM with 12 cores and 4 EMCA
Baseband 6620	DUS33	RCS/COM	=Bb5212 with 15 CPRI ports
Baseband 6630	DUS53	RCS/COM	=Bb5216 with 15 CPRI ports
Baseband 6303	ODS6303	RCS/COM	=Bb6620 with 3 CPRI ports in outdoor case. Replaces RBS6302
Baseband 6502	ODS6502	RCS/COM	=Bb6303 with a micro radio. Replace RBS6501
Baseband R503	XMU03	Linux	
Baseband P614	PIMCU	Linux	
Baseband T605	TCU04	RCS/COM	
Baseband C608		RCS/COM	

For the Baseband 5212/5216, there are two types of boards: secure and unsecure
- unsecure: product number ends in /3 (5212) or /4 (5216) : ssh to Linux shell from LMT port is enabled
- secure: product number ends in /31 (5212) or /41 (5216): ssh to Linux shell is disabled

1.3.2 Radio HW

- RU: Radio Unit (in cabinet)
- RRU: Remote Radio Unit (near antenna)
- RC: Radio Core (radio component in micro RBS)
- AIR: Antenna Integrated Radio (RRU+RET inside Antenna)
- IRU + RD: Indoor Radio Unit + Radio Dot (for indoor coverage)
- TMA: Tower Mounted Amplifier (low noise amplifier for Uplink signal, to compensate for feeder loss between antennan and RU)
- RET: Remote Electrical Tilt (to set the vertical tilt of the antenna)

RU
Located inside the cabinet => easier maintenance since inside cabinet
Connected to DU by electrical CPRI links => only supports 2.5G CPRI (=>2X2 20 MHz MIMO)
Long RF feeder between RU and antenna => needs more TX power to compensate for downlink loss in the long feeders between cabinet and antenna.
Also needs a TMA (Tower Mounted Amplifier) to compensate for uplink feeder loss.

RRU
Located outdoor near the antenna => maintenance is more costly due to having to climb the tower
Connected to DU by optical CPRI links => supports up to 10G CPRI (=>8x8 20 MHz MIMO)
Short feeder between RRU and antenna => need less TX power and no TMA since feeders are very short

Product Name	Product Description
RUL01/RUS01/RUS02/RUW02/RUS03	FDD cabinet mounted (8U) Radio Units 1TX/2RX.
RRUS01/RRUS02/RRUW02	FDD Remote Radio Units 1TX/2RX.
RRUL11/RRUS11/RRUS12/RRUS13/RRUS14	FDD Remote Radio Units 2TX/2RX.
Radio 2217/Radio 2219	FDD NGR G1/G1.5 Remote Radio Units 2TX/2RX.
RRU22F1/F2/F3	FDD Remote Radio Units with Single/Dual/Triple band, 2 transmitters and 2 receivers 1/2/3*(2TX/2RX).
RRUS31/RRUS32	FDD Remote Radio Units 4TX/4RX.
Radio 4407	NGR LFT FDD Remote Radio Units 4TX/4RX.
RRUS61/RRUL62/RRUL63	TDD Remote Radio Units 2TX/2RX.
Radio 2216/Radio 2218	NGR LFT TDD Remote Radio Units 2TX/2RX.
Radio 2212	NGR G2 FDD Remote Radio Unit 2TX/2RX.
RRUS72	TDD Remote Radio Units 4TX/4RX.
Radio4412	NGR LFT TDD Remote Radio Units 4TX/4RX.
Radio4415	NGR G2 FDD Remote Radio Units 4TX/4RX.
RRUL81/RRUL82/RRUS82/Radio 8808	TDD Remote Radio Units 8TX/8RX.
RRUSA2/RRUSA3	FDD Remote Radio Units with 2 receivers (2RX).
Radio 0208	NGR G1 FDD Remote Radio Unit with 2 receivers (2RX)
RRUSE2	FDD Remote Radio Unit with 2 transmitters (2TX)
Radio 2012	NGR G2 FDD Remote Radio Unit 2TX
mRRUS12	FDD Remote Radio Units with 2 low power transmitters and 2 receivers (2TX/2RX) and integrated power supply function.
mRRUS61	TDD Remote Radio Units with 2 low power transmitters and 2 receivers (2TX/2RX) and integrated power supply function.
Radio2205/Radio 2208	NGR LFT TDD Remote Radio Units with 2 low power transmitters and 2 receivers (2TX/2RX) and integrated power supply function.
Radio 2203	Single band FDD NGR G1 mRRU unit with one Radio Core (RC) consisting of 2 low power transmitters and 2 receivers (2TX/2RX), an mSUP with a AC or DC PSU and an optional fan, an optional antenna.
AIR11	FDD Antenna Integrated Remote Radio Units with 2TX/2RX. AIR11 is internally realized as two cascaded 1TX/2RX RRU:s.
AIR21	FDD Antenna Integrated Remote Radio Units with 2TX/4RX. AIR21 is internally realized as two cascaded 1TX/2RX RRU:s.
AIR32	FDD Antenna Integrated Remote Radio Units with 4TX/4RX.
IRU2242	FDD cabinet mounted (8U) Indoor Radio Unit with 2 band independent TX and RX functions

	(2TX/2RX) and 8 Radio Dot interfaces (RDI).
IRU2243	FDD/TDD cabinet mounted (8U) Indoor Radio Unit with 2 band independent TX and RX functions (2TX/2RX) and 8 Radio Dot interfaces (RDI).
RD2242/RD2243	Radio Dot unit with 2 RX/TX low power RF branches including antennas. One FDD variant and one TDD variant

1.3.3 Support System

Also called APC (Alarm Power Climate)
Takes care of:
- **Power Supply**
- **Climate Control**
- **External Alarms**

Support System Main-Remote
- **SUP: Support Unit (Power Supply, fan control, external alarms)**

Support System Macro
- **SAU: Support Alarm Unit (for connecting external alarms such as fire or burglar alarm)**
- **SHU: Support Hub Unit (interconnection of the Equipment Control bus)**
- **SCU: Support Control Unit (monitors cabinet temperature, controls the fans and heaters)**
- **PSU: Converts 230V AC or 24V DC to 48V DC**
- **BFU: Battery Fuse Unit**
- **PDU: Power Distribution Unit**
- **PCF: Power Control Field**

1.3.4 Enclosure (cabinet)

- **Macro: The Enclosure contains Digital HW, Radio HW, and Support System. Can also connect to Remote Radios.**
- **Main-Remote: Only Digital HW and Support System are in the enclosure. Radio HW is remote.**
- **Micro/Pico: Digital HW, Radio HW, and Support System are all together in one single HW Unit.**

- 61xx, 63xx, 65xx = outdoor
  - 61xx : macro
  - 63xx: main-remote
  - 65xx: micro

- **62xx, 64xx, 66xx = indoor**
  - **62xx: macro**
  - **64xx: pico**
  - **66xx: main-remote**

Ericsson radio system - site types

Outdoor | Indoor

61 series

Site with outdoor enclosures. Typically an enclosure for baseband, backhaul, power and a BBU or separate enclosure for batteries.

63 series

Site with zero footprint products for wall or pole mount which are carry to site designed.

65 series

Site with outdoor small form factor Micro.

62 series

Site with indoor enclosure or larger 19" shelf based products.

64 series

Site with indoor Pico, integrated radio, baseband and backhaul.

66 series

Site with indoor self contained 19" products.

RBS 6201

- **Top shelf: fan, heater and climate control (SCU)**
- **Middle two shelves: DU/RU**
- **Next shelf: Power Supply, power distribution, and Hub for the Control bus (SHU)**
- **Bottom shelf: transmission equipment**

A Fans
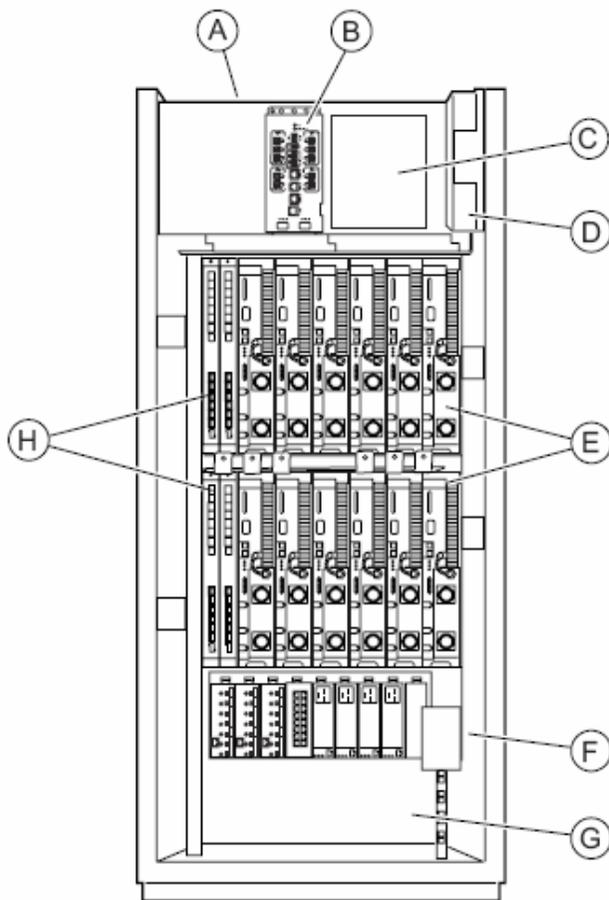
B Support Control Unit (SCU)

C Power Connection Unit Alternating Current (PCU AC) or Power Connection Unit Direct Current (PCU DC)

D Power Connection Filter (PCF)

E Radio Units (RU) :
- Modulation and demodulation of baseband signal
- RF Power amplification and filtering

F Power subrack including:
- Power Distribution Unit (PDU)
- Support Hub Unit (SHU)
- Power Supply Unit (PSU)
- Power Filter Unit (PFU)
- Power Connection Filter (PCF)
- Battery Fuse Unit (BFU)

G Space for optional transmission equipment

H Digital Units (DU)
- Control Processing
- Baseband

RBS 6601
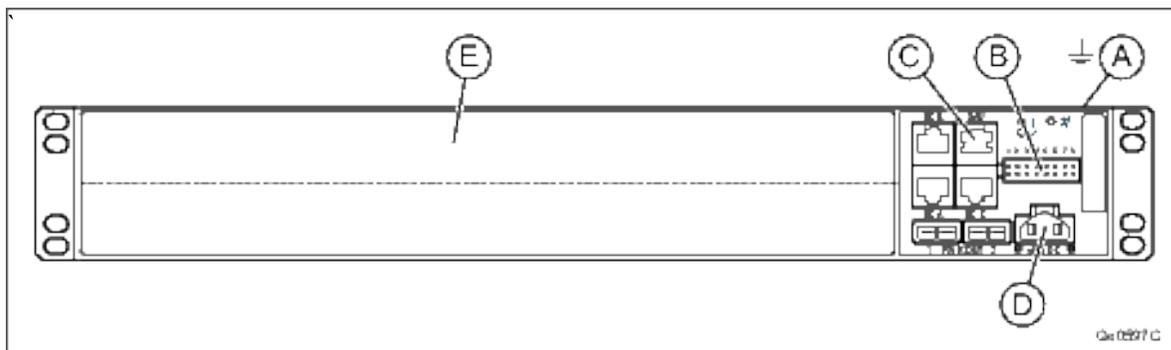
Position	Description
A	Earth grounding interface (positioned at the back of the main unit)
B	Built-in external alarm interface
C	SAU power interface
D	Power connection interface
E	2 DUL (or 1 DUW or 2 DUG)

1.4 Modes of operation

- **Single Standard Mode (SSM) => All nodes in the cabinet are of the same standard (GSM, WCDMA, or LTE)**
- **Multi Standard Single Mode (MSSM) => Nodes of different standard can share the same Support System in the cabinet, but have each their own Digital and Radio HW**
- **Multi Standard Mixed Mode Radio (MSMM) => Nodes of different standard can share the same Support System and Radio HW, but each have their own Digital HW.**
 Eg: L+W, L+G, L+W+G
- **Single Standard Mixed Mode Radio (SSMM) => Nodes of the same standard are sharing the same Support System and Radio HW.**
 Eg L+L, W+W, G+G
- **Multi Standard Mixed Mode Baseband (MSMM) => Nodes of different standard can share the same Support System, Radio HW, and Digital HW**

Note: MSMM with shared Baseband is only supported in RBS6000 Gen2

2 O&M interfaces

2.1 Element Managers

2.1.1 Command-line

Moshell
For Ericsson personnel only.
Latest moshell version must be used.
Latest moshell package can be downloaded from http://utran01.au.ao.ericsson.se/moshell
Installation instruction is available from that page by clicking on "Installation instructions"
It is also possible to run moshell directly from AFS: /app/moshell/latest/moshell/moshell

AMOS
For both Customer and Ericsson personnel.
Same as moshell, AMOS works for both CPP nodes and ECIM/COM nodes, just open a unix shell in OSSRC/ENM and type "amos <nodeip>"
More info about AMOS: http://utran01.epa.ericsson.se/moshell/forum_viewtopic.php?4.2717

EMCLI
EMCLI (Element Management Command Line Interface) is a special moshell version that only works for Gen2 nodes.
It is available to download from the node, from the URL https://\<nodeip\>/em/index.html

2.1.2   GUI

For Gen1:
 - EMAS: Available from https://\<nodeip\>/em/index.html

For Gen2:
 - Emergency access: https://\<nodeip\>/ea.html allows to perform operations such as board reset or ESI collection
 - Autointegration: https://\<nodeip\> allows to run netconf scripts
 - EMGUI: https://\<nodeip\>:8443/emgui

2.2   O&M Protocols

From MoShell it is possible to:
 - perform MO operations (get/set/delete/create/action) over CORBA / NETCONF / COMCLI
 - run commands in the node's shell (CPP-COLI / COMCLI / RCS-COLI / Linux-Shell)
 - transfer files to and from the node via file transfer protocol

**CPP NODE
(RNC, WRBS, ENB,
MGW, MRS)**

**MoShell/
AMOS**

**COM NODE
(picoRBS, MSRBS_V2,
TCU03, APG43L, EPG/SSR,
CSCF, HSS, MTAS, etc ...)**

PM Scanners

PM

FM

Alarms

CORBA

CM

MOs

CM

NCLI shell

SSH

CPP COLI shell

File system

SFTP

HTTP

NETCONF

CM

MOs

CM

830 /
6513

56834 /
56836

22

TCP/IP

SSH
or
TLS

2023 /
9830

COMCLI shell
(= ECLI)

4192/
9831

RCS-COLI shell
(=ESCI)

22

Linux shell

SFTP
or
FTPS

2024

File system

80

443

HTTPS
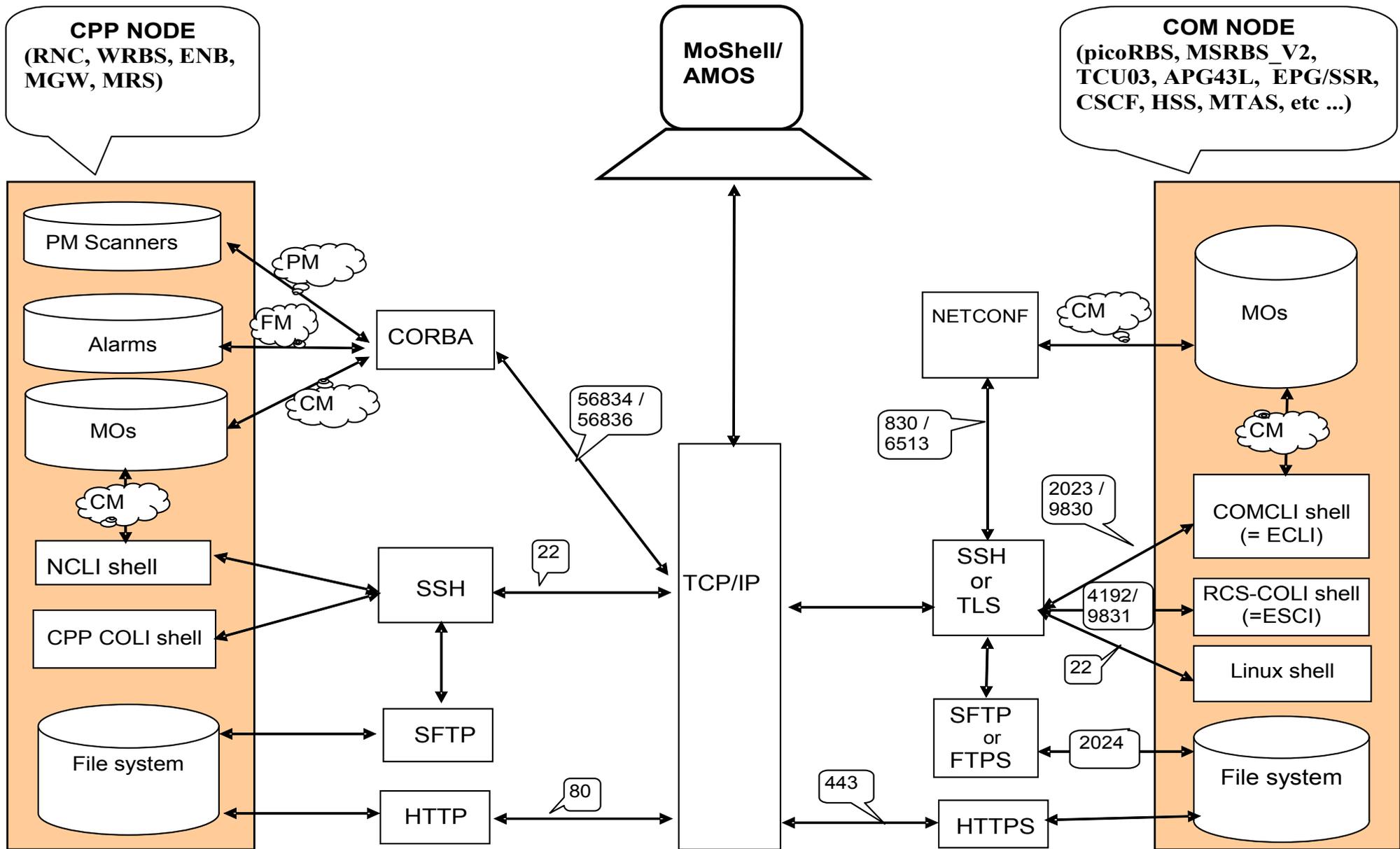
List of TCP ports used between moshell and CPP/RCS Node

Type	COM/CPP	Protocol/Shell	Port	Authentication
Machine-Machine	CPP	IIOP (CORBA)	56834	NO
		SSLIOP (Secure CORBA)	56836	Credential file
	RCS	NETCONF over SSH	830	Password
		NETCONF over TLS	6513	Credential file
Man-Machine	CPP	NCLI over SSH	22	Password
		COLI over SSH	22	Password
	RCS	COMCLI over SSH	2023	Password
		COLI over SSH	4192	Password
		COMCLI over TLS	9830	Credential file
		COLI over TLS	9831	Credential file
File Transfer	CPP	HTTP	80	No
		SFTP	22	Password
	RCS	HTTPS	443	No
		SFTP	2024	Password

For complete list, refer to the document "Node hardening Guidelines" in CPI, doc nr 9/1553-LZA 701 6014

Filter Library Contents »

Radio System
- ☐ GSM
- ☑ WCDMA
- ☐ CDMA
- ☑ LTE FDD
- ☑ LTE TDD

Product
- ☑ RBS 6101
- ☑ RBS 6102
- ☑ RBS 6110
- ☑ RBS 6120
- ☑ RBS 6131
- ☑ RBS 6201
- ☑ RBS 6202
- ☑ RBS 6301
- ☑ RBS 6601

Usage[1]	Port	Protocol	Service / Version[2]	Client / Server	Direction[3]
• ESI • Schema export	22	TCP	SFTP / SSH	Client	Out
Domain Name Server (DNS)	53	UDP, TCP	DNS	Client	Bi-directional
Network Time Protocol (NTP) Client	123	UDP	• NTP v3, v4 • SNTP	Client	Bi-directional
NTP frequency synchronization	123	UDP	• NTP v3, v4 • SNTP	Client	In
Simple Network Management Protocol (SNMP)	161	UDP	SNMP v1, v2c, 3	Server	In
SNMP alarm traps	162	UDP	SNMP v1, v2c, 3	Client	Out
• Baseband AI Interface • Maintenance User • ESI	443	TCP	HTTPS	Client and server	Bi-directional
DS lookup OM configurable	636	TCP	LDAPS	Client	Out
ECLI OM configurable	2023	TCP	SSH v2.0	Server	In
• PM • ROP-files	2024	TCP	SFTP	Server	In
ESCI	4192	TCP	SSH v2.0	Server	In
Ericsson troubleshooting	5342	TCP	-	Client	Bi-directional
	5343	TCP	-	Client	Bi-directional
NETCONF	6513	TCP	TLS v1.2	Server	In
ECLI	9830	TCP	TLS v1.2	Server	In
ESCI	9831	TCP	TLS v1.2	Server	In
EMCLI, Windows-client callback	10001	TCP	-	Server	Out
NTP frequency synchronization	32751–32766	UDP	• NTP v3, v4 • SNTP	Client	In
Ephemeral port range	32768–40999	UDP, TCP	SFTP	Client and server	In
Ericsson support L1-L2, troubleshooting	33079	UDP	-	Server	Out
Used by traversing traceroute	33434–33534	UDP	Traceroute	-	-

(1) Defines usage area.

(2) Application name.

(3) Aids in firewall configuration by defining direction of traffic.

2.3 Configuration Service

Both CPP and COM support the following MO operations in the Configuration Service:
- list MOs
- get MO attribute(s)
- set MO attribute

- create MO
- delete MO
- execute MO action

CREATE MO

DELETE MO

<<MoClass>> PlugInUnit

Attributes

- PlugInUnitId — MO identity attribute

- administrativeState
- piuType
- userLabel

Configuration attributes
(read & write)

GET attribute

SET attribute

(only supported by
non-restricted config.
attributes)

- operationalState
- availabilityStatus
- hwTestStatus

State attributes
(readOnly)

- pmProcessorLoad

Performance Monitoring
attributes (readOnly)

CALL action

Actions
- manualRestart()

Attribute types:
- string
- boolean
- long
- longlong
- float
- enumeration
- structure
- moRef
- sequence

Attribute flags:
- mandatory
- restricted
- readonly
- nonpersistent
- nonotification

In CPP there are some additional services:
 - Fault Management Service: print active alarm list, acknowledge/unacknowledge alarm
 - Performance Management Service: list/print PM scanner(s), create/delete PM scanner, stop/resume PM scanner

In COM, the alarm and PM operations are handled as standard MO operations in the Configuration Service:
 - each active alarm is represented by a system-created MO instance of type "FmAlarm", thus it is possible to view the active alarms by listing the FmAlarm MOs

- PM scanners are represented by PmJob MOs and EventJob MOs, thus there are no need for dedicated PM scanner operations as PM scanners are handled as regular MOs.

2.4 Notification Service

There are two notifications Services:
- **CM Notifications, inform about MIB topology changes (MO create/delete) and Attribute Value Changes (AVC)**
- **FM Notifications, inform about changes in the Alarm list (Alarm raised or ceased)**

CPP nodes send the notifications over CORBA callback ports (TCP 53248-55295)

COM nodes use the following protocols:
 - CM notifications: NETCONF
 - FM notifications (alarms and alerts): SNMP

OSS/ENM uses the notifications to keep the mirrored MIB synchronized with the node MIB and also to update the alarm list.

Moshell does not use the notification service but it is possible to manually subscribe to notifications from moshell:

Gen1:

Subcribe to FM notifications:
```
**:srld7261@~> ~/moshell/runClient.sh -a rnc11
Connecting to 137.58.194.147...
Fetching IOR file...Done.
Trying file=/tmp/ior293_060458
Starting the subscription to Alarm/Event Service
Successful subscription: OK
2007-05-28 10:48:53 AL_CLEAR Subrack=MS,Slot=7,PlugInUnit=1,ExchangeTerminal=1,Os155SpiTtp=2 Loss of Signal: loss_of_signal
2007-05-28 10:49:31 AL_MAJOR Subrack=MS,Slot=7,PlugInUnit=1,ExchangeTerminal=1,Os155SpiTtp=2 Loss of Signal: loss_of_signal
```

Subcribe to CM notifications:
```
**:srld7261@~> ~/moshell/runClient.sh -c rnc11
Connecting to 137.58.194.147...
Fetching IOR file...Done.
Starting CS Notification Client...
Trying file=/tmp/ior196_060049
**** Test Construction OK

080523 06:00:59 CRE IubLink=iub-90
080523 06:01:25 AVC IubLink=iub-90 userLabel Iub-90
080523 06:01:33 AVC RncModule=8 reservedBy
Subrack=MS,Slot=22,PlugInUnit=1,SpbDeviceGroup=1;Subrack=MS,Slot=23,PlugInUnit=1,SpbDeviceGroup=1;IubLink=Iub-40;IubLink=Iub-
9;IubLink=Iub-8;IubLink=Iub-7;IubLink=Iub-6;IubLink=Iub-5;IubLink=Iub-4;IubLink=Iub-3;IubLink=Iub-2;IubLink=Iub-1;IubLink=Iub-
39;IubLink=Iub-38;IubLink=Iub-37;IubLink=Iub-36;IubLink=Iub-35;IubLink=Iub-34;IubLink=Iub-33;IubLink=Iub-32;IubLink=Iub-31
080523 06:01:33 DEL IubLink=iub-90
```

Gen2:

Subcribe to FM notifications: Not yet supported in moshell

Subcribe to CM notifications:
```
RBS33> netconf

...
<?xml version="1.0" encoding="UTF-8"?><hello
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><capabilities><capability>urn:ietf:params:netconf:base:1.0</capability><capability
>urn:com:ericsson:ebase:0.1.0</capability><capability>urn:com:ericsson:ebase:1.1.0</capability></capabilities></hello>]]>]]>

<rpc message-id="1" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><create-subscription
xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0"></create-subscription></rpc>]]>]]>

<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="1"><ok/></rpc-reply>]]>]]>

<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
    <eventTime>2017-06-05T04:01:55+00:00</eventTime>
    <events dnPrefix="" xmlns="urn:ericsson:com:netconf:notification:1.0">
        <AVC dn="ManagedElement=1">
            <attr name="userLabel"/>
        </AVC>
    </events>
</notification>
]]>]]>
<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
    <eventTime>2017-06-05T04:02:05+00:00</eventTime>
    <events dnPrefix="" xmlns="urn:ericsson:com:netconf:notification:1.0">
        <AVC dn="ManagedElement=1">
            <attr name="userLabel">
                <v>test</v>
            </attr>
        </AVC>
    </events>
</notification>
]]>]]>
```

2.5 Node type detection

If the node type is CPP or ECIM/COM RAN node (MSRBS/TCU/PICO), then moshell can automatically detect the node type and it is possible to connect in generic way:

```
moshell <nodeip>
```

But if the node is ECIM/COM Core Network node, then it is necessary to specify the node type with the parameter "-v comcli=xx" :
- **BSP8100:** `moshell -v comcli=31 <nodeip>`
- **PGM:** `moshell -v comcli=32 <nodeip>`
- **APG43L:** `moshell -v comcli=34 <nodeip>`
- **EPG/SSR:** `moshell -v comcli=35 <nodeip>`
- **EMe:** `moshell -v comcli=36 <nodeip>`
- **MRSv:** `moshell -v comcli=37 <nodeip>` **(Note: MRSv may work without the comcli parameter)**

The complete list of comcli values can be found in the file moshell/moshell

2.6 User authentication

2.6.1 CPP

SL1 and SL2
In CPP nodes with Security Level 1 or 2, there is a unique password stored in the file /c/security/password , and the password can be changed with "passwd" command:

```
ENBG1>

$ cat /c/security/passwd
cellouser:xxZHFhqutvFOU:1234:1234:Cello User:/home/dir:/bin/tcsh
$

ENBG1> passwd

Syntax: passwd ; <current password> ; <new password>
```

To avoid having to enter the node password each time, it can be saved in the moshell ipdatabase file.
The ipdatabase file path is given in the uservariable "ip_database" which can be saved in the ~/.moshellrc
The format of the ipdatabase file will be:
 `<nodename> <nodeip> <nodepassword>`
Eg:
`enbg1 10.1.3.5  rbs`

It is also possible to configure moshell to "guess" the node password from a list of predefined known passwords.
This can be done by setting the uservariable "smart_password" to 1 (`smart_password=1`) in the file ~/.moshellrc
Also the list of known passwords can be configured in the uservariable " standard_passwords"

```
EnbG1> uv password
```

```
smart_password              = 1
standard_passwords          = x,$nodetype,$nodetype$ip,$nodetype$ip2,$nodename
```

At login, moshell tries first the password saved in ipdatabase file, then goes through the list of known passwords and if none work, it will prompt the user to enter the node password.

```
RNC309> vii
Trying password from ipdatabase file: /home/eanzmagn/ipdatabase...Not OK
Trying standard passwords: x ... Not OK
Trying standard passwords: rnc ... Not OK
Trying standard passwords: rnc147 ... Not OK
Trying standard passwords: rnc47 ... Not OK
Trying standard passwords: tch ... Not OK
Trying standard passwords: tch147 ... OK

$ vii
----- VII SERVER INFO -----
 registered clients:
    client  FAULT  LOAD_START  NO_POWER  BOOTTEST  MISSING_RESOURCE  BOARD_LOCKED  BOARD_BLOCKED  BOARD_BUSY  DISC_SYNC  SHUTDOWN
    ------  -----  ----------  --------  --------  ----------------  ------------  -------------  ----------  ---------  --------

LED     State
GREEN   CLS_LEDI_ON
RED     CLS_LEDI_OFF
YELLOW  CLS_LEDI_OFF
$
```

SL3

In CPP nodes with Security Level 3, the node password is not applicable anymore and each user have their own userid and password defined in the Single Logon Server (SLS).
To avoid having to enter the username/password at each moshell session it is possible to save it in the file ~/.moshellrc
in the uservariables sls_username and sls_password .
For security reasons it is possible to store the sls_password in encrypted format by using the moshell command encpw

```
RNC309> h encpw

******************************************************************************
encpw <password>
******************************************************************************
Create an encoded password for use in Moshell

Encoded passwords will be prefixed by "ENC?:". Make sure to keep this prefix when using the password
Encoded passwords can be used in moshellrc, ipdatabase files, scripts, on the command line and as input to MO creation

Example:
>> encpw SecretSLSPassword
```

2.6.2   COM

ECIM/COM supports two authentication methods:
 - LDAP username/password
 - TLS credential

LDAP username/password authentication

This is the default method used by moshell.
The username and password can be saved in the file ~/.moshellrc , in the uservariables `com_username` **and** `com_password`**.**
It is also possible to save a list of username/passwords in the uservariables `com_usernames` **and** `com_passwords`**.**
Example:

```
MOSHELL> uv com_usernames|com_passwords
com_usernames           = expert,muser,labuser,tester,rbs,super,super1,super2,SysAdminTest
com_passwords           = expert,muser,Letmein01,tester01,rbs,super01,super101,super201,SysAdminTest

RBS33> lt all

Trying tester's password from uservariable com_passwords ...Not OK
Trying rbs's password from uservariable com_passwords ...Not OK
Trying muser's password from uservariable com_passwords ...Not OK
Trying expert's password from uservariable com_passwords ...Not OK
Trying labuser's password from uservariable com_password ...OK

$ssh_pid = 13828

Connected to 10.220.131.52 (ManagedElement=1)
Connected to 10.220.131.52 (ManagedElement=1)

Last MO:  6215. Loaded 6215 MOs. Total:  6216 MOs.
```


Note that it is recommended to save the password in encrypted form. The moshell command `encpw` **can be used to encrypt the password.**
If the username/password are not saved in ~/.moshellrc, then moshell will prompt the user to enter them manually.

Example: if the username is "labuser" and password is "secret", then do:
```
MOSHELL> encpw secret
Your encoded password is      ENC?:jV2c0Vmc
```

Then, in ~/.moshellrc , add these lines:
```
com_username=labuser
com_password=ENC?:jV2c0Vmc
```

TLS Credential

Two types of credential files can be used:
 - **stand-alone credential "sam.p12" : manually downloaded by user from SLS server**
 - **network-mode credential "ssucredentials.xml" : usually stored automatically on the user's OSS account ($HOME/Ericsson/OMSec). This is the same credential file that is used towards CPP nodes running Security Level 2 or 3.**

To connect to a RCS node with TLS credential, use one of the following comcli parameter value:
 - **comcli=25: authentication with sam.p12**
 - **comcli=26: authentication with client.pem/ca.pem**
 - **comcli=27: authentication with ssucredentials.xml**
 - **comcli=28: get a prompt asking for which credential to use**

2.7 List connected users

Gen1

Use lgw to list the established Corba connections.
Each moshell session uses one or two Corba connections (one for MO interface , and one for PM interface)
The IP address of the PC/Workstation from where the Corba session initiated is shown.
Try to ssh to that IP address and list the moshell sessions running on that workstation.

```
ENB3004> lgw

Nr of active O&M connections on 2017-06-07 at 05:21:50: 10
=================================================================================
ConnType        Origin               ActiveSince          Duration
=================================================================================
Corba:56834     10.75.105.11:31485   2017-06-07 04:47:59  2031s (33m51s)
Corba:56834     10.75.105.10:31510   2017-06-07 04:48:01  2029s (33m49s)
Corba:56834     10.44.155.148:56178  2017-06-07 04:51:05  1845s (30m45s)
Corba:56834     10.44.159.72:37821   2017-06-07 04:54:47  1623s (27m03s)
Corba:56834     10.44.159.71:37880   2017-06-07 04:54:50  1620s (27m00s)
Corba:56834     10.32.138.40:39417   2017-06-07 04:55:47  1563s (26m03s)
Corba:56834     10.32.138.39:39435   2017-06-07 04:55:48  1562s (26m02s)
Corba:56834     10.62.158.40:35186   2017-06-07 05:20:51  59s
Corba:56834     10.62.158.40:35482   2017-06-07 05:21:21  29s
Ssh             10.62.158.40:46715
>>> Total: 10 O&M connections (9 Corba, 1 Ssh, 0 Telnet, 0 Ftp)


ssh 10.62.158.40

:sekilx1138@~> moshell/pstool list
  PID   PPID   USER     nCh  %CPU  %MEM    RSS     VSZ     ELAPSED   COMMAND
```

```
--------------------------------------------------------------------------------
27776   28151   eanzmagn     6   49.4   1.2   218.6M   5606.9M        00:46   /app/moshell/latest/moshell/moshell enb3004
23694   19705   eanzmagn     3    0.1   0.5    94.5M    215.3M        13:45   /app/moshell/latest/moshell/moshell 10.75.102.13
28882   30438   eshamob      2    0.0   0.6   103.5M    224.3M     18:24:38   /app/moshell/latest/moshell/moshell -v username=expert,password=expert
2001:1b70:8210:83be::30
 2791   25092   eshamob      3    0.0   0.6   106.6M    227.3M     18:51:00   /app/moshell/latest/moshell/moshell -v username=expert,password=expert
2001:1b70:8210:83be::2e
23212    9929   eshamob      2    0.0   0.6   101.2M    221.9M     18:59:16   /app/moshell/latest/moshell/moshell -v username=expert,password=expert
2001:1b70:8210:83be::2c
17487    9045   eortedg      2    0.0   0.5    91.5M    212.2M     20:23:00   /proj/toolswarehouse/linux/production/wh/dtd/RHE64-
6.4/moshell/latest/moshell/moshell  2001:1b70:8210:83a0::b5
 6588   17603   eshamob      3    0.0   0.6   112.5M    233.3M   1-16:32:03   /app/moshell/latest/moshell/moshell -v username=rbs,password=rbs
2001:1b70:8292:68::71:30
16330   21043   eshamob      3    0.0   0.7   124.5M    245.4M   1-17:23:35   /app/moshell/latest/moshell/moshell -v username=rbs,password=rbs
2001:1b70:8292:68::71:27
--------------------------------------------------------------------------------
Moshell Sessions: 8, Spawned Processes: 32
RSS:  953M of 15950M (6.0%)
VSZ: 7187M of 15950M (45.1%)
```

Gen2

Just run the command: sessions

```
ENB0513> sessions

coli>/labonly/rcs/sessions
     Type    Subtype          User                              IP address
================================================================================
      SSH    netconf          expert                            10.75.57.2
      SSH       coli          expert                         10.62.158.40
      SSH    netconf          expert                            10.75.57.2
      SSH       cli          expert                         10.62.158.40
================================================================================
Total SSH sessions:  4
SSH cli:             1
SSH coli:            1
SSH netconf:         2
SFTP sessions:       0
Total TLS sessions:  0
TLS cli:             0
TLS coli:            0
TLS netconf:         0
TLS FTP:             0
coli>
```

Kick out all users

```
ENBG2> acc MaintenanceUserSecurity closesessions

===============================================================================================
Proxy  MO                                                      Action               Nr of Params
===============================================================================================
 5994  SecM=1,UserManagement=1,UserIdentity=1,MaintenanceUserSecurity=1   closeSessions             0
```

```
 >>> Return value = null

================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

2.8 Debug mode

Moshell consists of a bash process and a gawk process.
The bash process sets some variables then spawns the gawk process which handles:
- **command line interpretation（解释，翻译）**
- **communication with the O&M clients (mobrowser, openssl, openssh, etc).**

AMOS package

moshell package

OSS/ENM
- LogService
- LicenseService
- AuthenticationService
- Node name to IP translate
- Account Lookup

amos request broker (java)

mobrowser (java) — MOCI — MIB

pmtester (java) — PMCI — Scanners

activealarm (java) — ALCI — Alarms

connect — HTTP — WebServer

ssh — SSH — COLI

sftp — SFTP — FileSystem

CPP Node

moshell (bash+gawk)

openssl — HTTPS — WebServer

— TLS — COMCLI (ECLI)

NETCONF

ssh — SSH — COLI (ESCI)

COM Node

sftp — SFTP — FileSystem

sftp-server — SFTP — SFTP Client

All communication with the O&M clients is text-based and can be traced via the debug mode.

Communication between moshell and SSH/SFTP/openSSL/connect:

RBS33> uv mosdebug=1

RBS33> get 0
2
$0 get 0
$1 get
$2 0

```
170526-08:55:36 10.220.131.52 17.0f MSRBS_NODE_MODEL_17B_308.32727.62_fd32_TESTMOM stopfile=/tmp/22683
>show
ManagedElement=1
EndOfPrint exec<@%>
cliss mode: exec
>show ManagedElement=1,SystemFunctions=1,SwInventory=1,active
active
    "ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9024418/6-R2A174"
EndOfPrint exec<@%>
==========================================================================================
0                                       ManagedElement=1
==========================================================================================
comcli_cmd:show ManagedElement=1,SystemFunctions=1 -m SwM -p reportProgress
>show
ManagedElement=1
EndOfPrint exec<@%>
cliss mode: exec
>show ManagedElement=1,SystemFunctions=1,SwInventory=1,active
active
    "ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9024418/6-R2A174"
EndOfPrint exec<@%>
EndOfPrint exec<@%>
comcli_cmd:show ManagedElement=1,SystemFunctions=1,SysM=1 -m Snmp -p agentAddress
>show
ManagedElement=1
EndOfPrint exec<@%>
cliss mode: exec
>show ManagedElement=1,SystemFunctions=1,SwInventory=1,active
active
    "ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9024418/6-R2A174"
EndOfPrint exec<@%>
EndOfPrint exec<@%>
comcli_cmd:show -v ManagedElement=1,SystemFunctions=1,SysM=1 -m Snmp -p agentAddressDtls
>show
ManagedElement=1
EndOfPrint exec<@%>
cliss mode: exec
>show ManagedElement=1,SystemFunctions=1,SwInventory=1,active
active
    "ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9024418/6-R2A174"
EndOfPrint exec<@%>
```

```
EndOfPrint exec<@%>
>show verbose ManagedElement=1
ManagedElement=1
    dateTimeOffset="+00:00" <read-only> <deprecated>
    dnPrefix=[] <empty>
    localDateTime="2017-05-26T06:55:01" <read-only> <deprecated>
    managedElementId="1"
    managedElementType="RadioNode" <read-only>
    networkManagedElementId=[] <empty>
    release="17B" <read-only>
    siteLocation=[] <empty>
    timeZone="UTC" <read-only> <deprecated>
    userLabel=[] <empty>
    productIdentity=[] <empty> <deprecated>
    Equipment=1
    EquipmentSupportFunction=1
    NodeBFunction=1
    NodeSupport=1
    SystemFunctions=1
    Transport=1
EndOfPrint exec<@%>
dnPrefix
managedElementId                        1
managedElementType                      RadioNode
networkManagedElementId
release                                 17B
siteLocation
userLabel
================================================================================================
Total: 1 MOs


RBS33> set 0 userlabel test
4
$0 set 0 userlabel test
$1 set
$2 0
$3 userlabel
$4 test

170526-08:55:44 10.220.131.52 17.0f MSRBS_NODE_MODEL_17B_308.32727.62_fd32_TESTMOM stopfile=/tmp/22683
>show
ManagedElement=1
EndOfPrint exec<@%>
cliss mode: exec
>show ManagedElement=1,SystemFunctions=1,SwInventory=1,active
active
    "ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9024418/6-R2A174"
EndOfPrint exec<@%>
Set userlabel on following 1 MOs ?
================================================================================
    0  ManagedElement=1
================================================================================
Set userlabel on 1 MOs. Are you Sure [y/n] ? y


=========================================================================================
    Id  MO                                              userLabel        Result
```

```
=====================================================================================================
3 0 userLabel origValue=test Value=test Type=s
DEBUG: /home/eanzmagn/moshell/commonjars/nc6.linux -w 10 -n -z 10.220.131.52 830 >/dev/null 2>&1---> 1
DEBUG: /home/eanzmagn/moshell/commonjars/nc6.linux -w 10 -n -z 10.220.131.52 2022 >/dev/null 2>&1---> 0
/home/eanzmagn/moshell/commonjars/ssh.lin64 -p 2022 -z '/proj/wcdmaiov/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170526-
085435_22656/sshz22683' -l expert -t -t -e none -o StrictHostKeyChecking=no -o UserKnownHostsFile=/dev/null -o HostKeyAlgorithms="ssh-dss,ssh-
rsa" -o NumberOfPasswordPrompts=1 -o ConnectTimeout=10 -o ServerAliveInterval=300 -o ServerAliveCountMax=0 -o TCPKeepAlive=no -o
PreferredAuthentications=publickey,password -o KexAlgorithms=diffie-hellman-group1-sha1,diffie-hellman-group14-sha1,diffie-hellman-group-
exchange-sha256 10.220.131.52 -s netconf 2>&1
<?xml version="1.0" encoding="UTF-8"?><hello
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><capabilities><capability>urn:ietf:params:netconf:base:1.0</capability><capability>urn:com:erics
son:ebase:0.1.0</capability><capability>urn:com:ericsson:ebase:1.1.0</capability></capabilities></hello>]]>]]>
Warning: Permanently added '[10.220.131.52]:2022' (DSA) to the list of known hosts.
<?xml version="1.0" encoding="UTF-8"?>
<hello xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
    <capabilities>
        <capability>urn:ietf:params:netconf:base:1.0</capability>
        <capability>urn:com:ericsson:ebase:0.1.0</capability>
        <capability>urn:com:ericsson:ebase:1.1.0</capability>
        <capability>urn:com:ericsson:ebase:1.2.0</capability>
        <capability>urn:ietf:params:netconf:capability:writable-running:1.0</capability>
        <capability>urn:ietf:params:netconf:capability:rollback-on-error:1.0</capability>
        <capability>urn:ietf:params:netconf:capability:notification:1.0</capability>
        <capability>urn:ericsson:com:netconf:action:1.0</capability>
        <capability>urn:ericsson:com:netconf:heartbeat:1.0</capability>
        <capability>urn:com:ericsson:netconf:operation:1.0</capability>
        <capability>urn:ietf:params:netconf:capability:interleave:1.0</capability>
    </capabilities>
    <session-id>7474</session-id>
</hello>
]]>]]>


$netconf_pid = 22903


com_process_value: test string    netconf -> test
make_netconf_string: set 0 userLabel test string ->
<ManagedElement><managedElementId>1</managedElementId><userLabel>test</userLabel></ManagedElement>
<rpc message-id="1" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><edit-config
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><target><running/></target><config
xmlns:xc="urn:ietf:params:xml:ns:netconf:base:1.0"><ManagedElement><managedElementId>1</managedElementId><userLabel>test</userLabel></ManagedEle
ment></config></edit-config></rpc>]]>]]>
<?xml version="1.0" encoding="UTF-8"?>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="1">
    <ok/>
</rpc-reply>
]]>]]>
    0  ManagedElement=1                                          test              >>> Set.
=====================================================================================================
Total: 1 MOs attempted, 1 MOs set
```

Communication between moshell and MoBrowser/PmTester/ActiveAlarm:

YT> uv **corba_debug=1**

corba_debug=1

```
YT> get 0

170526-07:51:37 fd93:79c:e4bb:41:1::b0 17.0e ERBS_NODE_MODEL_H_1_160 stopfile=/tmp/8587
24
1
inputTable[1]=DN=ManagedElement=1,SwManagement=1,ConfigurationVersion=1;currentLoadedConfigurationVersion
Your choice: Nr of MOs:
 >>> currentLoadedConfigurationVersion = CXPENM1201Loaded
=%$#^!

Enter_choice_or_type_8_for_help
24
1
inputTable[1]=DN=ManagedElement=1,SwManagement=1,ConfigurationVersion=1;currentLoadedConfigurationVersion
Your choice: Nr of MOs:
 >>> currentLoadedConfigurationVersion = CXPENM1201Loaded
=%$#^!

Enter_choice_or_type_8_for_help
24
1
inputTable[1]=DN=ManagedElement=1,SwManagement=1,ConfigurationVersion=1;currentUpgradePackage
Your choice: Nr of MOs:
 >>> currentUpgradePackage = SubNetwork=ERBS-SUBNW-1,MeContext=ieatnetsimv7004-
01_LTE02ERBS00001,ManagedElement=1,SwManagement=1,UpgradePackage=1
=%$#^!

Enter_choice_or_type_8_for_help
====================================================================================================
0                                           ManagedElement=1
====================================================================================================
23
0;ManagedElementId;applicationConfiguration;faultTolerantCoreStates;healthCheckResult;healthCheckSchedule;logicalName;mimInfo;productName;produc
tNumber;productRevisi
on;productType;site;userLabel
Your choice:
 >>> ManagedElementId = 1
=%$#^!
 >>> applicationConfigurationt[0] =
=%$#^!
 >>> faultTolerantCoreStatess[0] =
=%$#^!
 >>> Struct healthCheckResult has 3 members:
 >>> 1.message =
 >>> 2.startTime =
 >>> 3.healthCheckResultCode = 99
=%$#^!
 >>> healthCheckSchedulet[1] =
 >>> Struct[0]  has 2 members:
 >>> 1.time =
 >>> 2.weekday = 1
=%$#^!
 >>> logicalName = y
=%$#^!
 >>> Struct mimInfo has 3 members:
 >>> 1.mimName = ERBS_NODE_MODEL_H
```

```
 >>> 2.mimVersion = 1
 >>> 3.mimRelease = 160
=%$#^!
 >>> productName =
=%$#^!
 >>> productNumber =
=%$#^!
 >>> productRevision =
=%$#^!
 >>> productType = Node
=%$#^!
 >>> site =
=%$#^!
 >>> userLabel = yt
=%$#^!

Enter_choice_or_type_8_for_help
ManagedElementId                      1
applicationConfiguration              t[0] =
faultTolerantCoreStates               s[0] =
healthCheckResult                     Struct{3}
 >>> 1.message =
 >>> 2.startTime =
 >>> 3.healthCheckResultCode = 99 (INITIAL_VALUE)
healthCheckSchedule                   t[1] =
 >>> Struct[0]  has 2 members:
 >>> 1.time =
 >>> 2.weekday = 1 (SUNDAY)
logicalName                           y
mimInfo                               Struct{3}
 >>> 1.mimName = ERBS_NODE_MODEL_H
 >>> 2.mimVersion = 1
 >>> 3.mimRelease = 160
productName
productNumber
productRevision
productType                           Node
site
userLabel                             yt
=================================================================================================
Total: 1 MOs
```

Communication between moshell and AmosRequestBroker:

```
[administrator@scp-2-amos(ieatENM5432-1) ~]$ amos -v amos_debug=2  ieatnetsimv7004-01_LTE02ERBS00001
SLS_CERTIFICATE: info ( ssucredentials.sh ): The SLS certificate is already present and is valid for next 24 hours
```

```
 /‾‾‾\ /‾‾\ /‾‾\ /‾|
/ /\ \| |\/| | | |\__
\ \/ / | |  | | | |  /
 \__/ \_|  |_| |_|\_|__/
  OSS Framework for MoShell-17.0e
```
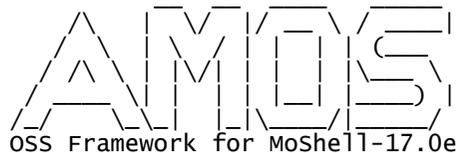
```
1/1: /opt/ericsson/amos/lib/amos.jar
/usr/bin/java -client  -Djava.security.egd=file:/dev/./urandom   -Damos.debug.mode=true -Damos.cache.sweep.interval=3600
-Damos.license.heart.beat.interval=113 -clas
spath /opt/ericsson/amos/lib/amos.jar:/opt/ericsson/amos/lib/* com.ericsson.oss.services.amos.requestbroker.AMOSRequestBroker 2>&1
DEBUG 1: Current time: 074350. delta=0 seconds.
DEBUG 2: Current time: 074351. delta=1 seconds.
DEBUG 3: Current time: 074351. delta=0 seconds.
$amosrb_pid = 13714

DEBUG 4: Current time: 074351. delta=0 seconds.
AMOSRequestCommand : permission get
AMOSRequestResponse : true

  isDBCAuthorized->true
        debug : running request : permission get
        debug : request : permission get took 81 m/s to process

AMOSRequestBroker Enter Command :
AMOSRequestCommand : permission get was executed on -
AMOSRequestResponse : true

  isDBCAuthorized->true
        debug : running request : permission get was executed on -
        debug : request : permission get was executed on - took 31 m/s to process

AMOSRequestBroker Enter Command :
AMOSRequestCommand : permission fro was executed on -
AMOSRequestResponse : true


        debug : running request : permission fro was executed on -
        debug : request : permission fro was executed on - took 8 m/s to process

AMOSRequestBroker Enter Command :
AMOSRequestCommand : permission set was executed on -
AMOSRequestResponse : true


        debug : running request : permission set was executed on -
        debug : request : permission set was executed on - took 10 m/s to process

AMOSRequestBroker Enter Command :
AMOSRequestCommand : permission fset was executed on -
AMOSRequestResponse : true


        debug : running request : permission fset was executed on -
        debug : request : permission fset was executed on - took 7 m/s to process

AMOSRequestBroker Enter Command :
AMOSRequestCommand : translate ieatnetsimv7004-01_LTE02ERBS00001
AMOSRequestResponse : true fd93:79c:e4bb:41:1::b0
```

```
        debug : running request : translate ieatnetsimv7004-01_LTE02ERBS00001
        debug : request : translate ieatnetsimv7004-01_LTE02ERBS00001 took 39 m/s to process


AMOSRequestBroker Enter Command :


        debug : TBAC not applicable, OSS revision is lower than O13:
DEBUG 5: Current time: 074351. delta=0 seconds.
Checking ip contact...OK


HELP MENU            : h
BASIC MO COMMANDS    : m
OTHER MO COMMANDS    : n
OTHER COMMANDS       : o
PM COMMANDS          : p
QUIT                 : q


IEATNETSIMV7004-01_LTE02ERBS00001> lt all


....

YT> get 0


.....


YT> vii
AMOSRequestBroker Enter Command : lookupAccountDetails fd93:79c:e4bb:41:1::b0
AMOSRequestResponse : true
 true netsim true netsim
        debug : running request : lookupAccountDetails fd93:79c:e4bb:41:1::b0
        debug : request : lookupAccountDetails fd93:79c:e4bb:41:1::b0 took 172 m/s to process
AMOSRequestBroker Enter Command :
Trying netsim's password from amos lookupAccount ... OK

170526-07:44:34 fd93:79c:e4bb:41:1::b0 17.0e ERBS_NODE_MODEL_H_1_160 stopfile=/tmp/13371
$ vii
Unknown command 'vii'.

$

YT> q

/usr/bin/java -client  -Djava.security.egd=file:/dev/./urandom    -Damos.debug.mode=true -Damos.cache.sweep.interval=3600
-Damos.license.heart.beat.interval=113 -clas
spath /opt/ericsson/amos/lib/amos.jar:/opt/ericsson/amos/lib/* com.ericsson.oss.services.amos.requestbroker.AMOSRequestBroker 2>&1
DEBUG 1: Current time: 074442. delta=51 seconds.
AMOSRequestBroker Enter Command :
DEBUG 2: Current time: 074442. delta=0 seconds.

AMOSRequestCommand : log User administrator has permission blocked,dbc,read,telnet,write
AMOSRequestResponse : true
        debug : running request : log User administrator has permission blocked,dbc,read,telnet,write
        debug : request : log User administrator has permission blocked,dbc,read,telnet,write took 52 m/s to process
AMOSRequestBroker Enter Command :

AMOSRequestCommand : log lt all ; DateTime=2017-05-26.07:44:17 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK
```

```
AMOSRequestResponse : true
        debug : running request : log lt all ; DateTime=2017-05-26.07:44:17 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK
        debug : request : log lt all ; DateTime=2017-05-26.07:44:17 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK took 4 m/s to process
AMOSRequestBroker Enter Command :

AMOSRequestCommand : log get 0 ; DateTime=2017-05-26.07:44:31 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK
AMOSRequestResponse : true
        debug : running request : log get 0 ; DateTime=2017-05-26.07:44:31 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK
        debug : request : log get 0 ; DateTime=2017-05-26.07:44:31 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK took 4 m/s to process
AMOSRequestBroker Enter Command :

AMOSRequestCommand : log vii ; DateTime=2017-05-26.07:44:33 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK
AMOSRequestResponse : true
        debug : running request : log vii ; DateTime=2017-05-26.07:44:33 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK
        debug : request : log vii ; DateTime=2017-05-26.07:44:33 was executed on fd93:79c:e4bb:41:1::b0 (yt). Result=OK took 3 m/s to process
AMOSRequestBroker Enter Command :

AMOSRequestCommand : stop
AMOSRequestBroker Enter Command :
AMOSRequestResponse : true
        debug : running request : deleteComAccount netsim
        debug : request : deleteComAccount netsim took 1 m/s to process
AMOSRequestBroker Enter Command :
Bye...

[administrator@scp-2-amos(ieatENM5432-1) ~]$
```

3   Managed Object Interface

Note: This chapter focuses on the differences in MO commands between Gen1 vs Gen2.
Refer to "Moshell Basic" for more details on all the MO commands.

3.1   MOM files

The XML MOM files contain the description information of all MO classes, Attributes, and Actions supported by the node.
 - the XML MOM in CPP nodes is stored as a single file on the node, containing the descriptions for all MO classes
 - the XML MOM for COM nodes is split into many files on the node, called MOM fragments. One MOM fragment for each function area (ManagedElement, Equipment, Transport, etc)

The XML MOM file(s) are fetched from the node over HTTP (Gen1) , HTTPS (Gen2), or SFTP (Pico)
Path of the XML MOM file(s):
-   **Gen1:** /cello/oe/xml/RbsNode.xml or /cello/oe/xml/RbsNodeComplete.xml
-   **Gen2:** /models/
-   **Pico:** /oss/models/

In Gen2 and Pico, each MOM file is represented by a Schema MO:

```
MSRBSV2> hget schema= ^(ident|version)


==========================================================================================
MO                                     identifier                version
==========================================================================================
SysM=1,Schema=ComFm                    ComFm                     12.0.0
SysM=1,Schema=ComLocalAuthorization    ComLocalAuthorization     11.1.0
SysM=1,Schema=ComSecM                  ComSecM                   11.1.0
SysM=1,Schema=ComSnmp                  ComSnmp                   10.11.1
SysM=1,Schema=ComSysM                  ComSysM                   3.2.1001
...<cut>...
SysM=1,Schema=RtnSctp                  RtnSctp                   2.7.0
SysM=1,Schema=RtnSctpProfile           RtnSctpProfile            2.4.0
SysM=1,Schema=RtnSctpServer            RtnSctpServer             1.5.0
SysM=1,Schema=RtnTwamp                 RtnTwamp                  1.2.0
SysM=1,Schema=Wrat                     Wrat                      6.11.0
==========================================================================================
Total: 97 MOs
```

The XML format of the MOM file(s) is slightly different between CPP and ECIM/COM.
More info in the respective MOM User Guides:

CPP_MOM_UG.pdf

ECIM_MOM_UG.pdf

3.2 MOM version

The MOM version of the node is shown in the header of each printout:

Node name   Node ip address   MOM version

Date/Time when command was run   Moshell version

```
RNC11> pr
090914-15:56:44 137.58.194.147 7.1u RNC_NODE_MODEL_J_3_45_COMPLETE stopfile=/tmp/26112
==========================================================================================
Proxy  MO
==========================================================================================
    0  ManagedElement=1
==========================================================================================
Total: 1 MOs
```

It is also saved in a scripting variable called $momversion and can be printed with the command "pv" :

```
MSRBSV2> pv mom

$momversion = MSRBS_NODE_MODEL_17A_307.32548.62_aad4
$comtopmomversion = ComTop_10.21.0
$momfile = /home/eanzmagn/jarxml/MSRBS_NODE_MODEL_17A_307.32548.62_aad4.xml
$momparts[01] = ComFm_12.0.0 (ECIM_FM_4.0.0)
$momparts[02] = ComTop_10.21.0 (ECIM_Top_2.3.0)
$momparts[03] = Grat_3.2.0_0
$momparts[04] = LratBb_1.8025.0_R7B06
...<cut>....
$momparts[96] = RtnL3InterfaceIPv6_4.14.1 (ECIM_T_L3_InterfaceIPv6_1.1.0)
$momparts[97] = RtnL3Router_1.20.0 (ECIM_T_L3_Router_1.1.0)
$momparts[98] = RtnOSPFv2_2.12.0 (ECIM_T_OSPFv2_1.0.0)
$momparts[99] = RtnPBRIPv4_1.1.1 (ECIM_T_PBR_IPv4_2.0.0)
```

The variable $momversion contains the name of the concatenated MOM file.
The variable $momfile contains the full path of the concatenated MOM file
The variable $momparts is a hashtable that contains the list of MOMs stored within the concatenated MOM file. If the MOM has a ECIM extension then it is shown in brackets.
The variable $comtopversion contains the MOM version of the ComTop MOM part.

The MOM version indicates the type of node, eg:
- RNC_NODE_MODEL : RNC
- RBS_NODE_MODEL : WCDMA RBS Gen1
- ERBS_NODE_MODEL : ENB Gen1
- MSRBS_NODE_MODEL : MSRBS Gen2

- WPRBS_NODE_MODEL : WCDMA Pico RBS
- LPRBS_NODE_MODEL : LTE Pico RBS
- MPRBS_NODE_MODEL: Multistandard Pico RBS
etc..

The MOM version also indicates the SW track, eg:
MSRBS_NODE_MODEL_17Q2_xxxx
ERBS_NODE_MODEL_H_XXX (F=L15, G=L16, H=L17,...)
RNC_NODE_MODEL_V_8_XXXX (V4=W15A, V5=W15B, V6=W16A, V7=W16B, V8=W17A, etc.)

Note: exact SW level can be shown with "cvcu" or "cvls"

3.3 mom command

In ECIM/COM MOM the MO class names are prefixed with the MOM fragment.
This is because the same MO class may appear in several MOM fragments, but with different attributes, so it is a completely different MO class, eventhough it has the same class name.
In CPP MOM the MO class names dont have any prefix since there is only one MOM file.

Example Gen2:

The MO class / struct /enum names are prefixed with the MOM fragment

```
RBSG2> mom unit

###############################################################################
MO Class                                                     Attributes/Actions
###############################################################################
ReqAntennaSystem.AntennaNearUnit
administrativeState,antennaNearUnitId,anuType,availabilityStatus,hardwareVersion,iuantDeviceType,onUnitUniqueId,operationalState,productNumber,r
fPortRef,selfTestStatus,serialNumber,softwareVersion,uniqueId
                                downloadSoftware,readUserData,restartUnit,selfTest,sendTmfConfigurationFile,writeUserData
This MO represents a hardware unit installed in the antenna system that can be controlled and supervised by the system.
-----------------------------------------------------------------------------
ReqAntennaSystem.AntennaSubunit
antennaSubunitId,azimuthHalfPowerBeamwidth,commonChBeamfrmPortMap,customComChBeamfrmWtsAmplitude,customComChBeamfrmWtsPhase,maxTotalTilt,minTota
lTilt,retSubunitRef,totalTilt
This MO groups the antenna elements that, because of being controlled by the same RET radiate with the same tilt angle.
-----------------------------------------------------------------------------
...<cut>....
-----------------------------------------------------------------------------
```

```
ReqSupportUnit.SupportUnit
administrativeState,availabilityStatus,faultIndicator,operationalIndicator,operationalState,productData,providedServices,reservedBy,specialIndic
ator,suAddressInfo,supportUnitId
                                          deregisterSupportUnit
A unit that provides support to adjacent units, in terms of power, climate and/or external alarms.
RDNs of these MOs are SupportUnit=Fan1, SupportUnit=PSU1, SupportUnit=Fan2, SupportUnit=PSU2 and so on. Autocreated when the support unit is
detected by the system.
Note: Instances of this MO class are SystemCreated.
-------------------------------------------------------------------------------


################################################################################
Struct                                  Members
################################################################################
ReqFieldReplaceableUnit.HwTestResult         timeStamp,hwTestStatus
HwTest Result.
-------------------------------------------------------------------------------
...<cut>...
-------------------------------------------------------------------------------
ReqSupportUnit.SuAddressInfo
hostObjectReference,hostPortNumber,supportUnitBusAddress,supportUnitHostPortNumber,hostedSupportUnitReference
The address elements of the support unit, one set per host the support unit is connected to. Note that a support unit can be directly connected
to one or several hosts by one support unit bus for each host. Alternatively, it can be connected indirectly by another support unit, which in
turn is connected to the hosts. If indirectly connected, the support unit is referred to as a "hosted support unit".
-------------------------------------------------------------------------------


################################################################################
Enum                                    Values
################################################################################
ReqAntennaSystem.AntNearUnit                 0:IUANT, 1:ASC, 2:ERET
ReqFieldReplaceableUnit.AdmState             0:LOCKED, 1:UNLOCKED, 2:SHUTTINGDOWN
..<cut>...


################################################################################
DerivedDataType                                                              Type
################################################################################
Lrat.Lrat_CarrierAggregationFunction_waitForAdditionalSCellOpportunity       int32
Lrat.Lrat_CarrierAggregationFunction_waitForCaOpportunity                    int32
RcsSnmp.SnmpCommunity                                                        string
...<cut>....



MSRBSV2> momt


---------------------------------
MO classes under ComTop.ManagedElement (systemCreated)
---------------------------------
ComTop.Legacy[0-1]
ComTop.SystemFunctions[1] (systemCreated)
        ComFm.Fm[1] (systemCreated)
                ComFm.FmAlarm[0-] (systemCreated)
                ComFm.FmAlarmModel[0-] (systemCreated)
                        ComFm.FmAlarmType[0-] (systemCreated)
        ComSecM.SecM[1] (systemCreated)
                ComSecM.Tls[0-1] (systemCreated)
                ComSecM.UserManagement[1] (systemCreated)
```

```
...<cut>...
              RmeOnSiteActivities.OnSiteActivities[1] (systemCreated)
              RmeSectorEquipmentFunction.SectorEquipmentFunction[0-]
              RmeTimeSettings.TimeSettings[1] (systemCreated)
Wrat.NodeBFunction[0-1]
              Wrat.CommunicationContexts[1] (systemCreated)
              Wrat.Iub[0-1]
                        Wrat.IubDataStreams[0-1]
                        Wrat.NbapCommon[0-1]
                        Wrat.NbapDedicated[0-1]
              Wrat.NodeBLocalCellGroup[0-8]
                        Wrat.NodeBLocalCell[0-6]
                                  Wrat.CellResources[0-1] (systemCreated)
                                  Wrat.CommonChannelResourcesDl[0-1] (systemCreated)
                                  Wrat.HsDschResources[0-1] (systemCreated)
                                  Wrat.NodeBSectorCarrier[0-3]
                                           Wrat.CommonChannelResourcesUl[0-1] (systemCreated)
                                           Wrat.EDchResources[0-1] (systemCreated)
                                  Wrat.RadioLinks[1] (systemCreated)
```

Example Gen1:

No prefix is needed in front of the MO class / struct /enum names

```
ENB> mom unit


##############################################################################
MO Class                        Attributes/Actions
##############################################################################
AntennaNearUnit
AntennaNearUnitId,administrativeState,availabilityStatus,hardwareVersion,iuantDeviceType,onUnitUniqueId,operationalState,productNumber,rfPortRef
,selfTestStatus,serialNumber,softwareVersion,uniqueId
                      downloadSoftware,readUserData,restartUnit,selfTest,sendTmfConfigurationFile,writeUserData
This MO represents a hardware unit installed in the antenna system that can be controlled and supervised by the system.
------------------------------------------------------------------------------
AntennaSubunit
AntennaSubunitId,azimuthHalfPowerBeamwidth,commonChBeamfrmPortMap,customComChBeamfrmWtsAmplitude,customComChBeamfrmWtsPhase,maxTotalTilt,minTota
lTilt,retSubunitRef,totalTilt
This MO groups the antenna elements that, because of being controlled by the same RET radiate with the same tilt angle.
------------------------------------------------------------------------------
...<cut>..
------------------------------------------------------------------------------
TmaSubUnit
TmaSubUnitId,availabilityStatus,dlAttenuation,dlTrafficDelay,iuantAntennaBearing,iuantAntennaInstalledMechanicalTilt,iuantAntennaModelNumber,iua
ntAntennaOperatingBand,iuantAntennaOperatingGain,iuantAntennaSerialNumber,iuantBaseStationId,iuantInstallationDate,iuantInstallersId,iuantSector
Id,iuantTmaSubunitFreqRangeRx,iuantTmaSubunitFreqRangeTx,iuantTmaSubunitGainRes,iuantTmaSubunitMaxGain,iuantTmaSubunitMinGain,operationalState,r
eservedBy,subunitNumber,tmaType,tmfData,ulGain,ulTrafficDelay,userLabel
This MO represents the TMA SubUnit providing low noise amplification of the uplink received by the reserving branch.
------------------------------------------------------------------------------


##############################################################################
Enum                            Values
##############################################################################
```

```
AntNearUnit                         0:IUANT, 1:ASC, 2:ERET


ENB> momt


-------------------------------
MO classes under ManagedElement (systemCreated)
-------------------------------
ENodeBFunction[1] (systemCreated)
        AdditionalCoreNetwork[0-5]
        AdmissionControl[1] (systemCreated)
        AirIfLoadProfile[0-24]
        AmoFunction[1] (systemCreated)
        AnrFunction[1] (systemCreated)
                AnrFunctionEUtran[1] (systemCreated)
...<cut>..
Equipment[1] (systemCreated)
        AntennaUnitGroup[0-]
                AntennaNearUnit[0-48]
                        RetSubUnit[0-8]
...<cut>...
```

3.4 prm command

On Gen2, it is possible to run the prm command to show the MOM fragment corresponding to each MO instance.

Lookout for MO instances where the MimName column is empty: this means that moshell could not find the MOM fragment for those MO instances and MO commands (get, set, etc) will not work on those MO instances.

Note: moclass_group is a MO group created by default which contains one randomly chosen MO instance of each class.

`MSRBSV2> prm moclass_group`

```
========================================================================
Proxy  MimName                      MO
========================================================================
    0  ComTop                       ManagedElement=1
    1  Lrat                         ENodeBFunction=1
    2  Lrat                         ENodeBFunction=1,AdmissionControl=1
    3  Lrat                         ENodeBFunction=1,AnrFunction=1
    4  Lrat                         ENodeBFunction=1,AnrFunction=1,AnrFunctionEUtran=1
    5  Lrat                         ENodeBFunction=1,AnrFunction=1,AnrFunctionGeran=1
    6  Lrat                         ENodeBFunction=1,AnrFunction=1,AnrFunctionUtran=1
    7  Lrat                         ENodeBFunction=1,AutoCellCapEstFunction=1
...<cut>...
  527  ReqEquipment                 Equipment=1
  594  ReqAntennaSystem             Equipment=1,AntennaUnitGroup=9
  595  ReqAntennaSystem             Equipment=1,AntennaUnitGroup=9,AntennaUnit=1
  596  ReqAntennaSystem             Equipment=1,AntennaUnitGroup=9,AntennaUnit=1,AntennaSubunit=1
  597  ReqAntennaSystem             Equipment=1,AntennaUnitGroup=9,AntennaUnit=1,AntennaSubunit=1,AuPort=1
  599  ReqAntennaSystem             Equipment=1,AntennaUnitGroup=9,RfBranch=2
  600  ReqEcBus                     Equipment=1,EcBus=1
  602  LratBb                       Equipment=1,FieldReplaceableUnit=1,BbProcessingResource=1
  603  LratMp                       Equipment=1,FieldReplaceableUnit=1,MpProcessingResource=1
  610  ReqSyncPort                  Equipment=1,FieldReplaceableUnit=1,SyncPort=1
```

```
  611  ReqTnPort                    Equipment=1,FieldReplaceableUnit=1,TnPort=TN_A
  667  ReqFieldReplaceableUnit      Equipment=1,FieldReplaceableUnit=9
  669  ReqRfPort                    Equipment=1,FieldReplaceableUnit=9,RfPort=B
...<cut>...
 1336  RcsLM                        SystemFunctions=1,Lm=1,FeatureState=CXC4040015
 1337  RcsLM                        SystemFunctions=1,Lm=1,IntegrationUnlock=1
 1338  RcsLM                        SystemFunctions=1,Lm=1,KeyFileManagement=1
 1339  RcsLM                        SystemFunctions=1,Lm=1,KeyFileManagement=1,KeyFileInformation=1
 1340  RcsLogM                      SystemFunctions=1,LogM=1
 1347  RcsLogM                      SystemFunctions=1,LogM=1,Log=TnNetworkLog
 1348  RcsPm                        SystemFunctions=1,Pm=1
...<cut>...
 8249  RtnL3InterfaceIPv4           Transport=1,Router=vr_OAM,InterfaceIPv4=1,AddressIPv4=1
 8250  RtnRoutesStaticRouteIPv4     Transport=1,Router=vr_OAM,RouteTableIPv4Static=1
 8257  RtnRoutesStaticRouteIPv4     Transport=1,Router=vr_OAM,RouteTableIPv4Static=1,Dst=4
 8258  RtnRoutesStaticRouteIPv4     Transport=1,Router=vr_OAM,RouteTableIPv4Static=1,Dst=4,NextHop=1
 8259  RtnSctpServer                Transport=1,Sctp=General
 8260  RtnSctp                      Transport=1,SctpEndpoint=1
 8261  RtnSctp                      Transport=1,SctpEndpoint=1,SctpAssociation=36412-10.45.132.7
 8262  RtnSctpProfile               Transport=1,SctpProfile=1
 8263  RsyncSynchronization         Transport=1,Synchronization=1
 8264  RsyncFrequencySyncIO         Transport=1,Synchronization=1,FrequencySyncIO=1
 8265  RsyncRadioEquipmentClock     Transport=1,Synchronization=1,RadioEquipmentClock=1
 8266  RsyncRadioEquipmentClock     Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=1
 8268  RtnL2VlanPort                Transport=1,VlanPort=2
================================================================================
Total: 193 MOs
```

3.5 ManagedElement MO id

In CPP nodes, the ManagedElement MO is always called ManagedElement=1 and the node name is found in the MeContext MO in MIB prefix

In COM nodes, the ManagedElement MO can be called ManagedElement=1 or it can also be called as the node name, eg ManagedElement=ENB34

To see the MIB prefix, use command "kget 0"

Example Gen1:

```
ENB3004> kget 0


===================================================================================
Proxy Id                            0
MO                                  SubNetwork=ONRM_ROOT_MO_R,SubNetwork=LTEKi,MeContext=kienb3004,ManagedElement=1
===================================================================================
ManagedElementId                    1
applicationConfiguration[0]
faultTolerantCoreStates[1]          ManagedElement=1,Equipment=1,Subrack=1,Slot=1,PlugInUnit=1;ftcState=Active
Struct healthCheckResult has 3 members:
 >>> 1.healthCheckResultCode = 99 (INITIAL_VALUE)
```

```
 >>> 2.message =
 >>> 3.startTime =
healthCheckSchedule[0]
logicalName                          kienb3004
Struct mimInfo has 3 members:
 >>> 1.mimName = ERBS_NODE_MODEL_G
 >>> 2.mimVersion = 1.308
 >>> 3.mimRelease =
productName                          RBS6201v2L
productNumber
productRevision
productType                          Node
site                                 kienb3004
userLabel                            kienb3004
==============================================================================================
Total: 1 MOs
```

Example Gen2:

```
ENB1501> kget 0


==============================================================================================
Proxy Id                             0
MO                                   SubNetwork=ONRM_ROOT_MO_R,SubNetwork=LTEKi,MeContext=kienb1501,ManagedElement=kienb1501
==============================================================================================
dnPrefix                             SubNetwork=ONRM_ROOT_MO_R,SubNetwork=LTEKi,MeContext=kienb1501
managedElementId                     kienb1501
managedElementType                   RadioNode
networkManagedElementId              kienb1501
release                              17.Q3
siteLocation
userLabel
==============================================================================================
Total: 1 MOs
```

3.6   Complete MOM

3.6.1   Gen1

The COMPLETE MOM is stored on the node and can be loaded in moshell by setting the uservariable use_complete_mom to 1.
Example, in the file ~/.moshellrc , just adding the line:
use_complete_mom=1

When the moshell session is using the complete MOM, this will be reflected in the MOM version which will have the suffix "_COMPLETE", eg:
ERBS_NODE_MODEL_H_1_365_COMPLETE

3.6.2 Gen2

The COMPLETE MOM is <u>not</u> applicable for MSRBS :

- On PDU lab nodes, there is a "TESTMOM" , this is equivalent to COMPLETE MOM and allows to read-write all EricssonOnly attributes with get/set command.
But it works only works if the node has been loaded with the Ericsson Internal Test SW (EITS).
This license can be checked with "invl" command. Also the MOM version will show the suffix "_TESTMOM"

```
RBSG2> invl test.mom
160126-17:30:06 RBSG2 16.0t MSRBS_NODE_MODEL_302.28650.1091_075f_TESTMOM stopfile=/tmp/29950
==============================================================================================
FeatureKey     FAJ           FeatureState      LicenseState  ValidFrom    ValidUntil   Description
==============================================================================================
CXC4011959     FAJ1214395    0 (DEACTIVATED)   1 (ENABLED)   2016-01-24   2017-01-19   Ericsson Internal Test MOM
----------------------------------------------------------------------------------------------
```

- On customer nodes, the EITS license is not available, therefore the Ericsson-only attributes shall be accessed via moshell commands `geti`/`seti` and can be listed with "`momi`" (or "mom . . . ericsson") .
The `geti`/`seti` are wrapper commands that interface to the COLI commands `testmomdump` or `internalmomread`, and `internalmomwrite` respectively.
Important: The below feature needs to be in state OPERABLE, otherwise the "geti" command will be very slow (up to 30 times slower).

```
RBSG2> invl hidden
=================================================================================================================
FeatureName             FeatureKey   FAJ           LicenseState   FeatureState   ServiceState   ValidFrom    ValidUntil   Description
=================================================================================================================
HiddenParameterAccess   CXC4012188   FAJ1214785    1 (ENABLED)    1 (ACTIVATED)  1 (OPERABLE)   2017-10-01   2018-10-01   Hidden Parameter Access
-----------------------------------------------------------------------------------------------------------------
```

Examples:

> **Show all EricssonOnly attributes `momi`/`momdi` (same as "momd . . . ericsson")**

```
RBSG2> momdi

################################################################################################
MO Class                        Attribute                        Type           Flags
################################################################################################
Lrat.AnrFunction                noOfTimesToCheckRel              int32          EricssonOnly
Lrat.AutoCellCapEstFunction     cellCapOffsetComp               int32          EricssonOnly
Lrat.AutoCellCapEstFunction     cellCapScaleComp                int32          EricssonOnly
Lrat.CarrierAggregationFunction dlOnlySCellPriorityEnabled      boolean        EricssonOnly
```

```
Lrat.CarrierAggregationFunction      fddTddSCellPriority                enumRef              EricssonOnly
Lrat.CarrierAggregationFunction      laaCaRateAdjustCoeff               int32                EricssonOnly
Lrat.CarrierAggregationFunction      laaSCellActDeactDataThres          int32                EricssonOnly
Lrat.CarrierAggregationFunction      laaSCellActDeactDataThresHyst      int32                EricssonOnly
Lrat.CarrierAggregationFunction      laaSCellActDeactProhibitTimer      int32                EricssonOnly
Lrat.CarrierAggregationFunction      laaSCellScheduleSinrThres          int32                EricssonOnly
Lrat.CellSleepNodeFunction           csmEutranInterFMeasReportIncrTimer int32                EricssonOnly
Lrat.CellSleepNodeFunction           csmHitRateEutran0                  int32                EricssonOnly
Lrat.CellSleepNodeFunction           csmHitRateEutranFilterCoeff        int32                EricssonOnly
Lrat.DataRadioBearer                 dlPollPDU                          int32                EricssonOnly
Lrat.DataRadioBearer                 headerCompression                  enumRef              EricssonOnly
Lrat.DataRadioBearer                 pelr                               int32                EricssonOnly
Lrat.DataRadioBearer                 tStatusProhibitDl                  int32                EricssonOnly
Lrat.DataRadioBearer                 tStatusProhibitUl                  int32                EricssonOnly
Lrat.DataRadioBearer                 ulPollPDU                          int32                EricssonOnly
Lrat.DlComp                          dlCompId                           string               EricssonOnly
Lrat.DlComp                          dlCompMeasRprtMaxSinr              int32                EricssonOnly
Lrat.DlComp                          dlCompMeasRprtMinSinr              int32                EricssonOnly
Lrat.DrxProfile                      reservedBy                         sequence:moRef       readOnly,EricssonOnly
Lrat.ENodeBFunction                  csmCovDiscoveryCycleTime           int32                EricssonOnly
Lrat.ENodeBFunction                  csmMaxNoHighHitRateCells           int32                EricssonOnly
Lrat.ENodeBFunction                  csmMinHighHitThreshold             int32                EricssonOnly
Lrat.ENodeBFunction                  estimateBasedPdcchCandSelection    boolean              EricssonOnly
Lrat.ENodeBFunction                  limitNonCriticalFeaturesInHighLoad boolean              EricssonOnly
Lrat.ENodeBFunction                  maxNoCellsNaccCsfb                 int32                EricssonOnly
Lrat.ENodeBFunction                  maxNoCellsNaccSessionCont          int32                EricssonOnly
Lrat.ENodeBFunction                  mimoSleepNoOfPrbAvg                int32                EricssonOnly
Lrat.ENodeBFunction                  mimoSleepNoOfRrcConnAvg            int32                EricssonOnly
Lrat.ENodeBFunction                  mimoSleepUpExtraTime               int32                EricssonOnly
Lrat.ENodeBFunction                  minPagingRefillUnits               int32                EricssonOnly
Lrat.ENodeBFunction                  multiTargetRrcConnReestPfActive    boolean              EricssonOnly
Lrat.ENodeBFunction                  randCdma20001xRtt                  int32                readOnly,EricssonOnly
Lrat.ENodeBFunction                  sizeThreshDciFormat1A              int32                EricssonOnly
Lrat.EUtranCellFDD                   activeMtdMeasurements              sequence:int32       readOnly,EricssonOnly
Lrat.EUtranCellFDD                   anrHoDisStatNum                    int32                EricssonOnly
Lrat.EUtranCellFDD                   anrHoDisStatTime                   int32                EricssonOnly
Lrat.EUtranCellFDD                   anrHoDisThreshold                  int32                EricssonOnly
Lrat.EUtranCellFDD                   assumedUePowerMsg3                 int32                EricssonOnly
...<cut>...
Lrat.UtranCellRelation               calculatedUeRelevance             int32                readOnly,EricssonOnly
Lrat.UtranCellRelation               hoSuccessRateLpFilt               int32                readOnly,EricssonOnly
Lrat.UtranCellRelation               lbUeMeasScaling                    int32                EricssonOnly
Lrat.UtranCellRelation               removingMonitoringStart            string               readOnly,EricssonOnly

Total: 73 MOs, 400 attributes
```

>> **Print description of an EricssonOnly attribute**

```
RBSG2> mom . dlCyclicPrefix


##############################################################################################
MO Class                                        Attribute                       Type
Flags
##############################################################################################
```

```
Lrat.EUtranCellFDD                              dlCyclicPrefix                          enumRef
EricssonOnly
----------------------------------------------------------------------------------------------------
Type of cyclic prefix used for downlink.  Note: EXTENDED_15khz and EXTENDED_7_5khz are not supported on current software.
Values: 0:NORMAL_15khz 1:EXTENDED_15khz 2:EXTENDED_7_5khz
****************************************************************************************************
Lrat.EUtranCellTDD                              dlCyclicPrefix                          enumRef
EricssonOnly
----------------------------------------------------------------------------------------------------
Type of cyclic prefix used for downlink.  Note: EXTENDED_15khz and EXTENDED_7_5khz are not supported on current software.
Values: 0:NORMAL_15khz 1:EXTENDED_15khz 2:EXTENDED_7_5khz
****************************************************************************************************


Total: 2 MOs, 2 attributes
```

>> **Print value of an EricssonOnly attribute**

```
RBSG2> geti . dlcyc


============================================================================================
 Id    MO                                            Attribute          Value
============================================================================================
  31    EUtranCellFDD=1                               dlCyclicPrefix     0 (NORMAL_15khz)
  71    EUtranCellFDD=2                               dlCyclicPrefix     0 (NORMAL_15khz)
 111    EUtranCellFDD=3                               dlCyclicPrefix     0 (NORMAL_15khz)
 151    EUtranCellFDD=4                               dlCyclicPrefix     0 (NORMAL_15khz)
 191    EUtranCellFDD=5                               dlCyclicPrefix     0 (NORMAL_15khz)
 231    EUtranCellFDD=6                               dlCyclicPrefix     0 (NORMAL_15khz)
============================================================================================
Total: 6 MOs
```

>> **Set value of an EricssonOnly attribute**

```
RBSG2> seti . dlCyclicPrefix 1

Run /cm/internalmomwrite on following 7 MOs ?
==============================================================================
  31    ENodeBFunction=1,EUtranCellFDD=1
  71    ENodeBFunction=1,EUtranCellFDD=2
 111    ENodeBFunction=1,EUtranCellFDD=3
 151    ENodeBFunction=1,EUtranCellFDD=4
 191    ENodeBFunction=1,EUtranCellFDD=5
 231    ENodeBFunction=1,EUtranCellFDD=6
 271    ENodeBFunction=1,EUtranCellFDD=7
==============================================================================
Run /cm/internalmomwrite on 7 MOs. Are you Sure [y/n] ? y


============================================================================================
 Id    MO                                            dlCyclicPrefix     Result
============================================================================================
  31    EUtranCellFDD=1                               1                  >>> Set.
  71    EUtranCellFDD=2                               1                  >>> Set.
```

```
  111  EUtranCellFDD=3                                        1                      >>> Set.
  151  EUtranCellFDD=4                                        1                      >>> Set.
  191  EUtranCellFDD=5                                        1                      >>> Set.
  231  EUtranCellFDD=6                                        1                      >>> Set.
  271  EUtranCellFDD=7                                        1                      >>> Set.
=====================================================================================================
Total: 7 MOs attempted, 7 MOs set


RBSG2> geti . dlCyclicPrefix


Run /cm/internalmomread on following 7 MOs ?
=====================================================================================
   31  ENodeBFunction=1,EUtranCellFDD=1
   71  ENodeBFunction=1,EUtranCellFDD=2
  111  ENodeBFunction=1,EUtranCellFDD=3
  151  ENodeBFunction=1,EUtranCellFDD=4
  191  ENodeBFunction=1,EUtranCellFDD=5
  231  ENodeBFunction=1,EUtranCellFDD=6
  271  ENodeBFunction=1,EUtranCellFDD=7
=====================================================================================
Run /cm/internalmomread on 7 MOs. Are you Sure [y/n] ? y


=====================================================================================================
  Id   MO                                                  Attribute         Value
=====================================================================================================
   31  EUtranCellFDD=1                                     dlCyclicPrefix    1 (EXTENDED_15khz)
   71  EUtranCellFDD=2                                     dlCyclicPrefix    1 (EXTENDED_15khz)
  111  EUtranCellFDD=3                                     dlCyclicPrefix    1 (EXTENDED_15khz)
  151  EUtranCellFDD=4                                     dlCyclicPrefix    1 (EXTENDED_15khz)
  191  EUtranCellFDD=5                                     dlCyclicPrefix    1 (EXTENDED_15khz)
  231  EUtranCellFDD=6                                     dlCyclicPrefix    1 (EXTENDED_15khz)
  271  EUtranCellFDD=7                                     dlCyclicPrefix    1 (EXTENDED_15khz)
=====================================================================================================
Total: 7 MOs
```

>> **Read values of all EricssonOnly attribute**

```
RBSG2> geti . .
```

....

>> **Perform a parameter audit of the EricssonOnly attributes**

```
RBSG2> diffi . /path/to/paramfile.txt
```

....

3.7 Loading/unloading MOs

Loading the whole MO tree

The whole MO tree can be loaded with "lt all" command.
The "lt all" command is much slower on Gen2 than Gen1 (~ 3 times slower) due to the way that the MO interface is implemented on the node:

Example:
In the nodes below it takes 9 seconds to load 6000 MOs on Gen2 and 1 second to load 2000 MOs on Gen1.

```
RBS_Gen1> time lt all

Connected to kienb34 (ManagedElement=1)
Last MO:  1830. Loaded 1830 MOs. Total:  1831 MOs.

$duration = 1


RBS_Gen2> time lt all

Connected to 10.220.131.52 (ManagedElement=1)
Last MO:  6215. Loaded 6215 MOs. Total:  6216 MOs.

$duration = 9
```

Loading part of the MO tree

It is possible to load partial MO tree using "lt" or "ldc" command.
- **lt \<moclass\> : load all MO instances of a particular MO class**
- **ldc \<ldn\>   : load a MO with a particular LDN and all its children**

```
ENB> lt ^eutrancell

Load Proxys for MOs of following type ...
================================================================================
EUtranCellFDD
EUtranCellRelation
EUtranCellRelationUnlicensed
EUtranCellTDD
================================================================================
Please Confirm [y/n]: y
```

```
Last MO:    91. Loaded   91 MOs. Total:    92 MOs.

ENB> ldc equipment=1

Load Proxys for children of following MOs ...
================================================================================
  92  Equipment=1
================================================================================
Please Confirm [y/n]: y

Last MO:   114. Loaded  114 MOs. Total:   115 MOs.
```

Unloading some MO instances from the MO list

Example:
If some MO instances will not be needed in our session, we can unload them. Example:

```
SFINX01> llu ,(pm|pmeventm|schema|FmAlarmModel)=

Unloaded 3954 MOs

SFINX01>
```

Unloading all MO instances from the MO list

```
SFINX01> lt root

Connected to 10.67.22.8 (SubNetwork=ONRM_ROOT_MO_R,SubNetwork=G2RBS,MeContext=SFINX01,ManagedElement=SFINX01)

SFINX01> pr

================================================================================
Proxy  MO
================================================================================
   0  ManagedElement=SFINX01
================================================================================
Total: 1 MOs
```

3.8 Execution of MO scripts

A .mos script generated by u+/u- , gmc/gmd, or diff command can be converted to trun or netconf format with the u! command
 - on Gen1, the u! converts from .mos to .mo (trun) format
 - on Gen2, the u! converts from .mos to .xml (netconf) format

Example Gen1

```
ENB11> l cat ~/moshell_logfiles/logs_moshell/undo/undo_ENB11_070604-114040.mos

confb+
gs+

cr Equipment=1,Subrack=MS,Slot=2,PlugInUnit=1
PiuType=ROJ1192108/2_R6 #piuType
lset Equipment=1,Subrack=MS,Slot=2,PlugInUnit=1$ administrativeState 1
lset Equipment=1,Subrack=MS,Slot=2,PlugInUnit=1$ piuGroupNumber 8
lset Equipment=1,Subrack=MS,Slot=2,PlugInUnit=1$ userLabel
lset Equipment=1,Subrack=MS,Slot=2,PlugInUnit=1$ allowedSeqRestarts 3
confb-
gs-

ENB11> u! ~/moshell_logfiles/logs_moshell/undo/undo_ENB11_070604-114040.mos

Result saved to: /home/eanzmagn/moshell_logfiles/logs_moshell/undo/undo_ENB11_070604-114040.mo ($undotrunfile).

ENB11> l cat ~/moshell_logfiles/logs_moshell/undo/undo_ENB11_070604-114040.mo

CREATE
(
    parent "ManagedElement=1,Equipment=1,Subrack=MS,Slot=28"
    identity "1"
    moType PlugInUnit
    exception none
    nrOfAttributes 1
    piuType Ref "ManagedElement=1,SwManagement=1,PiuType=ROJ1192108/2_R6"
)
...<cut>...
SET
(
    mo "ManagedElement=1,Equipment=1,Subrack=MS,Slot=28,PlugInUnit=1"
    exception none
    userLabel String ""
)

ENB11> trun ~/moshell_logfiles/logs_moshell/undo/undo_ENB11_070604-114040.mo

....
```

Example Gen2

```
RBSG2> l cat rbsg2_184919.mos

lt all
gs+

lset AnrFunction=1$ removeNcellTime 2
lset AnrFunction=1$ removeNenbTime 2
lset AnrFunction=1$ removeNrelTime 1
lset AnrFunction=1,AnrFunctionEUtran=1$ anrUesThreshInterFMax 0
lset ENodeBFunction=1$ s1HODirDataPathAvail false
lset ENodeBFunction=1$ x2SetupTwoWayRelations false
lset EUtranCellFDD=CVL00766_7A_1$ drxActive false
lset EUtranCellFDD=CVL00766_7A_1$ mappingInfo
mappingInfoSIB10=1,mappingInfoSIB11=0,mappingInfoSIB12=4,mappingInfoSIB3=1,mappingInfoSIB4=0,mappingInfoSIB5=2,mappingInfoSIB6=2,mappingInfoSIB7
=0,mappingInfoSIB8=0
...<cut>....
lset Rrc=1$ t301 400
lset Rrc=1$ t311 3000
lset Rrc=1$ tWaitForRrcConnReest 7
lset SecurityHandling=1$ cipheringAlgoPrio 0 1 2
lset SecurityHandling=1$ rbIdSupervisionActive false

gs-

RBSG2> u! rbsg2_184919.mos

Result saved to: OFFLINE_CVL00766_modump.zip_184919.xml ($undoxmlfile).

RBSG2> l cat $undoxmlfile

<?xml version="1.0" encoding="UTF-8"?><hello
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><capabilities><capability>urn:ietf:params:netconf:base:1.0</capability><capability>urn:com:erics
son:ebase:0.1.0</capability><capability>urn:com:ericsson:ebase:1.1.0</capability></capabilities></hello>]]>]]>
<rpc message-id="1" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><edit-config
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><target><running/></target><config
xmlns:xc="urn:ietf:params:xml:ns:netconf:base:1.0"><ManagedElement><managedElementId>CVL00766</managedElementId><ENodeBFunction><eNodeBFunctionI
d>1</eNodeBFunctionId><AnrFunction><anrFunctionId>1</anrFunctionId><removeNcellTime>2</removeNcellTime></AnrFunction></ENodeBFunction></ManagedE
lement></config></edit-config></rpc>]]>]]>
<rpc message-id="2" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><edit-config
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><target><running/></target><config
xmlns:xc="urn:ietf:params:xml:ns:netconf:base:1.0"><ManagedElement><managedElementId>CVL00766</managedElementId><ENodeBFunction><eNodeBFunctionI
d>1</eNodeBFunctionId><AnrFunction><anrFunctionId>1</anrFunctionId><removeNenbTime>2</removeNenbTime></AnrFunction></ENodeBFunction></ManagedEle
ment></config></edit-config></rpc>]]>]]>
<rpc message-id="3" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><edit-config
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><target><running/></target><config
xmlns:xc="urn:ietf:params:xml:ns:netconf:base:1.0"><ManagedElement><managedElementId>CVL00766</managedElementId><ENodeBFunction><eNodeBFunctionI
d>1</eNodeBFunctionId><AnrFunction><anrFunctionId>1</anrFunctionId><removeNrelTime>1</removeNrelTime></AnrFunction></ENodeBFunction></ManagedEle
ment></config></edit-config></rpc>]]>]]>
...<cut>...
<rpc message-id="128" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><edit-config
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><target><running/></target><config
xmlns:xc="urn:ietf:params:xml:ns:netconf:base:1.0"><ManagedElement><managedElementId>CVL00766</managedElementId><ENodeBFunction><eNodeBFunctionI
d>1</eNodeBFunctionId><SecurityHandling><securityHandlingId>1</securityHandlingId><rbIdSupervisionActive>false</rbIdSupervisionActive></Security
Handling></ENodeBFunction></ManagedElement></config></edit-config></rpc>]]>]]>
<rpc message-id="129" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><close-session/></rpc>]]>]]>
```

OFFLINE_CVL00766_DCG_K>

MSRBSV2> h netconf


```
*****************************************************************************
netconf [<commandfile>]
*****************************************************************************
```
Open an interactive NETCONF session to the node or execute a NETCONF command file. Only applicable for COM nodes.

MSRBSV2> netconf /home/eanzmagn/RBSG2_012156.xml


```
<hello
xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"><capabilities><capability>urn:ietf:params:netconf:base:1.0</capability><capabilty>urn:com:erics
son:ebase:0.1.0</capability><capability>urn:com:ericsson:ebase:1.1.0</capability><capability>urn:com:ericsson:ebase:1.2.0</capability><capabilit
y>urn:ietf:params:netconf:capability:writable-running:1.0</capability><capability>urn:ietf:params:netconf:capability:rollback-on-
error:1.0</capability><capability>urn:ietf:params:netconf:capability:notification:1.0</capability><capability>urn:ericsson:com:netconf:action:1.
0</capability><capability>urn:ericsson:com:netconf:heartbeat:1.0</capability><capability>urn:com:ericsson:netconf:operation:1.0</capability></ca
pabilities><session-id>7</session-id></hello>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="1"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="2"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="3"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="4"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="5"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="6"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="7"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="8"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="9"><ok/></rpc-reply>
...<cut>...
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="87"><ok/></rpc-reply>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="88"><ok/></rpc-reply>
Connection to rbsg2 closed by remote host.
```


How to execute a MO script in one single transaction

- Gen1: use the command "trun1"

KIENB7018> h trun1


```
*****************************************************************************
trun[is1cr] <moScript>|<http://ipaddress/script>
*****************************************************************************
```
Run a command file in EMAS/MoTester format.

Execute a command file in EMAS/MoTester format.
By typing <TAB>, the unix file system is displayed, making it easier to find the location of the command file.
It is also possible to specify a file located on a web server (eg. when the script is located on the CPP node).
The following commands are supported: ECHO, CREATE, SET, SETM, SETU, DELETE, ACTION, CHECK, CHECKM, CALL, CALLREL, WAIT.
Lines can be commented out by adding // at the beginning of each line.
See examples below. For more info, refer to MoTester documentation in moshell/examples/motester/runMoTester.html .
By default, the command file halts when a command fails.

```
Options:
 - i: ignore exceptions, the execution does not halt when a command fails.
 - s: simulated run, the command file execution is simulated, no commands are actually executed on the node. Can be used to verify the syntax of
a script prior to running it for real. The simulated mode is always used in "offline mode" or "simulated undo mode", regardless of the "trun"
options.
 - 1: executes the whole script in one transaction, then prompts for confirm or rollback. This option should be used with great care and only
when absolutely necessary (e.g. when changing IP address of the node, see example script in moshell/examples/misc/ip_change.mo). In regular
usage, it is recommended to not use this option as it has been observed to cause database corruptions in certain cases, for instance when
creating/deleting certain types of MOs within the same transaction. Database inconsistencies can be checked with the command "dbc".
 - c: used in combination with option "1" above, will avoid the prompt by automatically confirming the transaction
 - r: used in combination with option "1" above, will avoid the prompt by automatically rolling back the transaction
```

 - Gen2: use the command "run1"

```
MSRBSV2> h run


******************************************************************************
run[x][1][1p][1r] [-l <lineNr>] <command file> [<var1>] [<var2>] ...
******************************************************************************
Run a command file in moshell format.


The command file layout is the same as for monode and mobatch. See examples in moshell/examples/mobatch_files
It shall contain all lines to be sent to the moshell prompt, including password (for ose commands), but NOT confirmations ("y").
This applies to commands such as "lt/ltc", "lc/lcc", "del", "bl", "set", where confirmation is automatically entered when running a command
file.
Comments can be put in the command file using the # sign.
By typing <TAB>, the unix file system is displayed, making it easier to find the location of the command file.
If some arguments are given after the command file, the scripting variables $1, $2, $3, etc. will be set to the corresponding values. The
variable $0 will be set to the whole line contents. Type "h scripting" for info.


Options:
 - 1: to execute the file in one transaction and commit. Only applicable for COM nodes. To run a MO script in one transaction on CPP nodes, use
"trun1".
 - 1p: to execute the file in one transaction and prompt for commit/rollback. Only applicable for COM nodes.
 - 1r: to execute the file in one transaction and rollback. Only applicable for COM nodes.
 - x: to stop execution of the file upon failure of a MO WRITE command (create, delete, set, action).
The following scripting variables are set automatically when the script stops:
        * $errorline points to the line number where the script stopped
        * $errorcmdline points to the line number of the last command that failed
        * $nextcmdline points to the line number of the next command to execute


Switches:
 -l <lineNumber>: to start file execution at a specific line number.
```

3.9 Managed areas

Many MO classes are different between CPP and ECIM/COM . Examples:

CPP	ECIM/COM
PlugInUnit/AuxPlugInUnit	FieldReplaceableUnit or HwItem
LoadModule/Progam	SwItem
ConfigurationVersion	BrM
UpgradePackage	UpgradePackage and SwVersion
Licensing	Lm and KeyFileManagement
etc...	

More info about differences between CPP and ECIM MOM :

 - **https://ericoll.internal.ericsson.com/sites/Information_Model_Forum/Pages/InstanceModels.aspx**

 - **https://cpp-mom.rnd.ki.sw.ericsson.se/G2/mainpage_G2.htm**

More info about MOM structure Gen1 vs Gen2:

MOM structure LTE
CPPv16.pptx

MOM structure
eNodeB LTE COM v.1

With "momtl" command we can get an overview of the MOs under each managed area of the CPP or ECIM MOM

```
MSRBSV2> momtl


-------------------------------

s containing ComTop.ManagedElement (systemCreated)
-------------------------------
ManagedElement[1],Legacy[0-1]
ManagedElement[1],SystemFunctions[1]
```

3.9.1   Fault Management

Gen1:

Separate interface (ALCI), no MOs

Gen2:

Fm MOs are used to configure and display active alarm list

```
ManagedElement[1],SystemFunctions[1],Fm[1]
ManagedElement[1],SystemFunctions[1],Fm[1],FmAlarmModel[0-]
ManagedElement[1],SystemFunctions[1],Fm[1],FmAlarmModel[0-],FmAlarmType[0-]
ManagedElement[1],SystemFunctions[1],Fm[1],FmAlarm[0-]
```

3.9.2 Security Management

Gen1:

Security MO and "secmode" command are used to switch between O&M Security level 1, 2 , or 3

```
ManagedElement[1],SystemFunctions[1],Security[1]
ManagedElement[1],SystemFunctions[1],Security[1],RealTimeSecLog[1]
```

Gen2:

SecM MOs are used to configure LDAP and Certificate authorization and authentication methods
More info:
 - **http://lte-plm.rnd.ki.sw.ericsson.se/lte_trsh_wiki/G2P/index.php?n=UseCases.G2NodeAccess**
 - **http://lte-plm.rnd.ki.sw.ericsson.se/lte_trsh_wiki/G2P/index.php?n=UseCases.G2OSSsyncronization**

```
ManagedElement[1],SystemFunctions[1],SecM[1]
ManagedElement[1],SystemFunctions[1],SecM[1],Tls[0-1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LocalAuthorizationMethod[1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LocalAuthorizationMethod[1],CustomRole[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LocalAuthorizationMethod[1],CustomRule[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LocalAuthorizationMethod[1],Role[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LocalAuthorizationMethod[1],Role[0-],Rule[1-]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],AuthenticationOrder[0-1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],AuthorizationOrder[0-1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LdapAuthenticationMethod[1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LdapAuthenticationMethod[1],Ldap[1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LdapAuthenticationMethod[1],Ldap[1],EricssonFilter[0-1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],LdapAuthenticationMethod[1],Ldap[1],Filter[0-1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],UserIdentity[1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],UserIdentity[1],MaintenanceUserSecurity[1]
ManagedElement[1],SystemFunctions[1],SecM[1],UserManagement[1],UserIdentity[1],MaintenanceUser[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1]
```

```
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1],CertMCapabilities[1]
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1],EnrollmentAuthority[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1],EnrollmentServerGroup[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1],EnrollmentServerGroup[0-],EnrollmentServer[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1],NodeCredential[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1],TrustCategory[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1],TrustedCertificate[0-]
ManagedElement[1],SystemFunctions[1],SecM[1],CertM[1],VendorCredential[0-1]
```

3.9.3   System Management

To configure the O&M access protocols and TCP ports used on the various O&M interfaces

<u>**Gen1:**</u>

 - FTP/SFTP client and server: handled via the "secmode" coli command

- Ntp and Time Management: for configuring the date and time of the node
```
ManagedElement[1],SystemFunctions[1],TimeSetting[1]
ManagedElement[1],SystemFunctions[1],TimeSetting[1],NtpServer[0-10]
```

<u>**Gen2:**</u>

- Ntp and Time Management: for configuring the date and time of the node
```
ManagedElement[1],SystemFunctions[1],SysM[1],NtpServer[0-]
ManagedElement[1],SystemFunctions[1],SysM[1],TimeM[1]
ManagedElement[1],SystemFunctions[1],SysM[1],TimeM[1],DateAndTime[1]
```

 - SNMP (for sending alarms and alerts notifications)
```
ManagedElement[1],SystemFunctions[1],SysM[1]
ManagedElement[1],SystemFunctions[1],SysM[1],Snmp[1]
ManagedElement[1],SystemFunctions[1],SysM[1],Snmp[1],SnmpTargetV1[0-]
ManagedElement[1],SystemFunctions[1],SysM[1],Snmp[1],SnmpTargetV2C[0-]
ManagedElement[1],SystemFunctions[1],SysM[1],Snmp[1],SnmpTargetV3Dtls[0-]
ManagedElement[1],SystemFunctions[1],SysM[1],Snmp[1],SnmpTargetV3[0-]
ManagedElement[1],SystemFunctions[1],SysM[1],Snmp[1],SnmpViewV1[0-]
ManagedElement[1],SystemFunctions[1],SysM[1],Snmp[1],SnmpViewV2C[0-]
ManagedElement[1],SystemFunctions[1],SysM[1],Snmp[1],SnmpViewV3[0-]
```

 - COMCLI over SSH, COMCLI over TLS
```
ManagedElement[1],SystemFunctions[1],SysM[1],CliSsh[0-1]
ManagedElement[1],SystemFunctions[1],SysM[1],CliTls[0-1]
```

 - NETCONF over SSH, NETCONF over TLS

```
ManagedElement[1],SystemFunctions[1],SysM[1],NetconfSsh[0-1]
ManagedElement[1],SystemFunctions[1],SysM[1],NetconfTls[0-1]
```

- SFTP/FTPS client and server:
The client is used by the node for pushing logs and fetching SW or license file.
The server is used for providing the PM ROP files
```
ManagedElement[1],SystemFunctions[1],SysM[1],FileTPM[1],Sftp[0-1]
ManagedElement[1],SystemFunctions[1],SysM[1],FileTPM[1],Sftp[0-1],SftpServer[0-1]
ManagedElement[1],SystemFunctions[1],SysM[1],FileTPM[1],FtpTls[0-1]
ManagedElement[1],SystemFunctions[1],SysM[1],FileTPM[1],FtpTls[0-1],FtpTlsServer[0-1]
```

- HTTPS: for fetching MOM fragments
```
ManagedElement[1],SystemFunctions[1],SysM[1],HttpM[1]
ManagedElement[1],SystemFunctions[1],SysM[1],HttpM[1],Https[0-1]
```

- **OamAccessPoint: to configure the O&M IP address of the node**
```
ManagedElement[1],SystemFunctions[1],SysM[1],OamAccessPoint[0-]
ManagedElement[1],SystemFunctions[1],SysM[1],OamTrafficClass[0-]
```

- **Schema: each Schema MO represents a MOM fragment (name and version)**
```
ManagedElement[1],SystemFunctions[1],SysM[1],Schema[2-]
```

3.9.4 Backup & Restore Management

Gen1

```
ManagedElement[1],SwManagement[1],ConfigurationVersion[1]
```

Gen2

```
ManagedElement[1],SystemFunctions[1],BrM[1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupHousekeeping[0-1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupLabelStore[0-1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupScheduler[0-1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupScheduler[0-1],BrmCalendarBasedPeriodicEvent[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupScheduler[0-1],BrmPeriodicEvent[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupScheduler[0-1],BrmSingleEvent[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackup[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmFailsafeBackup[1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmRollbackAtRestore[0-1]
```

3.9.5 License Management

Gen1

```
ManagedElement[1],SystemFunctions[1],Licensing[1]
ManagedElement[1],SystemFunctions[1],Licensing[1],CapacityFeatureLicense[0-]
ManagedElement[1],SystemFunctions[1],Licensing[1],OptionalFeatureLicense[0-]
```

Gen2

```
ManagedElement[1],SystemFunctions[1],Lm[1]
ManagedElement[1],SystemFunctions[1],Lm[1],AutonomousMode[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],CapacityKey[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],CapacityState[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],CapacityState[0-],GracePeriod[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],CapacityState[0-],WarningThreshold[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],EmergencyUnlock[1]
ManagedElement[1],SystemFunctions[1],Lm[1],FeatureKey[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],FeatureState[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],IntegrationUnlock[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],KeyFileManagement[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],KeyFileManagement[0-1],KeyFileInformation[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],MaintenanceUnlock[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],SystemTriggeredUnlock[0-1]
```

3.9.6   Log Management

Gen1

Logs are fetched via FTP/SFTP transfer but it is also possible to configure some Log MOs (eg Audit trail) to be pushed to a server

```
ManagedElement[1],SystemFunctions[1],LogService[1]
ManagedElement[1],SystemFunctions[1],LogService[1],Log[0-]
```

Gen2

Logs can <u>not</u> be fetched via FTP/SFTP transfer but must be pushed to server via Log MOs

```
ManagedElement[1],SystemFunctions[1],LogM[1]
ManagedElement[1],SystemFunctions[1],LogM[1],Log[0-]
ManagedElement[1],SystemFunctions[1],LogM[1],Log[0-],LogPushTransfer[0-5]
```

3.9.7   Performance Management

Gen1

Very few MOs as most operations are done via a separate interface (PMCI)

Counter based measurements

```
ManagedElement[1],SystemFunctions[1],PmService[1]
ManagedElement[1],ENodeBFunction[1],PmFlexCounterFilter[0-8]
```

Event based measurements

```
ManagedElement[1],ENodeBFunction[1],PmEventService[1]
```

Gen2

Counter based measurements

```
ManagedElement[1],SystemFunctions[1],Pm[1]
ManagedElement[1],SystemFunctions[1],Pm[1],PmGroup[0-]
ManagedElement[1],SystemFunctions[1],Pm[1],PmGroup[0-],MeasurementType[1-]
ManagedElement[1],SystemFunctions[1],Pm[1],PmJob[0-]
ManagedElement[1],SystemFunctions[1],Pm[1],PmJob[0-],MeasurementReader[1-]
ManagedElement[1],SystemFunctions[1],Pm[1],PmJob[0-],MeasurementReader[1-],PmThresholdMonitoring[0-4]
ManagedElement[1],SystemFunctions[1],Pm[1],PmMeasurementCapabilities[1]
```

Event based measurements

```
ManagedElement[1],ENodeBFunction[1],PmEventService[1]

ManagedElement[1],SystemFunctions[1],PmEventM[1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventCapabilities[1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventFilterType[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventGroup[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventGroup[0-],EventType[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventJob[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],FilePullCapabilities[0-1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],StreamingCapabilities[0-1]
```

3.9.8   Software Inventory

List all SW loadmodules installed in the node.

Gen1
```
ManagedElement[1],SwManagement[1],LoadModule[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],Program[0-]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],XpProgram[0-2]
```

Gen2

A SwVersion is a group of SwItems that belong to the same SW package (equivalent to UpgradePackage in CPP)
```
ManagedElement[1],SystemFunctions[1],SwInventory[1]
ManagedElement[1],SystemFunctions[1],SwInventory[1],SwItem[0-]
ManagedElement[1],SystemFunctions[1],SwInventory[1],SwVersion[0-]
```

3.9.9 Software Management

For SW installation, upgrade, and removal

Gen1
```
ManagedElement[1],SwManagement[1],UpgradePackage[0-]
```

Gen2
```
ManagedElement[1],SystemFunctions[1],SwM[1]
ManagedElement[1],SystemFunctions[1],SwM[1],UpgradePackage[0-]
```

3.9.10 Equipment Handling

Same MO structure except for the following: PlugInUnit/AuxPlugInUnit/HwUnit (Gen1) replaced by FieldReplaceableUnit (Gen2)

Gen1

```
ManagedElement[1],Equipment[1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],RetSubUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],TmaSubUnit[0-6]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8],AuPort[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],MulticastAntennaBranch[0-2]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],RfBranch[0-24]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],TmfConfiguration[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],AlarmPort[0-8]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],BbProcessingResource[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],MpProcessingResource[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],PimcDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],RdicDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],RfPort[0-10]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],TrDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],Transceiver[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],XmuDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],XpProgram[0-2]
```

```
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],EcPort[0-]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],IplPort[0-]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],RdiPort[0-8]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],RiPort[0-16]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],SubDeviceGroup[0-]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],SubDeviceGroup[0-],CellDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],SubDeviceGroup[0-],RicmDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],SubDeviceGroup[0-],TrDeviceSet[0-1]
ManagedElement[1],Equipment[1],Cabinet[0-7]
ManagedElement[1],Equipment[1],Cabinet[0-7],FanGroup[0-16]
ManagedElement[1],Equipment[1],EcBus[0-7]
ManagedElement[1],Equipment[1],ExternalNode[0-7]
ManagedElement[1],Equipment[1],ExternalNode[0-7],EcPort[0-2]
ManagedElement[1],Equipment[1],HwGroup[0-]
ManagedElement[1],Equipment[1],HwUnit[0-]
ManagedElement[1],Equipment[1],HwUnit[0-],AlarmPort[0-32]
ManagedElement[1],Equipment[1],HwUnit[0-],ControlPort[0-8]
ManagedElement[1],Equipment[1],HwUnit[0-],EFuse[0-32]
ManagedElement[1],Equipment[1],HwUnit[0-],EFuse[0-32],EnergyMeter[0-1]
ManagedElement[1],Equipment[1],HwUnit[0-],EcPort[0-1]
ManagedElement[1],Equipment[1],HwUnit[0-],EnergyMeter[0-1]
ManagedElement[1],Equipment[1],HwUnit[0-],PlugInModule[0-32]
ManagedElement[1],Equipment[1],InterPiuLink[0-1]
ManagedElement[1],Equipment[1],Jvm[1]
ManagedElement[1],Equipment[1],RiLink[0-]
ManagedElement[1],Equipment[1],Shelf[0-]
ManagedElement[1],Equipment[1],SubrackProdType[0-]
ManagedElement[1],Equipment[1],Subrack[0-9]
ManagedElement[1],Equipment[1],Subrack[0-9],AppUnit[0-2]
ManagedElement[1],Equipment[1],Subrack[0-9],CaxFanUnit[0-2]
ManagedElement[1],Equipment[1],Subrack[0-9],PfmUnit[0-2]
ManagedElement[1],Equipment[1],Subrack[0-9],PfmUnit[0-2],Program[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],AlarmPort[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],BbProcessingResource[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],MpProcessingResource[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],PimcDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],RdicDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],RfPort[0-10]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],TrDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],Transceiver[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],XmuDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],DeviceGroup[0-1],XpProgram[0-2]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],EcPort[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-16]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-
16],DscpGroup[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-
16],IpFlowMonitor[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],Program[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],GeneralProcessorUnit[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],GeneralProcessorUnit[0-1],MediumAccessUnit[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],GeneralProcessorUnit[0-1],ProcessorLoad[0-4]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],Program[0-]
```

```
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],RiPort[0-6]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SrioTestPort[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SubDeviceGroup[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SubDeviceGroup[0-],CellDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SubDeviceGroup[0-],RicmDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SubDeviceGroup[0-],TrDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SystemClockDistribution[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],GpsOutSyncLink[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],GpsSyncRef[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],HptsiSyncRef[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],Program[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],TuSyncRef[0-3]
ManagedElement[1],Equipment[1],SupportUnit[0-]
ManagedElement[1],EquipmentSupportFunction[0-2]
ManagedElement[1],EquipmentSupportFunction[0-2],BatteryBackup[0-7]
ManagedElement[1],EquipmentSupportFunction[0-2],Climate[0-7]
ManagedElement[1],EquipmentSupportFunction[0-2],EnergyMeasurement[0-16]
ManagedElement[1],EquipmentSupportFunction[0-2],PowerDistribution[0-7]
ManagedElement[1],EquipmentSupportFunction[0-2],PowerSupply[0-7]
```

Gen2

```
ManagedElement[1],Equipment[1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],RetSubUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],TmaSubUnit[0-6]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8],AuPort[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],RfBranch[0-24]
ManagedElement[1],Equipment[1],Cabinet[0-]
ManagedElement[1],Equipment[1],Cabinet[0-],FanGroup[0-]
ManagedElement[1],Equipment[1],DiLink[0-]
ManagedElement[1],Equipment[1],EcBus[0-]
ManagedElement[1],Equipment[1],ExternalNode[0-]
ManagedElement[1],Equipment[1],ExternalNode[0-],EcPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],BbProcessingResource[0-1]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],MpProcessingResource[0-1]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],AlarmPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],DiPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],EFuse[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],EcPort[0-1]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],EnergyMeter[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],PlugInModule[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],RfPort[0-10]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],RiPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],SyncPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],TnPort[0-]
ManagedElement[1],Equipment[1],HwGroup[0-]
ManagedElement[1],Equipment[1],RiLink[0-]
ManagedElement[1],Equipment[1],SupportUnit[0-]
ManagedElement[1],EquipmentSupportFunction[1]
ManagedElement[1],EquipmentSupportFunction[1],BatteryBackup[0-]
```

```
ManagedElement[1],EquipmentSupportFunction[1],Climate[0-]
ManagedElement[1],EquipmentSupportFunction[1],EnergyMeasurement[0-]
ManagedElement[1],EquipmentSupportFunction[1],PowerDistribution[0-]
ManagedElement[1],EquipmentSupportFunction[1],PowerSupply[0-]
```

3.9.11 Transport Network

Transport MOM is the Management area that differs the most between Gen1 and Gen2

- Network Synchronization

Gen1
```
ManagedElement[1],TransportNetwork[1],Synchronization[1]
ManagedElement[1],TransportNetwork[1],Synchronization[1],NodeGroupSyncMember[0-1]
ManagedElement[1],TransportNetwork[1],Synchronization[1],PacketFrequencySyncRef[0-8]
ManagedElement[1],TransportNetwork[1],Synchronization[1],PacketTimeSyncRef[0-8]
ManagedElement[1],TransportNetwork[1],Synchronization[1],SyncEthEgress[0-30]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],GpsSyncRef[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],HptsiSyncRef[0-1]
ManagedElement[1],IpSystem[1],IpAccessHostEt[0-2500],IpSyncRef[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],TuSyncRef[0-3]
```

Gen2
```
ManagedElement[1],Transport[0-1]
ManagedElement[1],Transport[0-1],Ntp[0-1]
ManagedElement[1],Transport[0-1],Ntp[0-1],NtpFrequencySync[0-8]
ManagedElement[1],Transport[0-1],Ptp[0-1]
ManagedElement[1],Transport[0-1],Ptp[0-1],BoundaryOrdinaryClock[0-9]
ManagedElement[1],Transport[0-1],Ptp[0-1],BoundaryOrdinaryClock[0-9],PtpBcOcPort[0-]
ManagedElement[1],Transport[0-1],Synchronization[1]
ManagedElement[1],Transport[0-1],Synchronization[1],FrequencySyncIO[0-8]
ManagedElement[1],Transport[0-1],Synchronization[1],RadioEquipmentClock[0-1]
ManagedElement[1],Transport[0-1],Synchronization[1],RadioEquipmentClock[0-1],NodeGroupSyncMember[0-1]
ManagedElement[1],Transport[0-1],Synchronization[1],RadioEquipmentClock[0-1],RadioEquipmentClockReference[0-8]
ManagedElement[1],Transport[0-1],Synchronization[1],TimeSyncIO[0-8]
ManagedElement[1],Transport[0-1],Synchronization[1],TimeSyncIO[0-8],GnssInfo[0-1]
```

- Ethernet/IP

Gen1

```
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-16]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-16],DscpGroup[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-16],IpFlowMonitor[0-8]
```

```
ManagedElement[1],IpSystem[1]
ManagedElement[1],IpSystem[1],AccessControlList[0-]
ManagedElement[1],IpSystem[1],DnsResolver[0-]
ManagedElement[1],IpSystem[1],EthernetOamLocalMep[0-8]
ManagedElement[1],IpSystem[1],EthernetOamLocalMep[0-8],EthernetOamRemoteMep[0-510]
ManagedElement[1],IpSystem[1],Icmp[0-1]
ManagedElement[1],IpSystem[1],IpAccessHostEt[0-2500]
ManagedElement[1],IpSystem[1],IpAccessHostEt[0-2500],IpSyncRef[0-8]
ManagedElement[1],IpSystem[1],IpAccessSctp[0-]
ManagedElement[1],IpSystem[1],IpLicensing[0-1]
ManagedElement[1],IpSystem[1],IpSec[0-1]
ManagedElement[1],IpSystem[1],IpSec[0-1],IkePeer[0-]
ManagedElement[1],IpSystem[1],IpSec[0-1],IpSecTunnel[0-]
ManagedElement[1],IpSystem[1],Ippm[0-1]
ManagedElement[1],IpSystem[1],Ippm[0-1],TwampResponder[0-32]
ManagedElement[1],IpSystem[1],Ipv6Interface[0-]
ManagedElement[1],IpSystem[1],Ipv6Interface[0-],DscpGroup[0-8]
ManagedElement[1],IpSystem[1],Ipv6Interface[0-],IpFlowMonitor[0-8]
ManagedElement[1],IpSystem[1],Ipv6[0-1]
ManagedElement[1],IpSystem[1],MulticastListener[0-1]
ManagedElement[1],IpSystem[1],TrafficManagement[0-1]
ManagedElement[1],IpSystem[1],TrafficManagement[0-1],TrafficScheduler[0-]
ManagedElement[1],IpSystem[1],TrafficManagement[0-1],TrafficScheduler[0-],TrafficManagementQueue[0-]
ManagedElement[1],IpSystem[1],VpnInterface[0-]
ManagedElement[1],IpSystem[1],VpnInterface[0-],PeerIpSecProfile[0-1]
ManagedElement[1],IpSystem[1],VpnInterface[0-],PeerIpSecTunnel[0-256]
```

Gen2

```
ManagedElement[1],Transport[0-1],BfdProfile[0-64]
ManagedElement[1],Transport[0-1],Bridge[0-256]
ManagedElement[1],Transport[0-1],EthernetOamLocalMep[0-16]
ManagedElement[1],Transport[0-1],EthernetOamLocalMep[0-16],EthernetOamRemoteMep[0-510]
ManagedElement[1],Transport[0-1],EthernetPort[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QoSClassifier[1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QoSClassifier[1],PcpToQueueMap[1-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QoSClassifier[1],PcpToQueueMap[1-],PcpSetToQueue[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QueueRed[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QueueTailDrop[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],QueueRed[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],QueueTailDrop[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],QueueRed[0-4]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],QueueTailDrop[0-4]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],SchedulerDwrr[0-4]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],SchedulerDwrr[0-4],QueueRed[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],SchedulerDwrr[0-4],QueueTailDrop[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],SchedulerDwrr[0-4],SchedulerSp[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],QueueRed[0-4]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerSp[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],Shaper[0-1]
ManagedElement[1],Transport[0-1],VlanPort[0-]
ManagedElement[1],Transport[0-1],Ikev2PolicyProfile[0-1]
ManagedElement[1],Transport[0-1],IpsecProposalProfile[0-1]
```

```
ManagedElement[1],Transport[0-1],Router[0-8]
ManagedElement[1],Transport[0-1],Router[0-8],BfdProfile[0-64]
ManagedElement[1],Transport[0-1],Router[0-8],BfdSessionIPv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],DhcpRelayIPv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],DnsClient[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],AclIpv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],AclIpv4[0-],AclEntryIpv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],AclIpv6[0-]
ManagedElement[1],Transport[0-1],Router[0-8],AclIpv6[0-],AclEntryIpv6[0-]
ManagedElement[1],Transport[0-1],Router[0-8],IpsecTunnel[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],IpsecTunnel[0-1],Ikev2Session[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],IpsecTunnel[0-1],IpsecPolicy[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],InterfaceIPv4[0-256]
ManagedElement[1],Transport[0-1],Router[0-8],InterfaceIPv4[0-256],AddressIPv4[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],InterfaceIPv6[0-256]
ManagedElement[1],Transport[0-1],Router[0-8],InterfaceIPv6[0-256],AddressIPv6[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32],Area[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32],Area[0-1],Interface[0-]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32],Area[0-1],Nssa[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32],Area[0-1],Stub[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],RoutingPolicyIpv4[0-16]
ManagedElement[1],Transport[0-1],Router[0-8],RoutingPolicyIpv4[0-16],RoutingRuleIpv4[0-8]
ManagedElement[1],Transport[0-1],Router[0-8],RoutingPolicyIpv4[0-16],RoutingRuleIpv4[0-8],NextHop[1-2]
ManagedElement[1],Transport[0-1],Router[0-8],PeerIPv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv4Static[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv4Static[0-1],Dst[0-]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv4Static[0-1],Dst[0-],NextHop[0-]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv6Static[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv6Static[0-1],Dst[0-]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv6Static[0-1],Dst[0-],NextHop[0-]
ManagedElement[1],Transport[0-1],Router[0-8],TwampLightResponder[0-8]
ManagedElement[1],Transport[0-1],QosProfiles[1]
ManagedElement[1],Transport[0-1],QosProfiles[1],DscpPcpMapDefault[1]
ManagedElement[1],Transport[0-1],QosProfiles[1],DscpPcpMap[0-]
```

- SCTP

Gen1
```
ManagedElement[1],IpSystem[1],IpAccessSctp[0-]
ManagedElement[1],TransportNetwork[1],Sctp[0-]
ManagedElement[1],TransportNetwork[1],Sctp[0-],SctpAssociation[0-512]
ManagedElement[1],TransportNetwork[1],SctpProfile[0-128]
```

Gen2
```
ManagedElement[1],Transport[0-1],SctpEndpoint[0-]
ManagedElement[1],Transport[0-1],SctpEndpoint[0-],SctpAssociation[0-]
ManagedElement[1],Transport[0-1],SctpProfile[0-]
ManagedElement[1],Transport[0-1],Sctp[0-1]
```

3.9.12 Radio Network

- The GRAT MOM is new in Gen2 (GSM Gen1 RBS does not have a MOM)

```
ManagedElement[1],BtsFunction[0-1]
ManagedElement[1],BtsFunction[0-1],GsmSector[0-]
ManagedElement[1],BtsFunction[0-1],GsmSector[0-],AbisIp[0-1]
ManagedElement[1],BtsFunction[0-1],GsmSector[0-],Trx[0-12]
```

- The LRAT MOM is the same in Gen1 as in Gen2

```
ManagedElement[1],ENodeBFunction[0-1]
ManagedElement[1],ENodeBFunction[0-1],AdmissionControl[1]
ManagedElement[1],ENodeBFunction[0-1],AirIfLoadProfile[0-24]
ManagedElement[1],ENodeBFunction[0-1],AnrFunction[1]
ManagedElement[1],ENodeBFunction[0-1],AnrFunction[1],AnrFunctionEUtran[1]
ManagedElement[1],ENodeBFunction[0-1],AnrFunction[1],AnrFunctionGeran[1]
ManagedElement[1],ENodeBFunction[0-1],AnrFunction[1],AnrFunctionUtran[1]
ManagedElement[1],ENodeBFunction[0-1],AutoCellCapEstFunction[1]
ManagedElement[1],ENodeBFunction[0-1],CarrierAggregationFunction[1]
ManagedElement[1],ENodeBFunction[0-1],Cdma2000Network[0-1]
ManagedElement[1],ENodeBFunction[0-1],Cdma2000Network[0-1],Cdma2000FreqBand[0-18]
ManagedElement[1],ENodeBFunction[0-1],Cdma2000Network[0-1],Cdma2000FreqBand[0-18],Cdma2000Freq[0-64]
ManagedElement[1],ENodeBFunction[0-1],Cdma2000Network[0-1],Cdma2000FreqBand[0-18],Cdma2000Freq[0-64],ExternalCdma20001xRttCell[0-392]
ManagedElement[1],ENodeBFunction[0-1],Cdma2000Network[0-1],Cdma2000FreqBand[0-18],Cdma2000Freq[0-64],ExternalCdma2000Cell[0-392]
ManagedElement[1],ENodeBFunction[0-1],CellSleepNodeFunction[1]
ManagedElement[1],ENodeBFunction[0-1],DlComp[1]
ManagedElement[1],ENodeBFunction[0-1],DrxProfile[19]
ManagedElement[1],ENodeBFunction[0-1],EUtraNetwork[1]
ManagedElement[1],ENodeBFunction[0-1],EUtraNetwork[1],EUtranFrequency[0-24]
ManagedElement[1],ENodeBFunction[0-1],EUtraNetwork[1],ExternalENodeBFunction[0-256]
ManagedElement[1],ENodeBFunction[0-1],EUtraNetwork[1],ExternalENodeBFunction[0-256],ExternalEUtranCellFDD[0-24]
ManagedElement[1],ENodeBFunction[0-1],EUtraNetwork[1],ExternalENodeBFunction[0-256],ExternalEUtranCellTDD[0-24]
ManagedElement[1],ENodeBFunction[0-1],EUtraNetwork[1],ExternalENodeBFunction[0-256],TermPointToENB[0-1]
ManagedElement[1],ENodeBFunction[0-1],EUtraNetwork[1],ExternalENodeBFunction[0-256],TermPointToENB[0-1],TermPointToLbm[0-9]
ManagedElement[1],ENodeBFunction[0-1],EUtraNetwork[1],ExternalENodeBFunction[0-256],TermPointToENB[0-1],TermPointToLbm[0-9],GtpuApplicationTunnel[2]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],Cdma20001xRttBandRelation[0-32]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],Cdma20001xRttBandRelation[0-32],Cdma20001xRttFreqRelation[0-64]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],Cdma20001xRttBandRelation[0-32],Cdma20001xRttFreqRelation[0-64],Cdma20001xRttCellRelation[0-64]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],Cdma2000FreqBandRelation[0-32]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],Cdma2000FreqBandRelation[0-32],Cdma2000CellRelation[0-64]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],Cdma2000FreqBandRelation[0-32],Cdma2000FreqRelation[0-64]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],CellPortion[0-256]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],CellSleepFunction[1]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],EUtranFreqRelation[0-8]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],EUtranFreqRelation[0-8],EUtranCellRelation[0-128]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],Etws[1]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],GeranFreqGroupRelation[0-16]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],GeranFreqGroupRelation[0-16],GeranCellRelation[0-64]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],MimoSleepFunction[1]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],UeMeasControl[1]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],UeMeasControl[1],PmUeMeasControl[0-1]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],UeMeasControl[1],ReportConfigA1Prim[1]
....
```

```
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],UtranFreqRelation[0-16]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],UtranFreqRelation[0-16],UtranCellRelation[0-64]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],UtranTDDFreqRelation[0-16]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellFDD[0-24],UtranTDDFreqRelation[0-16],UtranCellRelation[0-64]
ManagedElement[1],ENodeBFunction[0-1],EUtranCellTDD[0-24]
....
ManagedElement[1],ENodeBFunction[0-1],GeraNetwork[0-1]
ManagedElement[1],ENodeBFunction[0-1],GeraNetwork[0-1],ExternalGeranCell[0-8192]
ManagedElement[1],ENodeBFunction[0-1],GeraNetwork[0-1],GeranFreqGroup[0-192]
ManagedElement[1],ENodeBFunction[0-1],GeraNetwork[0-1],GeranFrequency[0-512]
ManagedElement[1],ENodeBFunction[0-1],ImeisvTable[1]
ManagedElement[1],ENodeBFunction[0-1],ImeisvTable[1],ImeisvProfile[0-150]
ManagedElement[1],ENodeBFunction[0-1],LoadBalancingFunction[1]
ManagedElement[1],ENodeBFunction[0-1],LoadBalancingFunction[1],IdleModePrioAtRelease[0-8]
ManagedElement[1],ENodeBFunction[0-1],Mbms[0-1]
ManagedElement[1],ENodeBFunction[0-1],Mbms[0-1],MbsfnArea[0-48]
ManagedElement[1],ENodeBFunction[0-1],Mbms[0-1],MbsfnArea[0-48],MbsfnAreaCellRelation[0-24]
ManagedElement[1],ENodeBFunction[0-1],Mbms[0-1],MbsfnArea[0-48],PmchMch[0-15]
ManagedElement[1],ENodeBFunction[0-1],Mbms[0-1],MbsfnArea[0-48],PmchMch[0-15],MbmsService[0-28]
ManagedElement[1],ENodeBFunction[0-1],MdtConfiguration[1]
ManagedElement[1],ENodeBFunction[0-1],NonPlannedPciDrxProfile[1]
ManagedElement[1],ENodeBFunction[0-1],Paging[1]
ManagedElement[1],ENodeBFunction[0-1],ParameterChangeRequests[1]
ManagedElement[1],ENodeBFunction[0-1],PmEventService[1]
ManagedElement[1],ENodeBFunction[0-1],PreschedulingProfile[1]
ManagedElement[1],ENodeBFunction[0-1],PwsCmas[0-64]
ManagedElement[1],ENodeBFunction[0-1],PwsEtws[1]
ManagedElement[1],ENodeBFunction[0-1],QciTable[1]
ManagedElement[1],ENodeBFunction[0-1],QciTable[1],LogicalChannelGroup[4]
ManagedElement[1],ENodeBFunction[0-1],QciTable[1],QciProfileOperatorDefined[0-9]
ManagedElement[1],ENodeBFunction[0-1],QciTable[1],QciProfilePredefined[10]
ManagedElement[1],ENodeBFunction[0-1],RadioBearerTable[1]
ManagedElement[1],ENodeBFunction[0-1],RadioBearerTable[1],DataRadioBearer[1]
ManagedElement[1],ENodeBFunction[0-1],RadioBearerTable[1],MACConfiguration[1]
ManagedElement[1],ENodeBFunction[0-1],RadioBearerTable[1],SignalingRadioBearer[1]
ManagedElement[1],ENodeBFunction[0-1],Rcs[1]
ManagedElement[1],ENodeBFunction[0-1],RlfProfile[19]
ManagedElement[1],ENodeBFunction[0-1],Rrc[1]
ManagedElement[1],ENodeBFunction[0-1],SectorCarrier[0-48]
ManagedElement[1],ENodeBFunction[0-1],SectorCarrier[0-48],PmUlInterferenceReport[0-8]
ManagedElement[1],ENodeBFunction[0-1],SecurityHandling[1]
ManagedElement[1],ENodeBFunction[0-1],SrbTable[1]
ManagedElement[1],ENodeBFunction[0-1],SrbTable[1],Srb1Profile[1]
ManagedElement[1],ENodeBFunction[0-1],SrbTable[1],Srb2Profile[1]
ManagedElement[1],ENodeBFunction[0-1],SrbTable[1],SrbLogicalChannelGroup[1]
ManagedElement[1],ENodeBFunction[0-1],SubscriberProfileID[0-1]
ManagedElement[1],ENodeBFunction[0-1],SubscriberProfileID[0-1],HoWhiteList[0-1]
ManagedElement[1],ENodeBFunction[0-1],SubscriberProfileID[0-1],RATFreqPrio[0-8]
ManagedElement[1],ENodeBFunction[0-1],TermPointToMme[0-64]
ManagedElement[1],ENodeBFunction[0-1],UcToolFunction[1]
ManagedElement[1],ENodeBFunction[0-1],UlCompGroup[0-24]
ManagedElement[1],ENodeBFunction[0-1],UtraNetwork[0-1]
ManagedElement[1],ENodeBFunction[0-1],UtraNetwork[0-1],UtranFrequency[0-64]
ManagedElement[1],ENodeBFunction[0-1],UtraNetwork[0-1],UtranFrequency[0-64],ExternalUtranCellFDD[0-392]
ManagedElement[1],ENodeBFunction[0-1],UtraNetwork[0-1],UtranFrequency[0-64],ExternalUtranCellTDD[0-392]
ManagedElement[1],MceFunction[0-1]
ManagedElement[1],MceFunction[0-1],TermPointToMmeM3[0-64]
```

- The WRAT MOM is different in Gen1 vs Gen2

Gen1

```
ManagedElement[1],NodeBFunction[1]
ManagedElement[1],NodeBFunction[1],CommContexts[1]
ManagedElement[1],NodeBFunction[1],Iub[0-1]
ManagedElement[1],NodeBFunction[1],Iub[0-1],IubDataStreams[1]
ManagedElement[1],NodeBFunction[1],Iub[0-1],NbapCommon[0-1]
ManagedElement[1],NodeBFunction[1],Iub[0-1],NbapDedicated[0-1]
ManagedElement[1],NodeBFunction[1],RbsConfiguration[1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Aich[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],EDchResourcesCell[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],HsDschResources[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Mich[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Pccpch[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Pccpch[0-1],Bch[1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Pcpich[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Pich[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Psch[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],RadioLinksCell[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Sccpch[0-14]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Sccpch[0-14],Fach[0-2]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Sccpch[0-14],Pch[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Scpich[0-1]
ManagedElement[1],NodeBFunction[1],RbsLocalCell[0-18],Ssch[0-1]
ManagedElement[1],NodeBFunction[1],RbsSynchronization[1]
ManagedElement[1],NodeBFunction[1],Sector[0-12]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Aich[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],EDchResources[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],HsDschResources[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Mich[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Pccpch[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Pccpch[0-1],Bch[1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Pcpich[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Pich[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Prach[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Prach[0-1],Rach[1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Psch[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],RadioLinks[1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Sccpch[0-14]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Sccpch[0-14],Fach[0-2]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Sccpch[0-14],Pch[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Scpich[0-1]
ManagedElement[1],NodeBFunction[1],Sector[0-12],Carrier[0-8],Ssch[0-1]
ManagedElement[1],NodeBFunction[1],SystemConstants[1]
ManagedElement[1],NodeBFunction[1],UlSpectrumAnalyzer[0-4]
```

Gen2

```
ManagedElement[1],NodeBFunction[0-1]
ManagedElement[1],NodeBFunction[0-1],CommunicationContexts[1]
ManagedElement[1],NodeBFunction[0-1],Iub[0-1]
ManagedElement[1],NodeBFunction[0-1],Iub[0-1],IubDataStreams[0-1]
```

```
ManagedElement[1],NodeBFunction[0-1],Iub[0-1],NbapCommon[0-1]
ManagedElement[1],NodeBFunction[0-1],Iub[0-1],NbapDedicated[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-6]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-6],CellResources[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-6],CommonChannelResourcesDl[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-6],HsDschResources[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-6],NodeBSectorCarrier[0-3]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-6],NodeBSectorCarrier[0-3],CommonChannelResourcesUl[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-6],NodeBSectorCarrier[0-3],EDchResources[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-6],RadioLinks[1]
```

4   Alarm Interface

4.1   Listing active alarms

The "al" command works both for CPP and COM nodes

```
ENB> al


==============================================================================================
Sever Specific Problem                    MO (Cause/AdditionalInfo)
==============================================================================================
Min   External Link Failure               ENodeBFunction=1 (X2 link problem to one or several neighbouring eNodeBs. AI: PLMN ID-eNB ID 1 = 5051-
530824PLMN ID-eNB ID 2 = 5051-530581PLMN ID-eNB ID 3 = 5051-530878)
Min   No Connection                       ExternalNode=1 (EquipmentMalfunction)
>>> Total: 2 Alarms (0 Critical, 0 Major)


ENB> alt


==============================================================================================
Date & Time (UTC)   S Specific Problem      MO (Cause/AdditionalInfo)
==============================================================================================
2017-03-06 06:03:00 m No Connection         ExternalNode=1 (EquipmentMalfunction)
2017-03-28 17:54:46 m External Link Failure ENodeBFunction=1 (X2 link problem to one or several neighbouring eNodeBs. AI: PLMN ID-
eNB ID 1 = 5051-530824PLMN ID-eNB ID 2 = 5051-530581PLMN ID-eNB ID 3 = 5051-530878)
>>> Total: 2 Alarms (0 Critical, 0 Major)


ENB> alc


Date;Time;Severity;Object;Problem;Cause;AdditionalText;AckState;AlarmId;NotificationId
2017-03-28;17:54:46;Minor;ManagedElement=VIC_AADP15_ARDEER_WEST_533354,ENodeBFunction=1;External Link Failure;LinkFailure;X2 link problem to one
or several neighbouring eNodeBs. AI: 0:PLMN ID-eNB ID 1 = 5051-530824,0:PLMN ID-eNB ID 2 = 5051-530581,0:PLMN ID-eNB ID 3 = 5051-
530878,0:eventId=0;;7;3729
2017-03-06;06:03:00;Minor;ManagedElement=VIC_AADP15_ARDEER_WEST_533354,Equipment=1,ExternalNode=1;No Connection;EquipmentMalfunction; AI:
0:N/A,0:eventId=123,0:correlatedEvents[0]=0;;10;16
>>> Total: 2 Alarms (0 Critical, 0 Major)
```

In CPP , "al" fetches the alarm list via th Alarm Client Interface (ALCI)

In ECIM/COM nodes, "al" fetches the alarm list via the MO interface, by reading the "FmAlarm" MOs

```
MSRBSV2> momtl \.fm$


--------------------------------
LDNs containing ComFm.Fm (systemCreated)
--------------------------------
ManagedElement[1],SystemFunctions[1],Fm[1]
ManagedElement[1],SystemFunctions[1],Fm[1],FmAlarmModel[0-]
ManagedElement[1],SystemFunctions[1],Fm[1],FmAlarmModel[0-],FmAlarmType[0-]
ManagedElement[1],SystemFunctions[1],Fm[1],FmAlarm[0-]


MSRBSV2> get fm=1


=================================================================================
142                               SystemFunctions=1,Fm=1
=================================================================================
fmId                              1
heartbeatInterval                 60
lastChanged                       2015-10-28T07:55:00+00:00
lastSequenceNo                    1
sumCritical                       0
sumMajor                          0
sumMinor                          1
sumWarning                        0
totalActive                       1
=================================================================================
Total: 1 MOs



MSRBSV2> get fmalarm=


=================================================================================
143                               SystemFunctions=1,Fm=1,FmAlarm=3
=================================================================================
activeSeverity                    5 (MINOR)
additionalInfo                    t[3] =
 >>> Struct[0]  has 2 members:
 >>> 1.name = 0
 >>> 2.value = N/A
 >>> Struct[1]  has 2 members:
 >>> 1.name = 0
 >>> 2.value = eventId=123
 >>> Struct[2]  has 2 members:
 >>> 1.name = 0
 >>> 2.value = correlatedEvents[0]=0
additionalText                    SCU(A1), PDU(A2), PDU(B2) that is not configured detected.
```

```
eventType                          4 (PROCESSINGERRORALARM)
fmAlarmId                          3
lastEventTime                      2015-10-28T07:55:00+00:00
majorType                          193
minorType                          9175095
originalAdditionalText             SCU(A1), PDU(A2), PDU(B2) that is not configured detected.
originalEventTime                  2015-10-28T07:55:00+00:00
originalSeverity                   5 (MINOR)
probableCause                      307 (ConfigurationOrCustomizationError)
sequenceNumber                     1
source                             ManagedElement=1,EquipmentSupportFunction=1
specificProblem                    Number of HW Entities Mismatch
=================================================================================================
Total: 1 MOs
```

4.2 Configuring alarms severity

Only supported for ECIM/COM nodes. Done by setting attribut in FmAlarmType MO.

```
MSRBSV2> pr fmalarmtype

===========================================================================
Proxy  MO
===========================================================================
  145  SystemFunctions=1,Fm=1,FmAlarmModel=1,FmAlarmType=AlternateOAMConnectionInUse
  146  SystemFunctions=1,Fm=1,FmAlarmModel=1,FmAlarmType=ArchiveDiskAlmostFull
  147  SystemFunctions=1,Fm=1,FmAlarmModel=1,FmAlarmType=AutoExportBackupFailed
...<CUT>...
  249  SystemFunctions=1,Fm=1,FmAlarmModel=1,FmAlarmType=UnreliableResource
  250  SystemFunctions=1,Fm=1,FmAlarmModel=1,FmAlarmType=VSWROverThreshold
===========================================================================
Total: 106 MOs

MSRBSV2> momd fmalarmtype .

##########################################################################################################################
MO Class                 Attribute              Type                        Flags
##########################################################################################################################
ComFm.FmAlarmType        additionalText         string                      isNillable,readOnly,noNotification
ComFm.FmAlarmType        configuredSeverity     enumRef:ComFm.SeverityLevel isNillable
ComFm.FmAlarmType        defaultSeverity        enumRef:ComFm.SeverityLevel isNillable,readOnly,noNotification
ComFm.FmAlarmType        eventType              enumRef:ComFm.EventType     isNillable,readOnly,noNotification
ComFm.FmAlarmType        fmAlarmTypeId          string                      key,noNotification
ComFm.FmAlarmType        isStateful             boolean                     isNillable,readOnly,noNotification
ComFm.FmAlarmType        majorType              uint32                      isNillable,readOnly,noNotification
ComFm.FmAlarmType        minorType              uint32                      isNillable,readOnly,noNotification
ComFm.FmAlarmType        probableCause          derivedRef:ComFm.ProbableCause isNillable,readOnly,noNotification
ComFm.FmAlarmType        specificProblem        string                      isNillable,readOnly,noNotification
```

5 PM Interface

5.1 General concepts

NODE

pget, pdiff, pmxet

MIB

pst,pgets,pcr, pdel, pbl, pdeb

Statistics Scanner/Job

pst,pgets,pset, pbl, pdeb

Events Scanner/Job

MoShell/ AMOS

pmr,pmx

XML ROP file

pme

Binary ROP file
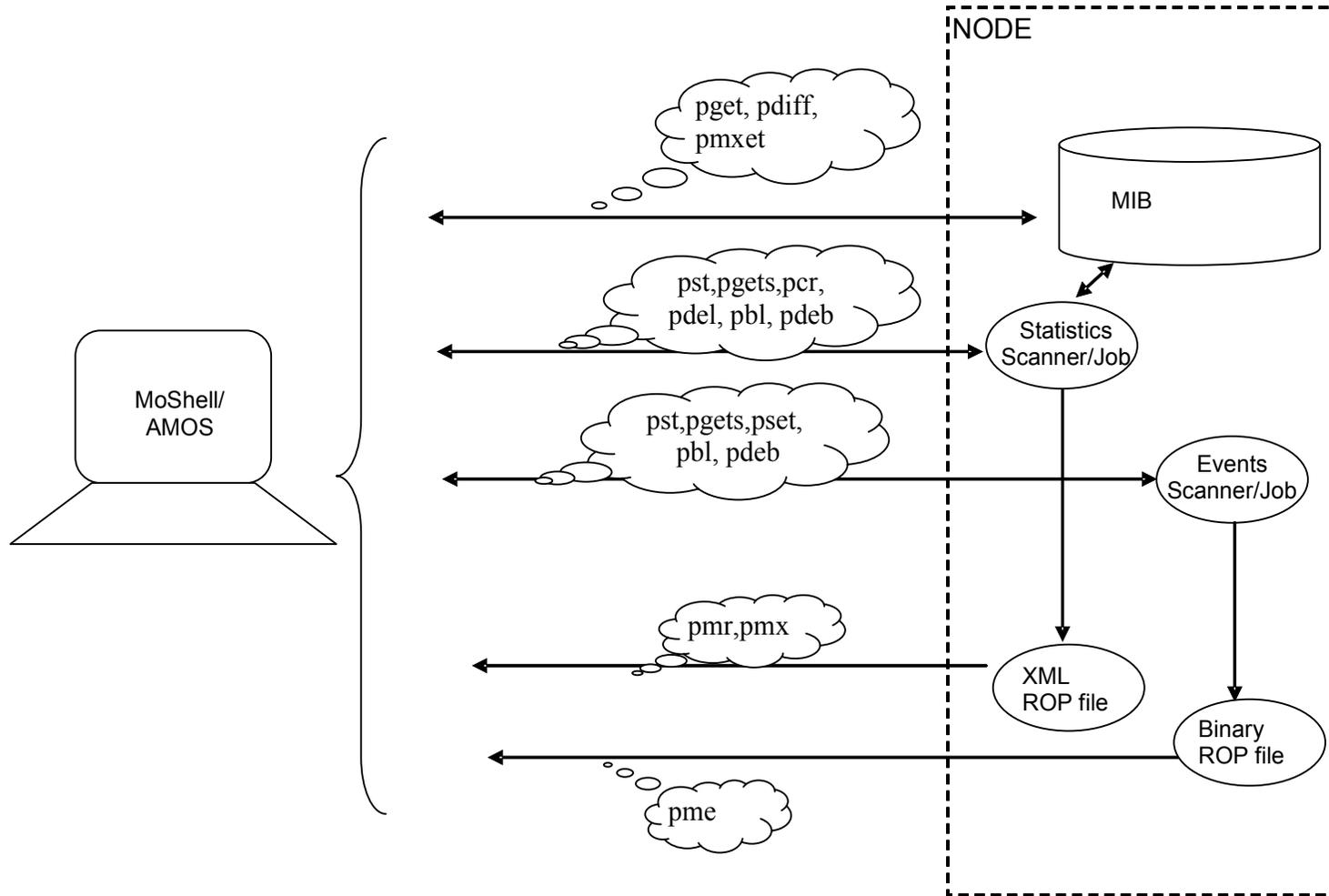
Gen1 MOM

Very few MOs as most operations are done via a separate interface (PMCI)

Counter based measurements

```
ManagedElement[1],SystemFunctions[1],PmService[1]
ManagedElement[1],ENodeBFunction[1],PmFlexCounterFilter[0-8]
```

Event based measurements

```
ManagedElement[1],ENodeBFunction[1],PmEventService[1]
```

Gen2 MOM

Counter based measurements

```
ManagedElement[1],SystemFunctions[1],Pm[1]
ManagedElement[1],SystemFunctions[1],Pm[1],PmGroup[0-]
ManagedElement[1],SystemFunctions[1],Pm[1],PmGroup[0-],MeasurementType[1-]
ManagedElement[1],SystemFunctions[1],Pm[1],PmJob[0-]
ManagedElement[1],SystemFunctions[1],Pm[1],PmJob[0-],MeasurementReader[1-]
ManagedElement[1],SystemFunctions[1],Pm[1],PmJob[0-],MeasurementReader[1-],PmThresholdMonitoring[0-4]
ManagedElement[1],SystemFunctions[1],Pm[1],PmMeasurementCapabilities[1]
```

Event based measurements

```
ManagedElement[1],ENodeBFunction[1],PmEventService[1]

ManagedElement[1],SystemFunctions[1],PmEventM[1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventCapabilities[1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventFilterType[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventGroup[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventGroup[0-],EventType[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventJob[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],FilePullCapabilities[0-1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],StreamingCapabilities[0-1]
```

Counter representation in Gen1 vs Gen2

In CPP MOM, each PM counter is an <u>attribute</u> in the MO class that owns the counter.

In COM, each PM counter is a <u>MO instance</u>.

Example:

- in Gen1 (CPP), the counter EUtranCellFDD::pmRrcConnEstabAtt is an attribute in the EUtranCellFDD MO

```
ENB> pget eutrancellfdd pmRrcConnEstabAtt$


================================================================================
MO                                              Attribute      Value
================================================================================
EUtranCellFDD=1                                 pmRrcConnEstabAtt 14
EUtranCellFDD=2                                 pmRrcConnEstabAtt 35
EUtranCellFDD=3                                 pmRrcConnEstabAtt 12
EUtranCellFDD=4                                 pmRrcConnEstabAtt 46
EUtranCellFDD=5                                 pmRrcConnEstabAtt 57
================================================================================
Total: 5 MOs
```

- in Gen2, the counter EUtranCellFDD::pmRrcConnEstabAtt is an MO instance with LDN :
SystemFunctions=1,Pm=1,PmGroup= EUtranCellFDD,MeasurementType=pmRrcConnEstabAtt

```
MSRBSV2> pr pmRrcConnEstabAtt$


=================================================================
Proxy  MO
=================================================================
 5331  SystemFunctions=1,Pm=1,PmGroup=EUtranCellFDD,MeasurementType=pmRrcConnEstabAtt
 6545  SystemFunctions=1,Pm=1,PmGroup=EUtranCellTDD,MeasurementType=pmRrcConnEstabAtt
 7569  SystemFunctions=1,Pm=1,PmGroup=NbIotCell,MeasurementType=pmRrcConnEstabAtt
=================================================================
Total: 3 MOs

MSRBSV2> get PmGroup=EUtranCellFDD,MeasurementType=pmRrcConnEstabAtt$


================================================================================
5331                                    SystemFunctions=1,Pm=1,PmGroup=EUtranCellFDD,MeasurementType=pmRrcConnEstabAtt
================================================================================
aggregation                             2 (SUM)
collectionMethod                        1 (CC)
condition                               Stepped at reception of RRC message RRC Connection Request.
derSampleRate
description                             The total number of RRC Connection Request attempts.
fmAlarmType
initialValue                            0
isCompressed                            false
measurementName                         pmRrcConnEstabAtt
measurementResult
measurementStatus                       1 (USED)
measurementTypeId                       pmRrcConnEstabAtt
multiplicity                            1
resetAtGranPeriod                       true
size                                    4
thresholdDirection
================================================================================
```

```
Total: 1 MOs
```

For Moshell users, the PM structure in COM is abstracted and the moshell PM commands are made to behave the same as for CPP nodes, ie, the counters are made to look like attributes instead of MO instances.

5.2   Printing counter description from the MOM

```
ENB> h pmom

******************************************************************************
pmom[acdpo] [<moclass>] [<counter>] [<data-type>] [<flags>] [<description>]
******************************************************************************
Print description of PM counters.

Options:
 - a : shows what regular attributes can be included in scanners.
 - c : show all the MO classes specified in the filter as well as their children/grandchildren/etc classes.
 - d : gives a shorter printout, without the description part.
 - p : show only the definitions relating to platform MOs (CPP)
 - o : show only the definitions relating to application MOs


The "type" field refers to the data type of the counter value, e.g. an integer (long), or a sequence of integers.
The "flags" field refers to the properties of the counter, eg:
    * deprecated: means that the counter is obsolete and will never be stepped.
    * notInMOM: means that the counter is implemented in RNC SW but not specified in the MOM. Should only happen on pre-GA SW.
    * notImplemented: means that the counter is specified in the MOM but not implemented in RNC SW. Should only happen on pre-GA SW.
    * ropReset: indicates that the counter value is reset to 0 before each ROP period.
    * noReset: indicates that the counter value is not reset to 0 at the ROP period and will only be reset at node restart or when the value
reaches 2^31
    * PEG,GAUGE,PDF,CC,DER,etc: this is the counter type, whose description can be found in CPI for CPP nodes, or from the command "mom \.
(collectionme|aggreg) ." for COM nodes.
    * a number in square brackets: shown on PDF counters to indicate the number of elements in the array.


Examples:
List all counters for the AtmPort MO
  >> pmom atmp
View description of all AtmPort counters that match the word "cell"
  >> pmom atmp cell
View description of all AtmPort counters:
  >> pmom atmp .
List all counters matching the word "reject"
  >> pmomd . reject
List all counters whose description contain the word "reject"
  >> pmomd . . . . reject
List all counters of data type sequence:long
  >> pmomd . . sequence:long
List all counters of type PEG
```

```
   >> pmomd . . . peg
List all counters which do not reset at the ROP period boundary:
   >> pmomd . . . noreset


WRBS691> pmom


##############################################################################
MO Class                        Pm Counters
##############################################################################
BfdSessionIPv4                  4
                                bfdSessDroppedPackets
                                bfdSessRxPackets
                                bfdSessTxPackets
                                bfdSessUpCount
------------------------------------------------------------------------------
DhcpRelayIPv4                   6
                                dhcpInClientErrorsHC
                                dhcpInClientMsgsHC
                                dhcpInServerErrorsHC
                                dhcpInServerMsgsHC
...<cut>...

                                pmSetupAttemptsUlSf64
                                pmSetupAttemptsUlSf8
                                pmSetupFailuresUl
                                pmSumCapacityDlCe
                                pmSumCapacityUlCe
                                pmSumCapacityUlCeStatic
------------------------------------------------------------------------------
RadioLinks                      7
                                pmAverageSir [38]
                                pmAverageSirError [42]
                                pmBranchDeltaSir [61]
                                pmDpcchBer [61]
                                pmOutOfSynch [50]
                                pmUlSynchTime [16]
                                pmUlSynchTimeSHO [16]
------------------------------------------------------------------------------


Enter a second argument in the pmom command for description of a counter (or type "h pmom" for help).


Total: 19 MOs, 252 counters  (1988 including PDF)


ENBG2> pmom eutrancellfdd


##############################################################################
MO Class                        Pm Counters
##############################################################################
Lrat.EUtranCellFDD              1172
                                pmA3InterFBestCellEvalReport
                                pmA3InterFBestCellEvalReportRsrp
                                pmA3InterFBestCellEvalReportUl
                                pmA5BestCellEvalReport
                                pmA5BestCellEvalReportRsrp
```

```
                                  pmA5BestCellEvalReportUl
                                  pmAccessClassBarringCsfbDistr [16]
                                  pmAccessClassBarringModDistr [16]
                                  pmAccessClassBarringMosDistr [16]
                                  pmActiveDrbDlSum
...<cut>....

                                  pmZtemporary92
                                  pmZtemporary93
--------------------------------------------------------------------------------


Enter a second argument in the pmom command for description of a counter (or type "h pmom" for help).


Total: 1 MOs, 1172 counters  (28590 including PDF)


WRBS691> pmomd . .


#####################################################################################################################
MO Class                        Pm Counter                      Type              Flags
#####################################################################################################################
BfdSessionIPv4                  bfdSessDroppedPackets           longlong          ropReset,CC,SUM
BfdSessionIPv4                  bfdSessRxPackets                longlong          ropReset,CC,SUM
BfdSessionIPv4                  bfdSessTxPackets                longlong          ropReset,CC,SUM
BfdSessionIPv4                  bfdSessUpCount                  longlong          ropReset,CC,SUM
DhcpRelayIPv4                   dhcpInClientErrorsHC            longlong          ropReset,CC,SUM
DhcpRelayIPv4                   dhcpInClientMsgsHC              longlong          ropReset,CC,SUM
DhcpRelayIPv4                   dhcpInServerErrorsHC            longlong          ropReset,CC,SUM
DhcpRelayIPv4                   dhcpInServerMsgsHC              longlong          ropReset,CC,SUM
DhcpRelayIPv4                   dhcpOutClientMsgsHC             longlong          ropReset,CC,SUM
DhcpRelayIPv4                   dhcpOutServerMsgsHC             longlong          ropReset,CC,SUM
AclEntryIpv4                    aclEntryPackets                 longlong          ropReset,CC,SUM
AclIpv4                         aclTotalDiscards                longlong          ropReset,CC,SUM
IpsecPolicyRule                 espTunInIntegrityFail           long              ropReset,CC,SUM
IpsecPolicyRule                 espTunInOctets                  longlong          ropReset,CC,SUM
IpsecPolicyRule                 espTunInPkt                     longlong          ropReset,CC,SUM
IpsecPolicyRule                 espTunInReplayFail              long              ropReset,CC,SUM
IpsecPolicyRule                 espTunOutNoSA                   long              ropReset,CC,SUM
IpsecPolicyRule                 espTunOutOctets                 longlong          ropReset,CC,SUM
IpsecPolicyRule                 espTunOutPkt                    longlong          ropReset,CC,SUM
...<cut>...
NodeBLocalCellGroup             pmSetupAttemptsUlSf4            longlong          ropReset,CC,SUM
NodeBLocalCellGroup             pmSetupAttemptsUlSf64           longlong          ropReset,CC,SUM
NodeBLocalCellGroup             pmSetupAttemptsUlSf8            longlong          ropReset,CC,SUM
NodeBLocalCellGroup             pmSetupFailuresUl              longlong          preliminary,ropReset,CC,SUM
NodeBLocalCellGroup             pmSumCapacityDlCe               longlong          preliminary,ropReset,CC,SUM
NodeBLocalCellGroup             pmSumCapacityUlCe               longlong          preliminary,ropReset,CC,SUM
NodeBLocalCellGroup             pmSumCapacityUlCeStatic         longlong          preliminary,ropReset,CC,SUM
RadioLinks                      pmAverageSir                    sequence:longlong [38]   preliminary,ropReset,SI,SUM
RadioLinks                      pmAverageSirError               sequence:longlong [42]   preliminary,ropReset,SI,SUM
RadioLinks                      pmBranchDeltaSir                sequence:longlong [61]   preliminary,ropReset,SI,SUM
RadioLinks                      pmDpcchBer                      sequence:longlong [61]   preliminary,ropReset,SI,SUM
RadioLinks                      pmOutOfSynch                    sequence:longlong [50]   preliminary,ropReset,SI,SUM
RadioLinks                      pmUlSynchTime                   sequence:longlong [16]   preliminary,ropReset,SI,SUM
RadioLinks                      pmUlSynchTimeSHO                sequence:longlong [16]   preliminary,ropReset,SI,SUM


Total: 19 MOs, 252 counters  (1988 including PDF)
```

```
MSRBSV2> mom \.(collectionme|aggreg) .


##############################################################################
Enum                                            Values
##############################################################################
RcsPm.Aggregation                               2:SUM, 3:AVG, 4:MIN, 5:MAX, 6:LAST_UPDATE
------------------------------------------------------------------------------
The aggregation method for a Measurement Type.
 - SUM: Aggregation method = SUM.
 - AVG: Aggregation method = AVG.
 - MIN: Aggregation method = MIN.
 - MAX: Aggregation method = MAX.
 - LAST_UPDATE: Aggregation method = LAST_UPDATE.
********************************************************************************
RcsPm.CollectionMethod                          1:CC, 2:GAUGE, 3:DER, 4:SI
------------------------------------------------------------------------------
The form in which measurement data for a Measurement Type  is obtained.
 - CC: The collection method is Cumulative Counter.
 - GAUGE: The collection method is Gauge - based on a dynamic variable.
This method is used when data being measured can vary up or down during the period of measurement.
 - DER: The collection method is Discrete Event Registration (DER).
When data related to a particular event are captured, every nth event is registered, where n can be 1 or greater.
 - SI: The collection method is Status Inspection.
********************************************************************************



WRBS691> pmom cell .


#####################################################################################################################
MO Class                          Pm Counter                    Type                    Flags
#####################################################################################################################
NodeBLocalCell                    pmAverageRssiHigh             sequence:longlong [142]  preliminary,ropReset,SI,SUM
------------------------------------------------------------------------------
Received Signal Strength Indicator (RSSI)\nBins:\n[0]: Number of sampled values less than -110.0 dBm\n[1]: Number of sampled values in range [-
110.0..-109.5[ dBm\n[2]: Number of sampled values in range [-109.5..-109.0[ dBm\n[3]: Number of sampled values in range [-109.0..-
108.5[ dBm\n...\n[139]: Number of sampled values in range [-41...-40.5[ dBm\n[140]: Number of sampled values in range [-40.5..-40.0[ dBm\n[141]:
Number of sampled values greater than or equal to -40.0 dBm\n
Condition: Measured every 100 ms, and the average value is calculated at the same rate. The actual measurement is started when the cell is
setup.
********************************************************************************
...<cut>...
********************************************************************************
NodeBLocalCellGroup               pmSumCapacityUlCeStatic       longlong                preliminary,ropReset,CC,SUM
------------------------------------------------------------------------------
Aggregate of all sample values recorded within the granularity period for number of used static UL Channel Elements.
Condition: A new sampled value is added each second of the granularity period.
********************************************************************************


Total: 2 MOs, 27 counters  (329 including PDF)

WRBS691> pmom . rssi
```

```
##############################################################################################################
MO Class                          Pm Counter                      Type                Flags
##############################################################################################################
NodeBLocalCell                    pmAverageRssiHigh               sequence:longlong [142]  preliminary,ropReset,SI,SUM
--------------------------------------------------------------------------------------------------------------
Received Signal Strength Indicator (RSSI)\nBins:\n[0]: Number of sampled values less than -110.0 dBm\n[1]: Number of sampled values in range [-
110.0..-109.5[ dBm\n[2]: Number of sampled values in range [-109.5..-109.0[ dBm\n[3]: Number of sampled values in range [-109.0..-
108.5[ dBm\n...\n[139]: Number of sampled values in range [-41...-40.5[ dBm\n[140]: Number of sampled values in range [-40.5..-40.0[ dBm\n[141]:
Number of sampled values greater than or equal to -40.0 dBm\n
Condition: Measured every 100 ms, and the average value is calculated at the same rate. The actual measurement is started when the cell is
setup.
**************************************************************************************************************
```

Total: 1 MOs, 1 counters (142 including PDF)

WRBS691>

ENBG2> pmomd . . . . . reject|fail


```
##############################################################################################################
MO Class                          Pm Counter                      Type                Flags
##############################################################################################################
Lrat.ENodeBFunction               pmMoFootprintMax                long                ropReset,GAUGE,LAST_UPDATE
Lrat.EUtranCellFDD                pmCompUlDeltaSinrPuschDistr     sequence:long [8]   ropReset,CC,SUM
Lrat.EUtranCellFDD                pmConfigRejDlComp               long                ropReset,CC,SUM
Lrat.EUtranCellFDD                pmErabEstabAttAddedHoOngoing    long                ropReset,CC,SUM
Lrat.EUtranCellFDD                pmErabEstabAttAddedHoOngoingArp sequence:long [16]  ropReset,CC,SUM
...<cut>....
RtnL2LagPort.LagPort              ifHCLossOfSignal                longlong            preliminary,ropReset,CC,SUM
RtnL2LagPort.LagPort              ifMaxLossOfSignalDuration       longlong            preliminary,ropReset,GAUGE,MAX
RtnL2LagPort.LagPort              ifMinLossOfSignalDuration       longlong            preliminary,ropReset,GAUGE,MIN
RtnL2LagPort.LagPort              ifTotalLossOfSignalDuration     longlong            preliminary,ropReset,CC,SUM
RtnL3InterfaceIPv4.InterfaceIPv4  ipIfStatsReasmFails             longlong            ropReset,CC,SUM
RtnL3InterfaceIPv6.InterfaceIPv6  ipIfStatsReasmFails             longlong            ropReset,CC,SUM
Wrat.EDchResources                pmCEdchReleaseCause             sequence:longlong [9]  preliminary,ropReset,CC,SUM
Wrat.EDchResources                pmCapacityAllocRejServEDchUsers longlong            ropReset,CC,SUM
Wrat.EDchResources                pmEulFachHarqTransmFailure      longlong            preliminary,ropReset,CC,SUM
Wrat.HsDschResources              pmAllocRejHwHsDschUsers         longlong            ropReset,CC,SUM
Wrat.HsDschResources              pmCapacityAllocRejHsDschUsers   longlong            ropReset,CC,SUM
Wrat.HsDschResources              pmCapacityAllocRejHsPdschCodes  longlong            ropReset,CC,SUM
Wrat.NodeBLocalCellGroup          pmCapacityAllocRejDlCe          longlong            ropReset,CC,SUM
Wrat.NodeBLocalCellGroup          pmCapacityAllocRejUlCe          longlong            ropReset,CC,SUM
Wrat.NodeBLocalCellGroup          pmSetupFailures                 longlong            ropReset,CC,SUM
Wrat.NodeBLocalCellGroup          pmSetupRejSwLoad                longlong            ropReset,CC,SUM
```

Total: 18 MOs, 268 counters (3636 including PDF)

5.3 List PM Jobs

```
RBS417> h pst

****************************************************
pst [<scan-filter>|<scan-proxy>] [<scan-state>]
****************************************************
List all PM scanners and their state.
....
```

Gen1

```
ENBG1> pst


=================================================================================
  PROXY  SCANNER-NAME                                              STATE
=================================================================================
     42  USERDEF.Riport/RFport/G1.Profile=5000517.Continuous=Y.STATS   ACTIVE
     43  USERDEF.4CC_G1.Profile=5000501.Continuous=Y.STATS         ACTIVE
     50  PREDEF.APC.STATS                                          ACTIVE
     51  PREDEF.STATS                                              ACTIVE
     52  PREDEF.10000.CELLTRACE                                    SUSPENDED
     53  PREDEF.10001.CELLTRACE                                    SUSPENDED
     54  PREDEF.10002.CELLTRACE                                    SUSPENDED
     55  PREDEF.10003.CELLTRACE                                    SUSPENDED
     56  PREDEF.10004.CELLTRACE                                    SUSPENDED
     57  PREDEF.10005.CELLTRACE                                    SUSPENDED
=================================================================================
>>> Total: 10 Scanners
```

Gen2

```
RBSG2> pst


=================================================================================
Proxy  Job                        ReqState   CurrState   Granul  nrRdrs/Evts
=================================================================================
 8074  PmJob=15001108_USERDEF.MEASJOB   ACTIVE     ACTIVE      900     1311
 9386  PmJob=PREDEF_Lrat           ACTIVE     ACTIVE      900      284
 9671  PmJob=PREDEF_Rtn            ACTIVE     ACTIVE      900       59
 9731  PmJob=PREDEF_Wrat           ACTIVE     ACTIVE      900       23
10369  Lrat,EventJob=10000         STOPPED    STOPPED     900        0
10370  Lrat,EventJob=10001         STOPPED    STOPPED     900        0
10371  Lrat,EventJob=10002         STOPPED    STOPPED     900        0
10372  Lrat,EventJob=10003         STOPPED    STOPPED     900        0
10373  Lrat,EventJob=10004         STOPPED    STOPPED     900        0
10374  Lrat,EventJob=10005         STOPPED    STOPPED     900       28
=================================================================================
>>> Total: 4 PmJobs, 6 EventJobs
```

5.4 Show PM Jobs contents

```
PRBS417> pgets


===============================================================================
  258   PmJob=test    ACTIVE      ACTIVE        900      141
===============================================================================
HsDschResources   141   pmAckReceived
                        pmAqmBasedDiscardSpi00
                        pmAqmBasedDiscardSpi01
                        pmAqmBasedDiscardSpi02
                        pmAqmBasedDiscardSpi03
                        pmAqmBasedDiscardSpi04
                        pmAqmBasedDiscardSpi05
                        pmAqmBasedDiscardSpi06
                        pmAqmBasedDiscardSpi07
                        pmAqmBasedDiscardSpi08
                        pmAqmBasedDiscardSpi09
                        pmAqmBasedDiscardSpi10
                        pmAqmBasedDiscardSpi11
                        pmAqmBasedDiscardSpi12
 ...<cut>...
                        pmSumTransmittedBitsSpi08
                        pmSumTransmittedBitsSpi09
                        pmSumTransmittedBitsSpi10
                        pmSumTransmittedBitsSpi11
                        pmSumTransmittedBitsSpi12
                        pmSumTransmittedBitsSpi13
                        pmSumTransmittedBitsSpi14
                        pmSumTransmittedBitsSpi15
                        pmTransmittedCarrierPowerWHs        [50]
                        pmTransmittedCarrierPowerWNonHs     [50]
                        pmUsedHsPdschCodes                  [16]
===============================================================================
  400   PmJob=test1   ACTIVE      ACTIVE        900      2
===============================================================================
IpsecTunnel       2   pmInDiscNoSa
                        pmOutDiscSeqOw
===============================================================================
>>> Total: 2 PmJobs
```

5.5 Define a new PM Job

```
OFFLINE> h pcr


********************************************************************************
pcr[cfpda]/lpcr[cfpda] <scannerName> <moclass-filter>|<moinstance-filter>|<mo-group>|<counter-file> [<counter-filter>] [<granularity>]
********************************************************************************
Create a statistics scanner.

Note: EVENT scanners are already created by default and shall be set with the "pset" command.

The granularity field is optional.
```

- On CPP nodes, it can be set to 300, 900, or 3600 seconds.
 - On COM nodes, it can be set to 10, 30, 60, 300, 900, 1800, 3600, 43200, or 86400 seconds.
By default it will be set to 900 (15 minutes).
In RCS node, it may be necessary to run the following command before being able to select other granularity values: /misc/authlevel
disabled;/pms/rp ecim

Options:
 - c: for activating counters on all MO classes matching the filter as well as all their children/grandchildren, etc.
 - f: for adding counters even if they are already included in another scanner.
 - p: for creating a PREDEF scanner. By default a USERDEF scanner is created.
 - d[a]: for debug. The syntax of "pcrd" is: pcrd/pcrda <counter-file>
where the format of the counter-file shall be as per below. The purpose of "pcrd" is to test a counter file and identify any pm counters that
are not supported by the node SW.
With option "a" (pcrda), it is also possible to test which regular attributes can be included in a scanner.

...<cut>..

PRBS417> pmom cell|transport

```
#############################################################################
MO Class                            Pm Counters
#############################################################################
ComTop.Transport                    27
                                    pmChildSaRekey
                                    pmInAuthReq
                                    pmInAuthRsp
                                    pmInCrChildReq
                                    pmInCrChildRsp
                                    pmInInfoReq
                                    pmInInfoRsp
                                    pmInInitReq
                                    pmInInitRsp
                                    pmInInvalid
                                    pmInInvalidSpi
                                    pmIpInAddrErrors
                                    pmIpInDiscards
                                    pmIpInHdrErrors
                                    pmIpInUnknownProtos
                                    pmIpOutRequests
                                    pmNoOfFailedPingsDefaultRouter
                                    pmOutAuthReq
                                    pmOutAuthRsp
                                    pmOutCrChildReq
                                    pmOutCrChildRsp
                                    pmOutInfoReq
                                    pmOutInfoRsp
                                    pmOutInitReq
                                    pmOutInitRsp
                                    pmUdpInErrors
                                    pmUdpNoPorts
-----------------------------------------------------------------------------
EPIC_WCDMA_MOM.NodeBLocalCell       3
                                    pmAverageRssi [65]
```

```
                              pmTransmittedCarrierPowerW [50]
                              pmTransmittedCarrierPowerWLimit
--------------------------------------------------------------------------------


Enter a second argument in the pmom command for description of a counter (or type "h pmom" for help).


Total: 2 MOs, 30 counters  (143 including PDF)


PRBS417> pcr test2 cell|transpor


Creating PmJob and MeasurementReader MOs. Please wait...
.......
Connected to prbs417 (ManagedElement=PRBS417)
.
Last MO:    576. Loaded  576 MOs. Total:    577 MOs.


>>> PmJobId: 404


PRBS417> pgets 404


================================================================================
  404   PmJob=test2  ACTIVE      ACTIVE          900       30
================================================================================
Transport          27   pmChildSaRekey
                        pmInAuthReq
                        pmInAuthRsp
                        pmInCrChildReq
                        pmInCrChildRsp
                        pmInInfoReq
                        pmInInfoRsp
                        pmInInitReq
                        pmInInitRsp
                        pmInInvalid
                        pmInInvalidSpi
                        pmIpInAddrErrors
                        pmIpInDiscards
                        pmIpInHdrErrors
                        pmIpInUnknownProtos
                        pmIpOutRequests
                        pmNoOfFailedPingsDefaultRouter
                        pmOutAuthReq
                        pmOutAuthRsp
                        pmOutCrChildReq
                        pmOutCrChildRsp
                        pmOutInfoReq
                        pmOutInfoRsp
                        pmOutInitReq
                        pmOutInitRsp
                        pmUdpInErrors
                        pmUdpNoPorts
NodeBLocalCell      3   pmAverageRssi                  [65]
                        pmTransmittedCarrierPowerW     [50]
                        pmTransmittedCarrierPowerWLimit
================================================================================
```

5.6 Stop a PM Job

```
PRBS417> pbl 404


Set requestedJobState on following 1 MOs ?
=============================================================================
   404   SystemFunctions=1,Pm=1,PmJob=test2
=============================================================================
Set requestedJobState on 1 MOs. Are you Sure [y/n] ? y


=================================================================================
   Id  MO                                          requestedJobState    Result
=================================================================================
   404  Pm=1,PmJob=test2                            2                   >>> Set.
=================================================================================
Total: 1 MOs attempted, 1 MOs set


PRBS417> pst


=================================================================================
Proxy  Job           ReqState  CurrState  Granul nrRdrs
=================================================================================
  259  PmJob=test    ACTIVE    ACTIVE        900   141
  401  PmJob=test1   ACTIVE    ACTIVE        900     2
  404  PmJob=test2   STOPPED   ACTIVE        900    30
=================================================================================
>>> Total: 3 PmJobs
```

5.7 Resume a PM Job

```
PRBS417> pdeb 404


Set requestedJobState on following 1 MOs ?
=============================================================================
   404   SystemFunctions=1,Pm=1,PmJob=test2
=============================================================================
Set requestedJobState on 1 MOs. Are you Sure [y/n] ? y


=================================================================================
   Id  MO                                          requestedJobState    Result
=================================================================================
   404  Pm=1,PmJob=test2                            1                   >>> Set.
=================================================================================
Total: 1 MOs attempted, 1 MOs set


PRBS417> pst


=================================================================================
Proxy  Job           ReqState  CurrState  Granul nrRdrs
```

```
================================================================
  259  PmJob=test    ACTIVE     ACTIVE         900    141
  401  PmJob=test1   ACTIVE     ACTIVE         900      2
  404  PmJob=test2   ACTIVE     ACTIVE         900     30
================================================================
>>> Total: 3 PmJobs
```

5.8 Delete a PM Job

```
PRBS417> pdel 404

Delete following MOs ?
==================================================================
  404   SystemFunctions=1,Pm=1,PmJob=test2
==================================================================
Delete 1 MOs. Are you Sure [y/n] ? y

Deleting ...
==================================================================
  404   SystemFunctions=1,Pm=1,PmJob=test2                            >>> Mo deleted
==================================================================
Total: 1 MOs attempted, 1 MOs deleted

PRBS417> pst

================================================================
Proxy  Job            ReqState  CurrState  Granul nrRdrs
================================================================
  259  PmJob=test     ACTIVE     ACTIVE         900    141
  401  PmJob=test1    ACTIVE     ACTIVE         900      2
================================================================
>>> Total: 2 PmJobs
```

5.9 OSS-RC/ENM

In OSS-RC there is setting called scannerConfigMaster .
When scannerConfigMaster=ON , any changes done to the scanners from moshell or AMOS will be reverted by OSS-RC after about 10-15 minutes.
To avoid this, you can either:
 - set the OSS-RC setting scannerConfigMaster to OFF
 - or create the PM scanner with the moshell command "pcrp" ("p" option, as in "predefined").
To delete predefined scanner, use command "pdelp"

5.10 <u>Print counter values from ROP files</u>

```
PRBS417> h pmx


******************************************************************************
pmx[hfdnsckwlb3zei] [<mofilter>|<mogroup>] [<counter-filter>|<kpi(s)>] [-l <zipfile>|<directory>] [-w <webdirectory>] [-m <minushours>] [-p
<plushours>] [-s <startdate>[.<starttime>]] [-e <enddate>[.<endtime>]] [-a|-d|-h]  [-o <outputFormat>] [-tz <hrs>] [-f <formulafile>] [-j
<precision>] [| <unix-cmds>]
******************************************************************************
Display counter values, extracted from the statistics ROP files.


...<cut>...



PRBS417> pmx .

get /opt/com/comea/internalFiles/PerformanceManagementReportFiles/A20131124.1230+0000-1245+0000_PRBS417.xml
/proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/prbs417/PerformanceManagementReportFiles/A20131124.1230+0000-
1245+0000_PRBS417.xml ... OK
....
get /opt/com/comea/internalFiles/PerformanceManagementReportFiles/A20131124.1245+0000-1300+0000_PRBS417.xml
/proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/prbs417/PerformanceManagementReportFiles/A20131124.1245+0000-
1415+0000_PRBS417.xml ... OK

cat /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/prbs417/PerformanceManagementReportFiles/A20131124.1400+0000-
1415+0000_PRBS417.xml | LANG=C LC_ALL=C /home/eanzmagn/moshell/gawk.lin64 -f /home/eanzmagn/moshell/commonjars/pmExtract.awk -u "." "."    |
/usr/bin/perl /home/eanzmagn/moshell/pmXtab  -cols time -fmt txt -m "(?:\w+=1,){0}((\w+=[^,]+,*)+)$"

Report from 2013-11-24 14:00 UTC to 2013-11-24 14:14 UTC (1 ropfiles)
Node SW: r0.1 ()


Date: 2013-11-24
Object                                                                                                                      Counter
14:00
ManagedElement=PRBS417,IpsecTunnel=1                                                                                        pmInDiscNoSa
0
ManagedElement=PRBS417,IpsecTunnel=1                                                                                        pmOutDiscSeqOw
0
ManagedElement=PRBS417,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=PRBS417_UtranCell_1,HsDschResources=1 pmAckReceived
0
ManagedElement=PRBS417,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=PRBS417_UtranCell_1,HsDschResources=1 pmAqmBasedDiscardSpi00
0
ManagedElement=PRBS417,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=PRBS417_UtranCell_1,HsDschResources=1 pmAqmBasedDiscardSpi01
0
...<cut>..
ManagedElement=PRBS417,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=PRBS417_UtranCell_1,HsDschResources=1
pmTransmittedCarrierPowerWNonHs     0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
ManagedElement=PRBS417,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=PRBS417_UtranCell_1,HsDschResources=1 pmUsedHsPdschCodes
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
```

```
PRBS417> pmx . carrier -m 3 -a


get /opt/com/comea/internalFiles/PerformanceManagementReportFiles/A20131124.0945+0000-1000+0000_PRBS417.xml
/proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/prbs417/PerformanceManagementReportFiles/A20131124.0945+0000-
1000+0000_PRBS417.xml ... OK
get /opt/com/comea/internalFiles/PerformanceManagementReportFiles/A20131124.1000+0000-1015+0000_PRBS417.xml
/proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/prbs417/PerformanceManagementReportFiles/A20131124.1000+0000-

...<cut>...


Report from 2013-11-24 11:15 UTC to 2013-11-24 14:14 UTC (11 ropfiles)
Node SW: r0.1 ()


Start Time: 2013-11-24 14:00:00 End Time: 2013-11-24 14:00:00
Object                                                                                                    Counter
ManagedElement=PRBS417,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=PRBS417_UtranCell_1,HsDschResources=1 pmTransmittedCarrierPowerWHs
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
ManagedElement=PRBS417,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=PRBS417_UtranCell_1,HsDschResources=1
pmTransmittedCarrierPowerWNonHs 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
```

5.11 Print KPIs from ROP files


```
MSRBSV2> pmxe fdd interferencepwr$


get /rop/A20160706.0515-0530_ki20enb1525.xml.gz /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/10.216.60.35/rop/A20160706.0515-
0530_ki20enb1525.xml.gz ... OK
get /rop/A20160706.0530-0545_ki20enb1525.xml.gz /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/10.216.60.35/rop/A20160706.0530-
0545_ki20enb1525.xml.gz ... OK
get /rop/A20160706.0545-0600_ki20enb1525.xml.gz /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/10.216.60.35/rop/A20160706.0545-
0600_ki20enb1525.xml.gz ... OK


Using formulafile /home/eanzmagn/moshell/commonjars/pm/FORMULA_MSRBS_0.txt
gzip -dc /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/10.216.60.35/rop/A20160706.0545-0600_ki20enb1525.xml.gz | LANG=C LC_ALL=C
/home/eanzmagn/moshell/gawk.solaris -f /home/eanzmagn/moshell/commonjars/pmExtract.awk -u "fdd" "^(WeightedAverage|log10|
pmRadioRecInterferencePwr)$"   | sort | uniq | /app/moshell/bin/perl /home/eanzmagn/moshell/pmxtab  -cols time -fmt txt -m "(?:\w+=1,){0}
((\w+=[^,]+,*)+$)" -fdef /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/FORMULA_MSRBS_0.txt.txt.txt -x
"^(Int_RadioRecInterferencePwr)$" -i "Int_RadioRecInterferencePwr" -p 6.1


Report from 2016-07-06 05:45 UTC to 2016-07-06 05:59 UTC (1 ropfiles)
Node SW: CXP9028754/5_R2ATK ()


Date: 2016-07-06
Object                                                                      Counter                      05:45
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_399_REAL    Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_400_REAL    Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_401_REAL    Int_RadioRecInterferencePwr -106.2
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_402_REAL    Int_RadioRecInterferencePwr -101.6
```

```
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_403_UCTOOL Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_404_UCTOOL Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_405_UCTOOL Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_406_UCTOOL Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_407_REAL   Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_408_UCTOOL Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_409_REAL   Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_410_REAL   Int_RadioRecInterferencePwr -116.5
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_411_UCTOOL Int_RadioRecInterferencePwr      0
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_412_UCTOOL Int_RadioRecInterferencePwr      0
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_413_UCTOOL Int_RadioRecInterferencePwr      0
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_414_UCTOOL Int_RadioRecInterferencePwr      0
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_415_UCTOOL Int_RadioRecInterferencePwr      0
ManagedElement=ki20enb1525,ENodeBFunction=1,EUtranCellFDD=ki20enb1525_416_UCTOOL Int_RadioRecInterferencePwr      0
```

Use your own formula file:

```
MSRBSV2> pmxe fdd mykpi -f /path/to/myformulafile



MSRBSV2> pmxe NodeBLocalCell= rssihigh

160301-10:02:48 MSRBSV2 16.0c MSRBS_NODE_MODEL_280.28418.1111_ec10_TESTMOM stopfile=/tmp/20491

............

Using formulafile /app/moshell/latest/moshell/commonjars/pm/FORMULA_MSRBS_0.txt

Report from 2016-03-01 08:30 UTC to 2016-03-01 08:44 UTC (1 ropfiles)
Node SW: CXP9024418/2_R13ATJ (16A)

Date: 2016-03-01
Object                                                                          Counter         08:30
ManagedElement=1,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,NodeBSectorCarrier=1  AvgRssiHigh     -105.2
ManagedElement=1,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,NodeBSectorCarrier=1  AvgRssiHigh_fw   30.2
ManagedElement=1,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,NodeBSectorCarrier=1 AvgRssiHigh     -105.2
ManagedElement=1,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,NodeBSectorCarrier=1 AvgRssiHigh_fw   30.0
ManagedElement=1,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,NodeBSectorCarrier=1 AvgRssiHigh     -105.2
ManagedElement=1,NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,NodeBSectorCarrier=1 AvgRssiHigh_fw   30.0

MSRBSV2> pmxenl utrancell Acc_RandomAccessDecodingRate -m 6

Using formulafile /home/eanzmagn/tools/moshell/commonjars/pm/FORMULA_MSRBS_0.txt

Report from 2015-12-09 07:45 UTC to 2015-12-09 13:44 UTC (24 ropfiles)
Node SW: CXP9024418/2_R13AJT (16A)
pmxcel v1.86
```

```
No periods defined,     warning level=25%,        mode=t
Reading formula file: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160304-150024_6812/FORMULA_MSRBS_0.txt.txt
Parsing formulas: 100%
formulainfo=240/512
Reading log file.....
Number of fetched rop files = 11
First time stamp in log file: 2015-12-09 11:00, Last time stamp in log file: 2015-12-09 13:30
Done.
periods_s1=0, periods_e1=10, periods_s2=10, periods_e2=10
Create excel sheets...
Done.
Counting counters...
Done.
Filling datasheet with 1 counters....


Done.
Autofitting main
Done.
Autofitting sheets
  adding: [Content_Types].xml (deflated 79%)
  adding: docProps/app.xml (deflated 52%)
  adding: docProps/core.xml (deflated 51%)
  adding: xl/comments1.xml (deflated 50%)
  adding: xl/sharedStrings.xml (deflated 64%)
  adding: xl/styles.xml (deflated 80%)
  adding: xl/workbook.xml (deflated 44%)
  adding: xl/charts/chart1.xml (deflated 71%)
  adding: xl/drawings/drawing1.xml (deflated 61%)
  adding: xl/drawings/vmlDrawing1.vml (deflated 65%)
  adding: xl/drawings/_rels/drawing1.xml.rels (deflated 39%)
  adding: xl/theme/theme1.xml (deflated 79%)
  adding: xl/worksheets/sheet1.xml (deflated 70%)
  adding: xl/worksheets/sheet2.xml (deflated 68%)
  adding: xl/worksheets/sheet3.xml (deflated 69%)
  adding: xl/worksheets/_rels/sheet1.xml.rels (deflated 40%)
  adding: xl/worksheets/_rels/sheet3.xml.rels (deflated 54%)
  adding: xl/_rels/workbook.xml.rels (deflated 75%)
  adding: _rels/.rels (deflated 60%)
Done!


$pmxlfile = /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBSV2/pmxl/pmxl_20160304_150255.xlsx
```
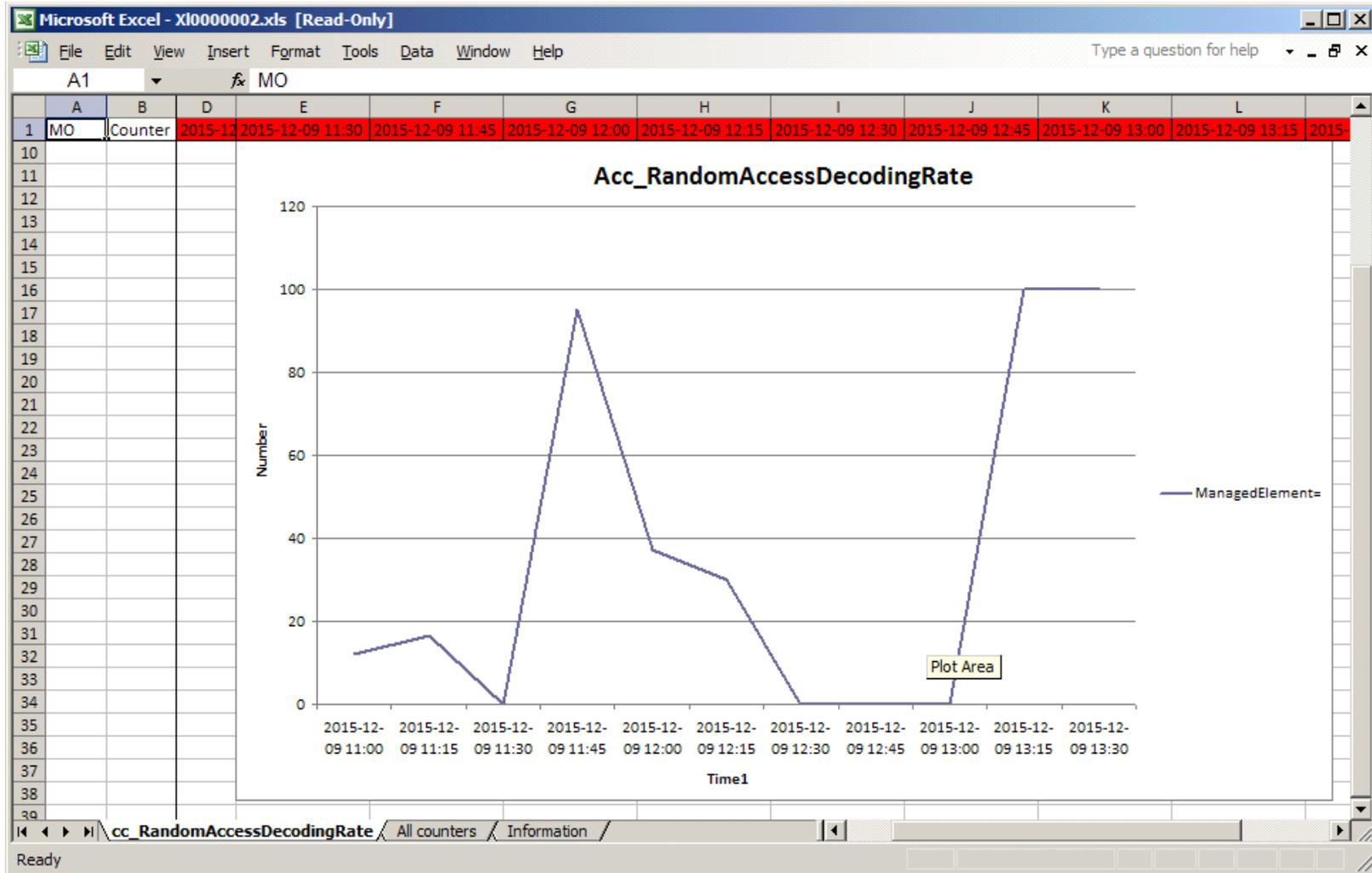
5.12 Print KPI reports from ROP files

Example: Pico WCDMA

```
PRBS417> pmr

Using formulafile /home/eanzmagn/moshell/commonjars/pm/FORMULA_PRBS_0.txt
Using configfile /home/eanzmagn/moshell/commonjars/pm/CONFIG_PRBS_0.txt
Connected to prbs417 (ManagedElement=PRBS417)
```

.
Last MO: 545. Loaded 545 MOs. Total: 546 MOs.
....

101) Carrier Average Rssi and Transmitted Power, Whole Period
102) Carrier Average Rssi and Transmitted Power, Hour by Hour
103) Carrier Average Rssi and Transmitted Power, ROP by ROP
104) Carrier Prach, Whole Period
105) Carrier Prach, Hour by Hour
106) Carrier Prach, ROP by ROP
107) Prach performance, Whole period
108) Prach performance, Hour by Hour
109) Prach performance, ROP by ROP
110) Radiolinks performance, Whole period
111) Radiolinks performance, Hour by Hour
112) Radiolinks performance, ROP by ROP
113) IubDataStreams performance, Whole Period
114) IubDataStreams performance, Hour by Hour
115) IubDataStreams performance, ROP by ROP
116) HsDschResources performance, Whole Period
117) HsDschResources performance, Hour by Hour
118) HsDschResources performance, ROP by ROP
119) EDchResources performance, Whole Period
120) EDchResources performance, Hour by Hour
121) EDchResources performance, ROP by ROP
122) DownlinkBaseBandPool performance, Whole Period
123) DownlinkBaseBandPool performance, Hour by Hour
124) DownlinkBaseBandPool performance, ROP by ROP
125) UplinkBaseBandPool performance, Whole Period
126) UplinkBaseBandPool performance, Hour by Hour
127) UplinkBaseBandPool performance, ROP by ROP
128) All DownlinkBaseBandPool performance, Whole Period
129) All DownlinkBaseBandPool performance, Hour by Hour
130) All DownlinkBaseBandPool performance, ROP by ROP
131) All UplinkBaseBandPool performance, Whole Period
132) All UplinkBaseBandPool performance, Hour by Hour
133) All UplinkBaseBandPool performance, ROP by ROP
134) NodeBFunction performance, ROP by ROP
201) EthernetPort Interface Integrity, ROP by ROP
202) Egress Ethernet Queue Integrity, ROP by ROP
203) SCTP and IP System Integrity, ROP by ROP
204) IpSec Tunnel Endpoint Integrity, ROP by ROP
Enter the report number followed by a piping command if postprocessing required.
Eg "1" (no piping) or "3 | sort -nrk 3". Type "m" to view the menu, type "x" to exit.

Example: Pico LTE

PRBS504> pmr

Using formulafile /home/eanzmagn/tools/moshell/commonjars/pm/FORMULA_LPRBS_0.txt
Using configfile /home/eanzmagn/tools/moshell/commonjars/pm/CONFIG_LPRBS_0.txt
....

```
101) LTE Node Traffic Performance, Whole Period
102) LTE Node Traffic Performance, Hour by Hour
103) LTE Node Traffic Performance, ROP by ROP
104) LTE EUtranCell Traffic Performance, Whole Period
105) LTE EUtranCell Traffic Performance, Hour by Hour
106) LTE EUtranCell Traffic Performance, ROP by ROP
201) EthernetPort Interface Integrity, ROP by ROP
202) Egress Ethernet Queue Integrity, ROP by ROP
203) SCTP and IP System Integrity, ROP by ROP
204) IpSec Tunnel Endpoint Integrity, ROP by ROP
Enter the report number followed by a piping command if postprocessing required.
Eg "1" (no piping) or "3 | sort -nrk 3". Type "m" to view the menu, type "x" to exit.


Your Choice: 101


101) LTE Node Traffic Performance, Whole Period
Report from 2015-11-11 08:00 UTC to 2015-11-11 08:59 UTC (4 ropfiles)
Node SW: 1/CXP9026658/1_R2AL04 ()


Start Time: 2015-11-11 08:00:00 End Time: 2015-11-11 08:45:00
Object Counter
...
        Acc_RrcConnSetupRatioForMOData                          11.7
        Acc_RrcConnSetupRatioForMOSignalling                    85.1
        Acc_RrcConnSetupRatioForMobileTerminating                3.2
        Acc_RrcConnSetupSuccRate                                 100
        Acc_S1SigEstabSuccRate                                   100
        Int_ActiveDRBsDl                                           0
        Int_ActiveDRBsUl                                           0
...<cut>...
        Ret_MinPerDrop                                         19200
        Ret_UeCtxtRelAbnormal                                    0.0
        Ret_UeCtxtRelAbnormalENB                                 0.0
        Ret_UeCtxtRelAbnormalENBCdt                                0
        Ret_UeCtxtRelAbnormalENBHoExec                             0
        Ret_UeCtxtRelAbnormalENBTnFail                             0
        Ret_UeCtxtRelAbnormalENBUeLost                             0
        Ret_UeCtxtRelAbnormal_2                                  1.2
        Ret_UeCtxtRelMME                                           0


Enter the report number followed by a piping command if postprocessing required.
Eg "1" (no piping) or "3 | sort -nrk 3". Type "m" to view the menu, type "x" to exit.


Your Choice: 203


203) SCTP and IP System Integrity, ROP by ROP
Report from 2015-11-11 08:00 UTC to 2015-11-11 08:59 UTC (4 ropfiles)
Node SW: 1/CXP9026658/1_R2AL04 ()


Date: 2015-11-11
Object      Counter                       08:00   08:15   08:30   08:45
Transport=1 IpSystemInPktDiscards_pkts        0       0       0       0
Transport=1 SctpInDataChunkDiscards_chunks    0       0       0       0
```

```
Transport=1 SctpOutDataChunkDiscards_chunks        0        0        0        0
```

Example: MSRBS V2

```
MSRBSV2> pmr

Using formulafile /home/eanzmagn/tools/moshell/commonjars/pm/FORMULA_MSRBS_0.txt
Using configfile /home/eanzmagn/tools/moshell/commonjars/pm/CONFIG_MSRBS_0.txt
....


101) Carrier Average Rssi and Transmitted Power, Whole Period
102) Carrier Average Rssi and Transmitted Power, Hour by Hour
103) Carrier Average Rssi and Transmitted Power, ROP by ROP
104) Carrier Prach, Whole Period
105) Carrier Prach, Hour by Hour
106) Carrier Prach, ROP by ROP
107) Aich performance, Whole period
108) Aich performance, Hour by Hour
109) Aich performance, ROP by ROP
110) Radiolinks performance, Whole period
111) Radiolinks performance, Hour by Hour
112) Radiolinks performance, ROP by ROP
113) IubDataStreams performance, Whole Period
114) IubDataStreams performance, Hour by Hour
115) IubDataStreams performance, ROP by ROP
116) HsDschResources performance, Whole Period
117) HsDschResources performance, Hour by Hour
118) HsDschResources performance, ROP by ROP
119) EDchResources performance, Whole Period
120) EDchResources performance, Hour by Hour
121) EDchResources performance, ROP by ROP
122) NodeBLocalCellGroup performance, ROP by ROP
201) LTE Node Traffic Performance, Whole Period
202) LTE Node Traffic Performance, Hour by Hour
203) LTE Node Traffic Performance, ROP by ROP
204) LTE EUtranCell Traffic Performance, Whole Period
205) LTE EUtranCell Traffic Performance, Hour by Hour
206) LTE EUtranCell Traffic Performance, ROP by ROP
301) InterfaceIPv[4|6] Tput in Mbps, ROP by ROP
302) VlanPort Tput in Mbps, ROP by ROP
303) EthernetPort Tput in Mbps, ROP by ROP
Enter the report number followed by a piping command if postprocessing required.
Eg "1" (no piping) or "3 | sort -nrk 3". Type "m" to view the menu, type "x" to exit.
Your Choice:
```

5.13 Print real-time counter values

```
TCU03> pget .


===============================================================================================
MO                                                      Attribute       Value
===============================================================================================
EthernetPort=1                                          ifHCInBroadcastPkts 188844
EthernetPort=1                                          ifHCInMulticastPkts 285122
EthernetPort=1                                          ifHCInOctets    77818343
EthernetPort=1                                          ifHCInUcastPkts  4350
EthernetPort=1                                          ifHCOutBroadcastPkts 1
EthernetPort=1                                          ifHCOutMulticastPkts 4
EthernetPort=1                                          ifHCOutOctets   21396
EthernetPort=1                                          ifHCOutUcastPkts 312
EthernetPort=1                                          ifInDiscards    1158
...<cut>...
Sctp=General                                            sctpStatRecChunksDropped 0
Sctp=General                                            sctpStatReceivedControlChunks 18
Sctp=General                                            sctpStatReceivedPackages 18
Sctp=General                                            sctpStatRetransChunks 0
Sctp=General                                            sctpStatSentChunks 7
Sctp=General                                            sctpStatSentChunksDropped 0
Sctp=General                                            sctpStatSentControlChunks 9
Sctp=General                                            sctpStatSentPackages 16
VlanPort=1                                              ifHCInBroadcastPkts 188844
VlanPort=1                                              ifHCInMulticastPkts 285124
VlanPort=1                                              ifHCInOctets    31149498
VlanPort=1                                              ifHCInUcastPkts  33
VlanPort=1                                              ifHCOutBroadcastPkts 1
VlanPort=1                                              ifHCOutMulticastPkts 4
VlanPort=1                                              ifHCOutOctets   21372
VlanPort=1                                              ifHCOutUcastPkts 312
VlanPort=1                                              ifInDiscards    0
VlanPort=1                                              ifInUnknownProtos 263
VlanPort=1                                              ifOutDiscards   0
===============================================================================================
Total: 12 MOs


WRBS691> hpget vlanport=  broadcast


===============================================================================================
MO          ifHCInBroadcastPkts ifHCOutBroadcastPkts
===============================================================================================
VlanPort=1 188953            1
===============================================================================================
Total: 1 MOs



WRBS691> uv pm_wait

pm_wait                 = 30

WRBS691> uv pm_wait=10

pm_wait=10
```

```
WRBS691>

WRBS691> pdiff .

======================================================================================
MO                                              Counter               DiffValue
======================================================================================
EthernetPort=1                                  ifHCInBroadcastPkts   19
EthernetPort=1                                  ifHCInMulticastPkts   33
EthernetPort=1                                  ifHCInOctets          6512
EthernetPort=1                                  ifHCInUcastPkts       1
EthernetPort=1                                  ifHCOutBroadcastPkts  0
EthernetPort=1                                  ifHCOutMulticastPkts  0
EthernetPort=1                                  ifHCOutOctets         0
EthernetPort=1                                  ifHCOutUcastPkts      0
EthernetPort=1                                  ifInDiscards          0
EthernetPort=1                                  ifInErrors            0
EthernetPort=1                                  ifInUnknownProtos     0
...<cut>...
Sctp=General                                    sctpShutdowns         0
Sctp=General                                    sctpStatAssocOutOfBlue 0
Sctp=General                                    sctpStatChecksumErrorCounter 0
Sctp=General                                    sctpStatCommResume    0
Sctp=General                                    sctpStatCommStop      0
Sctp=General                                    sctpStatFragmentedUserMsg 0
Sctp=General                                    sctpStatOutOfOrderRecChunks 0
Sctp=General                                    sctpStatOutOfOrderSendChunks 0
Sctp=General                                    sctpStatReassembledUserMsg 0
Sctp=General                                    sctpStatRecChunks     0
Sctp=General                                    sctpStatRecChunksDropped 0
Sctp=General                                    sctpStatReceivedControlChunks 0
Sctp=General                                    sctpStatReceivedPackages 0
Sctp=General                                    sctpStatRetransChunks  0
Sctp=General                                    sctpStatSentChunks     0
Sctp=General                                    sctpStatSentChunksDropped 0
Sctp=General                                    sctpStatSentControlChunks 0
Sctp=General                                    sctpStatSentPackages   0
VlanPort=1                                      ifHCInBroadcastPkts   21
VlanPort=1                                      ifHCInMulticastPkts   33
VlanPort=1                                      ifHCInOctets          3546
VlanPort=1                                      ifHCInUcastPkts       0
VlanPort=1                                      ifHCOutBroadcastPkts  0
VlanPort=1                                      ifHCOutMulticastPkts  0
VlanPort=1                                      ifHCOutOctets         0
VlanPort=1                                      ifHCOutUcastPkts      0
VlanPort=1                                      ifInDiscards          0
VlanPort=1                                      ifInUnknownProtos     0
VlanPort=1                                      ifOutDiscards         0
======================================================================================
Total: 4 MOs


WRBS691>
```

5.14 Print real-time KPI values

We use pmxe option "t" or "td" to specify source is "realtime" instead of ropfiles.
- t: the source is from "pget", this is applicable for most KPIs
- td: the source is from "pdiff", this should be used for KPIs where the formula contains the ROP duration

Examples:

- **Accessibility KPIs per cell**

```
MSRBSV2> pmxet fdd acc_


Using formulafile /home/eanzmagn/moshell/commonjars/pm/FORMULA_MSRBS_0.txt
lpget fdd ^(pmErabEstabAttAdded|pmErabEstabAttInit|pmErabEstabFailAddedLic|pmErabEstabFailInitLic|pmErabEstabSuccAdded|pmErabEstabSuccInit|
pmPagDiscarded|pmPagReceived|pmRaAttCbra|pmRaFailCbraMsg2Disc|pmRaSuccCbra|pmRrcConnEstabAtt|pmRrcConnEstabAttEm|pmRrcConnEstabAttHpa|
pmRrcConnEstabAttMod|pmRrcConnEstabAttMos|pmRrcConnEstabAttMta|pmRrcConnEstabAttReatt|pmRrcConnEstabFailLic|pmRrcConnEstabSucc|
pmS1SigConnEstabAtt|pmS1SigConnEstabSucc|pmUeCtxtEstabAtt|pmUeCtxtEstabSucc)$
grep ';' /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/pmxgLog11056  | sort | uniq | /app/moshell/bin/perl
/home/eanzmagn/moshell/pmXtab  -cols time -fmt txt -m "(?:\w+=1,){0}((\w+=[^,]+,*)+$)" -fdef
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/FORMULA_MSRBS_0.txt.txt.txt -x
"^(Acc_AddedERabEstabFailRateDueToMultipleLicense|Acc_AddedERabEstabSuccRate|Acc_InitialERabEstabFailureRateDueToMultipleLicense|
Acc_InitialERabEstabSuccRate|Acc_InitialErabSetupSuccRate|Acc_InitialUEContextEstabSuccRate|Acc_PagingDiscardRate|Acc_RandomAccessDecodingRate|
Acc_RandomAccessMSG2Congestion|Acc_RrcConnSetupFailureRateDueToLackOfConnectedUsersLicense|Acc_RrcConnSetupRatioForEmergency|
Acc_RrcConnSetupRatioForHighPrioAccess|Acc_RrcConnSetupRatioForMOData|Acc_RrcConnSetupRatioForMOSignalling|
Acc_RrcConnSetupRatioForMobileTerminating|Acc_RrcConnSetupSuccRate|Acc_S1SigEstabSuccRate)$" -i "Acc_AddedERabEstabFailRateDueToMultipleLicense|
Acc_AddedERabEstabSuccRate|Acc_InitialERabEstabFailureRateDueToMultipleLicense|Acc_InitialErabSetupSuccRate|
Acc_InitialUEContextEstabSuccRate|Acc_PagingDiscardRate|Acc_RandomAccessDecodingRate|Acc_RandomAccessMSG2Congestion|
Acc_RrcConnSetupFailureRateDueToLackOfConnectedUsersLicense|Acc_RrcConnSetupRatioForEmergency|Acc_RrcConnSetupRatioForHighPrioAccess|
Acc_RrcConnSetupRatioForMOData|Acc_RrcConnSetupRatioForMOSignalling|Acc_RrcConnSetupRatioForMobileTerminating|Acc_RrcConnSetupSuccRate|
Acc_S1SigEstabSuccRate" -p 6.1


Date: 2016-07-06
Object                                               Counter                                                           08:15
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_AddedERabEstabFailRateDueToMultipleLicense                    N/A
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_AddedERabEstabSuccRate                                        N/A
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_InitialERabEstabFailureRateDueToMultipleLicense                 0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_InitialERabEstabSuccRate                                      100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_InitialErabSetupSuccRate                                      100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_InitialUEContextEstabSuccRate                                 100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_PagingDiscardRate                                               0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RandomAccessDecodingRate                                      100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RandomAccessMSG2Congestion                                      0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RrcConnSetupFailureRateDueToLackOfConnectedUsersLicense         0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RrcConnSetupRatioForEmergency                                   0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RrcConnSetupRatioForHighPrioAccess                              0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RrcConnSetupRatioForMOData                                   92.3
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RrcConnSetupRatioForMOSignalling                                0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RrcConnSetupRatioForMobileTerminating                         7.7
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_RrcConnSetupSuccRate                                          100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399  Acc_S1SigEstabSuccRate                                            100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400  Acc_AddedERabEstabFailRateDueToMultipleLicense                    N/A
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400  Acc_AddedERabEstabSuccRate                                        N/A
```

```
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_InitialERabEstabFailureRateDueToMultipleLicense      0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_InitialERabEstabSuccRate                             99.7
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_InitialErabSetupSuccRate                             100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_InitialUEContextEstabSuccRate                        100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_PagingDiscardRate                                    0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RandomAccessDecodingRate                             100
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RandomAccessMSG2Congestion                           0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RrcConnSetupFailureRateDueToLackOfConnectedUsersLicense 0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RrcConnSetupRatioForEmergency                        0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RrcConnSetupRatioForHighPrioAccess                   0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RrcConnSetupRatioForMOData                           65.6
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RrcConnSetupRatioForMOSignalling                     0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RrcConnSetupRatioForMobileTerminating                34.4
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_RrcConnSetupSuccRate                                 99.7
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400   Acc_S1SigEstabSuccRate                                   100
```

- RRC success rate at node level

```
MSRBSV2> pmxetn fdd Acc_RrcConnSetupSuccRate


Using formulafile /home/eanzmagn/moshell/commonjars/pm/FORMULA_MSRBS_O.txt
lpget fdd ^(pmRrcConnEstabAtt|pmRrcConnEstabAttReatt|pmRrcConnEstabSucc)$
grep ';' /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/pmxgLog11056  | sort | uniq | /app/moshell/bin/perl
/home/eanzmagn/moshell/pmXtab  -cols time -fmt txt -m "(ManagedElement=[^,]+)" -fdef
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/FORMULA_MSRBS_O.txt.txt.txt -x "^(Acc_RrcConnSetupSuccRate)$" -i
"Acc_RrcConnSetupSuccRate" -p 6.1


Date: 2016-07-06
Object                    Counter                  08:19
ManagedElement=1          Acc_RrcConnSetupSuccRate    99.9
```

- Interference

```
MSRBSV2> pmxet fdd interferencepwr$


Using formulafile /home/eanzmagn/moshell/commonjars/pm/FORMULA_MSRBS_O.txt
lpget fdd ^(WeightedAverage|log10|pmRadioRecInterferencePwr)$
grep ';' /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/pmxgLog11056  | sort | uniq | /app/moshell/bin/perl
/home/eanzmagn/moshell/pmXtab  -cols time -fmt txt -m "(?:\w+=1,){0}((\w+=[^,]+,*)+$)" -fdef
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/FORMULA_MSRBS_O.txt.txt.txt -x "^(Int_RadioRecInterferencePwr)$" -i
"Int_RadioRecInterferencePwr" -p 6.1


Date: 2016-07-06
Object                                                Counter                      08:07
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=400 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=401 Int_RadioRecInterferencePwr -106.2
```

```
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=402 Int_RadioRecInterferencePwr -101.6
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=403 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=404 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=405 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=406 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=407 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=408 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=409 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=410 Int_RadioRecInterferencePwr -116.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=411 Int_RadioRecInterferencePwr      0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=412 Int_RadioRecInterferencePwr      0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=413 Int_RadioRecInterferencePwr      0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=414 Int_RadioRecInterferencePwr      0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=415 Int_RadioRecInterferencePwr      0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=416 Int_RadioRecInterferencePwr      0
```

- Interference on one cell for certain PRBs

```
MSRBSV2> pmxetd fdd=.*399 interferencepwrprb[0-9]$


Using formulafile /home/eanzmagn/moshell/commonjars/pm/FORMULA_MSRBS_0.txt
lpdiff fdd=.*399 ^(log10|pmRadioRecInterferencePwrPrb1|pmRadioRecInterferencePwrPrb2|pmRadioRecInterferencePwrPrb3|
pmRadioRecInterferencePwrPrb4|pmRadioRecInterferencePwrPrb5|pmRadioRecInterferencePwrPrb6|pmRadioRecInterferencePwrPrb7|
pmRadioRecInterferencePwrPrb8|pmRadioRecInterferencePwrPrb9)$
grep ';' /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/pmxgLog11056  | /app/moshell/bin/perl
/home/eanzmagn/moshell/pmDiff  -force  | sort | uniq | /app/moshell/bin/perl /home/eanzmagn/moshell/pmXtab  -cols time -fmt txt -m "(?:\w+=1,)
{0}((\w+=[^,]+,*)+$)" -fdef /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/FORMULA_MSRBS_0.txt.txt.txt -x
"^(Int_RadioRecInterferencePwrPrb1|Int_RadioRecInterferencePwrPrb2|Int_RadioRecInterferencePwrPrb3|Int_RadioRecInterferencePwrPrb4|
Int_RadioRecInterferencePwrPrb5|Int_RadioRecInterferencePwrPrb6|Int_RadioRecInterferencePwrPrb7|Int_RadioRecInterferencePwrPrb8|
Int_RadioRecInterferencePwrPrb9)$" -i "Int_RadioRecInterferencePwrPrb1|Int_RadioRecInterferencePwrPrb2|Int_RadioRecInterferencePwrPrb3|
Int_RadioRecInterferencePwrPrb4|Int_RadioRecInterferencePwrPrb5|Int_RadioRecInterferencePwrPrb6|Int_RadioRecInterferencePwrPrb7|
Int_RadioRecInterferencePwrPrb8|Int_RadioRecInterferencePwrPrb9" -p 6.1


Date: 2016-07-06
Object                                          Counter                         08:11
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb1 -117.6
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb2 -118.0
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb3 -117.6
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb4 -117.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb5 -117.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb6 -117.6
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb7 -117.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb8 -117.5
ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=399 Int_RadioRecInterferencePwrPrb9 -117.5
```

- Ethernet throughput

```
MSRBSV2> pmxetd eth eth


Using formulafile /home/eanzmagn/moshell/commonjars/pm/FORMULA_MSRBS_0.txt
lpdiff eth ^(ifHCInOctets|ifHCOutOctets)$
```

```
grep ';' /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/pmxgLog11056  | /app/moshell/bin/perl
/home/eanzmagn/moshell/pmDiff  -force  | sort | uniq | /app/moshell/bin/perl /home/eanzmagn/moshell/pmXtab  -cols time -fmt txt -m "(?:\w+=1,)
{0}((\w+=[^,]+,*)+$)" -fdef /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160706-080641_11032/FORMULA_MSRBS_0.txt.txt.txt -x
"^(EthernetPortMbpsIn|EthernetPortMbpsOut)$" -i "EthernetPortMbpsIn|EthernetPortMbpsOut" -p 6.1


Date: 2016-07-06
Object                                           Counter            08:22
ManagedElement=1,Transport=1,EthernetPort=1      EthernetPortMbpsIn   826.8
ManagedElement=1,Transport=1,EthernetPort=1      EthernetPortMbpsOut   46.9
```

5.15 Print real-time pmFlex counter values

```
RBSG2> pmomd . pmflex


############################################################################################################################
MO Class                          Pm Counter                          Type                  Flags
############################################################################################################################
Lrat.EUtranCellFDD                pmFlexDrbThpTimeDl                   sequence:long [9]     ropReset,CC,SUM
Lrat.EUtranCellFDD                pmFlexErabEstabAttAdded              sequence:long [9]     ropReset,CC,SUM
Lrat.EUtranCellFDD                pmFlexErabEstabAttAddedGbr           sequence:long [9]     ropReset,CC,SUM
...<cut>..
Lrat.EUtranCellTDD                pmFlexUeThpTimeDl                    sequence:long [9]     ropReset,CC,SUM
Lrat.EUtranCellTDD                pmFlexUeThpTimeUl                    sequence:long [9]     ropReset,CC,SUM
Lrat.EUtranCellTDD                pmFlexUeThpVolUl                     sequence:long [9]     ropReset,CC,SUM


Total: 2 MOs, 80 counters   (720 including PDF)


RBSG2> pget . pmFlexErabRelAbnormalEnb


=================================================================================================================
MO                                              Attribute          Value
=================================================================================================================
EUtranCellFDD=1                                 pmFlexErabRelAbnormalEnb Struct{8}
 >>> 1.pmFlexErabRelAbnormalEnb_Lcg0To3 = 0
 >>> 2.pmFlexErabRelAbnormalEnb_Plmn0To5UeCat0To33Spid1To255Qci0 = 0
 >>> 3.pmFlexErabRelAbnormalEnb_Plmn0To5UeCat0To33Spid1To256Qci0To255 = 0
 >>> 4.pmFlexErabRelAbnormalEnb_Plmn0To5UeCat0To33Spid1To256Qci2To255Arp0To15 = 0
 >>> 5.pmFlexErabRelAbnormalEnb_Qci0To254Arp0To15 = 0
 >>> 6.pmFlexErabRelAbnormalEnb_UeCat0To33Spid1To256Qci0To255 = 0
 >>> 7.pmFlexErabRelAbnormalEnb_UeCat0To33Spid1To256Qci0To255Arp0To15 = 0
 >>> 8.pmFlexErabRelAbnormalEnb_UeCat2To33Spid1To256 = 0
EUtranCellFDD=1                                 pmFlexErabRelAbnormalEnbAct Struct{8}
 >>> 1.pmFlexErabRelAbnormalEnbAct_Lcg0To3 = 0
 >>> 2.pmFlexErabRelAbnormalEnbAct_Plmn0To5UeCat0To33Spid1To255Qci0 = 0
 >>> 3.pmFlexErabRelAbnormalEnbAct_Plmn0To5UeCat0To33Spid1To256Qci0To255 = 0
 >>> 4.pmFlexErabRelAbnormalEnbAct_Plmn0To5UeCat0To33Spid1To256Qci2To255Arp0To15 = 0
 >>> 5.pmFlexErabRelAbnormalEnbAct_Qci0To254Arp0To15 = 0
 >>> 6.pmFlexErabRelAbnormalEnbAct_UeCat0To33Spid1To256Qci0To255 = 0
```

```
 >>> 7.pmFlexErabRelAbnormalEnbAct_UeCat0To33Spid1To256Qci0To255Arp0To15 = 0
 >>> 8.pmFlexErabRelAbnormalEnbAct_UeCat2To33Spid1To256 = 0
EUtranCellFDD=1                                  pmFlexErabRelAbnormalEnbActGbr Struct{8}
 >>> 1.pmFlexErabRelAbnormalEnbActGbr_Lcg0To3 = 0
 >>> 2.pmFlexErabRelAbnormalEnbActGbr_Plmn0To5UeCat0To33Spid1To255Qci0 = 0
 >>> 3.pmFlexErabRelAbnormalEnbActGbr_Plmn0To5UeCat0To33Spid1To256Qci0To255 = 0
 >>> 4.pmFlexErabRelAbnormalEnbActGbr_Plmn0To5UeCat0To33Spid1To256Qci2To255Arp0To15 = 0
 >>> 5.pmFlexErabRelAbnormalEnbActGbr_Qci0To254Arp0To15 = 0
 >>> 6.pmFlexErabRelAbnormalEnbActGbr_UeCat0To33Spid1To256Qci0To255 = 0
 >>> 7.pmFlexErabRelAbnormalEnbActGbr_UeCat0To33Spid1To256Qci0To255Arp0To15 = 0
 >>> 8.pmFlexErabRelAbnormalEnbActGbr_UeCat2To33Spid1To256 = 0
EUtranCellFDD=1                                  pmFlexErabRelAbnormalEnbGbr Struct{8}
 >>> 1.pmFlexErabRelAbnormalEnbGbr_Lcg0To3 = 0
 >>> 2.pmFlexErabRelAbnormalEnbGbr_Plmn0To5UeCat0To33Spid1To255Qci0 = 0
 >>> 3.pmFlexErabRelAbnormalEnbGbr_Plmn0To5UeCat0To33Spid1To256Qci0To255 = 0
 >>> 4.pmFlexErabRelAbnormalEnbGbr_Plmn0To5UeCat0To33Spid1To256Qci2To255Arp0To15 = 0
 >>> 5.pmFlexErabRelAbnormalEnbGbr_Qci0To254Arp0To15 = 0
 >>> 6.pmFlexErabRelAbnormalEnbGbr_UeCat0To33Spid1To256Qci0To255 = 0
 >>> 7.pmFlexErabRelAbnormalEnbGbr_UeCat0To33Spid1To256Qci0To255Arp0To15 = 0
 >>> 8.pmFlexErabRelAbnormalEnbGbr_UeCat2To33Spid1To256 = 0
================================================================================================
Total: 1 MOs


RBSG2> pget . pmFlexErabRelAbnormalEnb$

================================================================================================
MO                                               Attribute          Value
================================================================================================
EUtranCellFDD=1                                  pmFlexErabRelAbnormalEnb Struct{8}
 >>> 1.pmFlexErabRelAbnormalEnb_Lcg0To3 = 0
 >>> 2.pmFlexErabRelAbnormalEnb_Plmn0To5UeCat0To33Spid1To255Qci0 = 0
 >>> 3.pmFlexErabRelAbnormalEnb_Plmn0To5UeCat0To33Spid1To256Qci0To255 = 0
 >>> 4.pmFlexErabRelAbnormalEnb_Plmn0To5UeCat0To33Spid1To256Qci2To255Arp0To15 = 0
 >>> 5.pmFlexErabRelAbnormalEnb_Qci0To254Arp0To15 = 0
 >>> 6.pmFlexErabRelAbnormalEnb_UeCat0To33Spid1To256Qci0To255 = 0
 >>> 7.pmFlexErabRelAbnormalEnb_UeCat0To33Spid1To256Qci0To255Arp0To15 = 0
 >>> 8.pmFlexErabRelAbnormalEnb_UeCat2To33Spid1To256 = 0
================================================================================================
Total: 1 MOs


RBSG2> hpget . pmFlexErabRelAbnormalEnb$@Lcg0To3

================================================================================================
MO              pmFlexErabRelAbnormalEnb_Lcg0To3
================================================================================================
EUtranCellFDD=1 0
================================================================================================
Total: 1 MOs

Added 1 MOs to group: hget_group

RBSG2> hpget . pmFlexErabRelAbnormalEnb$@Lcg0To3|Plmn0To5UeCat0To33Spid1To255Qci0
```

```
===================================================================================================
MO              pmFlexErabRelAbnormalEnb_Lcg0To3 pmFlexErabRelAbnormalEnb_Plmn0To5UeCat0To33Spid1To255Qci0
===================================================================================================
EUtranCellFDD=1 0                                 0
===================================================================================================
Total: 1 MOs

Added 1 MOs to group: hget_group


RBSG2>
```

6 PM event commands

6.1 General concepts

```
MSRBSV2> momtl \.pmevent


------------------------------
LDNs containing Lrat.PmEventService (systemCreated)
------------------------------
ManagedElement[1],ENodeBFunction[0-1],PmEventService[1]


------------------------------
LDNs containing RcsPMEventM.PmEventM (systemCreated)
------------------------------
ManagedElement[1],SystemFunctions[1],PmEventM[1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventCapabilities[1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventFilterType[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventGroup[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventGroup[0-],EventType[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],EventJob[0-]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],FilePullCapabilities[0-1]
ManagedElement[1],SystemFunctions[1],PmEventM[1],EventProducer[0-],StreamingCapabilities[0-1]
```

6.2 Printing event list from the MOM

```
MSRBSV2> h emom


****************************************************************************
emom  [uetr|gpeh|ctr|all]  [<event-filter>]
****************************************************************************
Display list of events available for each kind of event-based scanner.

The event reference files are stored in moshell/commonjars/eventfiles and are SW dependent.
```

Moshell automatically chooses the appropriate version of the event files so the user does not have to worry about this.
Examples:
 >> emom u ranap   ---> display all ranap related events for uetr
 >> emom all audit ---> display all events containing the word "audit" for all kind of event based scanners

MSRBSV2> emom . measurement


```
==================================================================
Lrat EVENTS
==================================================================
RDT                             2   INTERNAL_PER_RADIO_UE_MEASUREMENT
                                    INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
EXTERNAL                        2   RRC_INTER_FREQ_RSTD_MEASUREMENT_INDICATION
                                    RRC_MEASUREMENT_REPORT
CCTR                            3   INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                    INTERNAL_PER_RADIO_UE_MEASUREMENT
                                    INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
SESSION_PERFORMANCE_EVALUATION  4   INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                    INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
                                    INTERNAL_PER_RADIO_UE_MEASUREMENT
                                    INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
UETR_ONLY                       4   INTERNAL_EVENT_UETR_MEASUREMENT_REPORT_RECEIVED
                                    INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT
                                    INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT_TDD
                                    INTERNAL_PER_UETR_RADIO_UE_MEASUREMENT
INTERNAL_PERIODIC               7   INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                    INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
                                    INTERNAL_PER_RADIO_UE_MEASUREMENT
                                    INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
                                    INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT
                                    INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT_TDD
                                    INTERNAL_PER_UETR_RADIO_UE_MEASUREMENT
INTERNAL                        2   INTERNAL_EVENT_MEASUREMENT_REPORT_RECEIVED
                                    INTERNAL_EVENT_UETR_MEASUREMENT_REPORT_RECEIVED
GENERAL_EVALUATION              2   INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                    INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
```

6.3 List Event Jobs

MSRBSV2> pst


```
=================================================================================================
Proxy  Job                 ReqState     CurrState      Granul  nrRdrs/Evts
=================================================================================================
 4579  PmJob=NodeBFunction  ACTIVE       ACTIVE          900      13
 4593  PmJob=PREDEF_Lrat    ACTIVE       ACTIVE          900     250
 4844  PmJob=PREDEF_Rtn     ACTIVE       ACTIVE          900      65
 4910  PmJob=PREDEF_Wrat    ACTIVE       ACTIVE          900      23
 5495  Lrat,EventJob=10000  ACTIVE       ACTIVATING      900       0
 5496  Lrat,EventJob=10001  ACTIVE       ACTIVATING      900       0
 5497  Lrat,EventJob=10002  ACTIVE       ACTIVATING      900       0
 5498  Lrat,EventJob=10003  ACTIVE       ACTIVATING      900       0
 5499  Lrat,EventJob=10004  ACTIVE       ACTIVATING      900       0
 5500  Lrat,EventJob=10005  ACTIVE       ACTIVE          900      25
=================================================================================================
>>> Total: 4 PmJobs, 6 EventJobs
```

6.4 Show Event Jobs contents

```
MSRBSV2> pgets 5728


===============================================================================
 5728  Lrat,EventJob=10004  STOPPED      STOPPED           900     30
===============================================================================
CellIdFilter                         ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=6
UeFraction                           300
-------------------------------------------------------------------------------
CCTR                              3  INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                     INTERNAL_PER_RADIO_UE_MEASUREMENT
                                     INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
EXTERNAL                          2  RRC_INTER_FREQ_RSTD_MEASUREMENT_INDICATION
                                     RRC_MEASUREMENT_REPORT
GENERAL_EVALUATION                2  INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                     INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
INTERNAL                          2  INTERNAL_EVENT_MEASUREMENT_REPORT_RECEIVED
                                     INTERNAL_EVENT_UETR_MEASUREMENT_REPORT_RECEIVED
INTERNAL_PERIODIC                 7  INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                     INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
                                     INTERNAL_PER_RADIO_UE_MEASUREMENT
                                     INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
                                     INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT
                                     INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT_TDD
                                     INTERNAL_PER_UETR_RADIO_UE_MEASUREMENT
PM_INITIATED_UE_MEASUREMENTS      4  UE_MEAS_EVENT_FEAT_NOT_AVAIL
                                     UE_MEAS_EVENT_NOT_CONFIG
                                     UE_MEAS_INTRAFREQ1
                                     UE_MEAS_INTRAFREQ2
RDT                               2  INTERNAL_PER_RADIO_UE_MEASUREMENT
                                     INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
SESSION_PERFORMANCE_EVALUATION    4  INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                     INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
                                     INTERNAL_PER_RADIO_UE_MEASUREMENT
                                     INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
UETR_ONLY                         4  INTERNAL_EVENT_UETR_MEASUREMENT_REPORT_RECEIVED
                                     INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT
                                     INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT_TDD
                                     INTERNAL_PER_UETR_RADIO_UE_MEASUREMENT
===============================================================================
>>> Total: 0 PmJobs, 1 EventJobs
```

6.5 Set contents of a Event Job

```
MSRBSV2> h pset


********************************************************************************
pset[d]
********************************************************************************
Set the contents of an event-based scanner (RNC/RBS/ENB/MSRBS).

Following syntaxes apply:
```

```
  * UETR/UETRACE:     pset[d] [-s/-f <ip>:<port>] <scan-filter>|<scan-proxy> <event-filter>|<event-file>|all  <imsi>
  * CTR:              pset[d] [-s/-f <ip>:<port>] <scan-filter>|<scan-proxy> <event-filter>|<event-file>|all  <moGroup>|<moFilter>
[<trigger-event>]
  * GPEH/CELLTRACE:   pset[d] [-s/-f <ip>:<port>] <scan-filter>|<scan-proxy> <event-filter>|<event-file>|all [<moGroup>|<moFilter>|all] [<ue-
fraction>] [<filter>=<value>]

  ...<etc>....
```

Setup a cell trace with output to file on a particular cell

```
MSRBSV2> pset 5728 measurement cellfdd=6 300


Setting 1 EventGroups and 26 EventTypes in Lrat,EventJob=10004. Please wait...
..
=============================================================================================
   5728  Lrat,EventJob=10004                                      >>> Done.
=============================================================================================


MSRBSV2> pgets 5728


=============================================================================================
  5728  Lrat,EventJob=10004  STOPPED      STOPPED          900     30
=============================================================================================
CellIdFilter                            ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=6
UeFraction                              300
---------------------------------------------------------------------------------------------
CCTR                                3   INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                        INTERNAL_PER_RADIO_UE_MEASUREMENT
                                        INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
EXTERNAL                            2   RRC_INTER_FREQ_RSTD_MEASUREMENT_INDICATION
                                        RRC_MEASUREMENT_REPORT
GENERAL_EVALUATION                 2   INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                        INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
INTERNAL                           2   INTERNAL_EVENT_MEASUREMENT_REPORT_RECEIVED
                                        INTERNAL_EVENT_UETR_MEASUREMENT_REPORT_RECEIVED
INTERNAL_PERIODIC                  7   INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                        INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
                                        INTERNAL_PER_RADIO_UE_MEASUREMENT
                                        INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
                                        INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT
                                        INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT_TDD
                                        INTERNAL_PER_UETR_RADIO_UE_MEASUREMENT
PM_INITIATED_UE_MEASUREMENTS       4   UE_MEAS_EVENT_FEAT_NOT_AVAIL
                                        UE_MEAS_EVENT_NOT_CONFIG
                                        UE_MEAS_INTRAFREQ1
                                        UE_MEAS_INTRAFREQ2
RDT                                2   INTERNAL_PER_RADIO_UE_MEASUREMENT
                                        INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
SESSION_PERFORMANCE_EVALUATION     4   INTERNAL_PER_RADIO_CELL_MEASUREMENT
                                        INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
                                        INTERNAL_PER_RADIO_UE_MEASUREMENT
                                        INTERNAL_PER_RADIO_UE_MEASUREMENT_TA
UETR_ONLY                          4   INTERNAL_EVENT_UETR_MEASUREMENT_REPORT_RECEIVED
```

```
                        INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT
                        INTERNAL_PER_UETR_RADIO_CELL_MEASUREMENT_TDD
                        INTERNAL_PER_UETR_RADIO_UE_MEASUREMENT
================================================================================
>>> Total: 0 PmJobs, 1 EventJobs
```

Setup a cell trace with output to stream, on all cells

Note: This functionality requires the optional feature RbsPmEventStreamer:

```
ENB30> inv streamer


================================================================================================
Feature                    keyId       licenseState  featureState    serviceState    description
================================================================================================
RbsEventStreamer=1         CXC4010856  1 (ENABLED)   1 (ACTIVATED)   1 (OPERABLE)
================================================================================================


ENB30> pset -s 150.132.81.127:51543 9 radio all 1000


=================================================================
       9   PREDEF.10000.CELLTRACE                      >>> Done.
=================================================================

ENB30> pgets 9


=================================================================
9          PREDEF.10000.CELLTRACE              SUSPENDED  4 (Stream to 150.132.81.127:51543)
=================================================================
UE_FRACTION            1000
-----------------------------------------------------------------
INTERNAL_PERIODIC  4    INTERNAL_PER_RADIO_UTILIZATION
                        INTERNAL_PER_RADIO_UE_MEASUREMENT
                        INTERNAL_PER_RADIO_CELL_MEASUREMENT
                        INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
=================================================================
>>> Total: 1 Scanners
```

Setup a cell trace with output to file and stream, on one particular cell

```
ENB30> pset -f 150.132.81.127:51543 10 radio fdd 20


=================================================================
      10   PREDEF.10001.CELLTRACE                      >>> Done.
=================================================================

ENB30> pgets 10


=================================================================
10         PREDEF.10001.CELLTRACE             SUSPENDED  4 (File_and_stream to 150.132.81.127:51543)
=================================================================
UE_FRACTION            20
```

```
CELL                  ManagedElement=1,ENodeBFunction=1,EUtranCellFDD=141
----------------------------------------------------------------------------------
INTERNAL_PERIODIC  4   INTERNAL_PER_RADIO_UTILIZATION
                       INTERNAL_PER_RADIO_UE_MEASUREMENT
                       INTERNAL_PER_RADIO_CELL_MEASUREMENT
                       INTERNAL_PER_RADIO_CELL_MEASUREMENT_TDD
==================================================================================
>>> Total: 1 Scanners


ENB30> pdeb 9


==================================================================================
    9  PREDEF.10000.CELLTRACE                                    >>> Done.
==================================================================================
>>> Total: 1 Scanners

ENB30> pdeb 10


==================================================================================
   10  PREDEF.10001.CELLTRACE                                    >>> Done.
==================================================================================
>>> Total: 1 Scanners
```

Check Cell Trace status

```
ENB30> hget pmevent stream.*cell


===========================================================================================================
MO                 streamStatusPmCellTrace fileStatus   ipAddress     portNumber scannerId streamStatus        traceReference
===========================================================================================================
PmEventService=1 t[6] =
PmEventService=1 t[0]                       0 (INACTIVE) 150.132.81.127 51543      10000     3 (RECONNECTING) 0
PmEventService=1 t[1]                       1 (ACTIVE)   150.132.81.127 51543      10001     3 (RECONNECTING) 17592186044416
PmEventService=1 t[2]                       0 (INACTIVE) 0.0.0.0        51543      10002     0 (INACTIVE)     -1
PmEventService=1 t[3]                       1 (ACTIVE)   150.132.81.127 51543      10003     3 (RECONNECTING) 41985465450594
PmEventService=1 t[4]                       0 (INACTIVE) 0.0.0.0        51543      10004     0 (INACTIVE)     -1
PmEventService=1 t[5]                       0 (INACTIVE) 0.0.0.0        51543      10005     0 (INACTIVE)     -1
===========================================================================================================
Total: 1 MOs
```

6.6 Stop a Event Job

```
MSRBSV2> pbl eventjob=10004


Set requestedJobState on following 1 MOs ?
==================================================================================
 5728  SystemFunctions=1,PmEventM=1,EventProducer=Lrat,EventJob=10004
==================================================================================
Set requestedJobState on 1 MOs. Are you Sure [y/n] ? y


==================================================================================
  Id  MO                                                requestedJobState   Result
```

```
==================================================================================================
 5728   PmEventM=1,EventProducer=Lrat,EventJob=10004                      2                    >>> Set.
==================================================================================================
Total: 1 MOs attempted, 1 MOs set

MSRBSV2> pst eventjob=10004


==================================================================================================
Proxy  Job                   ReqState     CurrState     Granul nrRdrs/Evts
==================================================================================================
 5728  Lrat,EventJob=10004   STOPPED      STOPPED        900    30
==================================================================================================
>>> Total: 0 PmJobs, 1 EventJobs
```

6.7 Resume a Event Job

```
MSRBSV2> pdeb eventjob=10004


Set requestedJobState on following 1 MOs ?
==================================================================================
 5728   SystemFunctions=1,PmEventM=1,EventProducer=Lrat,EventJob=10004
==================================================================================
Set requestedJobState on 1 MOs. Are you Sure [y/n] ? y


==================================================================================================
   Id  MO                                                        requestedJobState     Result
==================================================================================================
 5728   PmEventM=1,EventProducer=Lrat,EventJob=10004                      1                    >>> Set.
==================================================================================================
Total: 1 MOs attempted, 1 MOs set

MSRBSV2> pst eventjob=10004


==================================================================================================
Proxy  Job                   ReqState     CurrState     Granul nrRdrs/Evts
==================================================================================================
 5728  Lrat,EventJob=10004   ACTIVE       ACTIVE         900    30
==================================================================================================
>>> Total: 0 PmJobs, 1 EventJobs
```

6.8 Empty contents of a Event Job

```
MSRBSV2> pset 5728 null


Setting 0 EventGroups and 0 EventTypes in Lrat,EventJob=10004. Please wait...
==================================================================================================
   5728   Lrat,EventJob=10004                                  !!!! ERROR: Transaction not committed due to validation errors
Transaction validation failed! {1,1,1,Lrat,10004}:  Not allowed to update an event job that is not in state stopped
==================================================================================================

MSRBSV2> pbl 5728
```

```
Set requestedJobState on following 1 MOs ?
=========================================================================
  5728   SystemFunctions=1,PmEventM=1,EventProducer=Lrat,EventJob=10004
=========================================================================
Set requestedJobState on 1 MOs. Are you Sure [y/n] ? y


=========================================================================
   Id   MO                                          requestedJobState    Result
=========================================================================
  5728   PmEventM=1,EventProducer=Lrat,EventJob=10004            2              >>> Set.
=========================================================================
Total: 1 MOs attempted, 1 MOs set

MSRBSV2> pset 5728 null

Setting 0 EventGroups and 0 EventTypes in Lrat,EventJob=10004. Please wait...
=========================================================================
    5728   Lrat,EventJob=10004                               >>> Done.
=========================================================================


MSRBSV2> pgets 5728


=========================================================================
  5728   Lrat,EventJob=10004   STOPPED      STOPPED       900     0
=========================================================================
-------------------------------------------------------------------------
=========================================================================
>>> Total: 0 PmJobs, 1 EventJobs

MSRBSV2>
```

6.9   Fetch and decode Event ROP files

pme needs the ltng-decoder from <ins>https://wcdma-confluence.rnd.ki.sw.ericsson.se/display/PB/LTNG</ins>

```
MSRBSV2> uv ltedecoder

ltedecoder = /home/eanzmagn/ltetools/ltng-decoder

MSRBSV2> pmefdc -m 0.25


******** Fetching CellTrace files...
get /pm_data/A20160229.1115-1130_CellTrace_DUL1_2.bin.gz /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/rbs83/ctr/A20160229.1115-
1130_CellTrace_DUL1_2.bin.gz ... OK

******** Decoding ROP files ...
gzip -df /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/rbs83/ctr/A20160229.1115-1130_CellTrace_DUL1_2.bin.gz
```

```
/proj/stab_lmr/tools/LTE_MSRBS_Toolbox/latest/ltng-decoder -t /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160229-
122940_27163/enbxml -f /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/rbs83/ctr/A20160229.1115-1130_CellTrace_DUL1_2.bin >
/home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/rbs83/ctr/A20160229.1115-1130_CellTrace_DUL1_2.bin.dec
[info] Processing of 305 events completed...


MSRBSV2> l cat /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/rbs83/ctr/A20160229.1115-1130_CellTrace_DUL1_2.bin.dec


[info] LTNG version: R81G
[info] PM event translation version 25-R7A loaded
[info] Failed to load PM event translation version 25-R6A from Translation Storage
[info] Failed to load EHB event translation version 25-R6A from Translation Storage
[info] Failed to load Exception event translation version 25-R6A from Translation Storage
[3916-02-29 11:15:57.000] LTEEvent
LTEEvent {
  recordLength 417,
  recordType 0,
  FileHeader {
    file-format-version T,
    pm-recording-version CXP9018505/25,
    pm-recording-revision R6A,
    year 3916,
    month 2,
    day 29,
    hour 11,
    minute 15,
    second 57,
    ne-user-label ,
    ne-logical-name
  }
}
[3916-02-29 11:15:57.000] LTEEvent
LTEEvent {
  recordLength 16,
  recordType 3,
  ScannerConnection {
    hour 11,
    minute 15,
    second 57,
    millisecond 0,
    scanner-id '10 00 00'H,
    status 0,
    padding '00 00 00'H
  }
}
[3916-02-29 11:20:40.000] LTEEvent
LTEEvent {
  recordLength 16,
  recordType 3,
  ScannerConnection {
    hour 11,
    minute 20,
    second 40,

....<cut>...
```

6.10 Fetch and decode Exception event ROP files

```
MSRBS239> pmefdr -m 1


160406-04:14:05 MSRBS239 16.0d  stopfile=/tmp/7145


Downloading File from https://MSRBS239/pmevent/RbsPmEventLm.xml to /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160406-
041319_7121/enbxml/RbsPmEventLm.xml ...Done.


******** Fetching MSRBS Exception files...


Checking available boards on node...


Collecting RCS board data ...
.....................
.......................................................
=================================================================================
coli>/fruacc/lhsh 000100 /lrat/exception flushfile
0001: SUCCESS: No active file was open!
coli>


=================================================================================
coli>/fruacc/lhsh 000100 /lrat/exportexcep sftp://moshki7203@10.74.144.9/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160406-
041319_7121/pmefrgen2/ ******** 201604060130-0145_exception_1.bin.gz 201604060145-0200_exception_1.bin.gz 201604060145-0200_exception_2.bin.gz
0001: exporting ...
0001: file-num  : 3
0001: full-path : /rcs/applicationlogs/LRAT-ARM_CXP9025671_25/troubleshooting/exception/logs/201604060130-0145_exception_1.bin.gz
0001: FI_OK: File(1) exported!
0001: full-path : /rcs/applicationlogs/LRAT-ARM_CXP9025671_25/troubleshooting/exception/logs/201604060145-0200_exception_1.bin.gz
0001: FI_OK: File(2) exported!
0001: full-path : /rcs/applicationlogs/LRAT-ARM_CXP9025671_25/troubleshooting/exception/logs/201604060145-0200_exception_2.bin.gz
0001: FI_OK: File(3) exported!
coli>
cp /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160406-041319_7121/pmefrgen2/*
/home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/


******** Decoding ROP files ...
Downloading File from https://MSRBS239/exceptionevent/RbsExceptionEventsLm.xml to
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160406-041319_7121/enbxml/RbsExceptionEventLm.xml ...Done.
gzip -df /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060130-0145_exception_1.bin.gz
/home/eanzmagn/ltetools/ltng-decoder -t /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160406-041319_7121/enbxml -f
/home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060130-0145_exception_1.bin >
/home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060130-0145_exception_1.bin.dec
[info] Processing of 3 events completed (2 parsing errors)...
gzip -f /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060130-0145_exception_1.bin
gzip -df /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060145-0200_exception_1.bin.gz
/home/eanzmagn/ltetools/ltng-decoder -t /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160406-041319_7121/enbxml -f
/home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060145-0200_exception_1.bin >
/home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060145-0200_exception_1.bin.dec
[info] Processing of 3 events completed (2 parsing errors)...
gzip -f /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060145-0200_exception_1.bin
gzip -df /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060145-0200_exception_2.bin.gz
```

```
/home/eanzmagn/ltetools/ltng-decoder -t /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20160406-041319_7121/enbxml -f
/home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060145-0200_exception_2.bin >
/home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060145-0200_exception_2.bin.dec
[info] Processing of 3 events completed (2 parsing errors)...
gzip -f /home/eanzmagn/moshell_logfiles/logs_moshell/pmfiles/MSRBS239/exception/logs/201604060145-0200_exception_2.bin

MSRBS239>
```

7 <u>Log commands</u>

The node logs can be fetched and printed with the command "lg"

```
OFFLINE> h lg


*****************************************************************************
lg[abcdefghijklmnopqrstuvwxyz012345] [-l <logdirectory|logfile|zipfile>] [-m <minustime>] [-p <plustime>] [-s <startdate>] [-e <enddate>] [-g
<boardgroup>] [-n <nodefilter>] [-x <XBlog-filter|ESIlog-filter> ] [-b <xb> ] [-d <nrdumps>] [|<unix-cmds>]
*****************************************************************************
Fetching and processing of node logs


All options can be combined together, except options "d","w","x","f" which can only be combined with the options "r" and "c".


CPP Log Options:
**************
 - 1: Print the list of logs from the node.
 - 2: T&E disk and ramdisk log (/d/usr/cello/telogs and /r000X00/telogs)
 - 3: RNC SON logs (/c/logfiles/SON/ANR_EVENTLOG.xml and TPS_EVENTLOG.xml)
 - 4: MGW BGF log (/c/logfiles/BGF)
 - 5: MGW IPCS log (/c/logfiles/ipcs_logs)
 - a: Alarm log (ALARM_LOG.xml). History


 of alarms raising and ceasing.
 - j: Alarm durations (ALARM_LOG.xml). Same as option "a" except that raising and ceasing are combined into one entry, together with the total
duration of the alarm.
 - x: Active alarms (ALARM_LOG.xml). Snapshot of alarms active on a specific date/time given in -m/-s option.
 - e: Event log (EVENT_LOG.xml). History of MO events.
 - v: Availability log (CELLO_AVAILABILITY2_LOG.xml). History of node/board/program restarts.
 - s: System log (/c/logfiles/systemlog). History of node/board/program restarts.
 - p: Post Mortem Dumps (/c/pmd) and LTE ENodeB error files (/c/logfiles/troubleshooting/error). History of board/program crashes. PMD files are
saved permanently in moshell_logfiles/logs_moshell/pmdfiles/<nodeaddress>/pmd .
 - u: Upgrade log (Trace.log/Trace.txt). History of system upgrades.
 - d: Downtime log. History of node outages and partial outages.
 - o: MO command log (CORBA_AUDITTRAIL_LOG.xml and PNP_LOG.xml). History of MO write commands (set/action/create/delete).
 - q: MO command log in "trun" format (CORBA_AUDITTRAIL_LOG.xml). Useful for recovering configuration data which was not saved to CV before node
restart.
 - l: COLI command log (SHELL_AUDITTRAIL_LOG.xml). History of COLI commands.
 - y: SecurityEvent log (CELLO_SECURITYEVENT_LOG.xml). History of O&M connection setups.
 - w: Active O&M connections (CELLO_SECURITYEVENT_LOG.xml). Snapshot of O&M connections on a specific date/time given in -m/-s option.
 - z: IP Transport log (CELLO_IPTRAN_LOG.xml).
 - t: T&E log (lh all te log read. to specify a different boardgroup than "all", use the "-g" option). Trace and Error Log.
 - g: Board Restart error log (lh allpd llog -l ; lh ru llog -l -n 5).
```

- h: HW Inventory log (CELLO_HWINVENTORY_LOG.xml). This file must first be generated with the command "hili mk" on O&M MP.
 - k: XB logs. Fetches CMXB logs (HCS and Evo nodes) and SCXB logs (Evo nodes). Use "-b <xb>" to limit log fetching from a single board. Use "-x <xblogfilter>" to determine which logs are processed (see below).
 - b: RLIB log (/c/logfiles/Rlib/RLIB_PM_LOG.xml), applicable to RNC only.
 - f: collect all logs except XB logs and ENB DSP dumps, and save to a zipfile.
To specify number of ENB DSP dumps to collect, use option "-d <n>", eg "lgf -d 2" to collect the last 2 ENB DSP dumps.
 - f1: collect all logs and last ENB DSP dump, and save to a zipfile.
 - f2: collect only XB logs, and save to a zipfile. To only collect XB logs from a specific board, use option "-b", eg "lgf2 -b 000100"

Pico Log Options:
****
 - a: Alarm log (/var/volatile/log/permanent/oss/alarmlog.log)
 - e: FmEvent log (/var/volatile/log/permanent/oss/fmevents.log)
 - g: Runtime log (/var/volatile/log/runtime)
 - h: AutoIntegration log (/var/volatile/log/permanent/oss/AutointegrationLog.txt)
 - o: Audit Trail logs (/var/volatile/log/runtime* and /var/volatile/log/permanent/oss/runtime*)
 - s: SystemEvent log (/var/volatile/log/permanent/oss/sysevent)
 - u: Upgrade log (/var/volatile/log/permanent/oss/SWUpgradeLog.txt)
 - y: SecurityEvent log (/var/volatile/log/security)
 - f: collect all logs and save to a zipfile

RCS Log Options (MSRBSv2/TCU):
****
 - a: Alarm log (AlarmLog). History of alarms raising and ceasing.
 - j: Alarm durations. Same as option "a" except that raising and ceasing are combined into one entry, together with the total duration of the alarm.
 - x: Active alarms. Snapshot of alarms active on a specific date/time given in -m/-s option.
 - b: TN Application log (TnApplicationLog)
 - d: Downtime log. History of node outages and partial outages.
 - h: AutoIntegration log (AiLog)
 - g: Board Restart log ("llog -l" on DU/RU/XMU).
 - k: Ericsson Support Information log (EsiLog)
 - l: COLI command log (AuditTrailLog)
 - o: MO command log (AuditTrailLog)
 - p: Post Mortem Dumps (from /rcs/dumps/pmd). History of CPM crashes. PMD files are saved permanently in moshell_logfiles/logs_moshell/pmdfiles/<nodeaddress>/pmd .
 - v: Availability log (RBS_CS_AVAILABILITY_LOG)
 - t: T&E log (lh all te log read. to specify a different boardgroup than "all", use the "-g" option). Trace and Error Log.
 - u: Upgrade log (SwmLog)
 - y: Security log (SecurityLog)
 - z: TN Network log (TnNetworkLog)
 - 4: Battery Log (BatteryLog)
 - 5: OOT log (OotLog)
 - f: collect all logs with small ESI and save to a zipfile
 - f1: collect all logs with large ESI and save to a zipfile
 - f0: collect all logs except the ESI and save to a zipfile

Format Options:
****
 - m: merge the different logs together (eg: lgaevm will merge alarm/event/availability logs).
 - i: inverse chronological order.
 - r: refetch the logs from the node. Logs are only fetched once and kept in cache. This option is used to refresh the session cache.
 - c: print the output in csv format (semicolon separation).
 - f: fetch the logs only and store them in a directory on the workstation. Different number of DSP dumps can be specified with option "-d <nrdumps>", eg: "lgf -d 2" to collect the last 2 dsp dumps. By default, no ENB DSP dumps will be fetched and no XB logs will be fetched.
 - f1: fetch all logs including XB logs and the last ENB DSP dump.

```
 - f2: fetch only XB logs.


Time filtering:
****************
 - The "-s" and "-e" options are used for specifying an absolute timespan: -s gives the starting date and -e gives the ending date. The format
is yyyymmdd[.hhmm], for instance 20071230, or 20071230.0800.
 - The "-m" and "-p" options are used for specifying a timespan relative to today's date: -m gives how long time backward and -p gives how long
time forward. The format is in days, hours, or minutes, eg. 10d (10 days), 2h (2 hours), 30m (30 minutes).
Note: the switch "-s"/"-m" can sometimes be omitted. E.g. "lgo 14" can be used instead of "lgo -m 14", and "lgo 20080701.1200" can be used
instead of "lgo -s 20080701.1200". This works only when the options -e/-p are not used.


...<cut>...
```

7.1   Methods of transfer

7.1.1   Gen1 and Pico

The log files are stored in various folders on the node:
- **Gen1: /c/logfiles and /c/systemfiles**
- **Pico: /var/permanent, /var/persistent, and /var/volatile.**

The files are available to download via SFTP from the node's SFTP server.

7.1.2   Gen2

The Logs of RCS nodes are exported by MO action to an external SFTP server.

```
MSRBSV2> momtl \.logm$


-------------------------------
LDNs containing RcsLogM.LogM (systemCreated)
-------------------------------
ManagedElement[1],SystemFunctions[1],LogM[1]
ManagedElement[1],SystemFunctions[1],LogM[1],Log[0-]
ManagedElement[1],SystemFunctions[1],LogM[1],Log[0-],LogPushTransfer[0-5]


MSRBSV2> lacl logm=1


==================================================================================================
Proxy  MO                                                      Action                  Nr of Params
==================================================================================================
  574  LogM=1                                                  exportAvailabilityLog   2
  574  LogM=1                                                  exportEsi               3
  575  LogM=1,Log=AiLog                                        export                  2
  576  LogM=1,Log=AlarmLog                                     export                  2
  577  LogM=1,Log=AuditTrailLog                                export                  2
  578  LogM=1,Log=SecurityLog                                  export                  2
```

```
  579   LogM=1,Log=SwmLog                                              export                          2
  580   LogM=1,Log=TnApplicationLog                                    export                          2
  581   LogM=1,Log=TnNetworkLog                                        export                          2
==================================================================================================
```

There are four export methods supported by moshell. Which one to use depends on firewall configuration.
Refer to file moshell/moshell for description on the export methods.

```
#==============================================================================
# Export settings. Used on COM nodes for exporting the MOM from Schema MO (comcli_mom=3) and the Logs from Log/LogM MO ("lg" command)
#
#    - export_method=0
# export to custom SFTP server on a random port specified in sshd_port and sshd_range.
# The SFTP server will run on the same machine where moshell is executing and only for the duration of the export.
# No username or password need to be specified. The SFTP port is selected randomly in the range specified by the uservariables sshd_port/sshd_range
# This method only works if the firewall does not block the SFTP ports in that range from the node to the workstation.
# The following uservariables are used by export_method=0: sshd_port, sshd_range, sshd_random
#lt
#    - export_method=1
# export to the existing SFTP server running on port 22 on the moshell workstation
# With this method, the uservariables export_username and export_password must be set.
# If export_password is not set then it will be prompted at the first export.
# The following uservariables are used by export_method=1: export_username, export_password
#
#    - export_method=2
# export to a remote SFTP server on port 22, the address of the server is specified in the uservariable export_server
# important: the remote SFTP server must be reachable both from the node as well as from the workstation where moshell is running
#            since the logfile will be first transferred from the node to the server, then from the server to the moshell workstation.
# The temporary path where to store the logs on the remote server can be specified with the uv export_dir
# The export_dir setting is optional, but if it has been specified then it must actually exist on the server, moshell will not create it automatically.
# If export_dir has not been specified then the logs will be temporarily stored on the default root path of the SFTP server such as the user's home directory for
instance
# After the logs have been successfully transferred back to the moshell workstation, they will be removed from the remote SFTP server.
# With this method, the uservariables export_username and export_password must be set.
# If export_password is not set then it will be prompted at the first export.
# The following uservariables are used by export_method=2: export_username, export_password, export_server
#l
...
#==============================================================================
```

7.2 Types of logs

Type of Logs	lg option	Gen1	Gen2
Alarms	lga/lgj/lgx	/c/logfiles/alarm_event/ALARM_LOG.xml	Log=AlarmLog export()
Events	lge	/c/logfiles/alarm_event/EVENT_LOG.xml	N/A
Audit Trail	lgo	/c/logfiles/audit_trail/CORBA_AUDITTRAIL_LOG.xml	Log=AuditTrailLog export()
	lgl	/c/logfiles/audit_trail/SHELL_AUDITTRAIL_LOG.xml	Log=AuditTrailLog export()
Restarts	lgv/lgd	Cd /	LogM=1 exportAvailabilityLog()
	lgs/lgd	/c/logfiles/systemlog/00000syslog	N/A
	lgg	lh all llog	lh all llog

Crashes	lgp	/c/pmd	/rcs/dump/pmd (coli: /diagm/exportDump)
ESI	lgf/lgf1/lgk	N/A	LogM=1 exportEsi()
Upgrade	lgu	/c/systemfiles/cello/cma/su/trace/Trace.log	Log=SwmLog export()
	lgk -x swmi	-	LogM=1 exportEsi()
Security	lgy	/c/logfiles/security/CELLO_SECURITYEVENT_LOG.xml	Log=SecurityLog export()
Transport Network	lgz	/c/logfiles/iptran/CELLO_IPTRAN_LOG.xml	Log=TnNetworkLog export()
	lgb	N/A	Log=TnApplicationLog export()
PNP	lgo	/c/logfiles/pnp_log/PNP_LOG.xml	-
	lgk -x pnp	-	LogM=1 exportEsiLog()
Autointegration	lgh	-	Log=AiLog export()
	cat <file> get rbsconfig	/c/logfiles/autointegration/Autointegration_report.log RbsConfiguration:: configurationReport	-
HW	cabg	lh all dumpelg	-
	lgk -x hw	-	LogM=1 exportEsi()

Pico

```
/var/permanent
AutointegrationLog      //Autointegration log
Fmevents          //O&M fault log
Runtime           //EOAM runtime log
SwUpgradeLog          //Sw upgrade log
Sysevent          //Linux Kernel log


/var/persistent:
Diag1             //DSP crashlogs and coredumps
Diag2             //Same but backlog of previous crash
Pm                //PM ROP files in xml if activated

/var/volatile/log
Boam_traceLog         //BOAM log
ConnectedUEsNew       //Connected UEs status
Core0_traceLog        //DSP core0 femtolog in binary
Core1_traceLog        //DSP core1 femtolog in binary
Core2_traceLog        //DSP core2 femtolog in binary
Core3_traceLog        //DSP core3 femtolog in binary
DatabaseDump          //EOAM DB dump
Error           //EOAM and MW error prints
Fmevents            //O&M fault log
Iub_traceLog          //BOAM IUB log
Netfp_proxy       //Netfp logs
Pma_traceLog          //BOAM PM Agent's log
Runtime           //EOAM runtime log
Security          //Security events
Startup           //EOAM startup log until cell is up
```

7.3 ESI Log (Gen2 only)

ESI = Ericsson Support Information Log

7.3.1 Collect ESI (small or large)

The difference between small and large ESI is that the large logfiles (> 20 MB) are not included in the large ESI.
This means primarily the baseband crash dumps
By default, lgf and dcgm will collect a small ESI but it is possible to specify large with the following options:

- **lgf**   = collect all logs, including **small ESI**
- **lgf1** = collect all logs, including **large ESI**
- **lgf0** = collect all logs **except** the ESI
- **dcgm** = collect a dcgm with **large ESI**
- **dcgm -k 0** = collect a dcgm with **small ESI**

Note: The same option "-k 0" can be used as well in Gen1 , in order to not include the Baseband crash dumps (without this option, they are included in dcgm)

Example: Collect small ESI with lgf
Note: the other logs are also included in the same zipfile

```
RBSG2> lgf

Executing action Log.export()


================================================================================
MO                        result    resultInfo
================================================================================
LogM=1,Log=AiLog             1 (SUCCESS)
LogM=1,Log=AlarmLog          1 (SUCCESS)
LogM=1,Log=AuditTrailLog     1 (SUCCESS)
LogM=1,Log=SecurityLog       1 (SUCCESS)
LogM=1,Log=SwmLog            1 (SUCCESS)
LogM=1,Log=TnApplicationLog 1 (SUCCESS)
LogM=1,Log=TnNetworkLog      1 (SUCCESS)


Executing action LogM.exportAvailabilityLog()


================================================================================
MO     result    resultInfo
================================================================================
```

```
LogM=1 1 (SUCCESS)

Executing action LogM.exportEsi()


=========================================================================================
MO       result      resultInfo
=========================================================================================
LogM=1 1 (SUCCESS) esi.du1.20170515T152801+0000.tar.gz.gpg

Successful storage of the node logs to /home/eanzmagn/moshell_logfiles/logs_moshell/rbs579-w6_logfiles.zip
For offline processing, run: lg[<options>] -l <zipfile>.


[~] unzip -l /home/eanzmagn/moshell_logfiles/logs_moshell/rbs579-w6_logfiles.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
      152  05-15-2017 17:27   rcslogs/BatteryLog_20161213__141538.cfg
    56200  05-15-2017 17:27   rcslogs/TnNetworkLog_20161206__174233.log
        0  05-15-2017 17:27   rcslogs/BatteryLog_20161213__141538.log
    25386  05-15-2017 17:27   rcslogs/RBS_CS_AVAILABILITY_LOG_20170515152755.xml.gz
  5000000  05-15-2017 17:27   rcslogs/saLogAlarm_20170201__081939_20170224__111914.log
      120  05-15-2017 17:35   rcslogs/date.log
      153  05-15-2017 17:27   rcslogs/TnNetworkLog_20161206__174233.cfg
  5486817  05-15-2017 17:27   rcslogs/SecurityLog_20170418135113Z
      153  05-15-2017 17:27   rcslogs/TnApplicationLog_20161206__174233.cfg
  2455512  05-15-2017 17:27   rcslogs/SwmLog_20170515095900Z
  5000000  05-15-2017 17:27   rcslogs/saLogAlarm_20161225__225048_20170109__170336.log
   851600  05-15-2017 17:27   rcslogs/TnApplicationLog_20161206__174233.log
  5000000  05-15-2017 17:27   rcslogs/saLogAlarm_20170109__170336_20170201__081939.log
     2572  05-15-2017 17:27   rcslogs/AiLog_19700101000010Z
144480945  05-15-2017 17:34   rcslogs/esi.du1.20170515T152801+0000.tar.gz.gpg
  6162982  05-15-2017 17:27   rcslogs/AuditTrailLog_20170501015858Z
  1079000  05-15-2017 17:27   rcslogs/saLogAlarm_20170224__111914.log
      148  05-15-2017 17:27   rcslogs/saLogAlarm_20161206__174147.cfg
    84444  05-15-2017 17:34   llog.log
 16238297  05-15-2017 17:35   teread.log
     3087  05-15-2017 17:35   pmdzpm.log
---------                     --------
191927568                     21 files
```

Note:
 - if all logs cannot be collected then it is more likely an issue with the export_method
 - if only ESI fail to be collected then it could be that there is not enough disc space to store the ESI. Free up some disc space by removing old UPs.

7.3.2   Decrypt ESI

From 17A, the ESI log is encrypted (when encrypted, the ESI logfile has the file extension "tar.gz.gpg" instead of ".tar.gz")
To decrypt the ESI, use the moshell command gpg

Example: decrypt a ESI collected via lgf/lg1

```
OFFLINE> gpg modumps/197813_Bethany_logfiles.zip
cd /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/gpgextract && unzip
/home/eanzmagn/modumps/197813_Bethany_logfiles.zip 'rcslogs/esi.du1.*.tar.gz.gpg'
Archive:  /home/eanzmagn/modumps/197813_Bethany_logfiles.zip
  inflating: rcslogs/esi.du1.20170622T114358+0000.tar.gz.gpg


Decrypting file: /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-
080931_17179/gpgextract/rcslogs/esi.du1.20170622T114358+0000.tar.gz.gpg


****** 1st step: Obtain token ....
>>>>>> OK


****** 2nd step: Upload encrypted file ....
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
 10 31.6M    0     0   10 3264k      0  20.2M  0:00:01 --:--:--  0:00:01 20.5M
curl: (56) SSL read: error:00000000:lib(0):func(0):reason(0), errno 104
-- Failed. Retrying...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 31.6M    0    78  100 31.6M     40  16.3M  0:00:01  0:00:01 --:--:-- 16.3M
>>>>>> OK


****** 3rd step: Download decrypted file ....
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 32.4M    0 32.4M    0     0  2099k      0 --:--:--  0:00:15 --:--:-- 3734k
>>>>>> OK


GPG File has been successfully decrypted and saved to /home/eanzmagn/modumps/esi.du1.20170622T114358+0000.tar.gz.gpg.dec.tar.gz


****** 4th step: Update the zipfile with decrypted ESI
cp /home/eanzmagn/modumps/esi.du1.20170622T114358+0000.tar.gz.gpg.dec.tar.gz
/proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/updatezipfile/rcslogs
cd /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/updatezipfile
zip -m /home/eanzmagn/modumps/197813_Bethany_logfiles.zip  rcslogs/esi.du1.20170622T114358+0000.tar.gz.gpg.dec.tar.gz
  adding: rcslogs/esi.du1.20170622T114358+0000.tar.gz.gpg.dec.tar.gz (deflated 3%)
zip -d /home/eanzmagn/modumps/197813_Bethany_logfiles.zip *.gpg
deleting: rcslogs/esi.du1.20170622T114358+0000.tar.gz.gpg
>>>>>> OK
mv /home/eanzmagn/modumps/197813_Bethany_logfiles.zip /home/eanzmagn/modumps/197813_Bethany_esidec_logfiles.zip


Decrypted ESI has been successfully stored in /home/eanzmagn/modumps/197813_Bethany_esidec_logfiles.zip
```

Example: decrypt a ESI collected via dcgm

```
OFFLINE> gpg modumps/TBMNLWJ_170915_102822_EDT_MSRBS-L_CXP9024418-6_R21B24_dcgm.zip
Please enter eanzmagn's password:
```

```
cd /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/gpgextract && unzip
/home/eanzmagn/modumps/TBMNLWJ_170915_102822_EDT_MSRBS-L_CXP9024418-6_R21B24_dcgm.zip *_logfiles.zip
Archive:  /home/eanzmagn/modumps/TBMNLWJ_170915_102822_EDT_MSRBS-L_CXP9024418-6_R21B24_dcgm.zip
 extracting: TBMNLWJ_logfiles.zip
cd /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/gpgextract && unzip
/proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/gpgextract/TBMNLWJ_logfiles.zip
'rcslogs/esi.du1.*.tar.gz.gpg'
Archive:  /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/gpgextract/TBMNLWJ_logfiles.zip
  inflating: rcslogs/esi.du1.20170915T143116+0000.tar.gz.gpg


Decrypting file: /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-
080931_17179/gpgextract/rcslogs/esi.du1.20170915T143116+0000.tar.gz.gpg


****** 1st step: Obtain token ....
>>>>>> OK


****** 2nd step: Upload encrypted file ....
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0  408M    0     0    0 2656k      0  16.0M  0:00:25 --:--:--  0:00:25 16.3M
curl: (56) SSL read: error:00000000:lib(0):func(0):reason(0), errno 104
-- Failed. Retrying...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  408M    0    78  100  408M      2  13.5M  0:00:30  0:00:30 --:--:--     0
>>>>>> OK


****** 3rd step: Download decrypted file ....
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 2731k    0 2731k    0     0   397k      0 --:--:--  0:00:06 --:--:--  391k
curl: (56) SSL read: error:00000000:lib(0):func(0):reason(0), errno 104
-- Failed. Retrying...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 6293k    0 6293k    0     0   603k      0 --:--:--  0:00:10 --:--:--  907k
curl: (56) SSL read: error:00000000:lib(0):func(0):reason(0), errno 104
-- Failed. Retrying...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 1669k    0 1669k    0     0   384k      0 --:--:--  0:00:04 --:--:--  403k
curl: (56) SSL read: error:00000000:lib(0):func(0):reason(0), errno 104
-- Failed. Retrying...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 9975k    0 9975k    0     0   698k      0 --:--:--  0:00:14 --:--:-- 1221k
curl: (56) SSL read: error:00000000:lib(0):func(0):reason(0), errno 104
-- Failed. Retrying...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  408M    0  408M    0     0  2893k      0 --:--:--  0:02:24 --:--:-- 5201k
>>>>>> OK


GPG File has been successfully decrypted and saved to /home/eanzmagn/modumps/esi.du1.20170915T143116+0000.tar.gz.gpg.dec.tar.gz
```

```
****** 4th step: Update the zipfile with decrypted ESI
cp /home/eanzmagn/modumps/esi.du1.20170915T143116+0000.tar.gz.gpg.dec.tar.gz
/proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/updatezipfile/rcslogs
cd /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20171011-080931_17179/updatezipfile
unzip /home/eanzmagn/modumps/TBMNLWJ_170915_102822_EDT_MSRBS-L_CXP9024418-6_R21B24_dcgm.zip TBMNLWJ_logfiles.zip
Archive:  /home/eanzmagn/modumps/TBMNLWJ_170915_102822_EDT_MSRBS-L_CXP9024418-6_R21B24_dcgm.zip
 extracting: TBMNLWJ_logfiles.zip
zip -m TBMNLWJ_logfiles.zip  rcslogs/esi.du1.20170915T143116+0000.tar.gz.gpg.dec.tar.gz
  adding: rcslogs/esi.du1.20170915T143116+0000.tar.gz.gpg.dec.tar.gz (deflated 0%)
zip -d TBMNLWJ_logfiles.zip *.gpg
deleting: rcslogs/esi.du1.20170915T143116+0000.tar.gz.gpg
zip -u /home/eanzmagn/modumps/TBMNLWJ_170915_102822_EDT_MSRBS-L_CXP9024418-6_R21B24_dcgm.zip TBMNLWJ_logfiles.zip
updating: TBMNLWJ_logfiles.zip (stored 0%)
mv /home/eanzmagn/modumps/TBMNLWJ_170915_102822_EDT_MSRBS-L_CXP9024418-6_R21B24_dcgm.zip /home/eanzmagn/modumps/TBMNLWJ_170915_102822_EDT_MSRBS-
L_CXP9024418-6_R21B24_esidec_dcgm.zip
>>>>>> OK
mv TBMNLWJ_logfiles.zip TBMNLWJ_esidec_logfiles.zip

Decrypted ESI has been successfully stored in /home/eanzmagn/modumps/TBMNLWJ_170915_102822_EDT_MSRBS-L_CXP9024418-6_R21B24_esidec_dcgm.zip
```

7.3.3   Display ESI

After decryption, the ESI log can be displayed with "lgk" :

```
RBSG2> lgk


================================================================================
Timestamp           Type Sev    Description
================================================================================
2014-05-19 13:56:01 LIC  INFO   lmaGlms Got mo_update_feature_state_ind for 14
...<cut>..
```

Note: for lgk, there is a "-x <log>" option to filter certain specific logs. Type "h lg" for info.

```
ESI log filters (RCS):
*********************
The ESI (Ericsson Support Information) log filter is specified with "-x <filter>" in the command "lgk" on RCS nodes (TCU03/DUSgen2), to specify
the type of logs that will be displayed.
The XB log filter shall be given as a combination of one or more of the following strings, separated by commas:
 - 1) ai    : rcs/log/AiLog/AiLog.*
 - 2) al    : rcs/saf_log/saLogAlarm/saLogAlarm_*__*.log
 - 3) a_t   : rcs/log/AuditTrailLog/AuditTrailLog.*   (MO part)
 - 4) atr   : rcs/log/AuditTrailLog/AuditTrailLog.*   (COLI part)
 - 5) capi  : cpu_load.log
 - 6) com   : rcs/comte/com.log.*
 - 7) coma  : rcs/comte/com_alarm.log.*
 - 8) comi  : rcs/log/ComInterfaceLog/ComInterfaceLog.*
 - 9) erl   : rcs/bootlogs/erlang.log.1 AND rcs/erlang/erlang.log.*
```

```
- 10) ev    : rcs/log/NotificationLog/NotificationLog.*
- 11) lic   : rcs/log/LicensingLog/LicensingLog.*
- 12) ltt   : rcs/log/LttngLog/LttngLog.*
- 13) mmi   : rcs/log/MMILog/MMILog.*
- 14) nl    : rcs/bootlogs/nl_log.* and rcs/networkloader/nl_log.*
- 15) notif : rcs/saf_log/saLogNotification/saLogNotification_*__*.log
- 16) pnp   : rcs/saf_log/PnpApplicationLog/PnpApplicationLog_*__*.log
- 17) sys   : rcs/saf_log/saLogSystem/saLogSystem_*__*.log
- 18) sec   : rcs/log/SecurityLog/SecurityLog.*
- 19) swmi  : rcs/log/SwmInternal/SwmInternal.*
- 20) tnapp : rcs/saf_log/TnApplicationLog/TnApplicationLog_*__*.log
- 21) tnnet : rcs/saf_log/TnNetworkLog/TnNetworkLog_*__*.log
- 22) tri   : rcs/log/TriLog/TriLog.*
- 23) swm   : rcs/log/SwmLog/SwmLog.*
- 24) upg   : rcs/saf_log/saLogUpgrade/upgrade_*__*.log
- 25) pmc   : rcs/log/RcsPmCounters/RcsPmCounters.*
- 26) pmev  : rcs/log/RcsPmEvents/RcsPmEvents.1
- 27) syslog: var/log/syslog
- 28) llog  : var/log/llog/llog
- 29) hw    : tmp/ee_esi/ee_esi.log
Example:
 >> lgk -x coma,erl,tri  --> show the log entries from com_alarm.log, erlang.log and TriLog in the ESI
 >> lgk -x 7,9,22  --> same as above
 >> lgkm -x 2-4,7  --> show the log entries from saLogAlarm, com_alarm, and AuditTrail (both MO and COLI parts), and merge them chronologically
```

7.4 MSRBS Gen1/Gen2 Logs

7.4.1 Alarm Log

There are three ways to print the alarm log:

1) Show each raising and ceasing alarm as separate entries

```
MSRBS> lga


==========================================================================================
Timestamp           Type Sev    Description
==========================================================================================
2016-06-21 09:10:36 AL   M      RNC Connection Failure        Iub=1,NbapCommon=1
2016-06-21 09:10:46 AL   *      RNC Connection Failure        Iub=1,NbapCommon=1
2016-06-21 12:01:57 AL   m      Resource Allocation Failure   GsmSector=S1,Trx=S1C1  (Unable to allocate baseband HW resource for this RAT)
2016-06-21 12:09:03 AL   *      Resource Allocation Failure   GsmSector=S1,Trx=S1C1
2016-06-21 12:50:08 AL   M      Inconsistent Configuration    NodeBLocalCellGroup=1,NodeBLocalCell=S3C2  (Failed to allocate path!)
2016-06-21 12:50:57 AL   *      Inconsistent Configuration    NodeBLocalCellGroup=1,NodeBLocalCell=S3C2
2016-06-21 13:42:51 AL   M      PLMN Service Unavailable      EUtranCellFDD=S2C2  (PLMN mcc:999 mnc:99)
2016-06-21 13:45:27 AL   *      PLMN Service Unavailable      EUtranCellFDD=S2C2
```

2) Show only the raising entry with extra field showing the duration of the alarm

```
MSRBS> lgj


=====================================================================================================
Date & Time (UTC)    S  Duration            Specific Problem             MO (Cause/AdditionalInfo)
=====================================================================================================
2016-06-21 09:10:36 M* 10s                  RNC Connection Failure       Iub=1,NbapCommon=1 ()
2016-06-21 12:01:57 m* 426s (7m6s)          Resource Allocation Failure  GsmSector=S1,Trx=S1C1 (Unable to allocate baseband HW resource for
this RAT)
2016-06-21 12:50:08 M* 49s                  Inconsistent Configuration   NodeBLocalCellGroup=1,NodeBLocalCell=S3C2 (Failed to allocate path!)
2016-06-21 13:42:51 M* 137s (2m17s)         PLMN Service Unavailable     EUtranCellFDD=S2C2 (PLMN mcc:999 mnc:99)
```

3) Show the active alarm list for a specific day and time

```
MSRBS> lgx -s 20160621.091036


Nr of active alarms on 2016-06-21 at 09:10:36: 1
=====================================================================================================
Date & Time (UTC)    S Specific Problem              MO (Cause/AdditionalInfo)
=====================================================================================================
2016-06-21 09:10:36 M RNC Connection Failure         Iub=1,NbapCommon=1 ()
>>> Total: 1 Alarms (0 Critical, 1 Major)
```

7.4.2 Audit trail Logs

COLI commands

```
RBSG2> lgl


=============================================================================
Timestamp           Type Sev    Description
=============================================================================
2014-06-03 16:32:28 COLI INFO   expert /misc/list_cmds
2014-06-03 16:32:43 COLI INFO   expert /sys/uptime
2014-06-03 16:33:00 COLI INFO   expert /os/who
2014-06-03 16:33:14 COLI INFO   expert /board/vii
2014-06-05 23:59:07 COLI INFO   expert /misc/list_cmds
2014-06-05 23:59:46 COLI INFO   expert /misc/list_cmds
2014-06-09 16:11:25 COLI INFO   expert /misc/list_cmds
2014-06-09 16:11:32 COLI INFO   expert /bbi/observability/trace/bbte Rc: 1
2014-06-09 16:11:38 COLI INFO   expert /bbi/observability/trace/bbte status Rc: 1
2014-06-09 16:11:51 COLI INFO   expert /bbi/observability/trace/bbte listAgents Rc: 0
2014-06-09 16:11:59 COLI INFO   expert /board/hwpid
```

MO commands

```
RBSG2> lgo


=====================================================================================
Timestamp          Type Sev     Description
=====================================================================================
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1 administrativeState UNLOCKED
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1 baseDn dc=mordor,dc=invalid
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1 bindDn uid=&apos;%u&apos;,dc=mordor,dc=invalid
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1 filterType FLEXIBLE
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1 ldapIpAddress 10.68.108.45
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1 useTls false
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1 useTlsFallback false
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1 userLabel kalle
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1,Filter=1 filter uid=&apos;%u&apos;
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET
ManagedElement=1,SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1,Filter=1 type title
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 CRE ManagedElement=1,SystemFunctions=1,SysM=1,NtpServer=1
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET ManagedElement=1,SystemFunctions=1,SysM=1,NtpServer=1 administrativeState UNLOCKED
2014-05-15 12:37:51 MO-N INFO    autoint-7YtIpRIVE8 sid=1 SET ManagedElement=1,SystemFunctions=1,SysM=1,NtpServer=1 serverAddress 10.67.4.10
2014-05-15 12:37:51 MO-N NOTICE autoint-7YtIpRIVE8 sid=1 Session terminating (transaction commit)
2014-05-15 13:06:26 MO-C INFO    expert sid=1 cmd-grp-name=ComBasicCommands CLI agent connection start.
2014-05-15 13:08:42 MO-C WARN    expert sid=1 Transaction 65 Configuration Start
2014-05-15 13:28:02 MO-C INFO    expert sid=1 cmd-grp-name=ComBasicCommands CLI agent connection start.
2014-05-15 13:31:35 MO-N INFO    expert sid=1 CRE ManagedElement=1,Equipment=1,PlugInUnit=1
2014-05-15 13:31:35 MO-N INFO    expert sid=1 SET ManagedElement=1,Equipment=1,PlugInUnit=1 administrativeState UNLOCKED
2014-05-15 13:31:35 MO-N INFO    expert sid=1 SET ManagedElement=1,Equipment=1,PlugInUnit=1 userLabel BBC_LRAT
2014-05-15 13:31:35 MO-N INFO    expert sid=1 CRE ManagedElement=1,Equipment=1,PlugInUnit=1,DeviceGroup=1
2014-05-15 13:31:35 MO-N INFO    expert sid=1 CRE ManagedElement=1,Equipment=1,PlugInUnit=1,SubDeviceGroup=1
2014-05-15 13:31:35 MO-N INFO    expert sid=1 CRE ManagedElement=1,Equipment=1,PlugInUnit=1,SubDeviceGroup=1,CellDeviceSet=1
2014-05-15 13:31:35 MO-N INFO    expert sid=1 CRE ManagedElement=1,Equipment=1,PlugInUnit=1,SubDeviceGroup=2
2014-05-15 13:31:35 MO-N INFO    expert sid=1 CRE ManagedElement=1,Equipment=1,PlugInUnit=1,SubDeviceGroup=2,RicmDeviceSet=1
```

7.4.3   Restart Logs

Availability Log

```
RBS> lgv


=======================================================================================
Timestamp (UTC)     Type   Serv Reason          Piu Positn  Board/Prog  AdditionalInfo
=======================================================================================
2014-05-15 12:36:15 NODE   RcsNodeRestart
```

```
2014-05-15 12:36:24 NODE   OUT   UnOperational     RankCold
2014-05-15 12:36:24 NODE   IN    Starting
2014-05-15 12:36:24 OTHR   NodeRestarted CXP9023001_1 R2C671 MSRBS UP=CXP9023001_1-R2C671
2014-05-15 12:37:36 NODE   IN    Operational
2014-05-15 12:37:36 NODE   RcsTimeChange OldTime: 2014-05-15 12:37:58 NewTime: 2014-05-15 12:37:36
2014-05-15 13:24:40 NODE   RcsNodeRestart
2014-05-15 13:25:23 NODE   OUT   UnOperational     RankCold 2014-05-15 13:23:23
2014-05-15 13:25:23 NODE   IN    Starting
2014-05-15 13:25:30 OTHR   NodeRestarted CXP9023001_1 R2C671 MSRBS UP=CXP9023001_1-R2C671
2014-05-15 13:25:46 NODE   IN    Operational
2014-05-15 13:52:03 NODE   RcsNodeRestart
2014-05-15 13:52:31 NODE   OUT   UnOperational     RankCold 2014-05-15 13:50:40
2014-05-15 13:52:31 NODE   IN    Starting
2014-05-15 13:52:34 OTHR   NodeRestarted CXP9023001_1 R2C671 MSRBS UP=CXP9023001_1-R2C671
2014-05-15 13:53:00 NODE   IN    Operational
2014-05-16 13:05:52 NODE   RcsNodeRestart
```

Downtime Log

```
RBS> lgd


==================================================================================
Timestamp (UTC)     RestartType/Reason              SwVersion              SwRelease  RCS Downtime   Appl. Downtime
==================================================================================
...
2015-11-11 12:59:42 Spontaneous                     CXP9024418/2_R11ND     16A        82s (1m22s)    1481s (24m41s)
2015-11-11 13:25:01 ManualCold(0)                   CXP9024418/2_R11ND     16A        118s (1m58s)   332s (5m32s)
2015-11-13 18:37:51 UpgradeNormal                   CXP9024418/2_R11UA     16A        176s (2m56s)   221s (3m41s)
2015-11-16 15:17:46 ManualCold(0)                   CXP9024418/2_R11ND     16A        92s (1m32s)    135s (2m15s)
2015-11-16 15:47:40 UpgradeNormal                   CXP9024418/2_R11VD     16A        174s (2m54s)   219s (3m39s)
2015-11-16 16:28:32 ManualCold(0)                   CXP9024418/2_R11VD     16A        83s (1m23s)    129s (2m9s)
2015-11-17 16:40:36 ManualCold(0)                   CXP9024418/2_R11ND     16A        89s (1m29s)    129s (2m9s)
2015-11-17 17:06:57 UpgradeNormal                   CXP9024418/2_R11XD     W16A.0     179s (2m59s)   228s (3m48s)
2015-11-20 15:36:38 UpgradeNormal                   CXP9024418/2_R13LK     16A        210s (3m30s)   230s (3m50s)
2015-12-07 15:17:22 UpgradeNormal                   CXP9024418/2_R13ZM     16A        218s (3m38s)   242s (4m2s)
2015-12-07 18:22:47 ManualCold(0)                   CXP9024418/2_R13ZM     16A        82s (1m22s)    103s (1m43s)
2015-12-08 09:11:29 ManualCold(1)                   CXP9024418/2_R13ZM     16A        84s (1m24s)    109s (1m49s)
2015-12-08 10:31:18 ManualCold(1)                   CXP9024418/2_R13ZM     16A        83s (1m23s)    102s (1m42s)
2015-12-10 12:59:45 ManualWarm(0)                   CXP9024418/2_R13ZM     16A        29s            47s
2015-12-11 07:31:11 ManualWarm(0)                   CXP9024418/2_R13ZM     16A        27s            45s
2015-12-11 15:50:33 ManualWarm(0)                   CXP9024418/2_R13ZM     16A        27s            43s
2016-01-13 11:01:02 Spontaneous                     CXP9024418/2_R13ZM     16A        75s (1m15s)
2016-01-26 07:15:08 ManualCold(0)                   CXP9024418/2_R13ZM     16A        83s (1m23s)    197s (3m17s)
2016-01-26 10:39:30 UpgradeNormal                   CXP9024418/4_R2ACT     16B        149s (2m29s)   182s (3m2s)
2016-01-28 13:49:27 UpgradeNormal                   CXP9024418/4_R2AHL     16B        153s (2m33s)   175s (2m55s)
2016-02-09 10:11:34 UpgradeNormal                   CXP9024418/4_R2ANV     16B        159s (2m39s)   175s (2m55s)
2016-02-12 13:32:32 UpgradeNormal                   CXP9024418/4_R4G       16B        155s (2m35s)   174s (2m54s)
2016-02-15 22:44:41 PartialOutage                   60% Cell 1 10 11 12 2 3 4 5 6 7 8 9 (Transmission)     4s
2016-02-15 22:44:46 PartialOutage                   68% Cell 1 10 11 12 2 3 4 5 6 7 8 9 (Transmission)     7s
2016-02-16 11:46:26 UpgradeNormal                   CXP9024418/4_R4T       16B        152s (2m32s)   173s (2m53s)


Node uptime since last restart: 1122625 seconds (12 days, 23 hours, 50 minutes, 25 seconds)
----------------------------------------------------------------------------------
Period=116 days     NodeUpgrade     NodeManual     NodeSpontaneous  AllNodeRestarts  PartialOutages
```

```
--------------------------------------------------------------------------------
Number Of outages    11            16            3            30            2
Total downtime       2245s (37m25s) 2058s (34m18s) 1689s (28m9s) 5992s (1h39m) 11s
Downtime per day     19s           18s           15s          52s           0s
Downtime per outage  204s (3m24s)  129s (2m9s)   563s (9m23s) 200s (3m20s)  5s
```

Board restarts Logs (llog)

```
RBS> lgg


=================================================================================
Timestamp (UTC)         Board             Restart
=================================================================================
...
2016-11-05 04:59:09 LLOG  0001 DUS5201      Board restart. Reason: Ordered restart. Rank: Cold. Extra: 'Upgrade activate'
2016-11-05 05:08:16 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program: mhp3lnh. Signal: SIGABRT. PMD: pmd-mhp3lnh-2909-
20161105-050816
2016-11-05 05:08:18 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program: /home/sirpa/software/LRAT-
ARM_CXP9025671_25_R33FT/lratCentralArmLm/bin/lratCentralArmLm. Signal: SIGABRT. PMD: pmd-LmCentralTraffi-4794-20161105-050818
2016-11-05 05:08:18 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program: ns. Signal: SIGABRT. PMD: pmd-ose_ns-2922-20161105-
050818
2016-11-05 05:08:24 LLOG  0001 DUS5201      Board restart. Reason: Ordered restart. Rank: Cold. Extra: System program terminated
2016-11-05 05:10:27 LLOG  BXP_0_14          Board restart Ordered. Restart ordered from XPAI interface Trace Information: Recovery action,
faultId: 0x204 (NoContactInternal), faultDescription: Fault from antsys, evaluated as fault
2016-11-05 06:46:55 LLOG  0001 DUS5201      Board restart. Reason: Ordered restart. Rank: Cold. Extra: 'Upgrade activate'
2016-11-05 06:49:17 LLOG  0001 DUS5201      Program restart. Reason: Restart request. Program:
/home/sirpa/software/BBI_CXP9023495_3_R15KDS/bin/bbiEqmhController. Rank: Program. Signal: SIGABRT. PMD: pmd-bbiEqmhControll-6485-20161105-
064917. Extra: Failed to register HW database for EQMH /repo/bbijenkins/workspace/release-track-cl2-build-deploy-cpm-
main/bbi/build_cpm/components/eqmh/files/eqmhControllerSwU/src/bbiEqmhController.cc:733
2016-11-05 06:49:18 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program:
/home/sirpa/software/RBSNC_CXP9028860_5_R1ETM/SFPM_CXC1739081_5/sfpm-R1ETM/priv/tgt_arm/bin/sfpmLm. Signal: SIGABRT. PMD: pmd-sfp_manager_thr-
6510-20161105-064918
2016-11-05 06:49:18 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program:
/home/sirpa/software/FRUM_CXP9028850_5_R1SL/FRUM_CXC1736669_5/frum-R1SL/priv/tgt_arm/bin/frumLm. Signal: SIGABRT. PMD: pmd-fru_manager_thr-6490-
20161105-064918
2016-11-05 06:49:19 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program:
/home/sirpa/software/RBSULSA_CXP9028866_5_R1KG/RBSULSA_CXC1739080_5/rbsulsa-R1KG/priv/tgt_arm/bin/rbsULSpectrumAnalzyerCtrlLm. Rank: Program.
Extra: terminated by signal 6
2016-11-05 06:49:19 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program:
/home/sirpa/software/RBSRASSECTOR_CXP9028856_5_R1HJ/RBSRASSECTOR_CXC1736997_5/rbsrassector-R1HJ/priv/tgt_arm/bin/rbsRasSectorEquipmentCtrlLm.
Rank: Program. Extra: terminated by signal 6
2016-11-05 06:49:19 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program: /home/sirpa/software/APC-
ARM_CXP9024886_5_R1BDD/APC-ARM_CXC1736996_5/apc-arm-R1BDD/priv/tgt_arm/bin/apc. Rank: Program. Extra: terminated by signal 6
2016-11-05 06:49:19 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program: /home/sirpa/software/TN-
DUSG2_CXP9028825_2_R3BMZ/bin/tn-oam-agent. Signal: SIGABRT. PMD: pmd-tn-oam-agent-6531-20161105-064919
2016-11-05 06:49:19 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program:
/home/sirpa/software/RBSANTC_CXP9028846_5_R1UT/RBSANTC_CXC1736932_5/rbsantc-R1UT/priv/tgt_arm/bin/rbsAntcLm. Rank: Program. Extra: terminated by
signal 6
2016-11-05 06:49:20 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program:
/home/sirpa/software/RBSNC_CXP9028860_5_R1ETM/RBSNC_CXC1739060_5/rbsnc-R1ETM/priv/tgt_arm/bin/rbsNcLm. Rank: Program. Extra: terminated by
signal 6

2016-11-05 06:49:23 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program: /home/sirpa/software/LRAT-RACOAM-
ARM_CXP9029582_26_R15FS/lratLrhArmLm/bin/lratLrhArmLm. Rank: Program. Extra: terminated by signal 6
```

```
2016-11-05 06:49:43 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program:
/home/sirpa/software/SyncDusg2_CXP9030859_5_R2DBG/bin/sync-port-central. Rank: Program. Extra: terminated by signal 6
2016-11-05 06:49:43 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program:
/home/sirpa/software/SyncDusg2_CXP9030859_5_R2DBG/bin/sync-ngsm-central. Rank: Program. Extra: terminated by signal 6
2016-11-05 06:49:43 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program:
/home/sirpa/software/FRUM_CXP9028850_5_R1SL/HWIM_CXC1737460_5/hwim-R1SL/priv/tgt_arm/bin/hwimLm. Rank: Program. Extra: terminated by signal 6
2016-11-05 06:49:43 LLOG  0001 DUS5201      Program restart. Reason: Program Terminated Abnormally. Program:
/home/sirpa/software/SyncDusg2_CXP9030859_5_R2DBG/bin/sync-ntp-central. Rank: Program. Extra: terminated by signal 6
2016-11-05 06:49:43 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program:
/home/sirpa/software/SyncDusg2_CXP9030859_5_R2DBG/bin/sync-ptp-central. Signal: SIGABRT. PMD: pmd-sync-ptp-centra-6529-20161105-064943
2016-11-05 06:49:43 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program:
/home/sirpa/software/SyncDusg2_CXP9030859_5_R2DBG/bin/sync-testport-central. Signal: SIGABRT. PMD: pmd-sync-testport-c-6525-20161105-064943
2016-11-05 06:49:43 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program:
/home/sirpa/software/SyncDusg2_CXP9030859_5_R2DBG/bin/sync-central. Signal: SIGABRT. PMD: pmd-Sync_central_pr-6511-20161105-064943
2016-11-05 06:49:43 LLOG  0001 DUS5201      Program restart. Reason: Program Crash. Program:
/home/sirpa/software/SyncDusg2_CXP9030859_5_R2DBG/bin/sync-eth-central. Signal: SIGABRT. PMD: pmd-sync-eth-centra-6518-20161105-064943
2016-11-05 06:50:21 LLOG  0001 DUS5201      Board restart. Reason: Ordered restart. Rank: Cold. Extra: WARNING: reboot executed, not to be used
in production.
```

7.4.4 Crashes

Gen1

lgp shows all crashes: MP, Baseband, XMU/RU
- **PMD: MP crashes**
- **FAULT: Baseband crashes**
- **RUPMD: RU/XMU crashes**

```
ENB4084> lgp


==================================================================================
Timestamp (UTC)         Board           Info
==================================================================================
2014-02-04 16:38:22 PMD    0001 DUS4101      Program restart Core=0 Proc=RequestProcessor-3 Block=CXC1732844_R82EX02 (java_j9_vm) Err=0x00060113
(kernel) Desc=OSE_EUNEXPECTED_EXCEPTION_REGDUMP PMD=20140204_163825_c_pmd_193_000100_0x80000004.pmd PC=00000000
2014-04-10 12:10:48 PMD    0001 DUS4101      Board restart rank=Warm Core=0 Proc=ose_afm_/c Block=osemain Err=0x00900005 (ose_api)
Desc=OSE_EFS_EINTERNAL_FAULT PMD=20140410_121123_c_pmd_194_000100_0x589070ab.pmd PC=008F81D8 SRR0=008E339C
2014-05-20 01:43:35 PMD    0001 DUS4101      Program restart Core=0 Proc=bbmcBbOmMeThread (bpai_basic_if.c:186) Block=CXC1725398%21_R29X (bbom)
Err=0xF0F0F0F2 (eri_api) PMD=20140520_014407_c_pmd_197_000100_0x80000003.pmd PC=00860E1C Info=Recovery action, faultId: 0x301 (SwError),
faultDescription: ULMA[00768]:LPP fatal error with faultId = 0x64 arg1 = 0x0 arg2 = 0x30000 ar
...<cut>..


2015-08-26 10:16:42 PMD    0001 DUS4101      Program restart Core=0 Proc=bbmcBbOmMeThread (bbomme_svc_fault_handling_eh_cpp.cc:611)
Block=CXC1725398%23_R17SX (bbom) Err=0xF0F0F0F4 (eri_api) PMD=20150826_101645_c_pmd_224_000100_0x8000000d.pmd PC=00861194 Info=SNAPSHOT:[Dsp
Restart] ULMA[01024]:bbiSrioDrv_common.c:256: UCtool is unable to receive messages from DU. If status =
2015-09-22 11:57:07 FAULT 0001 ULMA[00256] bbiSrioDrv_common.c:382: bbiSrio_handleBdpInterrupt: bdpnr=0 o=0 t=0 e=1
File=000100!/d/systemfiles/FAULTLOG20_150922_115707.log
...<cut>...
```

```
2016-12-12 07:44:16 RUPMD 0001BXP_2        Board restart Proc=ltuServer0 Err=0x11005f Extra=0xbd0a0 LM=CXC1123669R64CA LMC=CXP9013268%6_R64CA
File=20161212_074416_0x1_0001BXP_2.txt.gz
2016-12-12 09:46:17 RUPMD 0001BXP_2        Board restart Proc=ltuServer0 Err=0x11005f Extra=0xb4a320 LM=CXC1123669R64CA LMC=CXP9013268%6_R64CA
File=20161212_094617_0x2_0001BXP_2.txt.gz
2017-01-20 21:56:31 FAULT 0001 ULMA[01024] Illegal semaphore id used when calling LPP_acquireSem(). Only dynamically allocated semaphores al
File=000100!/d/systemfiles/FAULTLOG17_170120_215631.log
2017-01-20 21:56:30 PMD   0001 DUS4101       Program restart Core=0 Proc=bbmcBbOmMeThread (bbomme_svc_fault_handling_eh_cpp.cc:652)
Block=CXC1725398%26_R17BH (bbomLm) Err=0xF0F0F0F4 (eri_api) PMD=20170120_215633_c_pmd_251_000100_0x80000001.pmd PC=008C4400 Info=SNAPSHOT:[Dsp
Restart] ULMA[01024]:Illegal semaphore id used when calling LPP_acquireSem(). Only dynamically allocated
2017-03-11 14:59:28 FAULT 0001 ULMA[01024] Illegal semaphore id used when calling LPP_acquireSem(). Only dynamically allocated semaphores al
File=000100!/d/systemfiles/FAULTLOG18_170311_145928.log
2017-03-11 14:59:27 PMD   0001 DUS4101       Program restart Core=0 Proc=bbmcBbOmMeThread (bbomme_svc_fault_handling_eh_cpp.cc:652)
Block=CXC1725398%26_R17BH (bbomLm) Err=0xF0F0F0F4 (eri_api) PMD=20170311_145930_c_pmd_252_000100_0x80000002.pmd PC=008C4400 Info=SNAPSHOT:[Dsp
Restart] ULMA[01024]:Illegal semaphore id used when calling LPP_acquireSem(). Only dynamically allocated
2017-04-30 08:10:18 FAULT 0001 ULMA[01024] Illegal semaphore id used when calling LPP_acquireSem(). Only dynamically allocated semaphores al
File=000100!/d/systemfiles/FAULTLOG19_170430_081018.log
2017-04-30 08:10:18 PMD   0001 DUS4101       Program restart Core=0 Proc=bbmcBbOmMeThread (bbomme_svc_fault_handling_eh_cpp.cc:652)
Block=CXC1725398%26_R17BH (bbomLm) Err=0xF0F0F0F4 (eri_api) PMD=20170430_081020_c_pmd_253_000100_0x80000003.pmd PC=008C4400 Info=SNAPSHOT:[Dsp
Restart] ULMA[01024]:Illegal semaphore id used when calling LPP_acquireSem(). Only dynamically allocated
```

The PMD files are stored on the user's workstation under $logdir/pmdfiles/$ipaddress/pmd.
To decode a PMD file (Gen1) it is possible to use "zpm", available in the moshell folder

```
:sekilx1138@~> /app/moshell/latest/moshell/zpm.linux
/proj/stab_lmr/users/eanzmagn/moshell_logfiles/logs_moshell/pmdfiles/10.32.10.94/pmd/20140204_163825_c_pmd_193_000100_0x80000004.pmd


[OUTPUT OF DUMP INFORMATION]


  ZPM Product ID: CXC 172 5950
  ZPM Version   : R32.2


  Dump identity :   0x80000004
  Dump created  :   2014-02-04  16:38:23.826811


[Signal 0x00009858]


  Signal data:
 00000000: 00000004 00009858 000001a8 00009859    ".......X.......Y"
 00000010: 00000000 01020304 00000000 00000000    "................"
...<cut>....
```

Gen2

lgp currently only shows MP crashes but will soon support Baseband crashes as well.
To see XMU/RU crashes, use lgg

```
RBS33> lgp
```

```
================================================================================
Timestamp (UTC)          Board          Info
================================================================================
2016-11-11 09:45:07 LPMD  0001 DUS3201         Program Crash Sig=SIGQUIT Proc=/home/sirpa/software/RCSMW-
ARM_CXP9025546_3_R8A17/COM3_CXC1733991_3/com-R7J01/priv/tgt_arm-wr6/opt/com/bin/cliss -c /etc/rcs_cs/com_user 9889 File=pmd-cliss-7673-20161111-
094507.tgz.gpg_with_llog.tgz
2016-11-11 11:13:20 LPMD  0001 DUS3201         Program Crash Sig=SIGQUIT Proc=/home/sirpa/software/RCSMW-
ARM_CXP9025546_3_R7S11/COM3_CXC1733991_3/com-R7J01/priv/tgt_arm-wr6/opt/com/bin/cliss -c /etc/rcs_cs/com_user 9889 File=pmd-cliss-29734-
20161111-111320.tgz.gpg_with_llog.tgz
2016-11-11 11:34:23 LPMD  0001 DUS3201         Program Crash Sig=SIGQUIT Proc=/home/sirpa/software/RCSMW-
ARM_CXP9025546_3_R7S11/COM3_CXC1733991_3/com-R7J01/priv/tgt_arm-wr6/opt/com/bin/cliss -c /etc/rcs_cs/com_user 9889 File=pmd-cliss-14962-
20161111-113423.tgz.gpg_with_llog.tgz
...<cut>...
```

The PMD files are stored in encrypted format on the user's workstation under $logdir/pmdfiles/$ipaddress/pmd :

```
RBS33> ! ls -l $logdir/pmdfiles/$ipaddress/pmd


total 2168
-rw-r--r-- 1 eanzmagn users 178137 Nov 17 08:49 pmd-cliss-11751-20161117-062150.tgz.gpg_with_llog.tgz
-rw-r--r-- 1 eanzmagn users 179514 Nov 17 08:49 pmd-cliss-1367-20161117-062101.tgz.gpg_with_llog.tgz
-rw-r--r-- 1 eanzmagn users 179116 Nov 17 08:49 pmd-cliss-14295-20161117-061837.tgz.gpg_with_llog.tgz
-rw-r--r-- 1 eanzmagn users 177594 Nov 17 08:49 pmd-cliss-14962-20161111-113423.tgz.gpg_with_llog.tgz
...<cut>...
```

Use gpg command to decrypt a PMD file:

```
OFFLINE> gpg pmd-cliss-28849-20161117-062032.tgz.gpg_with_llog.tgz

Please enter eanzmagn's password:

cd /home/eanzmagn/ && tar xzf /home/eanzmagn/pmd-cliss-28849-20161117-062032.tgz.gpg_with_llog.tgz pmd-cliss-28849-20161117-062032.tgz.gpg

Decrypting file: /home/eanzmagn/pmd-cliss-28849-20161117-062032.tgz.gpg

****** 1st step: Obtain token ....
>>>>>> OK


****** 2nd step: Upload encrypted file ....
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  174k    0    78 100  173k    135    302k --:--:-- --:--:-- --:--:--  303k
>>>>>> OK


****** 3rd step: Download decrypted file ....
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  178k    0  178k    0     0   159k      0 --:--:--  0:00:01 --:--:--  160k
>>>>>> OK
```

```
File has been successfully decrypted and saved to /home/eanzmagn/pmd-cliss-28849-20161117-062032.tgz.gpg.dec.tgz
```

To decode a Linux PMD file it is possible to use "licop" or https://plf-pmda.rnd.ki.sw.ericsson.se or just open the file with tar

7.4.5 TN Logs

Gen1

```
RBSG1> lgz


=============================================================================================
Timestamp (UTC)          MO-reference                              Event
=============================================================================================
2017-06-05 22:51:10 IPTR    MO RDN - SubNetwork=ONRM_ROOT_MO_R,MeContext=kienb1068,ManagedElement=1,:Event name - InInvalid:Exchange type -
IKE_AUTH:Detailed information - first payload is not ENCRYPTED payload:Local IP Address - 10.62.2.78:Remote IP Address - 10.62.254.212:Local
port - 500:Remote port - 500
2017-06-05 22:51:32 IPTR    MO RDN - SubNetwork=ONRM_ROOT_MO_R,MeContext=kienb1068,ManagedElement=1,:Event name - InInvalid:Exchange type -
IKE_AUTH:Detailed information - first payload is not ENCRYPTED payload:Local IP Address - 10.62.2.78:Remote IP Address - 10.62.254.212:Local
port - 500:Remote port - 500
2017-06-05 22:51:54 IPTR    MO RDN - SubNetwork=ONRM_ROOT_MO_R,MeContext=kienb1068,ManagedElement=1,:Event name - InInvalid:Exchange type -
IKE_AUTH:Detailed information - first payload is not ENCRYPTED payload:Local IP Address - 10.62.2.78:Remote IP Address - 10.62.254.212:Local
port - 500:Remote port - 500
...<cut>...
```

Gen2

```
RBSG2> lgz


==========================================================================================
Timestamp           Type Sev    Description
==========================================================================================
2015-04-01 05:34:44 TN-N INFO   Basic_Ethernet "Physical port TN_A link status: down
2015-04-01 05:34:44 TN-N INFO   Basic_Ethernet "Physical port TN_B link status: down
2015-04-01 05:34:44 TN-N INFO   Basic_Ethernet "Physical port TN_C link status: down
2015-04-01 05:36:53 TN-N INFO   Basic_Ethernet "Physical port TN_A link status: up
2015-04-01 08:30:32 TN-N INFO   Basic_Ethernet "Physical port TN_A link status: down
2015-04-01 08:30:32 TN-N INFO   Basic_Ethernet "Physical port TN_B link status: down
2015-04-01 08:30:32 TN-N INFO   Basic_Ethernet "Physical port TN_C link status: down


RBSG2> lgb
```

```
=================================================================================
Timestamp            Type Sev    Description
=================================================================================
2015-04-01 05:38:23 TN-A INFO    SCTP "Assoc=ESTABLISHED,Router=1,Local=5113-{ [0]10.67.10.167 },Remote=1-{ [0]10.67.10.223 }
2015-04-01 05:38:23 TN-A INFO    SCTP "Assoc=ESTABLISHED,Router=1,Local=5114-{ [0]10.67.10.167 },Remote=2-{ [0]10.67.10.223 }
2015-04-01 05:39:21 TN-A NOTICE SCTP "Assoc=CLOSED,Router=1,Local=5114-{ [0]10.67.10.167 },Remote=2-
{ [0]10.67.10.223 },Origin=REMOTE_USER,Reason=PEER_REQUESTED_TERMINATE
2015-04-01 05:39:21 TN-A NOTICE SCTP "Assoc=CLOSED,Router=1,Local=5113-{ [0]10.67.10.167 },Remote=1-
{ [0]10.67.10.223 },Origin=REMOTE_USER,Reason=PEER_REQUESTED_TERMINATE
2015-04-01 05:44:01 TN-A INFO    SCTP "Assoc=ESTABLISHED,Router=1,Local=5114-{ [0]10.67.10.167 },Remote=2-{ [0]10.67.8.52 }
2015-04-01 05:44:01 TN-A INFO    SCTP "Assoc=ESTABLISHED,Router=1,Local=5113-{ [0]10.67.10.167 },Remote=1-{ [0]10.67.8.52 }
2015-04-01 07:15:19 TN-A NOTICE SCTP "Assoc=CLOSED,Router=1,Local=5113-{ [0]10.67.10.167 },Remote=1-
{ [0]10.67.8.52 },Origin=REMOTE_USER,Reason=PEER_REQUESTED_TERMINATE
2015-04-01 07:15:19 TN-A NOTICE SCTP "Assoc=CLOSED,Router=1,Local=5114-{ [0]10.67.10.167 },Remote=2-
{ [0]10.67.8.52 },Origin=REMOTE_USER,Reason=PEER_REQUESTED_TERMINATE
```

7.4.6 Auto-Integration Log

Gen1

ENB> cat /c/logfiles/autointegration/Autointegration_report.log

or

ENB> get rbsconfig

```
=================================================================================
4488                              NodeManagementFunction=1,RbsConfiguration=1
=================================================================================
RbsConfigurationId                1
configFaultReason                 Struct{2}
 >>> 1.faultReason = 1 (OSS_CONNECTION_FAULT)
 >>> 2.faultInformation = Unsystemized error: org.omg.CORBA.TRANSIENT: Retries exceeded, couldnt reconnect to 10.217.1.197:50340 Retries
exceeded, cou..
configurationReport               2010-12-07 13:28:00.683  RbsConfiguration::rbsConfigLevel              BASIC_CV
2011-05-14 18:18:36.154  RbsConfiguration:actionStartRbsIntegration        <- Attribute = Value ->
                                                                  vlanId = 401
                                                                  logicalName = 209041_CAPITOL_CENTRE
                                                                  activateSecurity = false
                                                                  activateIpSecurity = false
                                                                  smrsUserId =
                                                                  smrsPassword = ***
                                                                  smrsAddress =
                                                                  smrsSummaryFilePath =
                                                                  dnsServerAddress =
                                                                  defDomainName = oss2.ericssondns.com
configurationReportUpdateCounter  45
dhcpClientIdentifier
ossCorbaNameServiceAddress        10.217.1.200
progressLevel                     100
progressReport                    <?xml version="1.0" encoding="ISO-8859-1"?>
```

```
<IntegrationProcess revision="R1G">
   <IntegrationGroup name="VLAN Scanning" group="20" message="Scans different VLANs to find one or more DHCP servers">
      <IntegrationStep name="VLAN scanning" step="20" status="Skipped" timeStamp="2013-12-20 06:12:27.995">
         <DetailedInformation>Found new integration step after upgrade</DetailedInformation>
      </IntegrationStep>
   </IntegrationGroup>
   <IntegrationGroup name="Initial creation of Configuration Version (CV)" group="50" message="Handles initial creation of Configuration Version
(CV)">
      <IntegrationStep name="Creating initial Configuration Version (CV)" step="50" status="Finished" timeStamp="2011-05-14 18:18:43.512">
         <DetailedInformation>Successfully created initial CV: "RbsConfiguration_Initial"</DetailedInformation>
      </IntegrationStep>
   </IntegrationGroup>
...<cut>...
      <IntegrationStep name="Ready for service" step="2700" status="Not started" timeStamp="Not started">
         <DetailedInformation>Not specified yet.</DetailedInformation>
      </IntegrationStep>
   </IntegrationGroup>
   <RbsIntegrationCanBeStarted value="false"/>
   <RbsIntegrationStarted value="true"/>
   <RbsIntegrationFinished value="false"/>
   <RbsIntegrationCancelled value="false"/>
   <RbsIntegrationCanBeCancelled value="false"/>
</IntegrationProcess>
progressReportUpdateCounter        152429
rbsConfigLevel                     25 (READY_FOR_SERVICE)
rbsModificationStateInfo           Struct{2}
 >>> 1.modificationInformation = Not implemented
 >>> 2.modificationState = 0 (NOT_STARTED)
supportedConfigFileRevisions
File name                Product number           Revisions
NPC.dtd                  CXC 172 9124/1           C
SiteBasic.dtd            CXC 172 9121/1           E
SiteEquipment.dtd        CXC 172 9123/1           F
NPC.xsd                  CXC 172 9124/1           D,E,F,G
SiteBasic.xsd            CXC 172 9121/1           AA,AB,AD,AE,AG,AH,AK,AL,AM,AN,AP,AS,AT,AU,AV,AX,AY,AZ,BA,BB,BC,T,U,V,W,X,Y,Z
SiteEquipment.xsd        CXC 172 9123/1           AH,AL,AM,AN,AO,AS,AT,AU,AU1,AV,AX,AY,AZ,BA,BB,M,N,R,S,U,V,X,Z
wantedPosition                     Struct{4}
 >>> 1.altitude = -
 >>> 2.latitude = -
 >>> 3.longitude = -
 >>> 4.tolerance = 50
===================================================================================================================
Total: 1 MOs
```

Gen2

```
RBSG2> lgh


Date of log collection: 2015-04-11
Startdate=19661031.151320, Enddate=20150423.062235
cp /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20150422-082044_6560/cpplogs/rcslogs/AiLog_19700101000009Z
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20150422-082044_6560/hiliLog6136.xml
===================================================================================================================
Timestamp           Type Sev    Description
===================================================================================================================
1970-01-01 00:00:09 AI   INFO   Setting system time to software build time: "2015-02-27 12:05:20"
```

```
2015-02-27 12:05:20 AI   INFO   Networkloader type3 booted from partition /dev/sda2
2015-02-27 12:05:20 AI   INFO   Running version: "CNX9012629-R3B22"
2015-02-27 12:05:43 AI   INFO   Autointegration waiting for user input
2015-02-27 12:05:45 AI   INFO   AutoIntegration started - without download
2015-02-27 12:05:45 AI   INFO   System time difference detected (256202 sec), adjusting
2015-03-02 11:15:47 AI   INFO   Received RbsSummaryFile
2015-03-02 11:15:47 AI   INFO   Filepaths in RbsSummaryFile valid for Semi Autointegration
2015-03-02 11:15:47 AI   INFO   Path(s) to optional files provided: licensingKeyFilePath labConfigFilePath
2015-03-02 11:15:47 AI   INFO   Download of Configuration files : Started
2015-03-02 11:15:47 AI   INFO   Download of Configuration files : Finished
2015-03-02 11:15:47 AI   INFO   Download of Software package : Started
2015-03-02 11:15:47 AI   INFO   Download progress: 0%
```

7.4.7 Security Log

```
RBSG2> lgy


==================================================================================
Timestamp          Type Sev    Description
==================================================================================
2014-05-15 13:06:26 SEC  INFO   ManagedElement=1 src_ip(-) LDAP: lookup for user: expert, Authenticated: true, Roles: expert
2014-05-15 13:06:26 SEC  INFO   ManagedElement=1 src_ip(-) SSH: User: expert, cli session started
2014-05-15 13:27:54 SEC  INFO   ManagedElement=1 src_ip(-) LDAP: lookup for user: expert, Authenticated: true, Roles: expert
2014-05-15 13:28:01 SEC  INFO   ManagedElement=1 src_ip(-) LDAP: lookup for user: expert, Authenticated: true, Roles: expert
2014-05-15 13:28:02 SEC  INFO   ManagedElement=1 src_ip(-) SSH: User: expert, cli session started
2014-05-15 13:31:34 SEC  INFO   ManagedElement=1 src_ip(-) LDAP: lookup for user: expert, Authenticated: true, Roles: expert
2014-05-15 13:31:34 SEC  INFO   ManagedElement=1 src_ip(-) SSH: User: expert, netconf session started
2014-05-15 13:31:36 SEC  INFO   ManagedElement=1 src_ip(-) SSH: User: expert, netconf session ended
2014-05-15 13:31:37 SEC  INFO   ManagedElement=1 src_ip(-) LDAP: lookup for user: expert, Authenticated: true, Roles: expert
2014-05-15 13:31:37 SEC  INFO   ManagedElement=1 src_ip(-) SSH: User: expert, netconf session started
```

7.4.8 SW upgrade Logs

Gen1

```
RBSG2> lgu


==================================================================================
Timestamp (UTC)          Description
==================================================================================
2005-08-25 09:30:56 UP    Start Action - Upgrade Product number: CXP9012014 Revision: R1T05
2005-08-25 09:30:56 UP    Sending AVC Event - aProgressCounter: 0
2005-08-25 09:30:56 UP    Sending AVC Event - aProgressTotal: 0
2005-08-25 09:30:56 UP    End Action - Upgrade, upgrade initiated(Action ID: 93056628)
2005-08-25 09:30:57 UP    Sending AVC Event - progressHeader: Variant of upgrade action initiated
2005-08-25 09:31:00 UP    Sending AVC Event - aProgressTotal: 10
2005-08-25 09:31:00 UP    Sending AVC Event - progressHeader: The verification phase has been initiated
```

```
2005-08-25 09:31:00 UP    Sending AVC Event - progressHeader: Verifying that the used PIUs in the node are supported according to the Upgrade
Control File
2005-08-25 09:31:02 UP    Sending AVC Event - progressHeader: Verifying that the upgrade window defined in the Upgrade Control File allows an
upgrade
2005-08-25 09:31:03 UP    Sending AVC Event - progressHeader: Verifying that it is possible to create the required number of CV's during the
upVgrade phase
2005-08-25 09:31:04 UP    Sending AVC Event - progressHeader: Verifying checksum for all load modules that has a checksum value defined in the
Upgrade Control File
2005-08-25 09:31:50 UP    Sending AVC Event - progressHeader: Verifying that Plug In Units(PIUs)on the node are not faulty before the upgrade is
initiated
2005-08-25 09:31:50 UP    Sending AVC Event - progressHeader: The verification phase is finished
2005-08-25 09:31:50 UP    Create an upgrade rollback CV.
2005-08-25 09:31:58 UP    CV 'Rb_CXP9012014_R1T05_050825_0931' has been created.
2005-08-25 09:32:06 UP    Sending AVC Event - state: Upgrade executing
2005-08-25 09:32:07 UP    Sending AVC Event - progressHeader: The upgrade phase is initiated and the system state is set to upgrade mode
2005-08-25 09:32:07 UP    The upgrade supervision timer is set to 14400 seconds and started.
2005-08-25 09:32:09 UP    Confirmation deadline timer data: 240 minutes.
```

Gen2

```
RBSG2> lgu


===================================================================================================
Timestamp          Type Sev    Description
===================================================================================================
2014-05-15 12:36:15 UPG  INFO    SwInventory Running software package ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9023001/1-
R2C671
2014-05-15 13:25:05 UPG  INFO    SwInventory Running software package ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9023001/1-
R2C671
2014-05-15 13:52:15 UPG  INFO    SwInventory Running software package ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9023001/1-
R2C671
2014-05-16 13:05:54 UPG  INFO    SwInventory Running software package ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9023001/1-
R2C671
2014-05-16 13:19:43 UPG  INFO    SwInventory Running software package ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9023001/1-
R2C671
2014-05-19 13:47:38 UPG  INFO    SwInventory Running software package ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9023001/1-
R2C671
2014-05-19 13:54:58 UPG  INFO    SwInventory Running software package ManagedElement=1,SystemFunctions=1,SwInventory=1,SwVersion=CXP9023001/1-
R2C671


RBSG2> lgk -x swmi


===================================================================================================
Timestamp          Type Sev    Description
===================================================================================================
2017-03-26 11:10:53 SWMI INFO    swmDbMonitor No quarantine in wait period
2017-03-26 11:10:58 SWMI INFO    swmDbMonitor {imm_objects,'LratExternalEUtranCellFDD'} changed
2017-03-26 11:11:28 SWMI INFO    swmDbMonitor Auto backup due to 43 changes
2017-03-26 11:11:31 SWMI INFO    swmOs cd /tmp ; gzip /tmp/autobackup Res=0
2017-03-26 11:11:32 SWMI INFO    swmOs mv -f /tmp/autobackup.gz /home/sirpa/autobackup.gz.new Res=0
2017-03-26 11:11:34 SWMI INFO    swmOs mv -f /home/sirpa/autobackup.gz.new /home/sirpa/autobackup.gz ; sync Res=0
2017-03-26 11:11:34 SWMI INFO    swmDbMonitor No quarantine in wait period
2017-03-26 11:12:31 SWMI INFO    swmDbMonitor {imm_objects,'LratEUtranCellRelation'} changed
```

```
2017-03-26 11:13:01 SWMI INFO    swmDbMonitor Auto backup due to 2 changes
2017-03-26 11:13:04 SWMI INFO    swmOs cd /tmp ; gzip /tmp/autobackup Res=0
2017-03-26 11:13:04 SWMI INFO    swmOs mv -f /tmp/autobackup.gz /home/sirpa/autobackup.gz.new Res=0
2017-03-26 11:13:07 SWMI INFO    swmOs mv -f /home/sirpa/autobackup.gz.new /home/sirpa/autobackup.gz ; sync Res=0
2017-03-26 11:13:07 SWMI INFO    swmDbMonitor No quarantine in wait period
2017-03-26 11:13:16 SWMI INFO    swmDbMonitor {imm_objects,'LratEUtranCellRelation'} changed
2017-03-26 11:13:46 SWMI INFO    swmDbMonitor Auto backup due to 15 changes
2017-03-26 11:13:50 SWMI INFO    swmOs cd /tmp ; gzip /tmp/autobackup Res=0
2017-03-26 11:13:50 SWMI INFO    swmOs mv -f /tmp/autobackup.gz /home/sirpa/autobackup.gz.new Res=0
2017-03-26 11:13:53 SWMI INFO    swmOs mv -f /home/sirpa/autobackup.gz.new /home/sirpa/autobackup.gz ; sync Res=0
2017-03-26 11:13:53 SWMI INFO    swmDbMonitor Quarantine set for 30 seconds
2017-03-26 11:16:31 SWMI INFO    swmDbMonitor {imm_objects,'LratEUtranCellRelation'} changed
2017-03-26 11:17:01 SWMI INFO    swmDbMonitor Auto backup due to 1 changes
2017-03-26 11:17:05 SWMI INFO    swmOs cd /tmp ; gzip /tmp/autobackup Res=0
2017-03-26 11:17:05 SWMI INFO    swmOs mv -f /tmp/autobackup.gz /home/sirpa/autobackup.gz.new Res=0
2017-03-26 11:17:07 SWMI INFO    swmOs mv -f /home/sirpa/autobackup.gz.new /home/sirpa/autobackup.gz ; sync Res=0
2017-03-26 11:17:08 SWMI INFO    swmDbMonitor Quarantine set for 30 seconds
2017-03-26 11:18:03 SWMI INFO    swmDbMonitor {imm_objects,'LratEUtranCellRelation'} changed
2017-03-26 11:18:33 SWMI INFO    swmDbMonitor Auto backup due to 1 changes
2017-03-26 11:18:36 SWMI INFO    swmOs cd /tmp ; gzip /tmp/autobackup Res=0
...


RBSG2> lgk -x erl


=================================================================================
Timestamp           Type Sev    Description
=================================================================================
...
2017-03-29 03:16:17.032654 ERL  WARN    logServer: Log "NotificationLog" wrapped and lost 1267 items
2017-03-29 03:16:26.537589 ERL  INFO    ootDhcp: DHCP address removed(leasefail) from LMT
2017-03-29 03:16:50.057880 ERL  INFO    swmOs: cd /tmp ; gzip /tmp/autobackup Res=0
2017-03-29 03:16:50.694036 ERL  INFO    swmOs: mv -f /tmp/autobackup.gz /home/sirpa/autobackup.gz.new Res=0
2017-03-29 03:16:54.034232 ERL  INFO    swmOs: mv -f /home/sirpa/autobackup.gz.new /home/sirpa/autobackup.gz ; sync Res=0
2017-03-29 03:16:55.880396 ERL  INFO    ootDhcp: DHCP address removed(leasefail) from LMT
2017-03-29 03:17:25.206604 ERL  INFO    ootDhcp: DHCP address removed(leasefail) from LMT
2017-03-29 03:17:27.459975 ERL  INFO    swmOs: cd /tmp ; gzip /tmp/autobackup Res=0
2017-03-29 03:17:30.305540 ERL  INFO    swmOs: mv -f /tmp/autobackup.gz /home/sirpa/autobackup.gz.new Res=0
2017-03-29 03:17:34.362515 ERL  INFO    swmOs: mv -f /home/sirpa/autobackup.gz.new /home/sirpa/autobackup.gz ; sync Res=0
2017-03-29 03:17:47.491524 ERL  ERROR   sysServer: Port count exceeds limit (900) : 910 Stored info in "/rcs/erlang/port_info.txt.gz"
2017-03-29 03:17:47.826937 ERL  INFO    sysServer: GC took 0.331927secs and GC away 77.0Mb
2017-03-29 03:17:54.531953 ERL  INFO    ootDhcp: DHCP address removed(leasefail) from LMT
2017-03-29 03:17:56.826132 ERL  ERROR   sysUtil: '-parallel_call_error/2-lc$^0/1-0-' parallel_call_timeout {logEsi,generate_cb_fun,
[gmfEsi,generate_esi,<0.27578.7877>]} '<0.30059.7878> process_type': erlang '<0.30059.7878> name': undefined '<0.30059.7878> current_function':
{gen,do_call,4} '<0.30059.7878> initial_call': {sysUtil,init_parallel_call,2} '<0.30059.7878> status': waiting '<0.30059.7878>
message_queue_len': 0 '<0.30059.7878> links': [] '<0.30059.7878> dictionary': [{{sysUtil,parent},<0.11793.7868>}] '<0.30059.7878> trap_exit':
false '<0.30059.7878> priority': normal '<0.30059.7878> group_leader': <0.2401.0> '<0.30059.7878> total_heap_size': 376 '<0.30059.7878>
heap_size': 376 '<0.30059.7878> stack_size': 58 '<0.30059.7878> reductions': 167485 '<0.30059.7878> garbage_collection': [{max_heap_size,
#{error_logger => true,kill => true,size => 0}}, {min_bin_vheap_size,46422}, {min_heap_size,233}, {fullsweep_after,65535}, {minor_gcs,0}]
'<0.30059.7878> suspending': []
2017-03-29 03:17:56.887747 ERL  WARN    logEsi: Directory size failed for "/rcs/dumps" du: cannot read directory '/rcs/dumps/lost+found':
Permission denied
2017-03-29 03:18:00.328755 ERL  WARN    logEsi: Directory size failed for "/rcs/dumps" du: cannot read directory '/rcs/dumps/lost+found':
Permission denied
```

7.4.9 PNP Log

Gen1

The PNP log is included in the Audit Trail log and can be viewed with: lgo | grep PNP

```
ENBG1> lgo | grep PNP

2016-12-22 09:45:15 PNP   SET  ENodeBFunction=1,EUtraNetwork=1,ExternalENodeBFunction=26280-104060,ExternalEUtranCellFDD=26280-104060-6
localCellId 6|physicalLayerCellIdGroup 48|physicalLayerSubCellId 2|tac 12032|activePlmnList mcc=262|mnc=80|mncLength=2|activeServiceAreaId
lastModification 1|dlChannelBandwidth 10000|ulChannelBandwidth 10000|freqBand 7|additionalFreqBandList
2016-12-22 09:45:15 PNP   SET  ENodeBFunction=1,EUtraNetwork=1,ExternalENodeBFunction=26280-104060,ExternalEUtranCellFDD=26280-104060-5
localCellId 5|physicalLayerCellIdGroup 48|physicalLayerSubCellId 1|tac 12032|activePlmnList mcc=262|mnc=80|mncLength=2|activeServiceAreaId
lastModification 1|dlChannelBandwidth 10000|ulChannelBandwidth 10000|freqBand 7|additionalFreqBandList
2016-12-22 09:45:16 PNP   SET  ENodeBFunction=1,EUtraNetwork=1,ExternalENodeBFunction=26280-104060,ExternalEUtranCellFDD=26280-104060-4
localCellId 4|physicalLayerCellIdGroup 48|physicalLayerSubCellId 0|tac 12032|activePlmnList mcc=262|mnc=80|mncLength=2|activeServiceAreaId
lastModification 1|dlChannelBandwidth 10000|ulChannelBandwidth 10000|freqBand 7|additionalFreqBandList
...<cut>....
2017-04-18 09:02:51 PNP   SET  ENodeBFunction=1,EUtranCellFDD=2 hostingDigitalUnit Moref|froType 0|froId 1000000001
2017-04-18 09:02:51 PNP   SET  ENodeBFunction=1,EUtranCellFDD=3 hostingDigitalUnit Moref|froType 0|froId 1000000001
2017-04-30 08:10:27 PNP   SET  ENodeBFunction=1,EUtranCellFDD=3 hostingDigitalUnit Moref|froType 0|froId 1000000001
2017-04-30 08:10:27 PNP   SET  ENodeBFunction=1,EUtranCellFDD=1 hostingDigitalUnit Moref|froType 0|froId 1000000001
2017-04-30 08:10:27 PNP   SET  ENodeBFunction=1,EUtranCellFDD=2 hostingDigitalUnit Moref|froType 0|froId 1000000001
```

Gen2

The PNP log is included in the ESI log and can be viewed with: lgk -x pnp

```
ENBG2> lgk -x pnp

2017-05-19 08:38:04 PNP  INFO   "Pnp Request: MO ManagedElement=1,ENodeBFunction=1,EUtraNetwork=1,ExternalENodeBFunction=26280-
204271,ExternalEUtranCellFDD=lienb4271_cell2; SET NoOfAttributes 11; S32 localCellId 1; S32 physicalLayerCellIdGroup 101; S32
physicalLayerSubCellId 0; S32 tac 4336; ARRAY activePlmnList noOfArrayElements 1; STRUCT plmnId noOfStructMembers 3; S32 mcc 262; S32 mnc 80;
S32 mncLength 2; ARRAY activeServiceAreaId noOfArrayElements 0; S32 lastModification 1; S32 dlChannelBandwidth 10000; S32 ulChannelBandwidth
10000; S32 freqBand 3; ARRAY additionalFreqBandList noOfArrayElements 0; Result = Successful"
2017-05-19 08:38:39 PNP  INFO   "Pnp Request: MO ManagedElement=1,ENodeBFunction=1,EUtraNetwork=1,ExternalENodeBFunction=26280-
204271,ExternalEUtranCellFDD=lienb4271_cell2; SET NoOfAttributes 11; S32 localCellId 1; S32 physicalLayerCellIdGroup 101; S32
physicalLayerSubCellId 0; S32 tac 4336; ARRAY activePlmnList noOfArrayElements 1; STRUCT plmnId noOfStructMembers 3; S32 mcc 262; S32 mnc 80;
S32 mncLength 2; ARRAY activeServiceAreaId noOfArrayElements 0; S32 lastModification 1; S32 dlChannelBandwidth 10000; S32 ulChannelBandwidth
10000; S32 freqBand 3; ARRAY additionalFreqBandList noOfArrayElements 0; Result = Successful"
....<cut>....
```

7.4.10 HW Log

Gen1

The HW can be printed by: cabg   (or: lh all dumpelg)

```
ENB> cabg

=================================================================================
Pos    Board    Dumpelg Entry
=================================================================================
0001   DUS4101  2       120528 142616 000;;Subrack 00;Slot 01
0001   DUS4101  3       120927 080715 000;CXP102051/18_R4AT
0001   DUS4101  4       120927 080843 200;SFP01 DELTA            ;prod LCP-2488B4HDRT-E;rev A    ;BR 25
0001   DUS4101  5       120927 080843 200;SFP02 DELTA            ;prod LCP-2488B4HDRT-E;rev A    ;BR 25
0001   DUS4101  6       120927 080843 200;SFP03 DELTA            ;prod LCP-2488B4HDRT-E;rev A    ;BR 25
0001   DUS4101  7       140219 091318 200;SFP01 FINISAR CORP.    ;prod FTLX1471D3BTL-E7;rev A    ;BR 103
0001   DUS4101  8       140219 091319 200;SFP02 FINISAR CORP.    ;prod FTLX1471D3BTL-E7;rev A    ;BR 103
0001   DUS4101  9       140219 091319 200;SFP03 FINISAR CORP.    ;prod FTLX1471D3BTL-E7;rev A    ;BR 103
0001   DUS4101  10      140219 091319 200;SFP04 OPNEXT,INC       ;prod TRS5021EN-SB01  ;rev 0001;BR 103
0001   DUS4101  11      140219 091319 200;SFP05 OPNEXT,INC       ;prod TRS5021EN-SB01  ;rev 0001;BR 103
0001   DUS4101  12      140219 091319 200;SFP06 OPNEXT,INC       ;prod TRS5021EN-SB01  ;rev 0001;BR 103
0001   DUS4101  13      140303 090223 000;CXP102051/21_R23J
0001   DUS4101  14      140303 090230 200;SFP05 OPNEXT INC       ;prod TRS5001EN-0039  ;rev A1A ;BR 103
0001   DUS4101  15      140303 090230 200;SFP06 OPNEXT INC       ;prod TRS5001EN-0039  ;rev A1A ;BR 103
...<cut>...
0001   DUS4101  89      700101 000000 004;CXC1731602_R92F04;Power on restart
0001   DUS4101  90      700101 000000 004;CXC1731602_R92F04;Power on restart
0001   DUS4101  91      700101 000000 004;CXC1731602_R92F04;Power on restart
0001   DUS4101  92      161031 161047 005;CXC1731602_R92F04;HW test ok
0001   DUS4101  93      700101 000000 004;CXC1731602_R92F04;Power on restart
0001   DUS4101  94      161031 161439 005;CXC1731602_R92F04;HW test ok
0001   DUS4101  95      700101 000000 004;CXC1731602_R92F04;Power on restart
0001   DUS4101  96      161114 082555 005;CXC1731602_R92F04;HW test ok
0001   DUS4101  97      700101 000000 004;CXC1731602_R92F04;Power on restart
0001   DUS4101  98      161114 083254 005;CXC1731602_R92F04;HW test ok
```

Gen2

Located in the file tmp/ee_esi/ee_esi.log

```
ENB2> lgk -x hw

===================================================================================
Timestamp            Type Sev    Description
===================================================================================
1970-01-01 00:00:29 HW    (004) Power On (Cable plugged in). Timestamp is however from the power off moment 25 8/CXC1736593/52_R1D
1970-01-01 00:00:29 HW    (004) Power On (Cable plugged in). Timestamp is however from the power off moment 25 8/CXC1736593/52_R1D
1970-01-01 00:00:29 HW    (004) Power On (Cable plugged in). Timestamp is however from the power off moment 25 8/CXC1736593/52_R1D
2016-03-31 05:05:41 HW    (005) ColdWithTest restart started -
2016-03-31 05:06:36 HW    (005) ColdWithTest restart finished with result HTMI_TEST_NO_FAULT -
2016-03-31 20:54:16 HW    (004) Power On (Cable plugged in). Timestamp is however from the power off moment 25 8/CXC1736593/52_R1D
2016-05-05 14:29:23 HW    (003) SW version : Baseband CXP9024418/4 R9CU started 1 CXP9025546_3_R5AS02
2016-05-15 16:15:26 HW    (003) SW version : Baseband CXP9024418/4 R9FD started 1 CXP9025546_3_R5AT04
```

```
2016-05-15 16:39:50 HW    (003) SW version : Baseband CXP9024418/4 R9CU started 1 CXP9025546_3_R5AS02
2016-05-15 17:31:37 HW    (003) SW version : Baseband CXP9024418/4 R9FD started 1 CXP9025546_3_R5AT04
2016-05-22 14:09:18 HW    (003) SW version : Baseband CXP9024418/4 R9HD started 1 CXP9025546_3_R5AX03
2016-10-16 13:15:19 HW    (003) SW version : Baseband CXP9024418/4 R15DJ started 1 CXP9025546_3_R5BS02
2016-10-16 14:35:25 HW    (003) SW version : Baseband CXP9024418/4 R9HD started 1 CXP9025546_3_R5AX03
2016-10-18 11:17:25 HW    (003) SW version : Baseband CXP9024418/4 R15DJ started 1 CXP9025546_3_R5BS02
2016-11-22 08:29:33 HW    (A6Z) BPM alert, uptime 20614132 1 CXP9025851/3
2016-11-22 09:48:35 HW    (004) Power On (Cable plugged in). Timestamp is however from the power off moment 25 8/CXC1736593/52_R1D
2016-11-29 08:33:33 HW    (A6Z) BPM alert, uptime 21206805 1 CXP9025851/3
2016-11-29 09:49:11 HW    (004) Power On (Cable plugged in). Timestamp is however from the power off moment 25 8/CXC1736593/52_R1D
2016-11-29 13:56:25 HW    (003) SW version : Baseband CXP9024418/5 R15GK started 1 CXP9025546_3_R7S14
2016-12-01 08:51:19 HW    (A6Z) BPM alert, uptime 21367572 1 CXP9025851/3
2016-12-01 10:34:44 HW    (004) Power On (Cable plugged in). Timestamp is however from the power off moment 25 8/CXC1736593/52_R1D
2016-12-02 00:27:01 HW    (004) Power On (Cable plugged in). Timestamp is however from the power off moment 25 8/CXC1736593/52_R1D
2017-03-02 01:30:40 HW    (003) SW version : Baseband CXP9024418/5 R16GK started 1 CXP9025546_3_R7T09
```

7.5 Pico Logs

The Logs of Pico RBS are stored under /var/permanent, /var/persistent, and /var/volatile, and can be fetched with the "lg" command over SFTP.

```
/var/permanent
AutointegrationLog      //Autointegration log
Fmevents          //O&M fault log
Runtime           //EOAM runtime log
SWUpgradeLog          //Sw upgrade log
Sysevent          //Linux Kernel log

/var/persistent:
Diag1             //DSP crashlogs and coredumps
Diag2             //Same but backlog of previous crash
Pm                //PM ROP files in xml if activated

/var/volatile/log
Boam_traceLog         //BOAM log
ConnectedUEsNew       //Connected UEs status
Core0_traceLog        //DSP core0 femtolog in binary
Core1_traceLog        //DSP core1 femtolog in binary
Core2_traceLog        //DSP core2 femtolog in binary
Core3_traceLog        //DSP core3 femtolog in binary
DatabaseDump          //EOAM DB dump
Error             //EOAM and MW error prints
Fmevents              //O&M fault log
Iub_traceLog          //BOAM IUB log
Netfp_proxy       //Netfp logs
Pma_traceLog          //BOAM PM Agent's log
Runtime               //EOAM runtime log
Security              //Security events
Startup               //EOAM startup log until cell is up
```

```
PRBS130> lgf

Startdate=19661031.151320, Enddate=20140615.235809
..
get /var/permanent/log/oss/alarmlog.log /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/permanent/oss/alarmlog.log ... OK
get /var/permanent/log/oss/AutointegrationLog.txt /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/permanent/oss/AutointegrationLog.txt ... OK
get /var/permanent/log/oss/webuiupdate.xml /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/permanent/oss/webuiupdate.xml ... OK
get /var/permanent/log/oss/runtime306 /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/permanent/oss/runtime306 ... OK
get /var/permanent/log/oss/runtime307 /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/permanent/oss/runtime307 ... OK
get /var/permanent/log/oss/runtime308 /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/permanent/oss/runtime308 ... OK
get /var/permanent/log/oss/SWUpgradeLog.txt /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-...<cut>...
get /var/volatile/log/csync_log/ntp_pktData_0.log.1.gz /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/volatile/log/csync_log/ntp_pktData_0.log.1.gz ... OK
get /var/volatile/log/csync_log/ntp_statslog_0.log /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/volatile/log/csync_log/ntp_statslog_0.log ... OK
get /var/volatile/log/csync_log/ntp_pktData_0.log /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-
014808_26648/picologs/volatile/log/csync_log/ntp_pktData_0.log ... OK

New directory: /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-014808_26648
zip -rmD /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/lg/PRBS130/20140615_014814/PRBS130_logfiles.zip picologs
  adding: picologs/volatile/log/UIA_Core0_traceLog2.dmp (deflated 66%)
  adding: picologs/volatile/log/UIA_Core0_traceLog5.dmp (deflated 66%)
  adding: picologs/volatile/log/fmevents.log (deflated 96%)
  adding: picologs/volatile/log/diagnostic/Diag_1.bin.gz (deflated 70%)
  adding: picologs/volatile/log/UIA_Core0_traceLog10.dmp (deflated 66%)
  adding: picologs/volatile/log/UIA_Core1_traceLog6.dmp (deflated 70%)
  adding: picologs/volatile/log/local0_elg_stack.log.1 (deflated 95%)
  adding: picologs/volatile/log/UIA_Core1_traceLog1.dmp (deflated 70%)
  adding: picologs/volatile/log/UIA_Core1_traceLog8.dmp (deflated 70%)
  adding: picologs/volatile/log/UIA_Core2_traceLog11.dmp (deflated 66%)
...<cut>...
  adding: picologs/persistent/oss/diag1/netfp_proxy.log (deflated 98%)
  adding: picologs/persistent/oss/diag1/runtime.2 (deflated 92%)
  adding: picologs/persistent/oss/diag1/fmevents.log (deflated 96%)
  adding: picologs/persistent/oss/diag1/trace2 (deflated 80%)

New directory: /home/eanzmagn
Successful storage of the node logs to /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/lg/PRBS130/20140615_014814/PRBS130_logfiles.zip
For offline processing, run: lg[<options>] -l <zipfile>.
```

Applicable logs for Pico RBS

```
Pico Log Options:
***************
 - a: Alarm log (/permanent/oss/alarmlog.log)
 - e: FmEvent log (/volatile/log/fmevents.log)
 - g: Runtime log (/volatile/log/runtime)
 - h: AutoIntegration log (/permanent/oss/AutointegrationLog.txt)
 - s: SystemEvent log (/permanent/oss/sysevent)
 - u: Upgrade log (/permanent/oss/SWUpgradeLog.txt)
 - y: SecurityEvent log (/volatile/log/security)
```

Alarm Log:

```
PRBS130> lga

Startdate=19661031.081320, Enddate=20140617.000119
cp /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/cpplogs/picologs/permanent/oss/alarmlog.log
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/alarmLog6588.xml
===================================================================================================
Timestamp          Type Description
===================================================================================================
...<cut>...
2014-05-20 21:40:13 AL   w Synchronization Holdover Synchronization=1,RadioEquipmentClock=1 (Sync reference not available )
2014-05-21 13:09:23 AL   M Software Component not Functioning SwM=1 (0x5005)
2014-05-21 13:19:24 AL   * Software Component not Functioning SwM=1 (0x5005)
2014-05-26 15:14:01 AL   M Configuration Problem EUtranCellFDD=* (LA returns false for the Stack reconfiguration request)
2014-05-26 15:14:41 AL   w Service Degraded Fm=1 (Alarms service is in a silent mode.)
2014-05-29 08:13:01 AL   M Software Component not Functioning SwM=1 (0x5005)
2014-05-29 08:19:51 AL   * Software Component not Functioning SwM=1 (0x5005)
2014-05-29 08:20:01 AL   M Software Component not Functioning SwM=1 (0x5005)
2014-05-29 08:23:51 AL   * Software Component not Functioning SwM=1 (0x5005)
2014-05-29 12:58:36 AL   M Configuration Problem EUtranCellFDD=* (LA returns false for the Stack reconfiguration request)
2014-05-29 13:03:36 AL   M Service Unavailable EUtranCellFDD=* (Check primary alarms for a possible root cause.)
2014-05-30 10:00:43 AL   M Configuration Problem EUtranCellFDD=* (LA returns false for the Stack reconfiguration request)
2014-05-30 10:01:24 AL   w Service Degraded Fm=1 (Alarms service is in a silent mode.)
2014-05-30 13:32:04 AL   m Hardware Failure RbsUnit=1 (Voltage above normal operation range.)
2014-05-30 13:33:15 AL   M Configuration Problem EUtranCellFDD=* (LA returns false for the Stack reconfiguration request)
2014-05-30 13:33:55 AL   w Service Degraded Fm=1 (Alarms service is in a silent mode.)
2014-06-02 09:14:21 AL   M Configuration Problem EUtranCellFDD=* (LA returns false for the Stack reconfiguration request)
2014-06-02 09:15:01 AL   w Service Degraded Fm=1 (Alarms service is in a silent mode.)
2014-06-02 10:12:34 AL   M Configuration Problem EUtranCellFDD=* (LA returns false for the Stack reconfiguration request)
2014-06-02 10:13:14 AL   w Service Degraded Fm=1 (Alarms service is in a silent mode.)
2014-06-02 11:10:32 AL   m Hardware Failure RbsUnit=1 (Voltage above normal operation range.)
2014-06-02 23:10:51 AL   * Hardware Failure RbsUnit=1 (Voltage above normal operation range.)
2014-06-04 08:06:00 AL   w Service Degraded Fm=1 (Alarms service is in a silent mode.)
2014-06-10 14:28:34 AL   * Software Component not Functioning SwM=1 (0x5005)
2014-06-10 14:28:44 AL   M Software Component not Functioning SwM=1 (0x5005)
2014-06-10 14:28:54 AL   * Software Component not Functioning SwM=1 (0x5005)
2014-06-13 14:32:48 AL   m Hardware Failure RbsUnit=1 (Voltage above normal operation range.)
```

Event Log:

```
PRBS130> lge

Startdate=19661031.081320, Enddate=20140617.000307
cp /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/cpplogs/picologs/volatile/log/fmevents.log
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/eventLog6588.xml
===================================================================================================
Timestamp          Type Description
===================================================================================================
...<cut>...
2014-06-09 15:20:14 EV   Id:36:MW_API_ALARM_OUT_OF_SYNC,Status:0:EStatus_Cancel,Source:syncmon,Message:MW_Fault received (src=0, cause=0)
2014-06-09 15:20:16 EV   Id:20546:EoamFault_ServiceFailure,Status:0:EStatus_Cancel,Source:2,Message:EOAM_Fault received
2014-06-10 07:25:43 EV   Id:20579:EoamFault_StackReconfigurationFailed,Status:1:EStatus_Start,Source:2,Message:EOAM_Fault received
2014-06-10 08:05:19 EV   Id:37:MW_API_ALARM_OUT_OF_TIME_SYNC,Status:0:EStatus_Cancel,Source:syncmon,Message:MW_Fault received (src=0, cause=0)
2014-06-13 14:32:42 EV   Id:99:MW_API_ALARM_VOLT_INT,Status:1:EStatus_Start,Source:int,Message:MW_Fault received (src=0, cause=0)
2014-06-13 14:32:44 EV   Id:20546:EoamFault_ServiceFailure,Status:0:EStatus_Cancel,Source:2,Message:EOAM_Fault received
2014-06-13 14:32:58 EV   Id:99:MW_API_ALARM_VOLT_INT,Status:0:EStatus_Cancel,Source:int,Message:MW_Fault received (src=0, cause=0)
```

```
2014-06-13 14:36:22 EV   Id:37:MW_API_ALARM_OUT_OF_TIME_SYNC,Status:0:EStatus_Cancel,Source:syncmon,Message:MW_Fault received (src=0, cause=0)
2014-06-13 14:36:25 EV   Id:36:MW_API_ALARM_OUT_OF_SYNC,Status:0:EStatus_Cancel,Source:syncmon,Message:MW_Fault received (src=0, cause=0)
2014-06-13 14:36:26 EV   Id:20546:EoamFault_ServiceFailure,Status:0:EStatus_Cancel,Source:2,Message:EOAM_Fault received
2014-06-13 20:07:07 EV   Id:37:MW_API_ALARM_OUT_OF_TIME_SYNC,Status:0:EStatus_Cancel,Source:syncmon,Message:MW_Fault received (src=0, cause=0)
2014-06-13 20:07:09 EV   Id:36:MW_API_ALARM_OUT_OF_SYNC,Status:0:EStatus_Cancel,Source:syncmon,Message:MW_Fault received (src=0, cause=0)
2014-06-13 20:07:11 EV   Id:20546:EoamFault_ServiceFailure,Status:0:EStatus_Cancel,Source:2,Message:EOAM_Fault received
```

Runtime log:

```
PRBS130> lgg

cp /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/cpplogs/picologs/volatile/log/runtime
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/llog6588.log
==========================================================================================
Timestamp           Type Description
==========================================================================================
2014-06-14 18:53:55 RUNT OS: [SW WD DRIVER] Refreshing SW WD..
2014-06-14 18:53:55 RUNT MWA-API: INF Entered pwr_watchdog_reset() function
2014-06-14 18:53:55 RUNT eoam_startup: INF Watchdog reset
2014-06-14 18:53:55 RUNT MWA-API: INF pwrmon_ipmeas: TRS_ETHERNET SW counters: in_discards 0 in_errors 0 out_discards 0 out_errors 0
2014-06-14 18:53:55 RUNT MWA-API: INF pwrmon_ipmeas: TRS_ETHERNET QoS counters: out_discards 0
2014-06-14 18:53:55 RUNT MWA-API: INF Reading GbE Ethernet counters
2014-06-14 18:53:55 RUNT MWA-API: INF CPSW_A:rx_crc_errors: 0
2014-06-14 18:53:55 RUNT MWA-API: INF CPSW_A:tx_underrun: 0
2014-06-14 18:53:55 RUNT MWA-API: INF CPSW_B:rx_crc_errors: 0
2014-06-14 18:53:55 RUNT MWA-API: INF CPSW_B:tx_underrun: 0
2014-06-14 18:53:55 RUNT MWA-API: INF CPSW_B:rx_sof_overruns: 0
2014-06-14 18:53:55 RUNT MWA-API: INF pwrmon_ipmeas: TRS_ETHERNET GbE counters: in_discards 0 in_errors 0 out_discards 0 out_errors 0
2014-06-14 18:53:55 RUNT MWA-API: INF pwrmon_ipmeas: Port (0x4) in_discards: 0
2014-06-14 18:53:55 RUNT MWA-API: INF pwrmon_ipmeas: Port (0x4) in_errors: 0
```

SW upgrade log:

```
PRBS130> lgu

Startdate=19661031.081320, Enddate=20140617.001859
cat /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/cpplogs/picologs/permanent/oss/SWUpgradeLog.txt >
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/upgLog6588.log
==========================================================================================
Timestamp           Type Description
==========================================================================================
2014-06-10 14:29:06 UPG  Initializing SwUpdate... (delimiter to start a new log) Received SW update request from COM SW update response sent,
success: FALSE SW update failure: actionName SwM=1:reportProgress, actionState createUpgradePackage, actionResult FINISHED. OSS SW update
response sent, success: TRUE File information from SwPackageContent.xml read succesfully. Total upgrade size 140795802. Downloading files from
SMRS:
...<cut>...
2014-06-13 14:24:34 UPG  File: rootfs-additions.tar.gz FTPStatus: OK Integrity check: OK File successfully downloaded from SMRS, filename:
eoam.tar.gz , version: LTE_KNIFE_epereds
2014-06-13 14:24:44 UPG  File: eoam.tar.gz FTPStatus: OK Integrity check: OK File successfully downloaded from SMRS, filename: lte.tar.gz ,
version: LTE_KNIFE_epereds
2014-06-13 14:24:54 UPG  File: lte.tar.gz FTPStatus: OK Integrity check: OK File successfully downloaded from SMRS, filename: com.tar.gz ,
version: LTE_KNIFE_epereds
2014-06-13 14:25:04 UPG  File: com.tar.gz FTPStatus: OK Integrity check: OK File successfully downloaded from SMRS, filename:
socb_image.tar.gz , version: LTE_KNIFE_epereds
```

```
2014-06-13 14:25:07 UPG  File: socb_image.tar.gz FTPStatus: OK Integrity check: OK File successfully downloaded from SMRS, filename:
webui.tar.gz , version: LTE_KNIFE_epereds
2014-06-13 14:25:11 UPG  File: webui.tar.gz FTPStatus: OK Integrity check: OK File successfully downloaded from SMRS, filename:
log_conf.tar.gz , version: LTE_KNIFE_epereds
2014-06-13 14:25:14 UPG  File: log_conf.tar.gz FTPStatus: OK Integrity check: OK File successfully downloaded from SMRS, filename:
compatibility.tar.gz , version: LTE_KNIFE_epereds
```

Auto-integration log:

```
PRBS130> lgh

Startdate=19661031.081320, Enddate=20140617.002202
cp /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/cpplogs/picologs/permanent/oss/AutointegrationLog.txt
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/hiliLog6588.xml
=========================================================================================
Timestamp          Type Description
=========================================================================================
2013-09-16 09:18:53 AI   Software version information:
2013-09-16 09:18:53 AI   Build ID: w13b_goldensw_RnD_20130916
2013-09-16 09:18:53 AI   Build version: 1336_884_RND_W_W13B
2013-09-16 09:18:53 AI   Job Name: w13b_goldensw_RnD_build
2013-09-16 09:18:53 AI   Builder: vuohves
2013-09-16 09:18:53 AI   Date: Mon Sep 16 09:02:38 EEST 2013
2013-09-16 09:18:53 AI   Machine: epic2_0
2013-09-16 09:18:53 AI
2013-09-16 09:18:53 AI   EOAM_version: 41cb7d9 (Mon, 16 Sep 2013 07:43:29 +0300)
2013-09-16 09:18:53 AI   BOAM_API_version: 4
2013-09-16 09:18:53 AI   COM_version: "hr63918_pico_early_drop"
2013-09-16 09:18:53 AI   FPGA_version: 2.0
2013-09-16 09:18:53 AI
2013-09-16 09:18:53 AI
2013-09-16 09:18:53 AI   WCDMA_DSP_version: WWP_1311.26
2013-09-16 09:18:53 AI   MCSDK_version: 02.00.02.16.p1
2013-09-16 09:18:53 AI   Scripts: 6886c85 (Mon, 26 Aug 2013 09:13:44 +0300)
2013-09-16 09:18:53 AI   DSP_version (L1): 9fa565e (Mon, 26 Aug 2013 08:59:56 +0300)
2013-09-16 09:18:53 AI   DSP_version (L2/L3): 2d2f72a (Mon, 26 Aug 2013 09:12:34 +0300)
2013-09-16 09:18:53 AI
2013-09-16 09:18:53 AI   Prod_MCSDK_version: 02.00.02.16.p1
2013-09-16 09:18:53 AI
2013-09-16 09:18:53 AI   Green LED slow blink
2013-09-16 09:18:53 AI   HW data read from MW
2013-09-16 09:18:53 AI   Serial number:C827609479 received.
2013-09-16 09:18:53 AI   RBS HW info, Product number: KRD 901 043/1X, Product revision: R2B, Serial number: C827609479
2013-09-16 09:18:54 AI   Autointegration started
2013-09-16 09:18:54 AI   Configured to use active backhaul port RJ-45.
2013-09-16 09:18:55 AI   AI_phase: AI_IpDiscovery
2013-09-16 09:18:55 AI   VLAN scan started
2013-09-16 09:19:24 AI   VLAN scan failed, reason: No servers found
```

Sytem log:

```
PRBS130> lgs

Startdate=19661031.081320, Enddate=20140617.002337
cat /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/cpplogs/picologs/permanent/oss/sysevent >
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/sysLog6588
```

```
=====================================================================================
Timestamp          Type Description
=====================================================================================
2013-09-16 09:18:54 SYS  : SysEvnt: Previous reset reason was eoam_reset_other
2013-09-16 09:19:54 SYS  : SysEvnt: Software upgrade requested, starting...
2013-09-16 09:21:19 SYS  : SysEvnt: SW copied from the SMRS to the partition 5, reset requested to activate new SW
2013-09-16 09:21:19 SYS  : SysEvnt: RBS reset requested, reset reason: eoam_reset_reason_sw_update, reset type: mw_api_rt_hw_reset
2014-01-01 00:00:44 SYS  : SysEvnt: Previous reset reason was eoam_reset_reason_sw_update
2014-01-01 00:01:51 SYS  : SysEvnt: S1-MME link TermPointToMme=1 (10.45.132.16) state has been ENABLED
2014-01-01 00:14:39 SYS  : SysEvnt: Software upgrade requested, starting...
2014-01-01 00:14:51 SYS  : SysEvnt: Software upgrade failed
2014-01-01 00:14:51 SYS  : SysEvnt: Software upgrade failed
2014-01-01 00:15:43 SYS  : SysEvnt: Software upgrade requested, starting...
2014-01-01 00:15:56 SYS  : SysEvnt: Software upgrade failed
2014-01-01 00:15:56 SYS  : SysEvnt: Software upgrade failed
2014-01-01 00:17:16 SYS  : SysEvnt: RBS reset requested, reset reason: eoam_reset_reason_oss_restart, reset type: mw_api_rt_hw_reset
2014-01-01 00:00:18 SYS  : SysEvnt: Previous reset reason was eoam_reset_reason_oss_restart
2014-01-01 00:00:50 SYS  : SysEvnt: S1-MME link TermPointToMme=1 (10.45.132.16) state has been ENABLED
2014-01-01 00:01:22 SYS  : SysEvnt: Software upgrade requested, starting...
2014-01-01 00:04:20 SYS  : SysEvnt: SW 2 copied from the SMRS to the partition 6, reset requested to activate new SW
2014-01-01 00:04:20 SYS  : SysEvnt: RBS reset requested, reset reason: eoam_reset_reason_sw_update, reset type: mw_api_rt_hw_reset
2014-01-01 00:00:13 SYS  eoam_startup: SysEvnt: Previous reset reason was eoam_reset_reason_sw_update
2014-01-01 00:00:15 SYS  eoam_startup: SysEvnt: Previous reset reason was eoam_reset_reason_sw_update
2014-01-01 00:00:57 SYS  eoam_cm: INF SysEvnt: S1-MME link TermPointToMme=1 (10.45.132.16) state has been ENABLED
2014-01-01 00:02:02 SYS  eoam_swm: SysEvnt: New SW activated, productName: RBS6401, productNumber: 2/CXP9024371/1, productRevision:
LTE_KNIFE_eagacho_sending_ConfigUpdate
2014-01-01 00:00:13 SYS  eoam_startup: SysEvnt: Previous reset reason was eoam_reset_other
2014-01-01 00:00:13 SYS  eoam_startup: SysEvnt: Previous reset reason was eoam_reset_other
2014-01-01 00:00:55 SYS  eoam_cm: INF SysEvnt: S1-MME link TermPointToMme=1 (10.45.132.16) state has been ENABLED
2014-01-01 00:02:05 SYS  eoam_swm: SysEvnt: Software upgrade failed
2014-01-01 00:02:05 SYS  eoam_reset: SysEvnt: RBS reset requested, reset reason: eoam_reset_reason_SW_fallback, reset type: mw_api_rt_hw_reset
...<cut>...
```

Security log:

```
PRBS130> lgy

Startdate=19661031.081320, Enddate=20140617.002407
cat /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/cpplogs/picologs/volatile/log/security >
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20140615-184743_6952/securityLog6588.xml
=====================================================================================
Timestamp          Type Description
=====================================================================================
2010-01-01 00:00:03 SEC  ipsec_starter: Starting strongSwan 5.1.3 IPsec [starter]...
2010-01-01 00:00:04 SEC  ipsec_starter: charon (1250) started after 280 ms
2010-01-01 00:00:04 SEC  ipsec_starter: 'traffic' shunt PASS policy installed
2010-01-01 00:00:04 SEC  ipsec_starter:
2010-01-01 00:00:14 SEC  eoam_db: ERR getAllChildren: Error while fetching child objects: No such parent dn:
ManagedElement=1,SystemFunctions=1,SecM=1,CertM=1,NodeCredential=1,id=1,nodeCredentialId=1,certMId=1 instance: 1
2010-01-01 00:00:14 SEC  eoam_db: ERR getAllChildren: Error while fetching child objects: No such parent dn:
ManagedElement=1,SystemFunctions=1,SecM=1,CertM=1,NodeCredential=1,id=progress_1,nodeCredentialId=1,certMId=1 instance: 1
2010-01-01 00:00:14 SEC  eoam_db: ERR getAllChildren: Error while fetching child objects: No such parent dn:
ManagedElement=1,SystemFunctions=1,SecM=1,CertM=1,VendorCredential=1,id=1,vendorCredentialId=1,certMId=1 instance: 1
2010-01-01 00:00:14 SEC  eoam_db: ERR getAllChildren: Error while fetching child objects: No such parent dn:
ManagedElement=1,SystemFunctions=1,SecM=1,CertM=1,id=progress_1,certMId=1 instance: 1
2010-01-01 00:00:15 SEC  com: INF parse Parsing file '/opt/com/model/MSRBS_V1_CertM_mp.xml'
```

```
2010-01-01 00:00:18 SEC  com: WRN checkAttrs If attribute (MSRBS_V1_CertM~1~CertMCapabilities~enrollmentSupport) multiplicity is grater than
zero it must be mandatory.
2010-01-01 00:00:36 SEC  eoam_db: INF Updated transactionNotifData with dn: NodeCredential=1, parentDn: CertM=1
2010-01-01 00:00:36 SEC  eoam_db: INF Updated transactionNotifData with dn: VendorCredential=1, parentDn: CertM=1
2014-06-14 00:02:31 SEC  sshd: pam_unix(sshd:auth): authentication failure; logname= uid=0 euid=0 tty=ssh ruser= rhost=10.199.80.2 user=root
2014-06-14 00:02:32 SEC  sshd: error: PAM: Authentication failure for root from 10.199.80.2
2014-06-14 00:03:32 SEC  sshd: Connection closed by 10.199.80.2 [preauth]
2014-06-14 23:48:13 SEC  sshd: Connection closed by 10.62.158.220 [preauth]
2014-06-14 23:48:13 SEC  sshd: Connection closed by 10.62.158.220 [preauth]
2014-06-14 23:48:13 SEC  sshd: Bad protocol version identification 'exit' from 10.62.158.220
2014-06-14 23:48:18 SEC  sshd: Accepted password for root from 10.62.158.220 port 49604 ssh2
2014-06-14 23:48:18 SEC  sshd: pam_unix(sshd:session): session opened for user root by (uid=0)
2014-06-14 23:48:43 SEC  sshd: error: Received disconnect from 10.62.158.220: 11: disconnected by user
```

MO command log (Audit trail):

```
PRBS130> lgo


================================================================================
Timestamp           Type Description
================================================================================
2015-11-11 11:59:34 MO-N  ACT ManagedElement=PRBS550,SystemFunctions=1,SwM=1 className: SwM, actionName createUpgradePackage
2015-11-11 12:00:11 MO-N  ACT ManagedElement=PRBS550,SystemFunctions=1,SwM=1,UpgradePackage=1 className: UpgradePackage, actionName prepare
2015-11-11 12:01:07 MO-N  ACT ManagedElement=PRBS550,SystemFunctions=1,SwM=1,UpgradePackage=1 className: UpgradePackage, actionName verify
2015-11-11 12:02:09 MO-N  ACT ManagedElement=PRBS550,SystemFunctions=1,SwM=1,UpgradePackage=1 className: UpgradePackage, actionName verify
2015-11-11 12:03:08 MO-N  ACT ManagedElement=PRBS550,SystemFunctions=1,SwM=1,UpgradePackage=1 className: UpgradePackage, actionName activate
2015-11-17 05:16:24 MO-C  SET ManagedElement=PRBS550 userLabel 'test'
2015-11-17 05:16:28 MO-C  DEL ManagedElement=PRBS550 userLabel
2015-11-17 05:19:29 MO-C  CRE ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test
2015-11-17 05:19:30 MO-C  SET ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test granularityPeriod 'FIFTEEN_MIN'
2015-11-17 05:19:30 MO-C  SET ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test reportingPeriod 'FIFTEEN_MIN'
2015-11-17 05:19:30 MO-C  CRE ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test,MeasurementReader=1
2015-11-17 05:19:30 MO-C  SET ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test,MeasurementReader=1 measurementSpecification ''
2015-11-17 05:19:30 MO-C  CRE ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test,MeasurementReader=2
2015-11-17 05:19:31 MO-C  SET ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test,MeasurementReader=2 measurementSpecification ''
2015-11-17 05:19:31 MO-C  CRE ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test,MeasurementReader=3
2015-11-17 05:19:31 MO-C  SET ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test,MeasurementReader=3 measurementSpecification ''
2015-11-17 05:19:32 MO-C  CRE ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test,MeasurementReader=4
2015-11-17 05:19:32 MO-C  SET ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test,MeasurementReader=4 measurementSpecification ''
2015-11-17 05:19:52 MO-C  SET ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test requestedJobState 'STOPPED'
2015-11-17 05:19:54 MO-C  DEL ManagedElement=PRBS550,SystemFunctions=1,Pm=1,PmJob=test
2015-11-17 06:58:38 MO-C  ACT ManagedElement=PRBS550,SystemFunctions=1,BrM=1,BrmBackupManager=1 createBackup
2015-11-17 06:58:57 MO-C  ACT ManagedElement=PRBS550,SystemFunctions=1,BrM=1,BrmBackupManager=1 deleteBackup
2015-11-17 07:06:26 MO-C  SET ManagedElement=PRBS550 userLabel 'test'
2015-11-17 07:06:32 MO-C  DEL ManagedElement=PRBS550 userLabel
```


Crashes:

- lgp command is currently not supported on Pico (but planned)

- up to three crash dumps are stored and located under:
/oss/persistent/diag1
/oss/persistent/diag2
/var/volatile/coredump

- can be listed with command "ftree" , fetched with "ftget" , and deleted with "ftdela"

7.6 Moshell/AMOS command log

```
RBS01> lgn -m 3

Startdate=20091130.084030, Enddate=20091204.084030


===============================================================================
Timestamp (Local)      User      Node          PID  Command
===============================================================================
2009-12-02 19:50:04 MOS nmsadm   137.58.194.147 21963 StartSession, interactive, ID=20091202-194947_21963, CWD=/home/nmsadm,
WS=SunOS atrcus422, ver=7.1y
2009-12-02 19:50:04 MOS nmsadm   137.58.194.147 21963 pr
2009-12-02 19:50:17 MOS nmsadm   137.58.194.147 21963 fget 0 userlabel
2009-12-02 19:50:21 MOS nmsadm   137.58.194.147 21963 q
2009-12-03 08:38:27 MOS design01 137.58.194.147  6567 StartSession, interactive, ID=20091203-083809_6567, CWD=/home/design01,
WS=SunOS atrcus422, ver=7.1y
2009-12-03 08:38:30 MOS design01 137.58.194.147  6567 vii
2009-12-03 08:38:39 MOS design01 137.58.194.147  6567 get 0
2009-12-03 08:39:05 MOS design01 137.58.194.147  6567 set 0 userlabel RNC11
2009-12-03 08:39:12 MOS design01 137.58.194.147  6567 q
2009-12-03 08:40:14 MOS design01 137.58.194.147 11902 StartSession, interactive, ID=20091203-084001_11902, CWD=/home/design01,
WS=SunOS atrcus422, ver=7.1y
2009-12-03 08:40:14 MOS design01 137.58.194.147 11902 lgn -m
```

8 COLI commands

COLI shell is available in some of the processors of the node:
 - MP on DUS Gen1/Gen2 (MP = Main Processor)
 - Baseband processors (EMCA) on DUS Gen1/Gen2
 - XP processor in RU/RRU, XMU, PIMCU
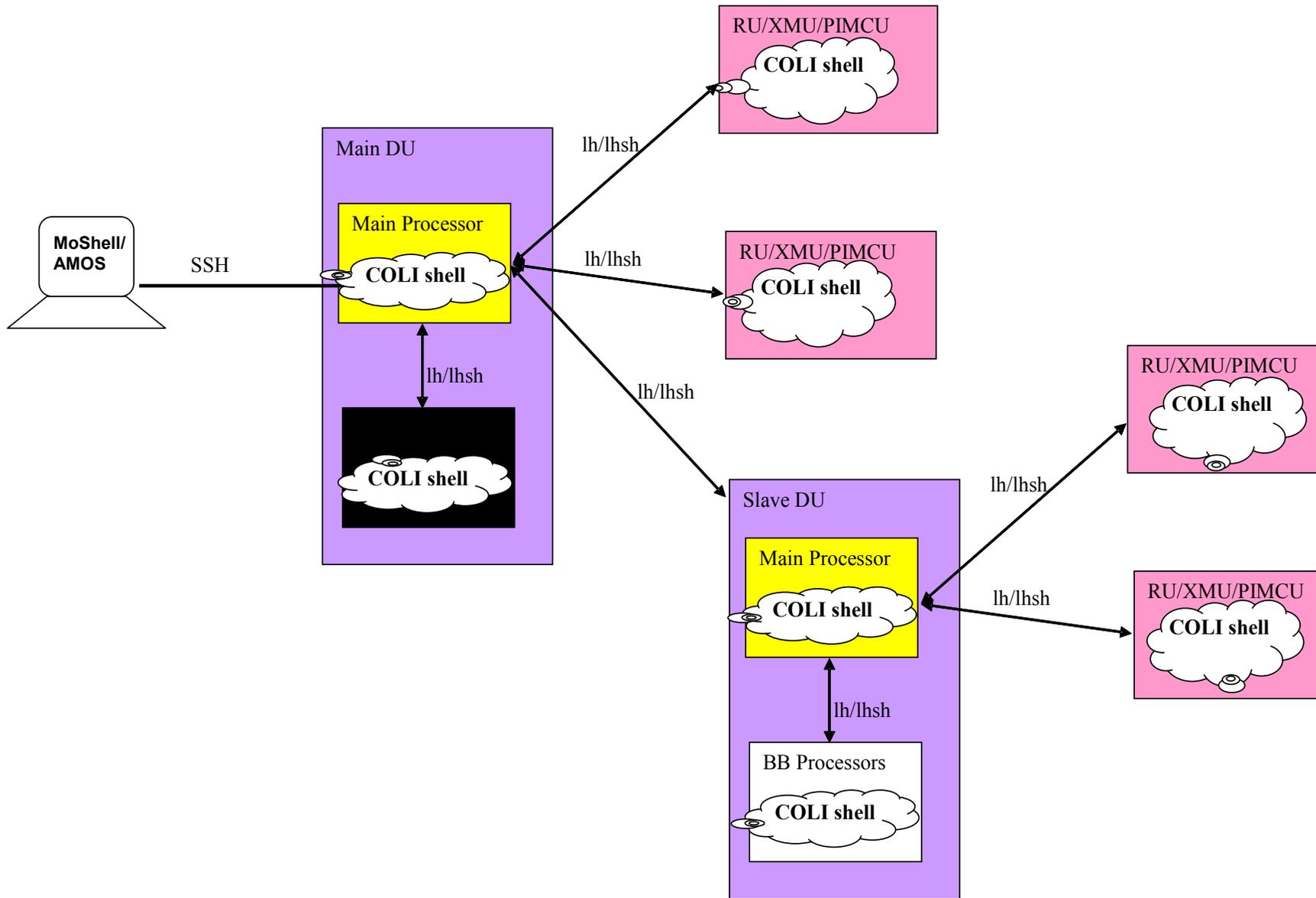
COLI commands are by default executed in the MP of the main DU.
It is possible to run COLI commands on other processors by using the command lh or lhsh.

- List all processor addresses and board groups: bp all

- Show list of commands available on a processor: lhsh \<processor\> ?
- Run a command on a particular processor: lhsh \<processor\> \<command\>
Examples:
lhsh BXP_0 ?
lhsh BXP_0 vii

- Show list of commands available on a group of processors: lh \<boardgroup\> ?
- Run commands on all processors of a board group: lh \<boardgroup\> \<commands\>
Examples:
lh mp ?
lh ru1 ?
lh all te s ; te log read

8.1 Listing all processor addresses and board groups

Gen1
-   **DUS Gen1 has 1 Main processor with address 000x00 (where x=1,2, or 3) and 4 baseband processors with address gcpuXXXX**
-   **The XMUs and RU/RRUs connected to each DUS have address 000x00/BXP_xxx**

Example:

```
ENB_G1> bp all


==========================================================================
Board     BoardType      SwAllocation              BoardGroups
==========================================================================
000100  DUS4101          main                      all allp allpd coremp et etip etipcbm3 mp ommp sctpmp tmmp tu
000100/gcpu00256         **                        all gcpu gcpu1
000100/gcpu00512         **                        all gcpu gcpu2
000100/gcpu00768         **                        all gcpu gcpu3
000100/gcpu01024         **                        all gcpu gcpu4
000100/BXP_0             **RRUS11B12                all ru ru1 xp
000100/BXP_1             **RRUS11B12                all ru ru2 xp
000100/BXP_2             **RRUS11B12                all ru ru3 xp
000100/BXP_3             **XMU0301                  all xmu xmu03 xmu1 xp
000100/BXP_3_12          **RRUS11B4                 all ru ru4 xp
000100/BXP_3_12_1        **RRUSA2B4                 all ru ru5 xp
000100/BXP_3_14          **RRUS11B4                 all ru ru6 xp
000100/BXP_3_14_1        **RRUSA2B4                 all ru ru7 xp
000100/BXP_4_8           **RRUS11B5                 all ru ru8 xp
000100/BXP_4_9           **RRUS11B5                 all ru ru9 xp
000200  DUS4101          DU_Extension              all allp allpd et etip etipcbm3 mp tu
000200/gcpu00256         **                        all gcpu gcpu5
000200/gcpu00512         **                        all gcpu gcpu6
```

```
000200/gcpu00768      **                          all gcpu gcpu7
000200/gcpu01024      **                          all gcpu gcpu8
000200/BXP_0          **RRUS11B2                   all ru ru10 xp
000200/BXP_0_1        **RRUSA2B25                  all ru ru11 xp
000200/BXP_1          **RRUS11B2                   all ru ru12 xp
000200/BXP_1_1        **RRUSA2B25                  all ru ru13 xp
000200/BXP_2          **RRUS11B2                   all ru ru14 xp
===============================================================================
Total: 17 boards, 8 devices
```

Gen2

 - DUS32/DUS33 (= Baseband 5212/6620) has 1 CPM with 8 cores and 2 EMCA processors
 - DUS52/DUS53 (= Baseband 5216/6630) has 1 CPM with 12 cores and 4 EMCA processors

- The CPM in DUS has address 000100
- The EMCA processors in DUS have address bbEqmXXX.
- The XMU and RU/RRUs have address BXP_xx

Example: node with DUS32 running WRAT

```
MSRBSV2> bp all


===============================================================================
Board    BoardType    SwAllocation                 BoardGroups
===============================================================================
000100   DUS3201                                   all coremp du mp
000100/bbEqm000003    **WRAT/0                      all du gcpu gcpu1
000100/bbEqm000004    **WRAT/1                      all du gcpu gcpu2
BXP_0                 **RUS01B1                     all ru ru1 xp
BXP_1                 **RUS01B1                     all ru ru2 xp
BXP_2                 **RUS01B1                     all ru ru3 xp
===============================================================================
Total: 4 boards
```

Example: node with DUS52 running LRAT only

```
MSRBSV2> bp all


===============================================================================
Board    BoardType    SwAllocation                 BoardGroups
===============================================================================
000100   DUS5201                                   all coremp du mp
000100/bbEqm000001    **LRAT/0                      all du gcpu gcpu1
000100/bbEqm000002    **LRAT/1                      all du gcpu gcpu2
000100/bbEqm000003    **LRAT/2                      all du gcpu gcpu3
000100/bbEqm000004    **LRAT/3                      all du gcpu gcpu4
BXP_0                 **XMU0301                     all xmu xmu03 xp
BXP_0_12              **RUS02B1                     all ru ru1 xp
```

```
BXP_0_13                **RUS02B1                          all ru ru2 xp
BXP_0_14                **RUS02B1                          all ru ru3 xp
BXP_0_15                **RUS01B1                          all ru ru4 xp
BXP_0_15_1              **RUS02B1                          all ru ru5 xp
BXP_1_10                **RRUS11B1                         all ru ru6 xp
BXP_1_11                **RRUS11                           all ru ru7 xp
BXP_1_8                 **RRUS12B8                         all ru ru8 xp
BXP_1_9                 **RRUS11                           all ru ru9 xp
BXP_2                   **RUS01B1                          all ru ru10 xp
BXP_3                   **RUS01B1                          all ru ru11 xp
BXP_4                   **RRUS12mB1                        all ru ru12 xp
================================================================================
Total: 14 boards
```

Example: node with DUS52 running WRAT and GRAT

```
MSRBS_GW> bp all


================================================================================
Board   BoardType    SwAllocation                 BoardGroups
================================================================================
000100  DUS5201                                   all coremp du mp
000100/bbEqm000001   **GRAT1/0                     all du gcpu gcpu1
000100/bbEqm000002   **WRAT/0                      all du gcpu gcpu2
000100/bbEqm000003   **GRAT3/0                     all du gcpu gcpu3
000100/bbEqm000004   **WRAT/1                      all du gcpu gcpu4
BXP_0                **RUS01B3                      all ru ru1 xp
BXP_0_1              **RUS01B3                      all ru ru2 xp
BXP_0_1_1            **RUS01B3                      all ru ru3 xp
================================================================================
```

Example: node with DUS52 running WRAT, GRAT, and LRAT

```
MSRBS_GWL> bp all


================================================================================
Board   BoardType    SwAllocation                 BoardGroups
================================================================================
000100  DUS5201                                   all coremp du mp
000100/bbEqm000001   **LRAT/0                      all du gcpu gcpu1
000100/bbEqm000002   **WRAT/0                      all du gcpu gcpu2
000100/bbEqm000003   **LRAT/1                      all du gcpu gcpu3
000100/bbEqm000004   **GRAT4/0                     all du gcpu gcpu4
BXP_0                **RUS01B8                      all ru ru1 xp
BXP_1                **RUS01B1                      all ru ru2 xp
BXP_2                **RUS01B3                      all ru ru3 xp
BXP_3                **RUS01B5                      all ru ru4 xp
BXP_3_1              **RUS02B3                      all ru ru5 xp
BXP_4                **RUS01B5                      all ru ru6 xp
BXP_4_1              **RUS01B8A                     all ru ru7 xp
BXP_5                **RUS01B5                      all ru ru8 xp
BXP_5_1              **RUS02B3                      all ru ru9 xp
================================================================================
Total: 10 boards, 4 devices
```

Example: node with thre DUS52 running LRAT

```
MSRBS_L> bp all

===================================================================================
Board     BoardType     SwAllocation            BoardGroups
===================================================================================
000100  DUS5201                                 all allb coremp du du1 mp
000100/bbEqm000001    **LRAT/0                  all du gcpu gcpu1
000100/bbEqm000002    **LRAT/1                  all du gcpu gcpu2
000100/bbEqm000003    **LRAT/2                  all du gcpu gcpu3
000100/bbEqm000004    **LRAT/3                  all du gcpu gcpu4
BXP_0                 **RRUS12B8                all allb ru ru1 xp
du3/                  **DUS5201                 all allb du du3 mp
du3/BXP_0             **RRUS12B8                all allb ru ru2 xp
du3/bbEqm000001       **LRAT/0                  all du gcpu gcpu5
du3/bbEqm000002       **LRAT/1                  all du gcpu gcpu6
du3/bbEqm000003       **LRAT/2                  all du gcpu gcpu7
du3/bbEqm000004       **LRAT/3                  all du gcpu gcpu8
du4/                  **DUS5201                 all allb du du4 mp
du4/BXP_0             **RRUS12B8                all allb ru ru3 xp
du4/bbEqm000001       **LRAT/0                  all du gcpu gcpu9
du4/bbEqm000002       **LRAT/1                  all du gcpu gcpu10
du4/bbEqm000003       **LRAT/2                  all du gcpu gcpu11
du4/bbEqm000004       **LRAT/3                  all du gcpu gcpu12
===================================================================================
Total: 6 boards, 12 devices
```

8.2 Using COLI help

Type "?" or "help" to see the list of commands, and "? <command>" to see the help for that command

Example: list commands available on MP of main DU

Note: When running COLI commands on the processor 000100 , the lhsh command can be ommitted.

```
ENB0621> ?

$ ?
Command         Description
                default shell command
.               execute commands from file
?               print description of commands
EtHostDump      List internal data for the Et Host SWB
EtHostMo_getPmCounters Get PM counters for a specified host
...
who             list who is logged on
wrfpga          Writes to a register in the FPGA.
zzosvarp        Show the address of the OSE kernel data handle.
$
```

Same as:

```
ENB0621> lhsh 000100 ?

$ lhsh 000100 ?
Command         Description
                default shell command
.               execute commands from file
?               print description of commands
EtHostDump      List internal data for the Et Host SWB
EtHostMo_getPmCounters Get PM counters for a specified host
....
wrfpga          Writes to a register in the FPGA.
zzosvarp        Show the address of the OSE kernel data handle.
$


ENB0621>  ? ue

$ ? ue
NAME
    ue - Coli commands connected to ue monitoring

SYNOPSIS
    ue -h

$


ENB0621> ue -h

$ ue -h

 ==== UE Identity Register COLI Commands ====
ue cap -racueref <ueId> -cellid <cellId>                           - Prints a list of capabilities for a specific Ue.
                                                                     When racUeRef is specifyed as idType, cellId needs to be entered.
ue disable -ue -traceref <traceRef>                               - Deactivate Ue selective RBS Ue trace for specific trace ref
                                                                     <traceref> is specified in hexcode (max 6 bytes)
ue disable -cellid <cellId>                                       - Deactivate all cell selective RBS Ue traces in specific cell
ue disable -allcell                                               - Deactivate all cell selective RBS Ue traces in all cells
...<cut>...
ue set -racueref <UeId> -cellid <cellId> -traceref <traceRef>     - Sets Ue selective RBS Ue trace for specific Ue on specific cell.
                                                                     <traceref> is specified in hexcode (max 6 bytes)
ue routing_info                                                   - Print number of EnbX2ApIds and S1ApUeId associated with a racUeRef and
CellId.
ue routing_info -x2                                               - Print number of EnbX2ApIds associated with a racUeRef and CellId.
ue routing_info -s1                                               - Print number of S1ApUeId associated with a racUeRef and CellId.
ue license_info                                                   - Print number of available and delegated capacity licenses.

$
```

Example: list commands available on a baseband processor:

```
ENB0621> lhsh gcpu00256 ?

$ lhsh gcpu00256 ?
Command         Description
                default shell command
```

```
.               execute commands from file
?               print description of commands
aom             Active Obervability Manager
biosls          List installed bios modules
bl              list processes
....
upe             Add UPP External commands (unsupported)
upi             Add UPP Internal commands (unsupported)
uptime          display system uptime
who             list who is logged on
$
```

Example: list commands available on a auxiliary processor:

```
ENB0621> lhsh BXP_0_1 ?

$ lhsh BXP_0_1 ?
Command         Description
                default shell command
.               execute commands from file
?               print description of commands
ai              Access to the AI Interface
antp            Send ANTP signals
atf             Execute ATF command
...
warpB           Warp driver test interface
who             list who is logged on
xpp             XPP test interface
$

ENB0621> lhsh BXP_0 ? carrierListHandler

$ lhsh BXP_0 ? carrierListHandler
NAME
    carrierListHandler - Carrier List Handler Test Interface

SYNOPSIS
    carrierListHandler print

$
```

Command prefix

In the shell of DUS Gen1, RU, XMU, PIMCU the COLI commands only have names, no prefix:

```
ENBG1> lhsh 000100 ?

$ lhsh 000100 ?
Command         Description
                default shell command
.               execute commands from file
?               print description of commands
....<cut>....
cat             copy files to stdout
```

```
cd              change the working directory
cease           cease ...
cell            Coli commands connected to cell
celltrace       Coli commands connected to cell selective tracing
chkdsk          Request a checkdisk on given volume
chmod           change access mode of files
...<cut>...
vii             VII info
viilist         VII state list
vlandev         Create or remove VLAN device
vols            report volume statistics
wdm             Write DSP Memory - alias for dspMemChange
who             list who is logged on
wrfpga          Writes to a register in the FPGA.
zzosvarp        Show the address of the OSE kernel data handle.
$

RBS33> lhsh BXP_0 ?

$ lhsh BXP_0 ?
Command         Description
                default shell command
.               execute commands from file
?               print description of commands
ai              Access to the AI Interface
antp            Send ANTP signals
atf             Execute ATF command
au3vii          Print LED status for all AU3 units or the selected one (au3==AU-type).
bc              Access to BCI test interface
biosls          List installed bios modules
bl              list blocks
board           Driver Layer Test Interface
carrierListHandler Carrier List Handler Test Interface
cd              change the working directory
cfheflist       Get active fault list
cfhefmap        Get fault mapping
cfhesve         Enable fault supervision
cfpga           FPGA driver test interface
ch              Measurement/Correction Channel test interface
channel         Measurement/Correction Channel test interface
clipinfo        'clipinfo <id>' replaces 'sputnik get dev <id>'
clipping        Down-link Turbo Clipping Test Interface
....
```

In the shell of DUS Gen2, COLI commands have a prefix, however that prefix does not need to be specified when running the command from moshell

```
RBSG2> lhsh 000100 ?

coli>/misc/cmds
/antm/antcdbi
/bin/date
/bin/echo
/bin/ls
/bin/ps
/board/escalation
/board/hwinfo
```

```
/board/hwpid
/board/restart
/board/simulatebutton
/board/vii
/cli/logging
/cli/timeout
/cli/welcometext
/cm/internalmomread
/cm/internalmomwrite

...<cut>...
```

8.3   Running COLI commands with lhsh

The command lhsh is used in order to run COLI commands on a specific processor.
When running COLI commands on the processor 000100 , the lhsh command can be ommitted.

```
RBS33> lhsh 000100 ?

coli>/misc/cmds
/antm/antcdbi
/board/escalation
/board/hwinfo
/board/hwpid
/board/restart
/board/simulatebutton
/board/vii
/cli/logging
...<cut>..
/wrat/upt/sirmeas
/wrat/upt/sirtarget
/wrat/upt/tpcmon
coli>

RBS33>
```

Same as:

```
RBS33> ?

coli>/misc/cmds
/antm/antcdbi
/board/escalation
/board/hwinfo
/board/hwpid
/board/restart
/board/simulatebutton
/board/vii
/cli/logging
...<cut>..
/wrat/upt/sirmeas
/wrat/upt/sirtarget
```

```
/wrat/upt/tpcmon
coli>

RBS33>

MSRBSV2> lhsh 000100 vii

coli>/board/vii
----- VII SERVER INFO -----
registered clients:
#Port<0.18833>
appmServer
comsaLedControl   NODE_FAULT
LED                 State
RED (Fault)         off
GREEN (Operational) steady_on
YELLOW (Status)     steady_on
BLUE (Maintenance)  off
coli>

MSRBSV2> lhsh 000100 ? te

coli>/misc/help /diagm/te
te
Call with no arguments for description.
Call with no arguments for description and usage information.
coli>

MSRBSV2> lhsh 000100 te

coli>/diagm/te
Common shell command to interact with LTTng and TRI
Usage: te <cmd> <param> ...
Commands <cmd>:
    enable <group/event> ... [<process/provider>]
        Enable trace groups/LTTng events.
    disable <group/event> .. [<process/provider>]
        Disable trace groups/LTTng events.
    status [-restart|-preset] [<process/provider>] [-l <program>]
        Display tracing status.
        '-l' lists registered LTTng events for the specifed program.
        '-restart' prints the saved Preset list.
        '-preset'  prints the Preset list.
    default [-preset|-restart][<process/provider>|'*']
...<cut>....
        te config myevent01 trace1 com_*
        te config myevent01 -trace1 *
coli>

MSRBSV2> lhsh 000100 te log read

coli>/diagm/te log read
...<cut>...
[2015-09-23 11:34:06.382613630] (+2543.541225897) du1 com_ericsson_tn_dpsd:INFO: { cpu_id = 1 }, { src = "dpsd_resource_logger.c:45", obj =
"GENERAL", msg = "dpsd_resource_logger_timer(): current heap usage: 363608 bytes" }
[2015-09-23 18:34:06.803595711] (+25200.420982081) du1 com_ericsson_tn_dpsd:INFO: { cpu_id = 1 }, { src = "dpsd_resource_logger.c:45", obj =
"GENERAL", msg = "dpsd_resource_logger_timer(): current heap usage: 363768 bytes" }
```

```
[2015-09-24 18:34:08.222590020] (+86401.418994309) du1 com_ericsson_tn_dpsd:INFO: { cpu_id = 0 }, { src = "dpsd_resource_logger.c:45", obj =
"GENERAL", msg = "dpsd_resource_logger_timer(): current heap usage: 363864 bytes" }
[2015-09-25 14:07:12.482147428] (+70384.259557408) du1 com_ericsson_plf_trace_util:testLog: { cpu_id = 0 }, { logger_entry = "hello" }
[2015-09-30 08:34:16.899463573] (+412024.417316145) du1 com_ericsson_sync_central:ERROR: { cpu_id = 5 }, { file = "Timer.cc", line = 118,
Message = "Timeout occurred too early." }
coli>

MSRBSV2>
```

Note: on BB52 , the "te log read" is very large (> 6MB instead of 72 kB on DU). It is possible to print only the last xx seconds of the te log , eg:

```
MSRBSV2> lhsh 000100 te log read 30

coli>/diagm/te log read
 [2015-09-30 08:34:16.899463573] (+412024.417316145) du1 com_ericsson_sync_central:ERROR: { cpu_id = 5 }, { file = "Timer.cc", line = 118,
Message = "Timeout occurred too early." }
coli>


MSRBSV2> lhsh BXP_0 ?

coli>/fruacc/lhsh BXP_0 ?
bciinfo
bciinfo
blog
boardpower
boardtemp
bootver
bpmver
ccrreg
cls
...<cut>...
retimer_read
ric
sfp
sleep
syncport
te
top
trxreg
vii
coli>

MSRBSV2> lhsh BXP_0 par get

coli>/fruacc/lhsh BXP_0 par get
....
productdate='20141105'
productname='XMU 03 01'
productnumber='KDU 137 949/1'
productrevision='R1D'
runlevel='3'
serialnumber='D16K187678'
sys_current_lmc='1'
sys_debug='0'
sys_fwdb='/etc/db/fwdb/fwdb.dtb'
```

```
sys_hwdb_dev='/dev/mtd4'
sys_hwlog_dev='/dev/mtd3'
sys_mode='auapplic'
sys_reboot_status='280000'
sys_reset_reason='128'
sys_sw_pid='CXP9025194%1_R4JA'
END
coli>

MSRBSV2> lhsh BXP_4 ?

coli>/fruacc/lhsh BXP_4 ?

.
?
AlmSv
CmdTrActTest
CmdTrReleaseTest
CmdTrsConfigTest
DcSv
DcSv0
DcSv1
FPGATemp
...<cut>...
xrhwlog
xspray
coli>


MSRBSV2> lhsh BXP_4 par get

coli>/fruacc/lhsh BXP_4 par get
'SYS_ADDRESS_BASE'   = 'RADIO'
'SYS_HW_PID'         = 'KRC 161 327/4'
'SYS_HW_REV'         = 'R1C'
'SYS_HW_NAME'        = 'RRUS 12mB1'
'SYS_HW_DATE'        = '20150322'
'SYS_HW_SERIAL'      = 'D16N894536'
'CONTAINER_HW_PID'   = ''
'CONTAINER_HW_REV'   = ''
....
END
coli>
```

Running several COLI commands on one line:

```
MSRBSV2> lhsh 000100 vii ; lhsh 000100 llog

coli>/board/vii
----- VII SERVER INFO -----
registered clients:
#Port<0.14726>
#Port<0.11911>
comsaLedControl   NODE_FAULT
appmServer
LED               State
```

```
RED (Fault)         off
GREEN (Operational) steady_on
YELLOW (Status)     steady_on
BLUE (Maintenance)  off
coli>/diagm/llog
NO  REASON/EXTRA                    TIME/PMD              PROGRAM              PID    RANK
---------------------------------------------------------------------------------------------
1   Ordered restart                 2015-09-28 10:28:17   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
2   Ordered restart                 2015-09-28 12:50:52   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
3   Ordered restart                 2015-09-29 05:06:03   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
4   Ordered restart                 2015-09-29 05:26:28   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
5   Ordered restart                 2015-09-29 08:39:35   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
6   Ordered restart                 2015-09-29 10:43:35   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
7   Ordered restart                 2015-09-29 12:32:40   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
8   Ordered restart                 2015-09-30 08:02:35   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
9   Ordered restart                 2015-09-30 08:23:01   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
10  Ordered restart                 2015-09-30 08:46:29   -                    -      Cold
    WARNING: reboot executed, n     -
---------------------------------------------------------------------------------------------
coli>
```

Piping COLI commands to a unix command

```
MSRBSV2> lhsh 000100 te log read | grep ERROR

 [2015-09-16 10:34:11.694080436] (+3615.196009689) du1 com_ericsson_sync_central:ERROR: { cpu_id = 5 }, { file = "Timer.cc", line = 118, Message
= "Timeout occurred too early." }
[2015-09-30 08:34:16.899463553] (+412024.417316106) du1 com_ericsson_sync_central:ERROR: { cpu_id = 5 }, { file = "Timer.cc", line = 118,
Message = "Timeout occurred too early." }

MSRBSV2>
```

8.4 Running COLI commands with lh

Listing boards and board groups

```
MSRBSV2> bp

===================================================
Board-Group        Nr of Boards
===================================================
all                20
coremp             1
du                 5
gcpu               4
gcpu1              1
gcpu2              1
gcpu3              1
gcpu4              1
mp                 1
ru                 12
ru1                1
ru10               1
ru11               1
ru12               1
ru2                1
ru3                1
ru4                1
ru5                1
ru6                1
ru7                1
ru8                1
ru9                1
rus02              6
rus32              6
xmu                3
xmu03              3
xp                 15
===================================================
Total: 27 groups

MSRBSV2> bp all

=========================================================================================
Board     BoardType      SwAllocation                   BoardGroups
=========================================================================================
000100    DUS5201                                       all coremp du mp
000100/bbEqm000001       **LRAT/0                        all du gcpu gcpu1
000100/bbEqm000002       **LRAT/1                        all du gcpu gcpu2
000100/bbEqm000003       **LRAT/2                        all du gcpu gcpu3
000100/bbEqm000004       **LRAT/3                        all du gcpu gcpu4
BXP_0                    **XMU0301                       all xmu xmu03 xp
BXP_0_12                 **RRUS32B3                      all ru ru1 rus32 xp
BXP_0_14                 **RUS02B28B                     all ru ru2 rus02 xp
BXP_0_15                 **RUS02B28B                     all ru ru3 rus02 xp
BXP_1                    **XMU0301                       all xmu xmu03 xp
BXP_1_12                 **RRUS32B3                      all ru ru4 rus32 xp
BXP_1_14                 **RUS02B28B                     all ru ru5 rus02 xp
BXP_1_15                 **RUS02B28B                     all ru ru6 rus02 xp
BXP_2                    **XMU0301                       all xmu xmu03 xp
BXP_2_12                 **RRUS32B3                      all ru ru7 rus32 xp
```

```
BXP_2_14              **RUS02B28B                   all ru ru8 rus02 xp
BXP_2_15              **RUS02B28B                   all ru ru9 rus02 xp
BXP_3                **RRUS32B7A                   all ru ru10 rus32 xp
BXP_4                **RRUS32B7A                   all ru ru11 rus32 xp
BXP_5                **RRUS32B7A                   all ru ru12 rus32 xp
=================================================================================
Total: 16 boards
```

Running one COLI command on all boards of a group

```
MSRBSV2> lh all vii


=====================================================================================
coli>/fruacc/lhsh 000100 /board/vii
0001: ----- VII SERVER INFO -----
0001: registered clients:
0001: #Port<0.15272>
0001: #Port<0.11528>
0001: comsaLedControl  NODE_FAULT
0001: LED                 State
0001: RED (Fault)         off
0001: GREEN (Operational) steady_on
0001: YELLOW (Status)     steady_on
0001: BLUE (Maintenance)  off
=====================================================================================
coli>/fruacc/lhsh BXP_0 vii
BXP_0: Red:   Default                       (off)
BXP_0: Green: Default                       (on)
BXP_0: Blue:  Default                       (off)
BXP_0: END
=====================================================================================
coli>/fruacc/lhsh BXP_1_10 vii
BXP_1_10: Indicated states:
BXP_1_10:    Red:
BXP_1_10:          Default                           (off)
BXP_1_10:    Green:
BXP_1_10:          Default                           (steady light)
BXP_1_10:    Blue/Yellow:
BXP_1_10:          Default                           (off)
BXP_1_10: END
=====================================================================================
coli>/fruacc/lhsh BXP_2 vii
BXP_2: Indicated states:
BXP_2:    Red:
BXP_2:          Default                       (off)
BXP_2:    Green:
BXP_2:          Default                       (steady light)
BXP_2:    Blue/Yellow:
BXP_2:          Default                       (off)
BXP_2: END
=====================================================================================
coli>/fruacc/lhsh BXP_3 vii
BXP_3: Indicated states:
BXP_3:    Red:
BXP_3:          Default                       (off)
BXP_3:    Green:
```

```
BXP_3:          Default                          (steady light)
BXP_3:    Blue/Yellow:
BXP_3:          Default                          (off)
BXP_3: END
=============================================================================
coli>/fruacc/lhsh BXP_4 vii
BXP_4: Indicated states:
BXP_4:    Red:
BXP_4:          Default                          (off)
BXP_4:    Green:
BXP_4:          Default                          (steady light)
BXP_4:    Blue/Yellow:
BXP_4:          Default                          (off)
BXP_4: END
coli>

RBS33> lh gcpu te s

160406-19:32:45 10.72.253.52 16.0e MSRBS_NODE_MODEL_280.28418.1111_ec10_TESTMOM stopfile=/tmp/16715
=============================================================================
coli>/fruacc/lhsh 000100/bbEqm000003 /diagm/bbte log s bbEqm000003
0001bb3: ok
0001bb3: Agent is connected
0001bb3: Trace object name                 Enabled groups
0001bb3: BbiMcsTraceFilter                 check error info interface
0001bb3: WBBL1_L1SpreaderDrvEul            check error info interface
0001bb3: WBBL1_L1SpreaderDrvHs             check error info interface
0001bb3: WBBL1_TurboDecDrv                 check error info interface
0001bb3: WBBL1_ViterbiDecDrv               check error info interface
...<cut>...
0001bb4: WBBL1_SapRaAC                     check error info interface
0001bb4: BbiTraceInternal                  check error info interface
0001bb4: LPP_TRACE_BIN                     check error info interface
coli>

RBS45> bp all

===============================================================================
Board     BoardType     SwAllocation              BoardGroups
===============================================================================
000100    DUS5201                                 all allb coremp du du1 mp
000100/bbEqm000001     **LRAT/0                    all du gcpu gcpu1
000100/bbEqm000002     **LRAT/1                    all du gcpu gcpu2
000100/bbEqm000003     **LRAT/2                    all du gcpu gcpu3
000100/bbEqm000004     **LRAT/3                    all du gcpu gcpu4
BXP_0                  **RRUS12B8                  all allb ru ru1 xp
du3/                   **DUS5201                   all allb du du3 mp
du3/BXP_0              **RRUS12B8                  all allb ru ru2 xp
du3/bbEqm000001        **LRAT/0                    all du gcpu gcpu5
du3/bbEqm000002        **LRAT/1                    all du gcpu gcpu6
du3/bbEqm000003        **LRAT/2                    all du gcpu gcpu7
du3/bbEqm000004        **LRAT/3                    all du gcpu gcpu8
du4/                   **DUS5201                   all allb du du4 mp
du4/BXP_0              **RRUS12B8                  all allb ru ru3 xp
du4/bbEqm000001        **LRAT/0                    all du gcpu gcpu9
du4/bbEqm000002        **LRAT/1                    all du gcpu gcpu10
du4/bbEqm000003        **LRAT/2                    all du gcpu gcpu11
du4/bbEqm000004        **LRAT/3                    all du gcpu gcpu12
```

```
=====================================================================================
Total: 6 boards, 12 devices

RBS45> lh mp uptime

180130-12:56:27 OFFLINE_RBSLN15MS1_dcg_k 18.0a MSRBS_NODE_MODEL_17.Q4_346.27775.46_0763_TESTMOM stopfile=/tmp/10196
=====================================================================================
coli>/fruacc/lhsh 000100 /os/uptime
0001:  13:47:25 up 20:30,  1 user,  load average: 2.26, 2.41, 2.05
=====================================================================================
coli>/fruacc/lhsh du3/ /os/uptime
du3/:  13:47:26 up 20:31,  0 users,  load average: 1.60, 1.60, 1.59
=====================================================================================
coli>/fruacc/lhsh du4/ /os/uptime
du4/:  13:47:27 up 20:31,  0 users,  load average: 3.03, 2.66, 2.31
coli>
```

Running several COLI commands on all boards of a group

```
MSRBSV2> lh ru par get SYS_HW* ; llog -n 3

=====================================================================================
coli>/fruacc/lhsh BXP_0 par get SYS_HW*
BXP_0: 'SYS_HW_PID'        = 'KRC 118 75/1'
BXP_0: 'SYS_HW_REV'        = 'R1A'
BXP_0: 'SYS_HW_NAME'       = 'RUS 01 B1'
BXP_0: 'SYS_HW_DATE'       = '20100819'
BXP_0: 'SYS_HW_SERIAL'     = 'C823690088'
BXP_0: 'SYS_HW_MAC_ADDRESS' = '00:13:5E:5C:E8:C0'
BXP_0: END
=====================================================================================
coli>/fruacc/lhsh BXP_0 llog -n 3
BXP_0: ----------------------------------------------------------------------
BXP_0: 57. [2015-09-30 08:04:07]              (-) Restart ordered due to Link timeout
BXP_0: ----------------------------------------------------------------------
BXP_0: 58. [2015-09-30 08:24:32]              (-) Restart ordered due to Link timeout
BXP_0: ----------------------------------------------------------------------
BXP_0: 59. [2015-09-30 08:48:00]              (-) Restart ordered due to Link timeout
BXP_0: END
=====================================================================================
coli>/fruacc/lhsh BXP_1 par get SYS_HW*
BXP_1: 'SYS_HW_PID'        = 'KRC 118 75/1'
BXP_1: 'SYS_HW_REV'        = 'R1A'
BXP_1: 'SYS_HW_NAME'       = 'RUS 01 B1'
BXP_1: 'SYS_HW_DATE'       = '20100819'
BXP_1: 'SYS_HW_SERIAL'     = 'C823690104'
BXP_1: 'SYS_HW_MAC_ADDRESS' = '00:13:5E:5C:E8:D0'
BXP_1: END
=====================================================================================
coli>/fruacc/lhsh BXP_1 llog -n 3
BXP_1: ----------------------------------------------------------------------
BXP_1: 57. [2015-09-30 08:04:07]              (-) Restart ordered due to Link timeout
BXP_1: ----------------------------------------------------------------------
BXP_1: 58. [2015-09-30 08:24:32]              (-) Restart ordered due to Link timeout
BXP_1: ----------------------------------------------------------------------
```

```
BXP_1: 59. [2015-09-30 08:48:00]              (-) Restart ordered due to Link timeout
BXP_1: END
==============================================================================
coli>/fruacc/lhsh BXP_2 par get SYS_HW*
BXP_2: 'SYS_HW_PID'         = 'KRC 118 75/1'
BXP_2: 'SYS_HW_REV'         = 'R2C'
BXP_2: 'SYS_HW_NAME'        = 'RUS 01 B1'
BXP_2: 'SYS_HW_DATE'        = '20111020'
BXP_2: 'SYS_HW_SERIAL'      = 'CC47381777'
BXP_2: 'SYS_HW_MAC_ADDRESS' = '74:D0:DC:BD:0F:9F'
BXP_2: END
==============================================================================
coli>/fruacc/lhsh BXP_2 llog -n 3
BXP_2: ------------------------------------------------------------------
BXP_2: 57. [2015-09-30 08:04:07]              (-) Restart ordered due to Link timeout
BXP_2: ------------------------------------------------------------------
BXP_2: 58. [2015-09-30 08:24:32]              (-) Restart ordered due to Link timeout
BXP_2: ------------------------------------------------------------------
BXP_2: 59. [2015-09-30 08:47:59]              (-) Restart ordered due to Link timeout
BXP_2: END
coli>

MSRBSV2> lh ru elog read;hwlog read


==============================================================================
coli>/fruacc/lhsh BXP_0_12 elog read
BXP_0_12: [161107 192315]   24: RL Statistic Counters: Branch B,[0]:0,[1]:0,[2]:0,[3]:0,[4]:0,[5]:0,[6]:0,[7]:0,[8]:0,[9]:0,[10]:0,[11]:0,
[12]:0,[13]:0,[14]:0,[15]:0,[16]:0,[17]:0,[18]:0,[19]:0,[20]:0,[21]:17280,Period is 24.00 h (23C)
BXP_0_12: [161108 150600]    9: Power Class Update performed; Antenna Branch Id:1; Power Class:4000
BXP_0_12: [161108 150600]   28: Carrier Config Change: Id:816 D
BXP_0_12: [161108 150600]   28: Carrier Config Change: Id:817 D
BXP_0_12: [161108 150600]   28: Carrier Config Change: Id:818 D
BXP_0_12: [161108 150600]   28: Carrier Config Change: Id:819 D
BXP_0_12: [161108 150600]   28: Carrier Config Change: Id:820 D
BXP_0_12: [161108 150600]   28: Carrier Config Change: Id:821 D
BXP_0_12: [161108 150600]   28: Carrier Config Change: Id:822 D
...<cut>...
BXP_0_12: [170329 010047]   24: RL Statistic Counters: Branch A,[0]:0,[1]:0,[2]:0,[3]:0,[4]:0,[5]:0,[6]:0,[7]:0,[8]:0,[9]:0,[10]:0,[11]:0,
[12]:0,[13]:0,[14]:0,[15]:0,[16]:0,[17]:0,[18]:0,[19]:0,[20]:0,[21]:17280,Period is 24.00 h (37C)
BXP_0_12: [170329 010047]   24: RL Statistic Counters: Branch B,[0]:0,[1]:0,[2]:0,[3]:0,[4]:0,[5]:0,[6]:0,[7]:0,[8]:0,[9]:0,[10]:0,[11]:0,
[12]:0,[13]:0,[14]:0,[15]:0,[16]:0,[17]:0,[18]:0,[19]:0,[20]:0,[21]:17280,Period is 24.00 h (37C)
BXP_0_12: [170329 010047]   24: RL Statistic Counters: Branch C,[0]:0,[1]:0,[2]:0,[3]:0,[4]:0,[5]:0,[6]:0,[7]:0,[8]:0,[9]:0,[10]:0,[11]:0,
[12]:0,[13]:0,[14]:0,[15]:0,[16]:0,[17]:0,[18]:0,[19]:0,[20]:0,[21]:17280,Period is 24.00 h (35C)
BXP_0_12: [170329 010047]   24: RL Statistic Counters: Branch D,[0]:0,[1]:0,[2]:0,[3]:0,[4]:0,[5]:0,[6]:0,[7]:0,[8]:0,[9]:0,[10]:0,[11]:0,
[12]:0,[13]:0,[14]:0,[15]:0,[16]:0,[17]:0,[18]:0,[19]:0,[20]:0,[21]:17280,Period is 24.00 h (35C)
BXP_0_12: [170329 024718]   11: Vswr: Branch A: >14dB have been seen 36000 times (382C)
BXP_0_12: [170329 024742]   11: Vswr: Branch B: >14dB have been seen 36000 times (382C)
BXP_0_12: [170329 024742]   11: Vswr: Branch C: >14dB have been seen 36000 times (370C)
BXP_0_12: [170329 024748]   11: Vswr: Branch D: >14dB have been seen 36000 times (369C)
BXP_0_12: [170329 030357]    8: COLI command: trx status
BXP_0_12: [170329 030358]    8: COLI command: trx pid
BXP_0_12: [170329 030358]    8: COLI command: fm getfaults
BXP_0_12: End of log
==============================================================================
coli>/fruacc/lhsh BXP_0_12 hwlog read
BXP_0_12: System area
BXP_0_12:    1 700101 000242 486;CXP9017316%5_R60JH;48V input failure;;;;48V_OK=Not Ok
BXP_0_12:    2 700101 000242 000;RU conf.;;;RXA:1,RXB:1,RXC:1,RXD:1;;
```

```
BXP_0_12:    3 700101 000015 000;Geminga FPGA ID:01414302
BXP_0_12:    4 700101 000015 000;SFP01 FINISAR CORP.    ;prod FTLX1370W3BTL-E7;rev A
BXP_0_12:    5 700101 000015 000;SFP02 FINISAR CORP.    ;prod FTLX1370W3BTL-E7;rev A
BXP_0_12:    6 700101 000011 000;Geminga FPGA ID:01414406
BXP_0_12:    7 700101 000013 000;CCB0_STATUS:0x00208001
BXP_0_12:    8 700101 000013 000;CCB0_STATUS:0x00208005
BXP_0_12:    9 160204 031658 000;RBS6202L;Site VIC_AADP15_ARDEER_WEST_530333;Subrack N/A;Slot N/A
BXP_0_12:   10 700101 000014 000;CCB0_STATUS:0x00008001
BXP_0_12:   11 700101 000015 000;CCB0_STATUS:0x00008005
BXP_0_12: Repair area
coli>
```

Piping output to a unix command

```
MSRBSV2> lh all te log read | grep ERROR

0001: [2015-09-30 09:55:24.454232234] (+0.000298562) du1 com_ericsson_triobjif:ERROR: { cpu_id = 3 }, { processAndObjIf =
"WratCtrlMainPT(dcGroupControllerC)", fileAndLine = "../src/target/RCS/RTActor/badMessage.cc:203", msg = "dcGroupControllerC(0)@Ready received
unexpected message: dcGroupOseP%wrgciL1CcbIqConnectRej data: osesig 17109000" }
0001: [2015-09-30 09:55:25.142193203] (+0.000355516) du1 com_ericsson_triobjif:ERROR: { cpu_id = 3 }, { processAndObjIf =
"WratCtrlMainPT(dcGroupControllerC)", fileAndLine = "../src/target/RCS/RTActor/badMessage.cc:203", msg = "dcGroupControllerC(0)@Ready received
unexpected message: dcGroupOseP%wrgciL1CcbIqConnectRej data: osesig 17109000" }
...<cut>...
0001: [2015-09-30 10:02:26.230209107] (+0.000267234) du1 com_ericsson_triobjif:ERROR: { cpu_id = 2 }, { processAndObjIf =
"WratCtrlMainPT(dcGroupControllerC)", fileAndLine = "../src/target/RCS/RTActor/badMessage.cc:203", msg = "dcGroupControllerC(0)@Ready received
unexpected message: dcGroupOseP%wrgciL1CcbIqConnectRej data: osesig 17109000" }

MSRBSV2>
```

8.5 Opening an interactive COLI session to the node

By typing "coli" at the moshell prompt, an interactive ssh session is initiated to the node on the port for COLI
After typing "exit" the session returns to the moshell prompt.

```
RBSG2> coli


This is an interface for troubleshooting. Using the commands available
through this interface can impact system performance. No actions
should be performed by personnel without the necessary authorization
and education.


This system is restricted solely to authorized users for legitimate
business purposes only. The actual or attempted unauthorized access,
use, or modification of this system is strictly prohibited.


Unauthorized users are subject to appropriate disciplinary proceedings
and/or criminal and civil penalties under state, federal, or other
applicable domestic and foreign laws.


The use of this system may be monitored and recorded for
```

```
coli [/]-> misc/list_cmds
/bbi/observability/trace/bbte
/board/hwpid
/board/simulate_button_event
/board/vii
/license/activate_production_unlock
/license/deactivate_production_unlock
/misc/..
/misc/cd
/misc/exit
/misc/grep
/misc/help
/misc/info
/misc/list_cmds
/misc/ls
/misc/pwd
/misc/set_auth_level
/misc/set_prompt
/misc/set_report_rc
/misc/set_timeout
/os/cpuinfo
/os/date
/os/df
/os/meminfo
/os/uptime
/os/who
/sys/allocated_disc_space
/sys/change_cli_welcome_text
/sys/cold_restart
/sys/free_up_disc_space
/sys/print_cli_welcome_text
/sys/warm_restart
/sysm/ntp_super_state
/sysm/ntpd_state
/sysm/ntpd_traps
coli [/]-> misc/help


Coli cmd shell usage


Use <TAB> to expand and see available commands
Use "cd", "pwd", "..", and "ls" to navigate in the cmd-tree.
History is available using <CTRL>-p and <CTRL>-n.
"exit" - will exit
All internal commands are organized under "/misc"
```

```
coli [/]-> exit
Connection to 10.68.110.43 closed.

RBSG2>
```

8.6 Other shells

8.6.1 COMCLI shell

Running one COMCLI command at a time:

```
MSRBSV2> help

>help
This is the Exec mode of the CLI. The CLI provides two modes: the Exec mode and the Config mode.
The Exec mode is the default mode when starting a CLI session. The Exec mode is used to view management information and execute O&M commands.
The Config mode is mainly used to change the configuration. Although possible in Config mode, it is recommended to view management information
and execute O&M commands while in Exec mode in order to minimize the risks of misconfiguring the system. The diagram below illustrates how to
enter and exit the CLI modes.

...<cut>...
GENERAL COMMANDS

exit                  quit CLI session
help                  display this CLI introduction help
history               display the command history of the current CLI session
length                display and set number of displayed CLI helpText rows until display is suspended
prompt                change the CLI prompt
scriptmode            turn off and on the CLI interactive features
show                  display configuration and state information
show-config           display the sequence of commands needed to re-create the same configuration
show-counters         display PM counters
show-mib              display brief configuration and state information
show-table            display configuration and state information in a tabular way
version               display Ericsson CLI version
width                 display and set number of displayed CLI helpText columns
filter                Print lines matching a pattern

...<cut>...

MSRBSV2> \t

>
configure
dn
exit
help
history
length
prompt
scriptmode
show
show-config
```

```
show-counters
show-dn
show-mib
show-table
top
up
version
width

MSRBSV2>

MSRBSV2> show

>show
ManagedElement=SFINX01

MSRBSV2> show verbose ManagedElement=SFINX01

>show verbose ManagedElement=SFINX01
ManagedElement=SFINX01
    dateTimeOffset="+00:00" <read-only>
    dnPrefix="SubNetwork=ONRM_ROOT_MO_R,SubNetwork=SFINX,MeContext=SFINX01"
    localDateTime="2015-09-30T09:38:56" <read-only>
    managedElementId="SFINX01"
    managedElementType="RadioNode" <read-only>
    networkManagedElementId="SFINX01"
    release="16A" <read-only>
    siteLocation=[] <empty>
    timeZone="UTC" <read-only>
    userLabel=[] <empty>
    productIdentity=[] <empty> <deprecated>
    Equipment=1
    EquipmentSupportFunction=1
    NodeSupport=1
    SystemFunctions=1
    Transport=1

MSRBSV2> show-mib

>show-mib
ManagedElement=SFINX01
    Equipment=1
        AntennaUnitGroup=1
            AntennaUnit=1
                AntennaSubunit=1
                    AuPort=1
                    AuPort=2
            RfBranch=1
            RfBranch=2
        EcBus=1
        FieldReplaceableUnit=1
            RiPort=A
            RiPort=B
            RiPort=C
            SyncPort=1
            TnPort=TN_A
...<cut>...
        Synchronization=1
```

```
        FrequencySyncIO=1
        RadioEquipmentClock=1
            RadioEquipmentClockReference=1
        VlanPort=TN_A_242

MSRBSV2>
```

Running several COMCLI commands on the same line:

```
MSRBSV2> configure ; show ManagedElement=SFINX01,userLabel ; ManagedElement=SFINX01,userLabel=test ; show ManagedElement=SFINX01,userLabel ;
commit

>configure
>show ManagedElement=SFINX01,userLabel
userLabel="test"
>ManagedElement=SFINX01,userLabel=test
>show ManagedElement=SFINX01,userLabel
userLabel="test"
>commit
```

Piping output of a COMCLI command:

```
MSRBSV2> show-mib -v | grep -i field

        ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=1
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=1,RiPort=A
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=1,RiPort=B
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=1,RiPort=C
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=1,SyncPort=1
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=1,TnPort=TN_A
        ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=2
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=2,RfPort=A
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=2,RfPort=B
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=2,RiPort=DATA_1
            ManagedElement=SFINX01,Equipment=1,FieldReplaceableUnit=2,RiPort=DATA_2
            ManagedElement=SFINX01,SystemFunctions=1,SysM=1,Schema=ReqFieldReplaceableUnit
```

8.6.2 Linux shell

For the Baseband 5212/5216, there are two types of boards: secure and unsecure
- **unsecure: product number ends in /3 (5212) or /4 (5216) : ssh to Linux shell from LMT port is enabled**
- **secure: product number ends in /31 (5212) or /41 (5216): ssh to Linux shell is disabled**

```
MSRBSV2> ls -l /

root@du1:~# ls -l /
total 12
drwxr-xr-x    2 root   root      5607 Sep 24 20:31 bin
drwxr-xr-x    2 root   root         3 Sep 24 20:25 boot
-rw-rw-r--    1 sirpa  tracing 2703 Sep 25 01:32 cxp9025851_3.xml
drwxr-xr-x   11 root   root      7920 Sep 30 08:47 dev
drwxr-xr-x   39 root   root      1426 Sep 24 20:31 etc
drwxr-sr-x    4 root   root        55 Sep 24 20:31 home
```

```
drwxr-xr-x   8 root   root     7203 Sep 24 20:31 lib
-rwxr-xr-x   1 root   root      509 Apr  6 16:32 linuxrc.sh
drwxr-xr-x   2 root   root        3 Sep 24 20:25 media
drwxr-xr-x   2 root   root        3 Sep 24 20:25 mnt
drwxr-xr-x   8 root   root      115 Sep 24 20:31 opt
drwxr-xr-x   3 root   root       30 Sep 24 20:31 priv
dr-xr-xr-x 663 root   root        0 Jan  1  1970 proc
drwxrwxrwx  23 sirpa  users    4096 Sep 28 07:18 rcs
drwxr-xr-x   2 root   root        3 Sep 24 20:25 root
drwxrwxrwt  12 root   root      560 Sep 30 08:48 run
drwxr-xr-x   2 root   root     2678 Sep 24 20:31 sbin
drwxr-xr-x  47 root   root     4096 Sep 28 07:10 software
dr-xr-xr-x  12 root   root        0 Sep 30 08:47 sys
drwxrwxrwt   7 root   root      600 Sep 30 08:48 tmp
drwxr-xr-x  11 root   root      153 Sep 24 20:25 usr
drwxr-xr-x  11 root   root      175 Sep 24 20:31 var
root@du1:~# exit
logout

MSRBSV2> find / -type f -name '*.xml' | grep model

/software/RCSMW-ARM_CXP9025546_3_R4K02/AIC3_CXC1737204_3/aic-R4H09/priv/model/RmeAI.xml
/software/RCSMW-ARM_CXP9025546_3_R4K02/CERT3_CXC1736590_3/cert-R4J01/priv/model/RcsCertM.xml
/software/RCSMW-ARM_CXP9025546_3_R4K02/COM3_CXC1733991_3/com-R4H01/priv/tgt_arm-wr6/opt/com/etc/model/ComFm.xml
/software/RCSMW-ARM_CXP9025546_3_R4K02/COM3_CXC1733991_3/com-R4H01/priv/tgt_arm-wr6/opt/com/etc/model/ComLocalAuthorization.xml
...<cut>...
/software/RCSMW-ARM_CXP9025546_3_R4K02/SWM_CXC1733929/swm-R4J02/priv/model/RcsSwM.xml
/software/RCSMW-ARM_CXP9025546_3_R4K02/TIM3_CXC1738528_3/tim-R4G01/priv/model/RmeTimeSettings.xml

MSRBSV2> ping -c 5 10.68.110.40

root@du1:~# ping -c 5 10.68.110.40
PING 10.68.110.40 (10.68.110.40) 56(84) bytes of data.
64 bytes from 10.68.110.40: icmp_seq=1 ttl=64 time=0.322 ms
64 bytes from 10.68.110.40: icmp_seq=2 ttl=64 time=0.387 ms
64 bytes from 10.68.110.40: icmp_seq=3 ttl=64 time=0.305 ms
64 bytes from 10.68.110.40: icmp_seq=4 ttl=64 time=0.319 ms
64 bytes from 10.68.110.40: icmp_seq=5 ttl=64 time=0.266 ms
--- 10.68.110.40 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3996ms
rtt min/avg/max/mdev = 0.266/0.319/0.387/0.045 ms
root@du1:~# exit
logout

MSRBSV2> COLUMNS=140 top -b -n 1

root@du1:~# COLUMNS=140 top -b -n 1
top - 09:48:22 up  1:01,  1 user,  load average: 3.42, 4.03, 3.01
Tasks: 651 total,   6 running, 645 sleeping,   0 stopped,   0 zombie
Cpu(s):  4.4%us,  4.8%sy,  0.0%ni, 87.4%id,  3.2%wa,  0.0%hi,  0.2%si,  0.0%st
Mem:   3002052k total,  2144276k used,   857776k free,   271052k buffers
Swap:        0k total,        0k used,        0k free,   586212k cached
  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
 9196 sirpa     20   0  498m 155m 2684 S   59  5.3  10:40.92 beam.smp
 8532 root     -16   0  290m 7032 1836 S   29  0.2  14:01.81 mhp3lnh
10000 sirpa     20   0  357m  32m  15m S   27  1.1   2:40.33 WratCtrl.rcs
12319 root     -42   0  309m 302m 247m S   24 10.3  13:48.92 BbEul.rcs
12240 root     -42   0  307m 299m 253m S   17 10.2   3:33.58 BbHs.rcs
```

```
19555 root       20   0  2504 1280   692 R   17  0.0   0:00.18 top
12230 root      -42   0  307m 299m 253m S   13 10.2   3:26.36 BbHs.rcs
 9989 sirpa      20   0  100m  23m  15m S    8  0.8   0:44.41 rbsNcLm
 8197 root       20   0 24848 5288  464 R    3  0.2   0:10.87 itcworld
12258 root      -42   0  307m 299m 253m S    3 10.2   3:24.70 BbHs.rcs
    3 root       -2   0     0    0     0 S    2  0.0   0:13.06 ksoftirqd/0
 8425 root       20   0  447m 1832 1168 S    2  0.1   1:03.25 rhsd
 8443 root      -51   0     0    0     0 S    2  0.0   0:02.09 irq/132-ncp-nca
...<cut>...
19535 root       20   0  4156 2148 1788 S    0  0.1   0:00.04 sshd
19544 root       20   0  2568 1492 1216 S    0  0.0   0:00.01 sh
30916 root       20   0     0    0     0 S    0  0.0   0:00.05 kworker/u16:0
root@du1:~# exit
logout
```

8.6.3 More info

```
RBSG2> h comcli


*********************************************************************************
comcli
*********************************************************************************
Open an interactive COMCLI session to the node. Only applicable for COM nodes.



********************************************************************************
- linux/rcs-coli/comcli command [|<unix-cmds>]
********************************************************************************
Menu: c. Send CLI commands to the COM node's linux shell, rcs-coli shell or comcli shell.


The commands are sent to the node over ssh.
The password is not required if it is defined in the ipdatabase or the $password variable (otherwise, the user will be prompted to enter the
password).


To print the list of linux commands, type "ls" on the list of directories shown in the $PATH environment variable ("echo $PATH").
To print the list of rcs-coli commands, type "/?".
To print the list comcli commands, type "?" or "\t" or "help" in comcli mode.


To switch between the linux/rcs-coli shell and the comcli shell, use the command c+/c1/c2 :
   * c+ sets the uservariable comcli to 2, giving access to the comcli shell
   * c1 sets the uservariable comcli to 1 and coli_shell to 1, giving access to the rcs-coli shell
   * c2 sets the uservariable comcli to 1 and coli_shell to 2, giving access to the linux shell
If the node does not have a rcs-coli shell then the commands c1 and c2 will be equivalent, and it is also possible to use the command c-.


Within the comcli shell, there are two modes: exec mode and config mode. Exec mode is the default. To switch to config mode type "configure".
The comcli allows to perform MO commands (get, set, create, delete, action, etc). More information about the comcli shell can be found in the
document 1/1553-FAE 151 01 ("CLI Style"). All MO commands can also be performed using moshell's own MO commands.


It is possible to pipe a shell command to any external unix utility, eg "grep", "sort", etc. The pipe sign must be surrounded by a blank space
on each side.
```

It is also possible to use the built-in COMCLI command "filter", in that case no spaces shall be around the pipe sign. See examples below.

Each command line is sent in a separate ssh session, so in order to send several commands within the same ssh session, they need to be run on the same line by separating each command with a semicolon.

```
Examples:
  >> ls -l /d/loadmodules | sort -nk 3   (to sort files by size)
  >> ps -ef | grep com   (to see the list of com processes)
  >> find /bin -ls   (recursive list all files and directories in /bin)
  >> bash && for file in /bin/*; do echo $file ; done ; exit  (open a bash shell and do a for loop on all files inside the /bin directory)
  >> c+  (to switch to comcli shell)
  >> show ManagedElement=1,Equipment=1,RbsUnit=1 ; configure ; ManagedElement=1,Equipment=1,RbsUnit=1,userLabel="test" ; end
  >> show all | grep Schema
  >> show all|filter Schema
  >> c2 (to switch back to linux shell)
```

```
Refer to the moshell file for more information about the uservariables for COM nodes:
  * comcli
  * linux_shell
  * cliss
  * comcli_columns
  * comcli_timeout
  * comcli_cfg
  * comcli_model
  * comcli_retry_maxtime
  * comcli_retry_interval
  * comcli_port
```

8.6.4 Opening an interactive COMCLI session to the node

By typing "comcli" at the moshell prompt, an interactive ssh session is initiated to the node.
If the node is a RnD node, then the COMCLI must be started manually from within the ssh session.
If the node is a commercial node, then the COMCLI will be accessed directly.
After typing "exit" the session returns to the moshell prompt.

Example:

```
PRBS417> comcli

*******************************************************************************************************************************************************
********************************
Welcome to local config
*******************************************************************************************************************************************************
********************************
>show
ManagedElement=PRBS417
>show ManagedElement=PRBS417,Transport=1
Transport=1
   EthernetPort=1
   Host=1
   Host=2
```

```
    SctpProfile=1
    Synchronization=1
    VlanPort=1
    VlanPort=2
    VlanPort=3
>configure
(config)>ManagedElement=PRBS417,userLabel="PRBS417"
(config)>commit
(config)>end
>exit


PRBS417>
```

9   DCG and Offline mode

The main two options are "k" and "m" :
- m is the preferred option which dumps all the node data and is mandatory to collect when raising a TR/CSR.
Add the option "-k 1" if DSP crash dumps are needed.
Add the option "i" if IP printouts are needed (only applicable for Gen1).
- k is a subset of m, and can be used for tasks that only require analysis of the MO data (eg parameter audit)

Command	Output file	Contents
dcgk	**<node>_modump.zip**	**MO data + MOM + Alarms + PM scanners + HW Inventory**
dcgm	**<node>_xxx_dcgm.zip**	**same as dcgk + Logfiles + PM ropfiles + COLI printouts**

```
RBS> h dcg

*****************************************************************************
dcg[meiasrfkx] [-m <rophours>] [-d <logdays>] [-b <boards|boardgroup>|all] [-k <nrdumps>] [-f <mofilter>] [<logdir>]
*****************************************************************************
Fetch data for TRs/CSRs, according to the Data Collection Guidelines.

The dcg command offers a number of options, it is possible to combine several options, eg: "dcgmsr"

Options for CPP nodes:
***********************
 - m: mandatory data. Includes modump, logfiles, pm ropfiles, CV's, coli printouts.
 - e: subset of the mandatory data which can be taken in case of emergency, before doing board/node restart. This option will usually be run on its own.
 - i: IP printouts
 - a: ATM/AAL2 printouts. By default only the AAL2 printouts are collected. To collect ATM printouts, use option "-b", see below.
 - s: SS7 printouts
 - x: SPAS printouts
 - r: RNC specific printouts.
 - f: fetch logfiles, ropfiles, and CV. Three zipfiles are produced which can be used in offline mode in pmr, pmx, lg, and dbc. Refer to the chapter "Offline mode"
for more info.
```

Options for COM nodes:
****
 - m: mandatory data. Includes modump, logfiles, pm ropfiles, coli printouts, and small ESI (RCS nodes). To get a large ESI (which will include DSP crash dumps), use the option "-k 1", eg "dcgm -k 1".
 - e: same as "m".
 - f: fetch logfiles and ropfiles. Two zipfiles are produced which can be used in offline mode in pmr, pmx, and lg. Refer to the chapter "Offline mode" for more info.
 - k: take a MO dump (kget format). A zipfile is produced containing the MO dump and MOM of the node, it can be used in offline mode by running "moshell <zipfile>". Refer to the chapter "Offline mode" for more info.

Switches:
 -m <rophours>: the number of hours of ROP files to collect with pmrf, eg "-m 2". Default is 8 hours in dcge and 48 hours in dcgm/dcgf
 -d <logdays> : the number of days of logfiles to collect with lgf, eg "-d 30". Default is 60 days in dcgm/dcgf. Note: to specify hours or minutes, use "h" or "m", eg "-d 2h" to collect the last 2 hours.
 -b <boards|boardgroup>|all : the ET boards on which dcgi/dcga will be run. When this option is not specified, dcga collects no ET board data, while dcgi collects all ET boards data. Example: dcgi -b 000600,000700
 -k <nrdumps> : the number of ENB DSP dumps to collect on CPP nodes, or whether to collect a large ESI on RCS nodes (0=small, 1=large). Corresponds to the option "-d" in lg command. Default: 0.
 -f <mofilter>: the MO filter for MO dump collection. Eg "-f !relation=" to skip MOs such as UtranRelation/GsmRelation in the MO dump.

Argument:
 - the directory where the collected data will be stored. If no directory is given, the directory ~/moshell_logfiles/logs_moshell/dcg/<node>/<date>_<time>/ is used.

Please refer to the command file in moshell/commonjars/scripts/dcg_datacollection.mos to view the various commands that are run for each option.
More info about each command can be found by typing "h <command>"

Note: for CPP nodes, if the MO layer is unavailable, it is possible to run dcg anyway by typing "uv nocorba=1" before executing dcg. Using "nocorba=1" means that moshell will not attempt to connect to the MO service and will only run commands via telnet/ftp/ssh/sftp.

9.1 Collecting the offline data with DCGM

More info: http://lte-plm.rnd.ki.sw.ericsson.se/lte_trsh_wiki/G2P/index.php?n=UseCases.G2DCG
Troubleshooting: https://lte-wiki.rnd.ki.sw.ericsson.se/mediawiki/index.php/FeatureTroubleShooting

```
RBSG2> dcgm

Please enter Username: expert
Please enter Node Password:

$ssh_pid = 13534

Connected to RBSG2 (ManagedElement=1)
....

Checking MOM version...CRBS_NODE_MODEL_Lrat_1_6053_R4E05_9d6909aa146cd9d21ca64d665995baf9
Parsing MOM (cached):
/home/eanzmagn/jarxml/CRBS_NODE_MODEL_Lrat_1_6053_R4E05_9d6909aa146cd9d21ca64d665995baf9.xml.cache.gz .........................................
........Done.
Connected to RBSG2 (ManagedElement=1)

Last MO:  3836. Loaded 3836 MOs. Total:  3837 MOs.
run /home/eanzmagn/moshell/commonjars/scripts/dcg_datacollection.mos /home/eanzmagn/moshell_logfiles/logs_moshell/dcg/RBSG2/150422_083026 RBSG2 m - - - - 1
150422_083026_CEST . -

RBSG2> # DATA COLLECTION SCRIPT FOR CSRs. Type "h dcg" for info.

...<cut>...
```

```
RBSG2> $duration_s = `$gawk 'BEGIN{ res=systime() - $dcg_start_time ; print res }'`

$duration_s = 683

RBSG2> $duration_m = `$gawk 'BEGIN{ print sprintf("%d min %d sec",int( $duration_s / 60), $duration_s % 60)}'`

$duration_m = 11 min 23 sec

RBSG2> l echo "Execution time: $duration_s seconds ($duration_m). Use the moshell command \"time\" against the dcg logfile to analyse individual commands
duration."

Execution time: 683 seconds (11 min 23 sec). Use the moshell command "time" against the dcg logfile to analyse individual commands duration.

RBSG2>

RBSG2> subdcgfinish

RBSG2> l+mmo $tempdir/dummy

Zipping all files to RBSG2_150422_083026_CEST_dcgm.zip
  adding: RBSG2_dcg_m.log.gz (stored 0%)
  adding: RBSG2_logfiles.zip (stored 0%)
  adding: RBSG2_modump.zip (stored 0%)
  adding: RBSG2_xml.zip (stored 0%)
  adding: bglog_1.log.gz (stored 0%)
test of /home/eanzmagn/moshell_logfiles/logs_moshell/dcg/RBSG2/150422_083026/RBSG2_150422_083026_CEST_dcgm.zip OK

dcg completed successfully, logs stored in /home/eanzmagn/moshell_logfiles/logs_moshell/dcg/RBSG2/150422_083026
```

9.2 Contents of the DCGM file

The DCGM zipfile consists of the main following files:
 - <nodename>_modump.zip : contains the MO data (MOM fragments, kget, and showall)
 - <nodename>_logfiles.zip : contains the node logs (alarm log, audit trail log, etc)
 - <nodename>_ropfiles.zip : contains the PM ROP files (counter based statistics xml files)
 - <nodename>_dcgm.log.gz : the printout from the dcgm execution as well as printout from COLI commands

Example:

```
[~]$ unzip -l modumps/com/g2/VIC_AADP15_ARDEER_WEST_533354_170329_140235_AEDT_MSRBS-L_CXP9024418-5_R16GK_dcgm.zip
Archive:   modumps/com/g2/VIC_AADP15_ARDEER_WEST_533354_170329_140235_AEDT_MSRBS-L_CXP9024418-5_R16GK_dcgm.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
   360307  03-29-2017 05:08   VIC_AADP15_ARDEER_WEST_533354_bgpmrf.log.gz
  1884757  03-29-2017 05:14   VIC_AADP15_ARDEER_WEST_533354_dcg_e2.log.gz
   514657  03-29-2017 05:23   VIC_AADP15_ARDEER_WEST_533354_dcg_m.log.gz
   146908  03-29-2017 05:07   VIC_AADP15_ARDEER_WEST_533354_dcg_x2.log.gz
 41909932  03-29-2017 05:23   VIC_AADP15_ARDEER_WEST_533354_logfiles.zip
  2035285  03-29-2017 05:11   VIC_AADP15_ARDEER_WEST_533354_modump.zip
 12709514  03-29-2017 05:03   VIC_AADP15_ARDEER_WEST_533354_ropfiles.zip
     5014  03-29-2017 05:05   VIC_AADP15_ARDEER_WEST_533354_wrateventlog_traffic.zip
  5745785  03-29-2017 05:05   VIC_AADP15_ARDEER_WEST_533354_xml.zip
```

```
     2903  03-29-2017 05:11    bglog_1.log.gz
---------                      -------
 65315062                      10 files
```

9.3 <u>Starting a offline session towards a DCGM file</u>

Important: The DCGM zipfile should not be unzipped. Just connected moshell directly to the DCGM zipfile.

Example:

```
[~]$ moshell modumps/com/g2/VIC_AADP15_ARDEER_WEST_533354_170329_140235_AEDT_MSRBS-L_CXP9024418-5_R16GK_dcgm.zip


##################################################################
#           Welcome to MoShell 17.0g (LPA108514/1_R17G)         #
#                Finn Magnusson, Jan Pettersson                 #
#           http://newtran01.au.ao.ericsson.se/moshell          #
#              Contact: Finn.Magnusson@ericsson.com             #
#                   Joakim.xo.Ostlund@ericsson.com              #
##################################################################


unzip -ojq modumps/com/g2/VIC_AADP15_ARDEER_WEST_533354_170329_140235_AEDT_MSRBS-L_CXP9024418-5_R16GK_dcgm.zip -d
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump

Found MO dump: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/VIC_AADP15_ARDEER_WEST_533354_modump.zip


unzip -ojq /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/VIC_AADP15_ARDEER_WEST_533354_modump.zip -d
/home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump

Found alarm data: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/alarmlist.txt
Found internalmom data: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/intmomlog.txt
Found internalmom data: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/intmomlog2.txt
Found RBS board data: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/rbsbdlog.txt
Found RF data: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/rftlog.txt
Found RNC board data: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/rnclog.txt
Found TN data: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/tnplog.txt
Found MO dump: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-
075757_9924/modump/modump/VIC_AADP15_ARDEER_WEST_533354_dcg_k.log.gz


Found logfiles:  /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/VIC_AADP15_ARDEER_WEST_533354_logfiles.zip


Found ropfiles:  /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/VIC_AADP15_ARDEER_WEST_533354_ropfiles.zip


Splitting "dcg run" printouts from COLI file: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-
075757_9924/modump/VIC_AADP15_ARDEER_WEST_533354_dcg_e2.log.gz...Done.


Found COLI logs:
  /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/intmomlog.txt
  /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/intmomlog2.txt
  /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/modump/rnclog.txt
  /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/teread.log
```

```
    /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/llog.log
    /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/VIC_AADP15_ARDEER_WEST_533354_dcg_m0.log.gz
    /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/VIC_AADP15_ARDEER_WEST_533354_dcg_m.log.gz
    /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-075757_9924/modump/VIC_AADP15_ARDEER_WEST_533354_dcg_x2.log.gz
Use command "lfc <file>" to load more COLI files.


Parsing MOM (cached): /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170624-
075757_9924/MSRBS_NODE_MODEL_17A_307.32548.62_aad4.xml.cache.gz .........................
............Done.
Using paramfile /home/eanzmagn/tools/moshell/commonjars/pm/PARAM_MSRBS_16B.txt
Parsing file /home/eanzmagn/tools/moshell/commonjars/pm/PARAM_MSRBS_16B.txt ...........................Done.
Using imomdfile /home/eanzmagn/tools/moshell/commonjars/pm/IMOMD_MSRBS_16B.txt
Using imomfile /home/eanzmagn/tools/moshell/commonjars/pm/IMOM_MSRBS_16B.txt
Last MO: 11086. Loaded 11086 MOs. Total: 11087 MOs.


Moshell version of the MO dump: 17.0d
Preparing offline MIB:
0%                                          ~50%                                          ~100%
...............................................................................

HELP MENU          : h
QUIT               : q


For offline browsing of PM ropfiles, run "pmr/pmx".
For offline browsing of CPP logfiles, run "lg[options]".
To list all available facc/mcc commands, type "?"
To list all available COLI commands, type "lh all ?"


OFFLINE_VIC_AADP15_ARDEER_WEST_533354_DCG_K> get 0


170624-07:58:24 OFFLINE_VIC_AADP15_ARDEER_WEST_533354_dcg_k 17.0g MSRBS_NODE_MODEL_17A_307.32548.62_aad4 stopfile=/tmp/8772
================================================================================================
0                                      ManagedElement=VIC_AADP15_ARDEER_WEST_533354
================================================================================================
dnPrefix                               SubNetwork=Telstra_R,SubNetwork=VIC_METRO,MeContext=VIC_AADP15_ARDEER_WEST_533354
managedElementId                       VIC_AADP15_ARDEER_WEST_533354
managedElementType                     RadioNode
networkManagedElementId                VIC_AADP15_ARDEER_WEST_533354
release                                17A
siteLocation
userLabel
================================================================================================
Total: 1 MOs



OFFLINE_VIC_AADP15_ARDEER_WEST_533354_DCG_K> cvls


170624-07:58:25 OFFLINE_VIC_AADP15_ARDEER_WEST_533354_dcg_k 17.0g MSRBS_NODE_MODEL_17A_307.32548.62_aad4 stopfile=/tmp/8772


========================================================================
170624-07:58          BackupName                SwVersion
========================================================================
```

```
LastCreatedBackup:      CMLTE1_NC_VT16269_AADP_POST_2A   CXP9024418/5_R16GK
LastRestoredBackup:
----------------------------------------------------------------------
Current SwVersion:      CXP9024418/5_R16GK (17A.0-MI)
BrmHouseKeeping:        ENABLED (max: 20 backups)
BrmFailSafe:            IDLE
BrmTimeBeforeRollback:  /3600
RestoreEscalationList:  s[0] =
================================================================================
SwVersion             ProductData        ProdDate  Rel      LMs  InstallationDate     ActivationDate       DeactivationDate
================================================================================
CXP9024418/5-R16GK    CXP9024418/5_R16GK 20161216  17A.0-MI  62  2017-03-02 01:30:40  2017-03-02 04:42:48
================================================================================
UpgradePackage        ProductData        ProdDate  Rel      CreationDate         State
================================================================================
CXP9024418/5-R16GK    CXP9024418/5_R16GK 20161216  17A.0-MI  2017-03-02 01:30:39  COMMIT_COMPLETED
================================================================================
Id  BackupName                      CreationTime         SwVersion          Rel       Type    Stat  MO
================================================================================
 1  Pre_raxq96799                   2017-03-05 11:44:22  CXP9024418/5_R16GK 17A.0-MI  MANUAL  OK    BrmBackup=1
 2  BKP-2017-03-05_23-09-07         2017-03-05 12:10:04  CXP9024418/5_R16GK 17A.0-MI  MANUAL  OK    BrmBackup=2
 3  CMLTE1_NC_VT16269_AADP_POST_2A  2017-03-15 04:36:49  CXP9024418/5_R16GK 17A.0-MI  MANUAL  OK    BrmBackup=3
================================================================================
>>> Total: 3 CV's, 1 UP's


OFFLINE_VIC_AADP15_ARDEER_WEST_533354_DCG_K> al


170624-07:58:28 OFFLINE_VIC_AADP15_ARDEER_WEST_533354_dcg_k 17.0g MSRBS_NODE_MODEL_17A_307.32548.62_aad4 stopfile=/tmp/8772


================================================================================
Sever Specific Problem                MO (Cause/AdditionalInfo)
================================================================================
Min   External Link Failure           ENodeBFunction=1 (X2 link problem to one or several neighbouring eNodeBs. AI: PLMN ID-eNB ID 1 = 5051-
530824PLMN ID-eNB ID 2 = 5051-530581PLMN ID-eNB ID 3 = 5051-530878)
Min   No Connection                   ExternalNode=1 (EquipmentMalfunction)
>>> Total: 2 Alarms (0 Critical, 0 Major)


OFFLINE_VIC_AADP15_ARDEER_WEST_533354_DCG_K> st


170624-07:58:40 OFFLINE_VIC_AADP15_ARDEER_WEST_533354_dcg_k 17.0g MSRBS_NODE_MODEL_17A_307.32548.62_aad4 stopfile=/tmp/8772
================================================================================
Proxy Adm State      Op. State      MO
================================================================================
   31  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPAM1
  154  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPAM2
  292  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPAM3
  383  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPBM1
  506  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPBM2
  638  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPBM3
...<cut>...
10863               1 (ENABLED)    Transport=1,SctpEndpoint=1
11080  1 (UNLOCKED)  1 (ENABLED)    Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=1
11081  1 (UNLOCKED)  1 (ENABLED)    Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=2
11082  1 (UNLOCKED)  1 (ENABLED)    Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=3
11083               1 (ENABLED)    Transport=1,Synchronization=1,TimeSyncIO=1
```

```
================================================================================
Total: 559 MOs


OFFLINE_VIC_AADP15_ARDEER_WEST_533354_DCG_K> h


------------------------------ COMMANDS SUPPORTED ON COM NODES ------------------------------
mom[abcdfloprtuxsi]      Print description of MO classes, CM/FM attributes, actions, enums and structs.
lt                       Load MO tree and build proxy table.
lcc                      Load MO tree and build proxy table.
ld[c]                    Load one MO instance and (optionally) the MO tree below it.
lu/llu                   Unload MOs from MO tree.
pr[s][m]/lpr[s][m]       Print MO LDNs and proxy ids for all or part of the MO tree currently loaded in moshell.
ma/lma                   Add MO(s) to an MO group.
mr/lmr                   Remove an MO group or remove MOs from an MO group (MOs will NOT be deleted, only the group).
mp                       Print all defined MO groups.
get[m][i]/lget[m][i]     Read CM/FM attribute(s) from MO(s).
hget[c][m][i]/lhget[c][m][i]  Read CM/FM attribute(s) from MO(s), print horizontally one line per MO (instead of one line per attribute).
kget[m]/lkget[m]         Display CM/FM attributes in exportable printout format.
...<cut>....
pdeb                     Resume a scanner.
pdel[p]                  Delete a scanner.
emom                     Display list of events available for each kind of event-based scanner.
pset[d]                  Set the contents of an event-based scanner (RNC/RBS/ENB/MSRBS).
....


OFFLINE_VIC_AADP15_ARDEER_WEST_533354_DCG_K>
```

10 HW Inventory

10.1 Number of DUs

Gen1
- **up to 2 DUs can be connected via the IDL1 connector**
- **up to 3 DUs can be connected if using IDL2 (= CPRI port)**

Capacity (1*DUS41/16B SW):
- 4000/2300 static/dynamic
  RRC connected users
- 12 FDD cells
- 480 MHz antenna BW

Capacity (2*DUS41/16B SW):
- 8000/4000 static/dynamic
  RRC connected users
- 24 FDD cells
- 960 MHz antenna BW

Capacity (3*DUS41/16B SW):
- 12000/5500 static/dynamic
  RRC connected users
- 24 FDD cells

1 DU
DUL20/DUS31/
DUS41

2 DU cluster, IDL1
2*DUL20 or
2*DUS31 or
2*DUS41

2 DU cluster, IDL2
2*DUS31 or
2*DUS41

3 DU cluster, IDL2
3*DUS31 or
3*DUS41

2 ODS cluster, IDL1
2*ODS41
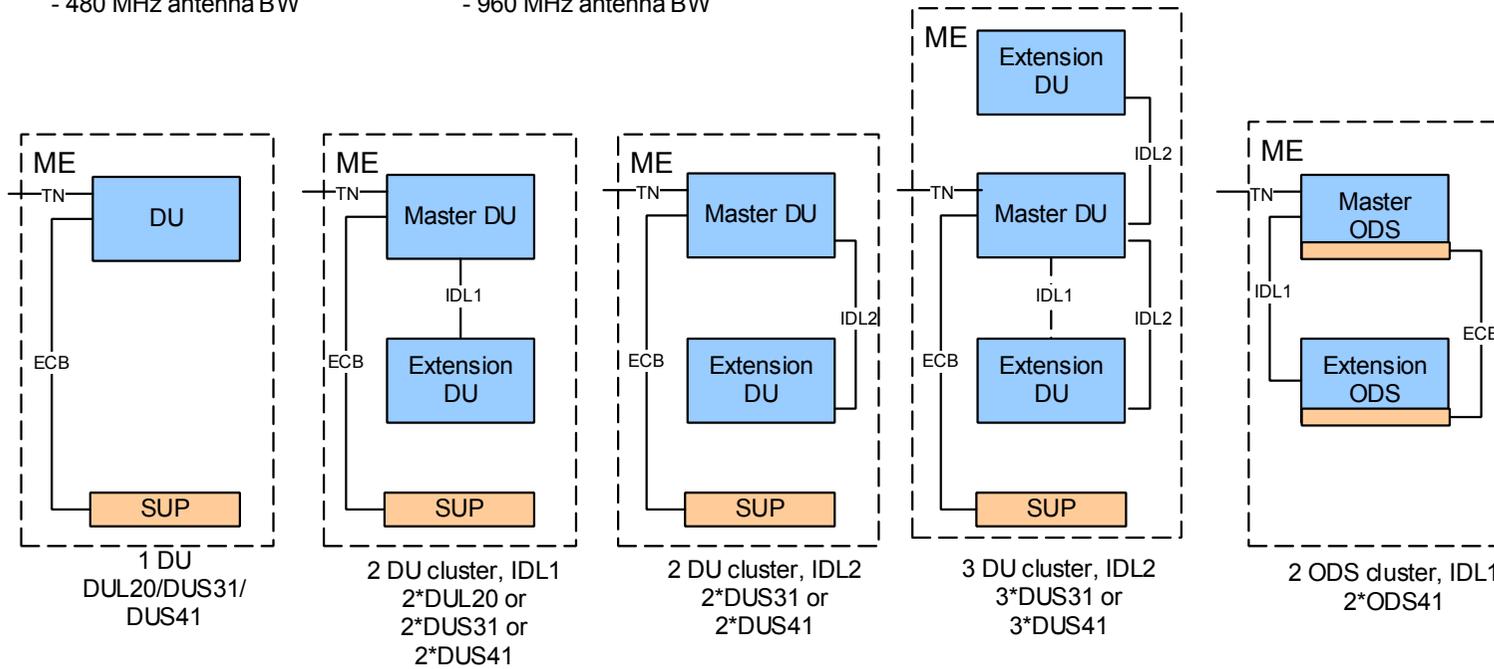
Gen2
- **Currently only one DU per node but should be supported to have up to 4 DUs from 18.Q2 (?)**

LTE Capacity (Baseband 5216/16B SW):
- 5000/4000 static/dynamic RRC
  connected users
- 18 FDD cells
- 1440 MHz antenna BW
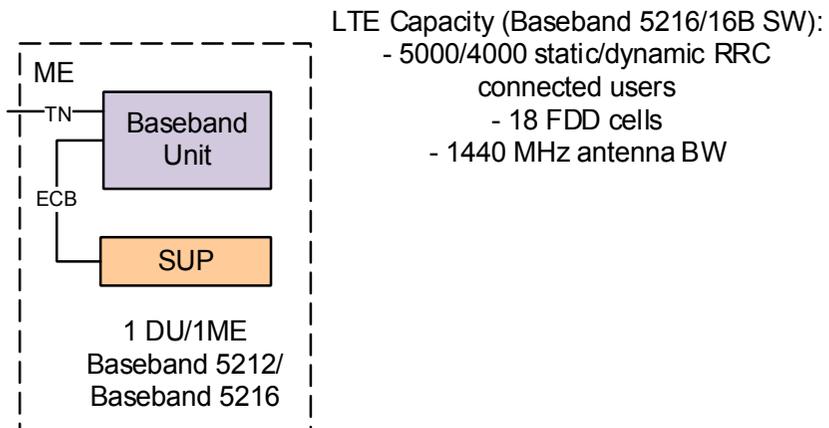
- **it is also possible to interconnect several DUs with each-other over the IDLe connector but they remain separate nodes with their own O&M IP address. More information in attached slides "Elastic RAN feature" for MSRBS 17A**

eRAN L17A.pptx

10.2 DU HW

DUS31/41
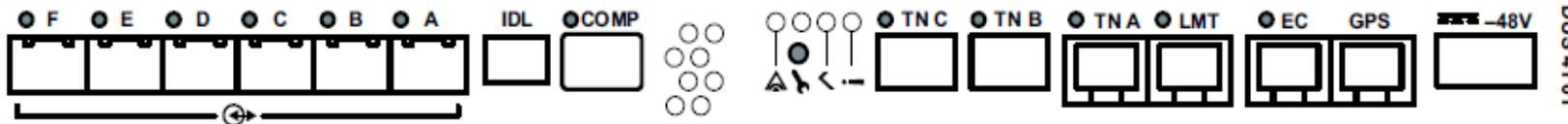
Port	Connector	Description	Interface/protocol
A-F	SFP	Radio Interface, 10Gbps/s Interface DU-RU (electrical) or DU-RRU (optical).	Interface: Uu', Protocol: CPRI (proprietary) C,D,E,F has also support for IDL2

TN A	RJ-45	Transport Network, **Gigabit Ethernet** (electrical 1000BASE-T)	Interface: S1,X2 and Mul "Link1"
TN B	SFP	Transport Network, **Gigabit Ethernet** (optical SFP, 1000BASE-X)	Interface: S1,X2 and Mul "Link2"
TN C	SFP	Transport Network, **Gigabit Ethernet** (optical SFP, 1000BASE-X)	Interface: S1,X2 and Mul NOT USED AT YET
IDL	HSIO	Inter-DU link (DU to DU)	IDL1
COMP	SFP	Coordinated Multi Point communication (CoMP)	NOT USED AT YET
LMT	RJ-45	Local Maintenance Terminal, , **Fast Ethernet** for local O&M	Protocol: IP Default enodeB IP: 169.254.1.10/24
EC	RJ-45	EC bus (Dedicated EC bus)	Communication with SCU(Fan Control)
GPS	RJ-45	Used when the network synchronization source is a GPS receiver	Protocol: NMEA 0183

ECPort

EC   UART

LMT   eth

GeneralProcessorUnit,
Sctp, ENodeBFunction,
TermPointToMMe

CellDeviceSet

RicmDeviceSet

RiPort

EthernetLink

GigabitEthernet

sRI

BB module   CPRI

RI A

MP   MP

PCI

GbE

sRIO X

NPU:LSI

Ethernet
Switch

HERMES HERMES HERMES HERMES

RI F

TN A/B

GTP-U switching
IPSEC termination

IDL2

xIO   xIO   xIO   xIO

InterPiuLink

IDL

Ethernet
Switch

DUXI FPGA

10G Eth

GPS

Synch

TuSyncRef
GpsSyncRef

Radio oscillator
Time generator

IpInterface,
IpAccessHostEt,
IpHostLink

TimingUnit,
Synchronization

DUS32/DUS52 (BB52)

DUS41 ports (on top) vs BB52 ports (bottom)
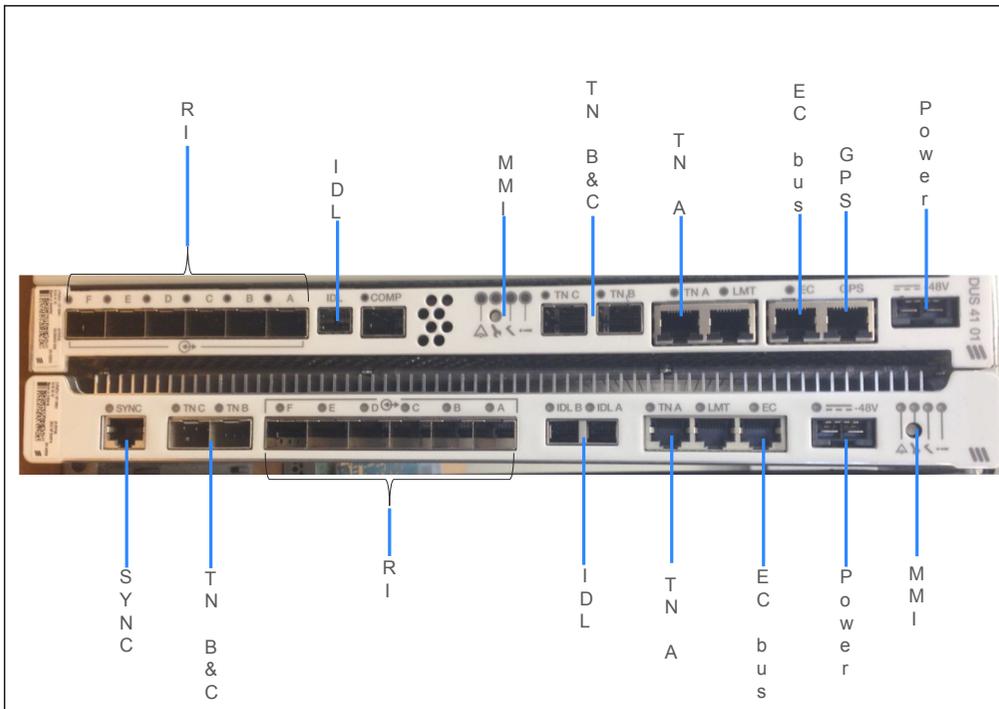
› Interfaces:

Interface name	Connector	Comment
Power	ET20	No change
EC bus	RJ-45	No change
LMT	RJ-45	No change
TN A	RJ-45	No change
IDL A, B	Xcede	New connector, CPRI & Ethernet
RI A-F	SFP+	New support for 10 Gbps
TN B, C	SFP+	New 10 Gbps Electrical/Optical Ethernet
SYNC	RJ-45	New port name

› Interfaces that the Ports positions change (compared to earlier boards):
- Power
- SYNC (previously GPS)
- TN A, TN B and TN C
- RI A – F
- IDL A and IDL B (new interface)

CPM is the equivalent of CBM in DUS31/41: it hosts the MP, the NPU, ethernet switch
TRINITY ASIC is the baseband processor (2 in DUS32, 4 in DUS52), like HERMES in DUS31/41
Both HERMES and TRINITY are based on the EMCA platform (Ericsson Multi Core Architecture)
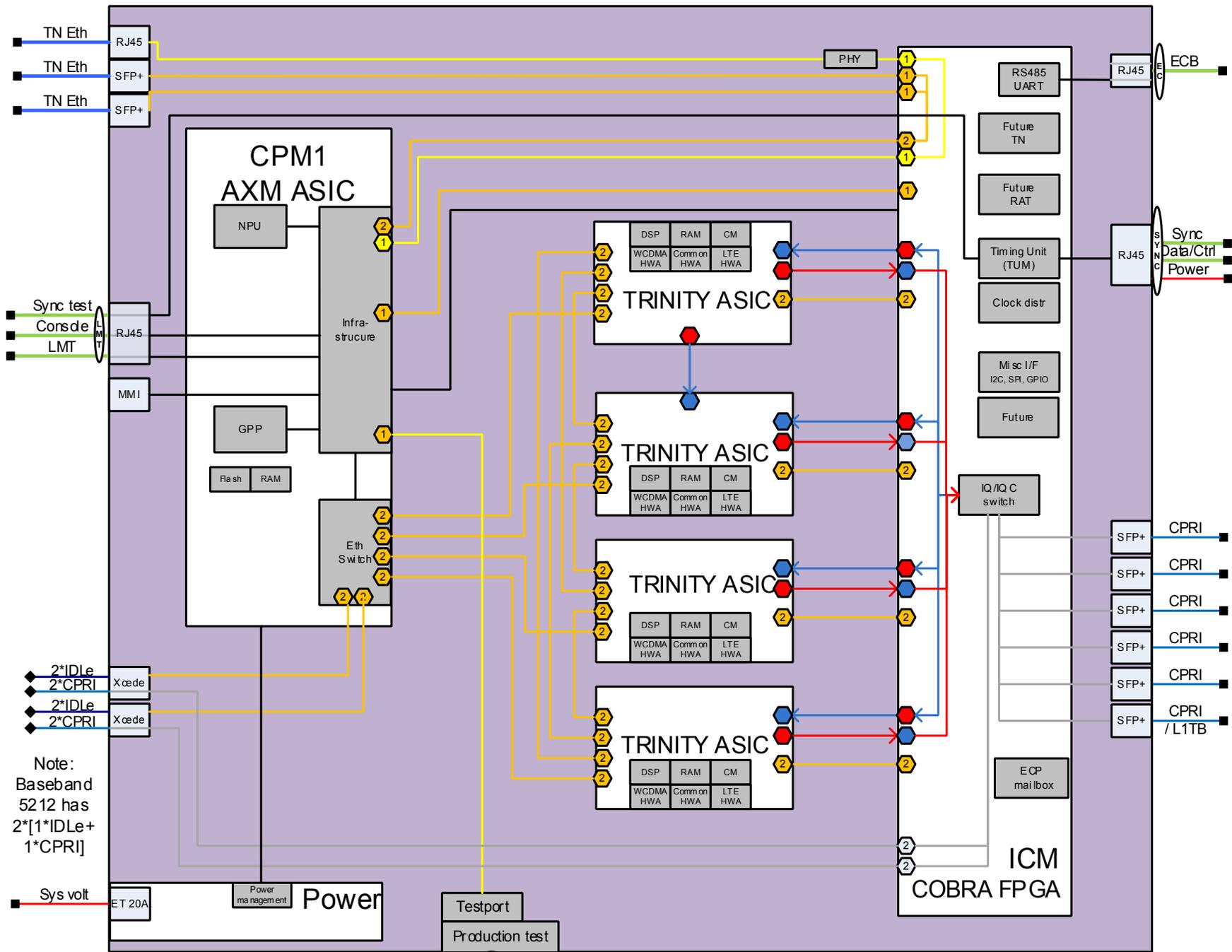
Baseband 5216
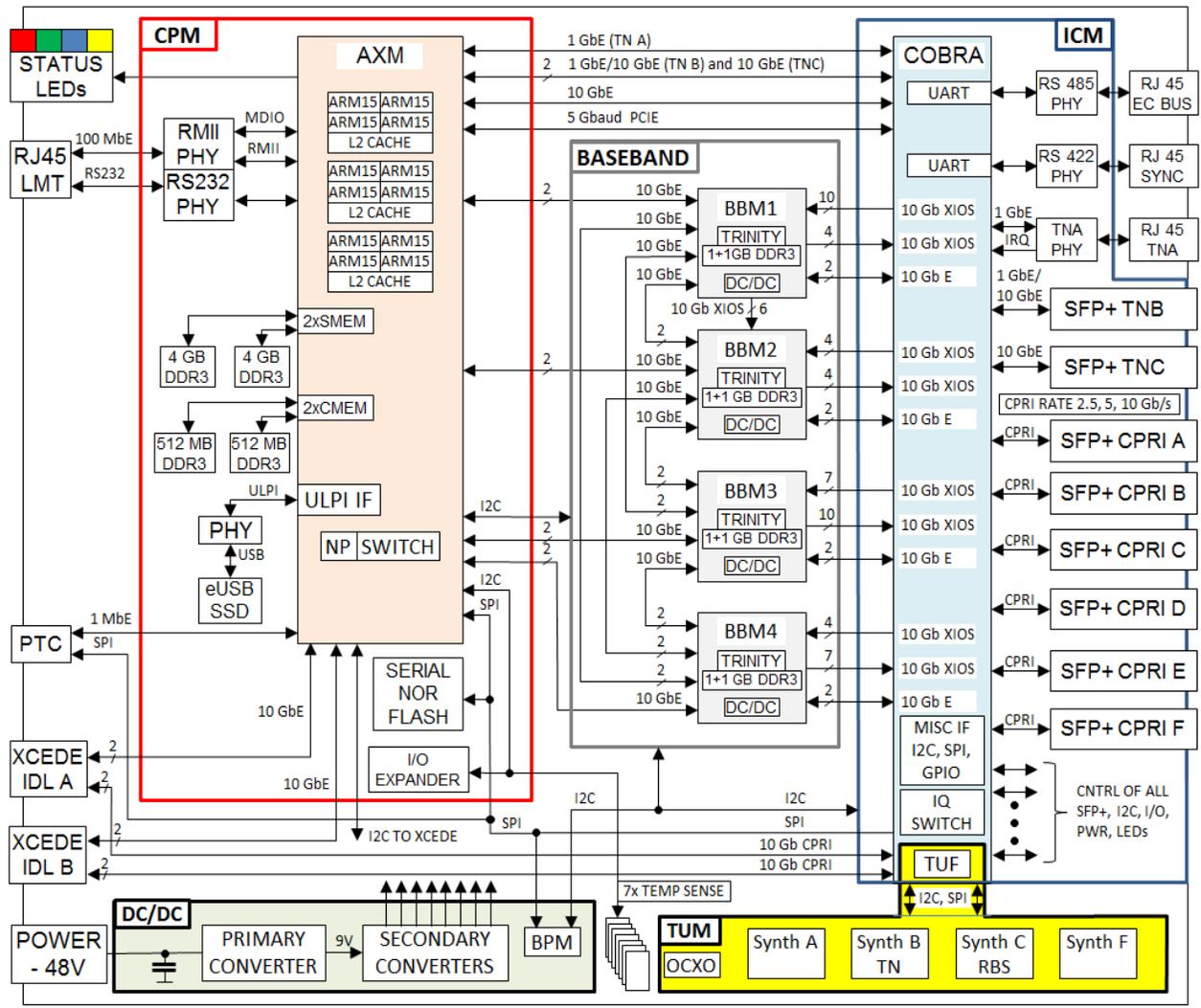
DUS33/DUS53 (BB66)
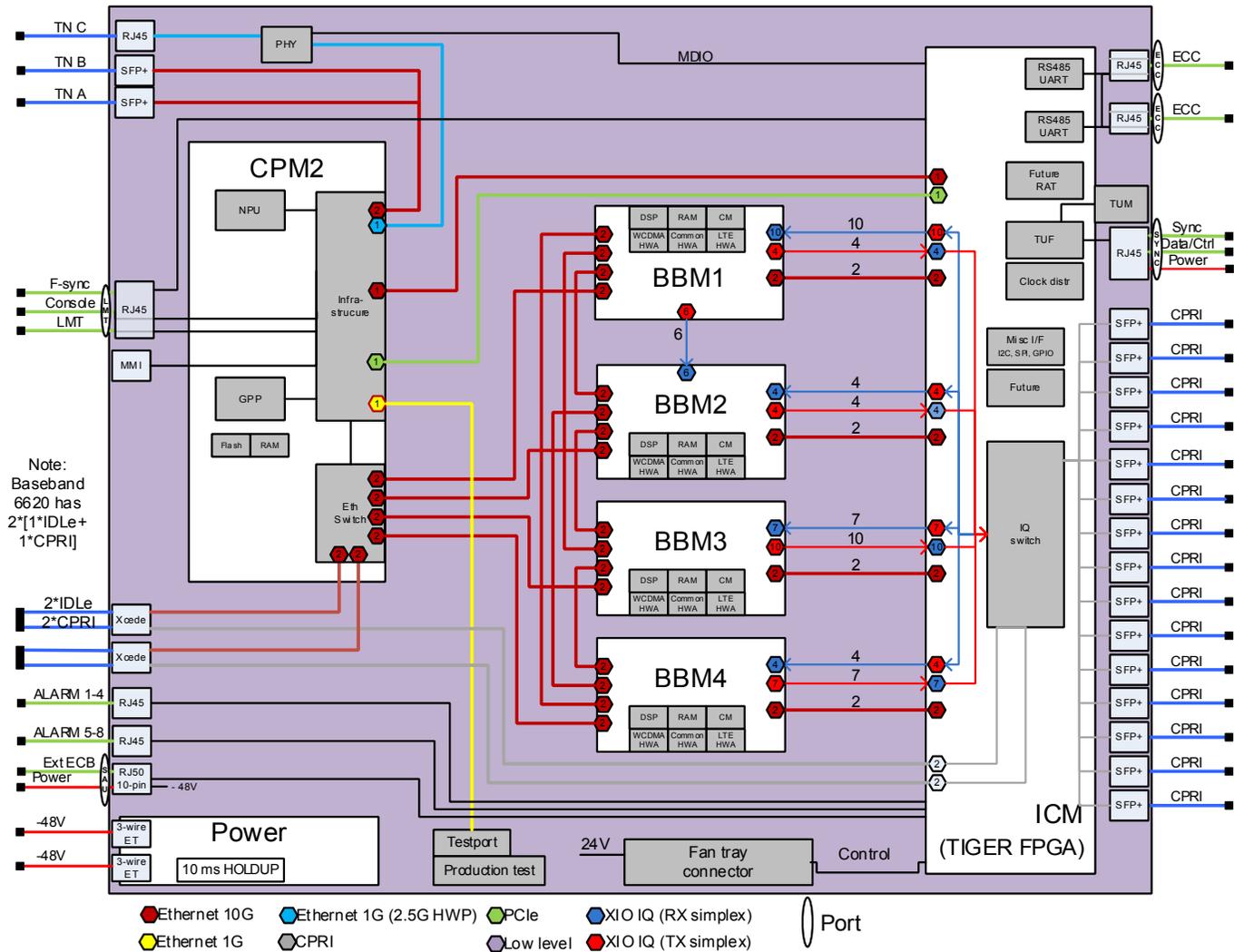
10.3 MO mapping

Board Type	CPP MO	RCS MO
DU	PlugInUnit	FieldReplaceableUnit
XMU/RU/RRU/PIMCU	AuxPlugInUnit	FieldReplaceableUnit

SUP, SCU, SAU, PSU, etc	HwUnit	FieldReplaceableUnit
RET/TMA	AntennaNearUnit	AntennaNearUnit
FAN	FanGroup	FanGroup

MO structure Gen1

```
ENB> momtl equipm

-------------------------------
LDNs containing Equipment (systemCreated)
-------------------------------
ManagedElement[1],Equipment[1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],RetSubUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],TmaSubUnit[0-6]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8],AuPort[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],AlarmPort[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],BbProcessingResource[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],MpProcessingResource[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],PimcDeviceSet[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],RdicDeviceSet[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],RfPort[0-10]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],TrDeviceSet[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],Transceiver[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],XmuDeviceSet[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],DeviceGroup[0-1],XpProgram[0-2]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],EcPort[0-]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],IplPort[0-]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],RdiPort[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],RiPort[0-16]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],SubDeviceGroup[0-]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],SubDeviceGroup[0-],CellDeviceSet[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],SubDeviceGroup[0-],RicmDeviceSet[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AuxPlugInUnit[0-1],SubDeviceGroup[0-],TrDeviceSet[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],MulticastAntennaBranch[0-2]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],RfBranch[0-24]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],TmfConfiguration[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],AlarmPort[0-8]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],BbProcessingResource[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],MpProcessingResource[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],PimcDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],RdicDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],RfPort[0-10]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],TrDeviceSet[0-1]
```

```
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],Transceiver[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],XmuDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],XpProgram[0-2]
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ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],IplPort[0-]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],RdiPort[0-8]
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ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],SubDeviceGroup[0-],RicmDeviceSet[0-1]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],SubDeviceGroup[0-],TrDeviceSet[0-1]
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ManagedElement[1],Equipment[1],Cabinet[0-7],FanGroup[0-16]
ManagedElement[1],Equipment[1],EcBus[0-7]
ManagedElement[1],Equipment[1],ExternalNode[0-7]
ManagedElement[1],Equipment[1],ExternalNode[0-7],EcPort[0-2]
ManagedElement[1],Equipment[1],HwGroup[0-]
ManagedElement[1],Equipment[1],HwUnit[0-]
ManagedElement[1],Equipment[1],HwUnit[0-],AlarmPort[0-32]
ManagedElement[1],Equipment[1],HwUnit[0-],ControlPort[0-8]
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ManagedElement[1],Equipment[1],HwUnit[0-],EcPort[0-1]
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ManagedElement[1],Equipment[1],InterPiuLink[0-1]
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...<cut>...
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ManagedElement[1],Equipment[1],Shelf[0-]
ManagedElement[1],Equipment[1],SubrackProdType[0-]
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ManagedElement[1],Equipment[1],Subrack[0-9],AppUnit[0-2]
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ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],EcPort[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-16]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-
16],DscpGroup[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-
16],IpFlowMonitor[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],ExchangeTerminalIp[0-1],Program[0-]
```

```
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],GeneralProcessorUnit[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],GeneralProcessorUnit[0-1],MediumAccessUnit[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],GeneralProcessorUnit[0-1],ProcessorLoad[0-4]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],PiuDevice[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],PiuDevice[0-],ExchangeTerminalIp[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],PiuDevice[0-],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],PiuDevice[0-],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-
16]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],PiuDevice[0-],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-
16],DscpGroup[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],PiuDevice[0-],ExchangeTerminalIp[0-1],GigaBitEthernet[0-1],IpInterface[0-
16],IpFlowMonitor[0-8]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],PiuDevice[0-],ExchangeTerminalIp[0-1],Program[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],Program[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],RiPort[0-6]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SrioTestPort[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SubDeviceGroup[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SubDeviceGroup[0-],CellDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SubDeviceGroup[0-],RicmDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SubDeviceGroup[0-],TrDeviceSet[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],SystemClockDistribution[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],GpsOutSyncLink[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],GpsSyncRef[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],HptsiSyncRef[0-1]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],Program[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],TimingUnit[0-1],TuSyncRef[0-3]
ManagedElement[1],Equipment[1],SupportUnit[0-]


ENBG1> lpr equipment=1

================================================================================
Proxy  MO
================================================================================
  381  Equipment=1
  383  Equipment=1,HwUnit=SCU
  384  Equipment=1,HwUnit=SCU,EcPort=1
  385  Equipment=1,HwUnit=SCU,AlarmPort=1
  386  Equipment=1,HwUnit=SCU,AlarmPort=2
  387  Equipment=1,HwUnit=SCU,AlarmPort=3
  388  Equipment=1,HwUnit=SCU,AlarmPort=4
  389  Equipment=1,HwUnit=SCU,AlarmPort=5
  390  Equipment=1,HwUnit=SCU,AlarmPort=6
  391  Equipment=1,HwUnit=SCU,AlarmPort=7
  392  Equipment=1,HwUnit=SCU,AlarmPort=8
  393  Equipment=1,HwUnit=SCU,AlarmPort=9
  394  Equipment=1,HwUnit=SCU,AlarmPort=10
  395  Equipment=1,HwUnit=SCU,AlarmPort=11
  396  Equipment=1,HwUnit=SCU,AlarmPort=12
  397  Equipment=1,HwUnit=SCU,AlarmPort=13
  398  Equipment=1,HwUnit=SCU,AlarmPort=14
  399  Equipment=1,HwUnit=SCU,AlarmPort=15
  400  Equipment=1,HwUnit=SCU,AlarmPort=16
....
  402  Equipment=1,AuxPlugInUnit=RRU-R2-4
  403  Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru
  404  Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,XpProgram=CXP9013268/9_R65FE_CF81551786
```

```
405   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,RfPort=A
406   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,RfPort=B
407   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,RfPort=R
408   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,RfPort=RXB_IO
409   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,AlarmPort=1
410   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,AlarmPort=2
411   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,AlarmPort=3
412   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,AlarmPort=4
413   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,AlarmPort=5
414   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,AlarmPort=6
415   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,AlarmPort=7
416   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,AlarmPort=8
417   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,RfPort=RXA_IO
418   Equipment=1,AuxPlugInUnit=RRU-R2-4,DeviceGroup=ru,TrDeviceSet=tr
419   Equipment=1,AuxPlugInUnit=RRU-R2-4,RiPort=DATA_1
420   Equipment=1,AuxPlugInUnit=RRU-R2-4,RiPort=DATA_2
...
627   Equipment=1,Cabinet=1
628   Equipment=1,Cabinet=1,FanGroup=1
629   Equipment=1,Cabinet=1,FanGroup=2
630   Equipment=1,Cabinet=1,FanGroup=3
636   Equipment=1,AuxPlugInUnit=XMU03-1
637   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=1
638   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=2
639   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=3
640   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=4
641   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=5
642   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=6
643   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=7
644   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=9
645   Equipment=1,AuxPlugInUnit=XMU03-1,DeviceGroup=xmu
646   Equipment=1,AuxPlugInUnit=XMU03-1,DeviceGroup=xmu,XpProgram=CXP9025194/1_R8KZ_D16R274576
647   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=10
648   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=11
649   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=12
650   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=13
651   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=14
652   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=15
653   Equipment=1,AuxPlugInUnit=XMU03-1,RiPort=16
....
675   Equipment=1,AntennaUnitGroup=1
676   Equipment=1,AntennaUnitGroup=1,AntennaUnit=1
677   Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=1
678   Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=1,AuPort=1
679   Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=1,AuPort=2
680   Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=2
681   Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=2,AuPort=1
682   Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=2,AuPort=2
683   Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=1
684   Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=1,TmaSubUnit=1
685   Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=2
686   Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=2,TmaSubUnit=1
687   Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=3
688   Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=3,TmaSubUnit=1
689   Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=4
690   Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=4,TmaSubUnit=1
691   Equipment=1,AntennaUnitGroup=1,RfBranch=1
692   Equipment=1,AntennaUnitGroup=1,RfBranch=2
```

```
693   Equipment=1,AntennaUnitGroup=1,RfBranch=3
694   Equipment=1,AntennaUnitGroup=1,RfBranch=4
...
903   Equipment=1,Subrack=1
904   Equipment=1,Subrack=1,Slot=1
905   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1
912   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,RiPort=A
913   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,RiPort=B
914   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,RiPort=C
915   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,RiPort=D
916   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,RiPort=E
917   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,RiPort=F
929   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,DeviceGroup=dul
930   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,DeviceGroup=dul,MpProcessingResource=1
931   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,DeviceGroup=dul,BbProcessingResource=1
933   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,GeneralProcessorUnit=1
934   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,GeneralProcessorUnit=1,ProcessorLoad=1
935   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,GeneralProcessorUnit=1,MediumAccessUnit=1
938   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,TimingUnit=1
939   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,TimingUnit=1,GpsSyncRef=1
952   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,ExchangeTerminalIp=1
953   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,ExchangeTerminalIp=1,GigaBitEthernet=1
954   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,ExchangeTerminalIp=1,GigaBitEthernet=1,IpInterface=1
955   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,ExchangeTerminalIp=1,Program=CXC1735309_R93G01
956   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,SubDeviceGroup=du-1
957   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,SubDeviceGroup=du-1,RicmDeviceSet=1
961   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,EcPort=1
973   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,SubDeviceGroup=bb-1
974   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,SubDeviceGroup=bb-1,CellDeviceSet=1
975   Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,Program=CXC2010113/1_R6G05
...
================================================================================
Total: 976 MOs
```

MO structure Gen2

```
ENBG2> momtl equipm

--------------------------------
LDNs containing ReqEquipment.Equipment (systemCreated)
--------------------------------
ManagedElement[1],Equipment[1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],RetSubUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],TmaSubUnit[0-6]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8],AuPort[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],MulticastAntennaBranch[0-2]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],RfBranch[0-24]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],TmfConfiguration[0-1]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],CcBranch[0-24]
ManagedElement[1],Equipment[1],Cabinet[0-]
```

```
ManagedElement[1],Equipment[1],Cabinet[0-],FanGroup[0-]
ManagedElement[1],Equipment[1],CcLink[0-24]
ManagedElement[1],Equipment[1],DiLink[0-]
ManagedElement[1],Equipment[1],EcBus[0-]
ManagedElement[1],Equipment[1],ExternalNode[0-]
ManagedElement[1],Equipment[1],ExternalNode[0-],EcPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],BbProcessingResource[0-1]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],MpProcessingResource[0-1]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],AlarmPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],DiPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],EFuse[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],EcPort[0-1]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],EnergyMeter[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],PlugInModule[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],RdiPort[0-8]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],RfPort[0-10]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],RiPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],SfpModule[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],SyncPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],TnPort[0-]
ManagedElement[1],Equipment[1],FieldReplaceableUnit[0-],Transceiver[0-1]
ManagedElement[1],Equipment[1],HwGroup[0-]
ManagedElement[1],Equipment[1],RiLink[0-]
ManagedElement[1],Equipment[1],SupportUnit[0-]


ENBG2> lpr equipment=1


===============================================================================
Proxy  MO
===============================================================================
 3163  Equipment=1
 3164  Equipment=1,AntennaUnitGroup=1
 3165  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=RET-1
 3166  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=RET-1,RetSubUnit=1
 3167  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=RET-1,RetSubUnit=2
 3168  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=RET-1,RetSubUnit=3
 3169  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=RET-2
 3170  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=RET-2,RetSubUnit=1
 3171  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=RET-2,RetSubUnit=2
 3172  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=RET-2,RetSubUnit=3
 3173  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=TMA-700-1
 3174  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=TMA-700-1,TmaSubUnit=1
 3175  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=TMA-700-1,TmaSubUnit=2
 3176  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=TMA-700-2
 3177  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=TMA-700-2,TmaSubUnit=1
 3178  Equipment=1,AntennaUnitGroup=1,AntennaNearUnit=TMA-700-2,TmaSubUnit=2
 3179  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1
 3180  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=1
 3181  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=1,AuPort=1
 3182  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=1,AuPort=2
 3183  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=2
 3184  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=2,AuPort=1
 3185  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=2,AuPort=2
 3186  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=3
 3187  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=3,AuPort=1
 3188  Equipment=1,AntennaUnitGroup=1,AntennaUnit=1,AntennaSubunit=3,AuPort=2
```

```
...
3199   Equipment=1,AntennaUnitGroup=1,RfBranch=1800-1
3200   Equipment=1,AntennaUnitGroup=1,RfBranch=1800-2
3201   Equipment=1,AntennaUnitGroup=1,RfBranch=1800-3
3202   Equipment=1,AntennaUnitGroup=1,RfBranch=1800-4
3203   Equipment=1,AntennaUnitGroup=1,RfBranch=2600-1
3204   Equipment=1,AntennaUnitGroup=1,RfBranch=2600-2
3205   Equipment=1,AntennaUnitGroup=1,RfBranch=2600-3
3206   Equipment=1,AntennaUnitGroup=1,RfBranch=2600-4
3207   Equipment=1,AntennaUnitGroup=1,RfBranch=700-1
3208   Equipment=1,AntennaUnitGroup=1,RfBranch=700-2
3209   Equipment=1,AntennaUnitGroup=1,RfBranch=700-3
3210   Equipment=1,AntennaUnitGroup=1,RfBranch=700-4
3211   Equipment=1,AntennaUnitGroup=2
....
3305   Equipment=1,Cabinet=1
3306   Equipment=1,Cabinet=1,FanGroup=1
3307   Equipment=1,Cabinet=1,FanGroup=2
3308   Equipment=1,Cabinet=2
3309   Equipment=1,Cabinet=2,FanGroup=1
3310   Equipment=1,Cabinet=2,FanGroup=2
3311   Equipment=1,Cabinet=3
3312   Equipment=1,Cabinet=3,FanGroup=1
3313   Equipment=1,Cabinet=3,FanGroup=2
3314   Equipment=1,Cabinet=4
3315   Equipment=1,Cabinet=4,FanGroup=1
3316   Equipment=1,EcBus=1
3317   Equipment=1,EcBus=2
3318   Equipment=1,EcBus=3
3319   Equipment=1,EcBus=4
3320   Equipment=1,ExternalNode=1
3321   Equipment=1,ExternalNode=1,EcPort=1
3322   Equipment=1,FieldReplaceableUnit=DU-1
3323   Equipment=1,FieldReplaceableUnit=DU-1,BbProcessingResource=1
3324   Equipment=1,FieldReplaceableUnit=DU-1,EcPort=1
3325   Equipment=1,FieldReplaceableUnit=DU-1,MpProcessingResource=1
3326   Equipment=1,FieldReplaceableUnit=DU-1,RiPort=A
3327   Equipment=1,FieldReplaceableUnit=DU-1,RiPort=B
3328   Equipment=1,FieldReplaceableUnit=DU-1,RiPort=C
3329   Equipment=1,FieldReplaceableUnit=DU-1,RiPort=D
3330   Equipment=1,FieldReplaceableUnit=DU-1,RiPort=E
3331   Equipment=1,FieldReplaceableUnit=DU-1,RiPort=F
3332   Equipment=1,FieldReplaceableUnit=DU-1,SfpModule=A
3333   Equipment=1,FieldReplaceableUnit=DU-1,SfpModule=B
3334   Equipment=1,FieldReplaceableUnit=DU-1,SfpModule=C
3335   Equipment=1,FieldReplaceableUnit=DU-1,SfpModule=D
3336   Equipment=1,FieldReplaceableUnit=DU-1,SfpModule=E
3337   Equipment=1,FieldReplaceableUnit=DU-1,SfpModule=F
3338   Equipment=1,FieldReplaceableUnit=DU-1,SfpModule=TN_B
3339   Equipment=1,FieldReplaceableUnit=DU-1,SyncPort=1
3340   Equipment=1,FieldReplaceableUnit=DU-1,TnPort=TN_B
3341   Equipment=1,FieldReplaceableUnit=PDU-1
3342   Equipment=1,FieldReplaceableUnit=PDU-1,EcPort=1
3343   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=1
3344   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=10
3345   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=11
3346   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=2
3347   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=3
```

```
3348   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=4
3349   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=5
3350   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=6
3351   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=7
3352   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=8
3353   Equipment=1,FieldReplaceableUnit=PDU-1,EFuse=9
3354   Equipment=1,FieldReplaceableUnit=PDU-2
....
3380   Equipment=1,FieldReplaceableUnit=R503-1
3381   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=1
3382   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=10
3383   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=11
3384   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=12
3385   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=13
3386   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=14
3387   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=15
3388   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=16
3389   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=2
3390   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=3
3391   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=4
3392   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=5
3393   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=6
3394   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=7
3395   Equipment=1,FieldReplaceableUnit=R503-1,RiPort=9
...
3473   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1
3474   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,RfPort=A
3475   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,RfPort=B
3476   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,RfPort=C
3477   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,RfPort=D
3478   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,RfPort=R
3479   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,RiPort=DATA_1
3480   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,RiPort=DATA_2
3481   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,SfpModule=DATA_1
3482   Equipment=1,FieldReplaceableUnit=RRU-1800-1-1,SfpModule=DATA_2
...
3575   Equipment=1,FieldReplaceableUnit=SAU-1
3576   Equipment=1,FieldReplaceableUnit=SAU-1,AlarmPort=1
3577   Equipment=1,FieldReplaceableUnit=SAU-1,AlarmPort=2
3578   Equipment=1,FieldReplaceableUnit=SAU-1,AlarmPort=3
3579   Equipment=1,FieldReplaceableUnit=SAU-1,AlarmPort=4
3580   Equipment=1,FieldReplaceableUnit=SAU-1,AlarmPort=5
3581   Equipment=1,FieldReplaceableUnit=SAU-1,AlarmPort=6
3582   Equipment=1,FieldReplaceableUnit=SAU-1,AlarmPort=7
3583   Equipment=1,FieldReplaceableUnit=SAU-1,AlarmPort=8
3584   Equipment=1,FieldReplaceableUnit=SAU-1,EcPort=1
3585   Equipment=1,FieldReplaceableUnit=SCU-1
3586   Equipment=1,FieldReplaceableUnit=SCU-1,EcPort=1
3587   Equipment=1,FieldReplaceableUnit=SCU-2
3588   Equipment=1,FieldReplaceableUnit=SCU-2,EcPort=1
3589   Equipment=1,FieldReplaceableUnit=SCU-3
3590   Equipment=1,FieldReplaceableUnit=SCU-3,EcPort=1
3591   Equipment=1,FieldReplaceableUnit=SUP-1
3592   Equipment=1,FieldReplaceableUnit=SUP-1,EcPort=1
...
==============================================================================
Total: 448 MOs
```

10.4 <u>Inv command</u>

Main command : inv
- **without option: show everything**
- **option h: show HW only**
- **option x: show HW, CPRI links, and RF ports**
- **option xt: show HW and CPRI links only**
- **option xb or xtb: show HW and CPRI links together with CPRI BER**
- **option xf: show HW and RF ports only (same like cabx)**
- **option xtg: show graph of CPRI connections**
- **option xg: show graph of CPRI connections and RF connections**
- **option l: show feature and capacity licenses**
- **option r (combined with any of the above): refresh the printout (by emptying the moshell cache)**
- **option c: display the printout in CSV format**

More info: "h inv"

```
RBS33> h inv


********************************************************************************
inv[hlxpbctrgf] [<Filter>] [<stateFilter>]
********************************************************************************
Complete HW/SW inventory. Includes information about RPUs, licensing, JVM, devices, XPs, ISL, etc.

This command performs a complete HW/SW inventory via the MO and COLI interface. All SW including JVM, RPU, and Device SW (spm,dsp,fpga) is
shown. Licensing (features and capacity) as well as overview of the ISL links is also shown.

Options:
 - h : fetch HW information only, only via MO commands.
 - x : fetch HW information only, using MO commands and COLI commands. The "x" option is similar to the "h" option but shows the XP link handler
addresses associated to each AuxPlugInUnit MO. Applicable for RBS and ENB only. This information is also shown when no options are specified.
 - xf: fetch HW and RF (TX/VSWR) information only, similar like "cabx" command.
 - xt: fetch HW and CPRI information only, and no temperature display.
 - l : show licensing information only (feature and capacity licenses)
 - p : show CPU load of the PlugInUnits
 - r : re-read the inventory data from the node.
 - c : print the tables in CSV format
 - b : show received BER values in the CPRI tables
 - g : display graphical view of CPRI and RF connection (RBS/ERBS/MSRBS)

The first time the command is run, it takes a bit longer because the data has to be fetched from the node before parsing.
```

The following times the command is run, the existing data is parsed again, unless the "r" switch is used ("refresh"), in which case, the data is fetched again and parsed.
When no options are specified, all the information will be displayed except the CPU load.

Arguments:
 - The first argument (general filter) allows to only show the lines matching the filter string. Negative filter is supported by putting a exclamation mark in front of the filter. See examples further down.
 - The second argument (state filter) allows to only show the lines where the MO status matches the state filter.

Printout description:
...<cut>.....

10.5 HW inventory Gen1/Gen2

10.5.1 DU/XMU/RU/HWU tables

Gen1

One table for the DUs and one table for XMU, RU, HWU, Cabinet, Fans (and SupportUnits when applicable)

Node: RBS6201L   CXP102051/27_R5G18 L17Q1.5 (C17.1_LSV204_PA17)


```
=========================================================================================================================
SMN APN  BOARD     SWALLOCATION  S  FAULT OPER MAINT STAT   c/p   d   PRODUCTNUMBER   REV    SERIAL     DATE      TEMP MO
=========================================================================================================================
  0   1  DUS4101   main          1  OFF   ON   OFF   OFF    14% 61%  KDU137624/1      R5A/A D16C066945 20140126  41C 1,Slot=1
  0   2  DUS4101   DU_Extension  1  OFF   ON   OFF   OFF    19% 43%  KDU137624/1      R5A/A D16A317346 20131002  46C 1,Slot=2
-------------------------------------------------------------------------------------------------------------------------

=========================================================================================================================
XPBOARD    ST  FAULT OPER MAINT  PRODUCTNUMBER REV   SERIAL/NAME DATE       TEMP  UPT MO (LNH)
=========================================================================================================================
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   D161279962  20120707   56.0 10.8 RbsSubrack=1,RbsSlot=1,AuxPlugInUnit=RU-1-1 (000100/BXP_0)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   CC43732460  20110127   59.0 10.8 RbsSubrack=1,RbsSlot=2,AuxPlugInUnit=RU-1-2 (000100/BXP_0_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   D168896721  20130721   62.5 10.8 RbsSubrack=2,RbsSlot=1,AuxPlugInUnit=RU-2-1 (000100/BXP_0_1_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   D168896816  20130721   62.5 10.8 RbsSubrack=2,RbsSlot=2,AuxPlugInUnit=RU-2-2
(000100/BXP_0_1_1_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   CC43732695  20110127   58.0 10.8 RbsSubrack=1,RbsSlot=3,AuxPlugInUnit=RU-1-3 (000100/BXP_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   CC43732457  20110127   57.5 10.8 RbsSubrack=1,RbsSlot=4,AuxPlugInUnit=RU-1-4 (000100/BXP_1_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   D168896821  20130721   58.0 10.8 RbsSubrack=2,RbsSlot=3,AuxPlugInUnit=RU-2-3 (000100/BXP_1_1_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   D168893618  20130721   58.5 10.8 RbsSubrack=2,RbsSlot=4,AuxPlugInUnit=RU-2-4
(000100/BXP_1_1_1_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   CC43732455  20110127   57.0 10.8 RbsSubrack=1,RbsSlot=5,AuxPlugInUnit=RU-1-5 (000100/BXP_2)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   CC43732454  20110127   54.0 10.8 RbsSubrack=1,RbsSlot=6,AuxPlugInUnit=RU-1-6 (000100/BXP_2_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   D168893612  20130721   59.0 10.8 RbsSubrack=2,RbsSlot=5,AuxPlugInUnit=RU-2-5 (000100/BXP_2_1_1)
RUL01B13   1   OFF   ON   OFF    KRC11856/1    R1D   CC43500091  20110109   54.5 10.8 RbsSubrack=2,RbsSlot=6,AuxPlugInUnit=RU-2-6
(000100/BXP_2_1_1_1)
XMU03      1   OFF   ON   OFF    KDU137949/1   R1J   D16T415422  20160529   26.0 10.8 AuxPlugInUnit=XMU03-2 (000100/BXP_3)
RRUS12B2   1   OFF   ON   OFF    KRC161299/2   R1M   CF83049457  20160206   73.2 10.8 AuxPlugInUnit=RRU-7 (000100/BXP_3_11)
RRUS12B2   1   OFF   ON   OFF    KRC161299/2   R1M   CF83049866  20160206   71.5 10.8 AuxPlugInUnit=RRU-R2-7 (000100/BXP_3_11_1)
RRUS12B2   1   OFF   ON   OFF    KRC161299/2   R1M   CF83049854  20160206   49.8 10.8 AuxPlugInUnit=RRU-9 (000100/BXP_4_13)
```

```
RRUS12B2    1  OFF   ON   OFF   KRC161299/2  R1M  CF83049860  20160206  51.9 10.8 AuxPlugInUnit=RRU-R2-9 (000100/BXP_4_13_1)
RRUS12B2    1  OFF   ON   OFF   KRC161299/2  R1M  CF83049048  20160206  73.7 10.8 AuxPlugInUnit=RRU-8 (000100/BXP_4_15)
RRUS12B2    1  OFF   ON   OFF   KRC161299/2  R1M  CF83049014  20160206  72.6 10.8 AuxPlugInUnit=RRU-R2-8 (000100/BXP_4_15_1)
RRUS12B4    1  OFF   ON   OFF   KRC161349/2  R1B  CF81551784  20131106  74.6 10.8 AuxPlugInUnit=RRU-4 (000200/BXP_0)
XMU03       1  OFF   ON   OFF   KDU137949/1  R1H  D16R274576  20151029  35.0 10.8 AuxPlugInUnit=XMU03-1 (000200/BXP_1)
RRUS12B4    1  OFF   ON   OFF   KRC161349/2  R1C  CF82106674  20140916  74.5 10.8 AuxPlugInUnit=RRU-5 (000200/BXP_1_12)
RRUS12B4    1  OFF   ON   OFF   KRC161349/2  R1B  CF81581122  20131121  74.3 10.8 AuxPlugInUnit=RRU-R2-5 (000200/BXP_1_13)
RRUS12B4    1  OFF   ON   OFF   KRC161349/2  R1B  CF81545388  20131101  48.8 10.8 AuxPlugInUnit=RRU-6 (000200/BXP_1_14)
RRUS12B4    1  OFF   ON   OFF   KRC161349/2  R1B  CF81544641  20131031  51.0 10.8 AuxPlugInUnit=RRU-R2-6 (000200/BXP_1_15)
RRUS12B4    L  OFF   ON   ON    KRC161349/2  R1B  CF81551786  20131106  49.8 10.8 AuxPlugInUnit=RRU-R2-4 (000200/BXP_3)
RBS6201                          126/BFM901290 R1B CC43746501 20110128  32        Cabinet=1
FANGROUP       OFF                                                                Cabinet=1,FanGroup=1
FANGROUP       OFF                                                                Cabinet=1,FanGroup=2
FANGROUP       OFF                                                                Cabinet=1,FanGroup=3
PDU0201     1  OFF   ON         BMG980336/4  R2G  C941071960  20101201            HwUnit=PDU-1
PDU0201     1  OFF   ON         BMG980336/4  R2X  BW97562930  20151015            HwUnit=PDU-2
PDU0104     1  OFF   ON         BMG980336/7  R1D  X051896089  20120927            HwUnit=PDU-3
PDU0104     1  OFF   ON         BMG980336/7  R1E  X052854382  20150430            HwUnit=PDU-4
PSU         1  OFF   ON         BMR910427/1  R3G  Bw92010931  20100820            HwUnit=PSU-1
PSU         1  OFF   ON         BMR910427/1  R3G  Bw92010856  20100820            HwUnit=PSU-2
PSU         1  OFF   ON         BMR910427/1  R3G  Bw92010601  20100820            HwUnit=PSU-3
PSU2401     1  OFF   ON         BMR910427/1  R4A  BR88247767  20130608            HwUnit=PSU-4
PSU2401     1  OFF   ON         BMR910427/1  R4A  BR88247819  20130608            HwUnit=PSU-5
SCU0201     1  OFF   ON         BGM1361006/2 R2A  CD31649337  20101228            HwUnit=SCU
20150803    1  OFF   ON         BML901367/1  P1B  Bw9A600100  20150803            SupportUnit=1 (POWER_SUPPLY)
20151007    1                   BKV          R1A  SC580059417 20151007            SupportUnit=2 (FAN)
------------------------------------------------------------------------------------------------------------
```

Gen2

One table for the DUs, XMU, RU, HWU, and one table for Cabinets and Fans (and SupportUnits when applicable)

```
Node: RadioNode L   CXP9024418/4_R13GM (16B)
```

FRU	LNH	BOARD	ST	FAULT	OPER	MAINT	STAT	PRODUCTNUMBER	REV	SERIAL	DATE	TEMP	UPT	
DU-1	000100	DUS5201	1	OFF	ON	OFF	ON	KDU137925/31	R1E	D16Q934032	20150909		0.53	(Bb5216)
R503-1	BXP_0	XMU0301	1	OFF	ON	OFF	N/A	KDU137949/1	R1H	D16Q973492	20150915	39.0	9.87	(BbR503)
RRU-1800-1-1	BXP_0_12	RRUS32B3	1	OFF	ON	OFF	N/A	KRC161413/1	R1C	D16R381480	20151112	36.9	9.87	
RU-1-4	BXP_0_14	RUS02B28B	1	OFF	ON	OFF	N/A	KRC161382/1	R1C	CB4T868617	20140530	44.8	9.87	
RU-1-3	BXP_0_15	RUS02B28B	1	OFF	ON	OFF	N/A	KRC161382/1	R1C	CB4T868599	20140530	46.5	9.87	
R503-2	BXP_1	XMU0301	1	OFF	ON	OFF	N/A	KDU137949/1	R1H	D16Q973527	20150915	40.0	9.87	(BbR503)
RRU-1800-2-1	BXP_1_12	RRUS32B3	1	OFF	ON	OFF	N/A	KRC161413/1	R1C	D16R381811	20151112	37.2	9.87	
RU-2-4	BXP_1_14	RUS02B28B	1	OFF	ON	OFF	N/A	KRC161382/1	R1C	CB4T868595	20140530	48.6	9.87	
RU-2-3	BXP_1_15	RUS02B28B	1	OFF	ON	OFF	N/A	KRC161382/1	R1C	CB4T868614	20140530	49.0	9.87	
R503-3	BXP_2	XMU0301	1	OFF	ON	OFF	N/A	KDU137949/1	R1H	D16Q973488	20150915	38.0	9.87	(BbR503)
RRU-1800-3-1	BXP_2_12	RRUS32B3	1	OFF	ON	OFF	N/A	KRC161413/1	R1C	D16R381814	20151112	35.4	9.87	
RU-3-4	BXP_2_14	RUS02B28B	1	OFF	ON	OFF	N/A	KRC161382/1	R1C	CB4T868576	20140530	45.3	9.87	
RU-3-3	BXP_2_15	RUS02B28B	1	OFF	ON	OFF	N/A	KRC161382/1	R1C	CB4T868573	20140530	46.1	9.87	
RRU-2600-1-1	BXP_3	RRUS32B7A	1	OFF	ON	OFF	N/A	KRC161602/1	R1B	D16R319309	20151104	36.7	9.87	
RRU-2600-2-1	BXP_4	RRUS32B7A	1	OFF	ON	OFF	N/A	KRC161602/1	R1B	D16R319297	20151104	36.1	9.87	
RRU-2600-3-1	BXP_5	RRUS32B7A	1	OFF	ON	OFF	N/A	KRC161602/1	R1B	D16R319310	20151104	35.5	9.87	
PDU-1	Z??_01	PDU0202	1	OFF	ON	N/A	N/A	BMG980336/5	R1L	X052305717	20140110			
PDU-2	Z??_02	PDU0202	1	OFF	ON	N/A	N/A	BMG980336/5	R1U	BW97900519	20140102			
PDU-3	Z??_03	PDU0202	1	OFF	ON	N/A	N/A	BMG980336/5	R1U	BW97900516	20140102			

```
SAU-1      Z??_04   SAU0101   1   OFF   ON   N/A   N/A   ZHY60117/1    R1E   CD39325074   20131228
SCU-1      Z??_05   SCU0301   1   OFF   ON   N/A   N/A   BGM1361006/3  R1B   CD39738173   20140311
SCU-2      Z??_06   SCU0301   1   OFF   ON   N/A   N/A   BGM1361006/3  R1B   CD39718851   20140307
SCU-3      Z??_07   SCU0301   1   OFF   ON   N/A   N/A   BGM1361006/3  R1B   CD39632887   20140224
SUP-1      Z??_08   SUP6601   1   OFF   ON   N/A   N/A   1/BFL901009/4 R1E   BR82207677   20120828
-----------------------------------------------------------------------------------------------------


=====================================================================================================
XPBOARD     ST FAULT OPER PRODUCTNUMBER REV SERIAL/NAME DATE       TEMP MO
=====================================================================================================
RBS6202                   102/BFM901351 R4A C824834996  20110708   28  Cabinet=1
FANGROUP       OFF                                                      Cabinet=1,FanGroup=1
FANGROUP       OFF                                                      Cabinet=1,FanGroup=2
RBS6202                   306/BFM901351 R2C CB4T966107  20140606   31  Cabinet=2
FANGROUP       OFF                                                      Cabinet=2,FanGroup=1
FANGROUP       OFF                                                      Cabinet=2,FanGroup=2
RBS6202                   102/BFM901351 R5A CB4N295219  20120716   32  Cabinet=3
FANGROUP       OFF                                                      Cabinet=3,FanGroup=1
FANGROUP       OFF                                                      Cabinet=3,FanGroup=2
RBS6601                   102/BFL901009 R2A BR81844376  20120319   29  Cabinet=4
FANGROUP       OFF                                                      Cabinet=4,FanGroup=1
PSUAC10     1 N/A   N/A  BML901350/1   R1A DF90000020  20150413       SupportUnit=1 (POWER_SUPPLY EXTERNAL_ALARM_PORTS)
FAN01       1 N/A   N/A  BKV106176/2                                  SupportUnit=2 (FAN)
Power6302   1 OFF   ON   BML901367/1   P1C BR84290708  20151016       SupportUnit=3 (POWER_SUPPLY)
-----------------------------------------------------------------------------------------------------
```

10.5.2 AntennaNearUnit table

Same in Gen1 and Gen2

```
========================================================================================================
AntennaNearUnit                                 ST  TYPE   PRODUCTNR     REV       UNIQUEID         RfPort
========================================================================================================
AntennaUnitGroup=1,AntennaNearUnit=RET-1800-1   1   M-RET  RVVPX310B2.15 332       AR00015CN1038491061  FieldReplaceableUnit=RRU-1800-1-1,RfPort=A
AntennaUnitGroup=1,AntennaNearUnit=RET-1800-2   1   M-RET  RVVPX310B2.15 332       AR00013CN1040626971  FieldReplaceableUnit=RRU-1800-1-1,RfPort=C
AntennaUnitGroup=1,AntennaNearUnit=RET-1800-3   1   M-RET  RVVPX310B2.15 332       AR00013CN1041562371  FieldReplaceableUnit=RRU-1800-1-1,RfPort=A
AntennaUnitGroup=1,AntennaNearUnit=TMA-700-1    1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142403700      FieldReplaceableUnit=RU-1-3,RfPort=A
AntennaUnitGroup=1,AntennaNearUnit=TMA-700-2    1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142400175      FieldReplaceableUnit=RU-1-4,RfPort=B
AntennaUnitGroup=2,AntennaNearUnit=RET-1800-1   1   M-RET  RVVPX310B2.15 332       AR00013cn1040417871  FieldReplaceableUnit=RRU-1800-2-1,RfPort=A
AntennaUnitGroup=2,AntennaNearUnit=RET-1800-2   1   M-RET  RVVPX310B2.15 332       AR00013CN1041058031  FieldReplaceableUnit=RRU-1800-2-1,RfPort=C
AntennaUnitGroup=2,AntennaNearUnit=RET-1800-3   1   M-RET  RVVPX310B2.15 332       AR00013CN1040627491  FieldReplaceableUnit=RRU-1800-2-1,RfPort=A
AntennaUnitGroup=2,AntennaNearUnit=TMA-700-1    1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142004583      FieldReplaceableUnit=RU-2-3,RfPort=A
AntennaUnitGroup=2,AntennaNearUnit=TMA-700-2    1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142400158      FieldReplaceableUnit=RU-2-4,RfPort=B
AntennaUnitGroup=3,AntennaNearUnit=RET-1800-1   1   M-RET  RVVPX310B2.15 332       AR00013CN1040747711  FieldReplaceableUnit=RRU-1800-3-1,RfPort=A
AntennaUnitGroup=3,AntennaNearUnit=RET-1800-2   1   M-RET  RVVPX310B2.15 332       AR00013cn1040747541  FieldReplaceableUnit=RRU-1800-3-1,RfPort=A
AntennaUnitGroup=3,AntennaNearUnit=RET-1800-3   1   M-RET  RVVPX310B2.15 332       AR00013CN1040503861  FieldReplaceableUnit=RRU-1800-3-1,RfPort=C
AntennaUnitGroup=3,AntennaNearUnit=TMA-700-1    1   TMA    TMA2094F01V2-1 ?-R953052 KSAN1153704131      FieldReplaceableUnit=RU-3-3,RfPort=A
AntennaUnitGroup=3,AntennaNearUnit=TMA-700-2    1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142403735      FieldReplaceableUnit=RU-3-4,RfPort=B
--------------------------------------------------------------------------------------------------------
```

10.5.3 AIR table

Same in Gen1 and Gen2

```
========================================================================================================
```

```
AIR             PRODUCTNUMBER   REV   SERIAL       DATE        LNH
==============================================================================================
AIR32B4AB2P     KRD901044/1     R1A   TM30007813   20140813    BXP_0
AIR11B20aB8p    KRC11822/1      R1A   CQ30095646   20130319    BXP_0_1 BXP_0_1_1
AIR21B4AB2P     KRC118046/1     R3B   D240087672   20140404    BXP_3_14
----------------------------------------------------------------------------------------------
```

10.5.4 RDS/DOT table

Same in Gen1 and Gen2
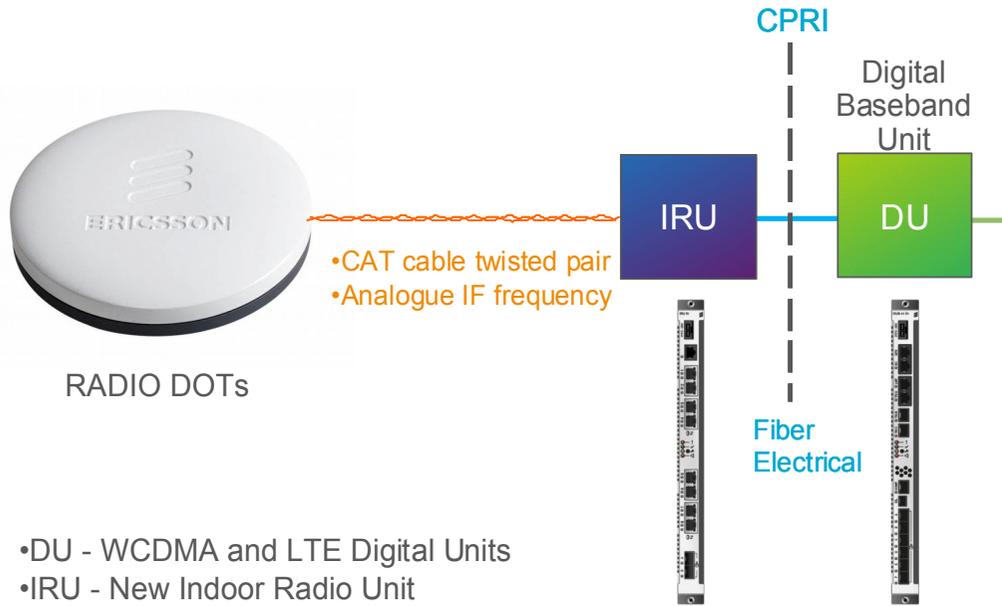
•DU - WCDMA and LTE Digital Units
•IRU - New Indoor Radio Unit
•Radio Dot - New product

```
==============================================================================================
RDS        LNH            ID PCT TX RX PRODUCTNR    REV SERIAL       DATE       TEMP VII (FAULT)
==============================================================================================
RD2242B4 000100/BXP_0   1 111 11 11 KRY901309/1 R2A C828676693 20141114 56C  OPER
RD2242B4 000100/BXP_0   2 111 11 11 KRY901309/1 R2A C828676586 20141114 64C  OPER
RD2242B4 000100/BXP_0   3 111 11 11 KRY901309/1 R2A C828676604 20141114 65C  OPER
RD2242B4 000100/BXP_0   4 110 00 00 KRY901309/1 R2A C828676573 20141114 63C  DEP_RES_MISSING (TimingSyncError)
RD2242B4 000100/BXP_0   5 111 11 11 KRY901309/1 R2A C828676666 20141114 54C  OPER
RD2242B4 000100/BXP_0   6 111 11 11 KRY901309/1 R2A C828676583 20141114 63C  OPER
RD2242B4 000100/BXP_0   7 111 11 11 KRY901309/1 R2A C828676707 20141114 67C  OPER
RD2242B4 000100/BXP_0   8 111 11 11 KRY901309/1 R2A C828676574 20141114 62C  OPER
RD2242B4 000100/BXP_1   1 111 11 11 KRY901309/1 R2A C828676712 20141114 52C  OPER
RD2242B4 000100/BXP_1   2 111 11 11 KRY901309/1 R2A C828676719 20141114 62C  OPER
```

```
RD2242B4 000100/BXP_2  1 111 11 11 KRY901309/1 R2A C828676664 20141114 56C  OPER
RD2242B4 000100/BXP_2  2 111 11 11 KRY901309/1 R2A C828676667 20141114 45C  OPER
RD2242B1 000100/BXP_3  1 111 11 11 KRY901327/1 R1A C828301974 20140905 60C  OPER
RD2242B1 000100/BXP_3  2 111 11 11 KRY901327/1 R1A C828301891 20140905 59C  OPER
RD2242B1 000100/BXP_4  1 111 11 11 KRY901327/1 R2A C828603233 20141103 62C  OPER
RD2242B1 000100/BXP_4  2 111 11 11 KRY901327/1 R2A C828603187 20141103 55C  OPER
RD2242B1 000100/BXP_5  1 111 11 11 KRY901327/1 R2A C828623869 20141106 67C  OPER
RD2242B1 000100/BXP_5  2 111 11 11 KRY901327/1 R2A C828623881 20141106 58C  OPER
RD2242B1 000100/BXP_5  3 111 11 11 KRY901327/1 R2A C828623866 20141106 67C  OPER
RD2242B1 000100/BXP_5  4 111 11 11 KRY901327/1 R2A C828623865 20141106 58C  OPER
RD2242B1 000100/BXP_5  5 111 11 11 KRY901327/1 R2A C828623890 20141106 66C  OPER
RD2242B1 000100/BXP_5  6 111 11 11 KRY901327/1 R2A C828623860 20141106 62C  OPER
RD2242B1 000100/BXP_5  7 111 11 11 KRY901327/1 R2A C828623863 20141106 70C  OPER
RD2242B1 000100/BXP_5  8 111 11 11 KRY901327/1 R2A C828624000 20141106 64C  OPER
-------------------------------------------------------------------------------------------------
```

10.6 HW inventory Pico

```
PRBS> get rbsunit=


======================================================================================================
500                                          Equipment=1,RbsUnit=1
======================================================================================================
productCode                                  productNumber: KRD 901 060/2, productRevision: R1B, serialNumber: C829811209
rbsUnitId                                    1
======================================================================================================
Total: 1 MOs



PRBS> lmidh krd901060/2


KRD901060/26    RBS6402B8B20
KRD901060/24    RBS6402B3
KRD901060/28    RBS6402B8
KRD901060/20    RBS64022xB1B3B7
KRD901060/21    RBS6402B1B3B7Wi
KRD901060/22    RBS64022xB1B3B7Wi
KRD901060/29    RBS6402B20
KRD901060/23    RBS6402B1
KRD901060/27    RBS6402B8B20Wi
KRD901060/2     RBS64022xB2/25B4B7
```

11 CPRI connections

DUs are connected to RUs via CPRI links (Common Public Radio Interface http://www.cpri.info/)

The CPRI links are electrical but can be made optical by using SFP modules on the CPRI ports at each end of the link

11.1 CPRI topology

The DUs can be directly connected to each RU or via a CPRI splitter XMU (BB R503).
The RUs can be connected in cascade.

Example CPRI topology
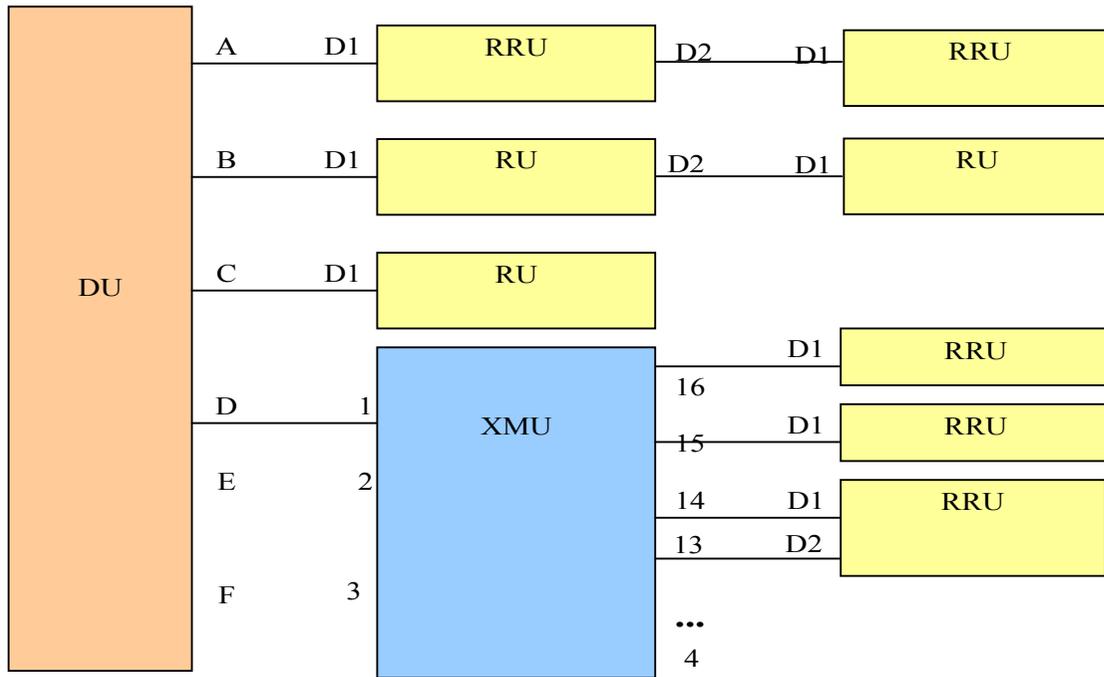
XMU (Baseband R) port mapping
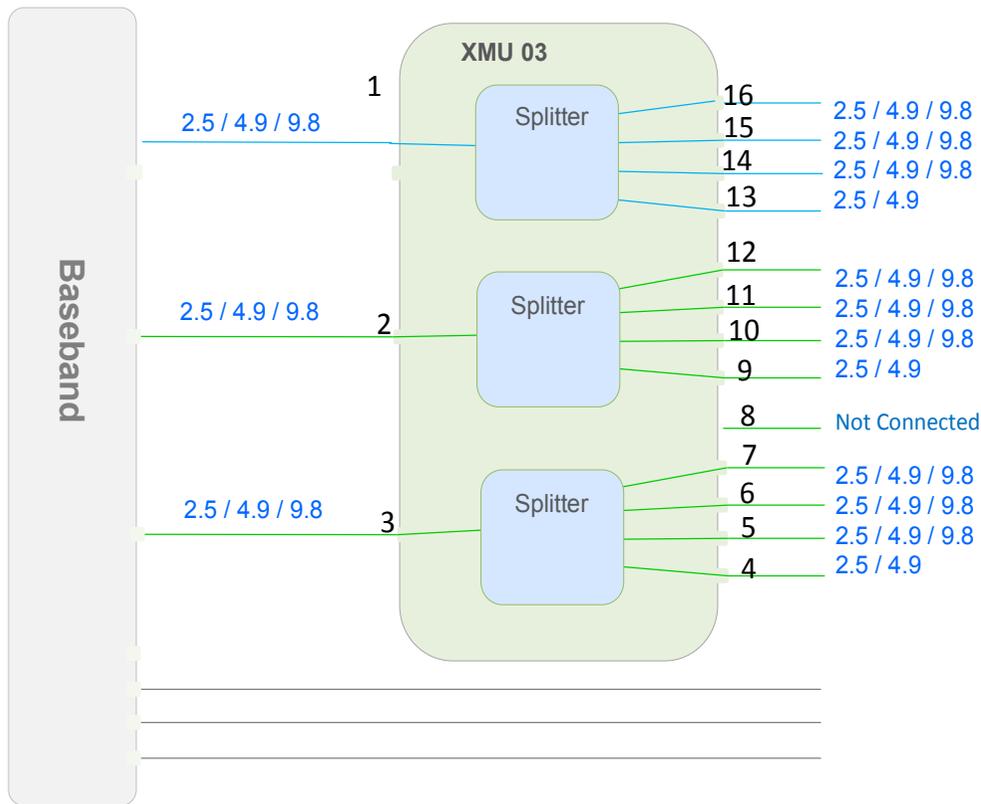
Each CPRI link is represented by a RiLink MO

```
ENB> hget rilink= ref|rate


===============================================================================================
MO         linkRate riPortRef1                        riPortRef2
===============================================================================================
RiLink=1   9800     FieldReplaceableUnit=DU-1,RiPort=A  FieldReplaceableUnit=R503-1,RiPort=1
RiLink=10  2500     FieldReplaceableUnit=R503-1,RiPort=16 FieldReplaceableUnit=RU-1-3,RiPort=DATA_1
RiLink=11  4900     FieldReplaceableUnit=R503-2,RiPort=13 FieldReplaceableUnit=RRU-1800-2-1,RiPort=DATA_2
RiLink=12  9800     FieldReplaceableUnit=R503-2,RiPort=14 FieldReplaceableUnit=RRU-1800-2-1,RiPort=DATA_1
RiLink=13  2500     FieldReplaceableUnit=R503-2,RiPort=15 FieldReplaceableUnit=RU-2-4,RiPort=DATA_1
RiLink=14  2500     FieldReplaceableUnit=R503-2,RiPort=16 FieldReplaceableUnit=RU-2-3,RiPort=DATA_1
RiLink=15  2500     FieldReplaceableUnit=R503-3,RiPort=13 FieldReplaceableUnit=RRU-1800-3-1,RiPort=DATA_2
RiLink=16  2500     FieldReplaceableUnit=R503-3,RiPort=14 FieldReplaceableUnit=RRU-1800-3-1,RiPort=DATA_1
RiLink=17  2500     FieldReplaceableUnit=R503-3,RiPort=15 FieldReplaceableUnit=RU-3-4,RiPort=DATA_1
RiLink=18  2500     FieldReplaceableUnit=R503-3,RiPort=16 FieldReplaceableUnit=RU-3-3,RiPort=DATA_1
RiLink=2   9800     FieldReplaceableUnit=DU-1,RiPort=B  FieldReplaceableUnit=R503-2,RiPort=1
RiLink=3   9800     FieldReplaceableUnit=DU-1,RiPort=C  FieldReplaceableUnit=R503-3,RiPort=1
RiLink=4   9800     FieldReplaceableUnit=DU-1,RiPort=D  FieldReplaceableUnit=RRU-2600-1-1,RiPort=DATA_1
RiLink=5   9800     FieldReplaceableUnit=DU-1,RiPort=E  FieldReplaceableUnit=RRU-2600-2-1,RiPort=DATA_1
```

```
RiLink=6   9800     FieldReplaceableUnit=DU-1,RiPort=F     FieldReplaceableUnit=RRU-2600-3-1,RiPort=DATA_1
RiLink=7   2500     FieldReplaceableUnit=R503-1,RiPort=13 FieldReplaceableUnit=RRU-1800-1-1,RiPort=DATA_2
RiLink=8   2500     FieldReplaceableUnit=R503-1,RiPort=14 FieldReplaceableUnit=RRU-1800-1-1,RiPort=DATA_1
RiLink=9   2500     FieldReplaceableUnit=R503-1,RiPort=15 FieldReplaceableUnit=RU-1-4,RiPort=DATA_1
=================================================================================================================
Total: 18 MOs
```

- **to only show CPRI connections and not RF connections , add the "t" option (faster)**
- **to not show the CPRI BER, skip the "b" option (also faster)**
- **info about the recommended values for Txbs, DlLoss, UlLoss, etc can be found in "h inv"**

```
ENB> invxtbg

....<cut>...

============================================================================================================================
ID T RiL BOARD1    LNH1 PORT R LINK RATE BOARD2      LNH2     PORT R LINK RATE LENGTH MO1 - MO2
============================================================================================================================
 1 E   1 DUS5201   000100  1 M Up   9.8G XMU0301     BXP_0      0 S Up   9.8G    90m Fru=DU-1(A)  Fru=R503-1(1)
 2 E   2 DUS5201   000100  2 M Up   9.8G XMU0301     BXP_1      0 S Up   9.8G    89m Fru=DU-1(B)  Fru=R503-2(1)
 3 E   3 DUS5201   000100  3 M Up   9.8G XMU0301     BXP_2      0 S Up   9.8G    90m Fru=DU-1(C)  Fru=R503-3(1)
 4 O   4 DUS5201   000100  4 M Up   9.8G RRUS32B7A   BXP_3      0 S Up   9.8G   174m Fru=DU-1(D)  Fru=RRU-2600-1-1(D1)
 5 O   5 DUS5201   000100  5 M Up   9.8G RRUS32B7A   BXP_4      0 S Up   9.8G   173m Fru=DU-1(E)  Fru=RRU-2600-2-1(D1)
 6 O   6 DUS5201   000100  6 M Up   9.8G RRUS32B7A   BXP_5      0 S Up   9.8G   173m Fru=DU-1(F)  Fru=RRU-2600-3-1(D1)
 7 O   7 XMU0301   BXP_0  12 M Up   2.5G RRUS32B3    BXP_0_12   1 S Up   2.5G   199m Fru=R503-1(13) Fru=RRU-1800-1-1(D2)
 8 O   8 XMU0301   BXP_0  13 M Up   2.5G RRUS32B3    BXP_0_12   0 S Up   2.5G   198m Fru=R503-1(14) Fru=RRU-1800-1-1(D1)
 9 E   9 XMU0301   BXP_0  14 M Up   2.5G RUS02B28B   BXP_0_14   0 S Up   2.5G     0m Fru=R503-1(15) Fru=RU-1-4(D1)
10 E  10 XMU0301   BXP_0  15 M Up   2.5G RUS02B28B   BXP_0_15   0 S Up   2.5G     0m Fru=R503-1(16) Fru=RU-1-3(D1)
11 O  11 XMU0301   BXP_1  12 M Up   4.9G RRUS32B3    BXP_1_12   1 S Up   4.9G   126m Fru=R503-2(13) Fru=RRU-1800-2-1(D2)
12 O  12 XMU0301   BXP_1  13 M Up   9.8G RRUS32B3    BXP_1_12   0 S Up   9.8G    88m Fru=R503-2(14) Fru=RRU-1800-2-1(D1)
13 E  13 XMU0301   BXP_1  14 M Up   2.5G RUS02B28B   BXP_1_14   0 S Up   2.5G     0m Fru=R503-2(15) Fru=RU-2-4(D1)
14 E  14 XMU0301   BXP_1  15 M Up   2.5G RUS02B28B   BXP_1_15   0 S Up   2.5G     0m Fru=R503-2(16) Fru=RU-2-3(D1)
15 O  15 XMU0301   BXP_2  12 M Up   2.5G RRUS32B3    BXP_2_12   1 S Up   2.5G   197m Fru=R503-3(13) Fru=RRU-1800-3-1(D2)
16 O  16 XMU0301   BXP_2  13 M Up   2.5G RRUS32B3    BXP_2_12   0 S Up   2.5G   197m Fru=R503-3(14) Fru=RRU-1800-3-1(D1)
17 E  17 XMU0301   BXP_2  14 M Up   2.5G RUS02B28B   BXP_2_14   0 S Up   2.5G     0m Fru=R503-3(15) Fru=RU-3-4(D1)
18 E  18 XMU0301   BXP_2  15 M Up   2.5G RUS02B28B   BXP_2_15   0 S Up   2.5G     0m Fru=R503-3(16) Fru=RU-3-3(D1)
----------------------------------------------------------------------------------------------------------------------------


+---------+      +---------+     +----------+
|         | A E98  1 |        |     | 16  E25  D1 |   RU-1-3   |
|         |----1/1----|        |     |----10/10----| RUS02B28B |
|         |  90m    |        |     |    0m      | BXP_0_15 |
|         |         |        |     |            +----------+
|         |         |        |     |                 |A  |B
|         |         |        |     SE=700-1 FDD=AADPFM1  |
|         |         |        |     |                 SE=700-1
|         |         |        |     |
|         |         |        |     |
|         |         |        |     |            +----------+
|         |         |        |     | 15  E25  D1 |   RU-1-4   |
|         |         |        |     |-----9/9-----| RUS02B28B |
|         |         |        | R503-1  |    0m      | BXP_0_14 |
|         |         |        | XMU0301 |            +----------+
|         |         |        |  BXP_0  |                 |A  |B
```

```
|          |          |          |          | SE=700-1 FDD=AADPFM1   |
|          |          |          |          |              SE=700-1
|          |          |          |          |
|          |          |          |          |
|          |          |          |          |     +---------------+
|          |          |          |          | 14 O25 D1 |               |
|          |          |          |          |----8/8----| RRU-1800-1-1  |
|          |          |          |          |   198m    |   RRUS32B3    |
|          |          |          |          |           |   BXP_0_12    |
|          |          |          |          | 13 O25 D2 |               |
|          |          |          |          |----7/7----|               |
|          |          |          |          |   199m    +---------------+
|          |          |          |          |           |A  |B   |C   |D
|          |          |          +----------+       SE=1800-1 FDD=AADPEM1
|          |          |
|          |          |          +----------+       +-----------+
|          |      B  E98  1 |          |    | 16  E25   D1 |  RU-2-3   |
|          |----2/2----|          |    |----14/14----| RUS02B28B |
|          |      89m   |          |    |      0m    | BXP_1_15  |
|          |          |          |    |           +-----------+
|          |          |          |    |           |A   |B
|          |          |          |    | SE=700-2 FDD=AADPFM2  |
|          |          |          |    |              SE=700-2
|          |          |          |    |
|          |          |          |    |     +-----------+
|          |          |          |    | 15  E25   D1 |  RU-2-4   |
|          |          |          |    |----13/13----| RUS02B28B |
|          |          |   R503-2   |    |      0m    | BXP_1_14  |
|          |          |  XMU0301  |    |           +-----------+
|          |          |   BXP_1    |    |           |A   |B
|          |          |          |    | SE=700-2 FDD=AADPFM2  |
|          |          |          |    |              SE=700-2
|          |          |          |    |
|          |          |          |    |     +---------------+
|          |          |          |    | 14 O98 D1 |               |
|          |          |          |    |---12/12---| RRU-1800-2-1  |
|          |          |          |    |    88m    |   RRUS32B3    |
|          |          |          |    |           |   BXP_1_12    |
|          |          |          |    | 13 O49 D2 |               |
|          |          |          |    |---11/11---|               |
|          |          |          |    |   126m    +---------------+
|    DU-1  |          |          |    |           |A  |B   |C   |D
|  DUS5201 |          |          +----------+       SE=1800-2 FDD=AADPEM2
|  000100  |          |
|          |          |          +----------+       +-----------+
|          |      C  E98  1 |          |    | 16  E25   D1 |  RU-3-3   |
|          |----3/3----|          |    |----18/18----| RUS02B28B |
|          |      90m   |          |    |      0m    | BXP_2_15  |
|          |          |          |    |           +-----------+
|          |          |          |    |           |A   |B
|          |          |          |    | SE=700-3 FDD=AADPFM3  |
|          |          |          |    |              SE=700-3
|          |          |          |    |
|          |          |          |    |     +-----------+
|          |          |          |    | 15  E25   D1 |  RU-3-4   |
|          |          |          |    |----17/17----| RUS02B28B |
|          |          |   R503-3   |    |      0m    | BXP_2_14  |
|          |          |  XMU0301  |    |           +-----------+
|          |          |   BXP_2    |    |           |A   |B
```

```
|        |              |                |  SE=700-3 FDD=AADPFM3  |
|        |              |                |                 SE=700-3
|        |              |                |
|        |              |                |
|        |              |                |     +--------------+
|        |              |                | 14 O25 D1 |              |
|        |              |                |---16/16---| RRU-1800-3-1 |
|        |              |                |     197m  |    RRUS32B3  |
|        |              |                |           |    BXP_2_12  |
|        |              |                | 13 O25 D2 |              |
|        |              |                |---15/15---|              |
|        |              |                |     197m  +--------------+
|        |              |                |            |A  |B  |C  |D
|        |              +---------+       |       SE=1800-3 FDD=AADPEM3
|        |
|        |                       +--------------+
|        |            D  O98 D1 | RRU-2600-1-1 |
|        |            ----4/4----|    RRUS32B7A  |
|        |               174m   |    BXP_3      |
|        |                       +--------------+
|        |                        |A  |B  |C  |D
|        |                     SE=2600-1 FDD=AADPAM1
|        |                               FDD=AADPBM1
|        |
|        |                       +--------------+
|        |            E  O98 D1 | RRU-2600-2-1 |
|        |            ----5/5----|    RRUS32B7A  |
|        |               173m   |    BXP_4      |
|        |                       +--------------+
|        |                        |A  |B  |C  |D
|        |                     SE=2600-2 FDD=AADPAM2
|        |                               FDD=AADPBM2
|        |
|        |                       +--------------+
|        |            F  O98 D1 | RRU-2600-3-1 |
|        |            ----6/6----|    RRUS32B7A  |
|        |               173m   |    BXP_5      |
|        |                       +--------------+
|        |                        |A  |B  |C  |D
+--------+                     SE=2600-3 FDD=AADPAM3
                                        FDD=AADPBM3
```

11.2 SFP inventory and diagnostics

```
ENB> invxtbg

....<cut>...

============================================================================================================================
ID LINK VENDOR1        VENDORPROD1        REV1 SERIAL1       DATE1     ERICSSONPROD1   VENDOR2        VENDORPROD2        REV2 SERIAL2       DATE2
ERICSSONPROD2
============================================================================================================================
 4 Up   DELTA          LCP-10G3B4HDRM-E A   145209101187 20141224 RDH10265/2 R1A  FINISARCORP.   FTLX1370W3BTL-E7 A     US40XRP        20140724
RDH10265/2 R1A
```

```
  5 Up   DELTA      LCP-10G3B4HDRM-E A    145209101189 20141224 RDH10265/2 R1A  FINISARCORP.  FTLX1370W3BTL-E7 A   US40S5W      20140724
RDH10265/2 R1A
  6 Up   DELTA      LCP-10G3B4HDRM-E A    145209101197 20141224 RDH10265/2 R1A  FINISARCORP.  FTLX1370W3BTL-E7 A   US410FG      20140724
RDH10265/2 R1A
  7 Up   JDSU       JSH-12L1DD1-ES   2    SC41677008C4 20121009 RDH10247/2 R1A  FINISARCORP.  FTLX1370W3BTL-E7 A   US40U5H      20140724
RDH10265/2 R1A
  8 Up   JDSU       JSH-12L1DD1-ES   2    SC4067700199 20120927 RDH10247/2 R1A  FINISARCORP.  FTLX1370W3BTL-E7 A   US40VQ5      20140724
RDH10265/2 R1A
 11 Up   DELTA      LCP-10G3B4QDRTJA A    152709M02445 20150706 RDH10265/31 R1A DELTA         LCP-10G3B4HDRM-E A   145209101195 20141224
RDH10265/2 R1A
 12 Up   DELTA      LCP-10G3B4QDRTJA A    152709M02442 20150706 RDH10265/31 R1A DELTA         LCP-10G3B4HDRM-E A   145209101193 20141224
RDH10265/2 R1A
 15 Up   JDSU       JSH-12L1DD1-ES   2    SC37677012D1 20120926 RDH10247/2 R1A  FINISARCORP.  FTLX1370W3BTL-E7 A   US40U84      20140724
RDH10265/2 R1A
 16 Up   JDSU       JSH-12L1DD1-ES   2    SC4167700E9E 20121009 RDH10247/2 R1A  FINISARCORP.  FTLX1370W3BTL-E7 A   US40VQU      20140724
RDH10265/2 R1A
----------------------------------------------------------------------------------------------------------------------------------


=============================================================================================================================
ID LINK RiL WL1  TEMP1 TXbs1 TXdBm1 RXdBm1 BER1   WL2  TEMP2 TXbs2 TXdBm2 RXdBm2 BER2   DlLoss UlLoss
=============================================================================================================================
  4 Up    4 1310 39C   23%   -2.31  -6.38   0    1310 41C   67%   -0.58  -2.89   0     0.58    5.8
  5 Up    5 1310 44C   24%   -2.87  -1.62   0    1310 36C   61%   -0.59  -2.06   0    -0.81    1.03
  6 Up    6 1310 42C   24%   -1.08  -2.45   0    1310 35C   61%   -0.57  -2.25   0     1.17    1.88
  7 Up    7 1310 46C   52%   -3.66  -4.22   0    1310 40C   65%   -2.80  -4.47   0     0.81    1.42
  8 Up    8 1310 45C   50%   -5.77  -4.35   0    1310 38C   66%   -0.53  -5.16   0    -0.61    3.82
 11 Up   11 1310 40C   32%   -2.38  -2.90   NZ   1310 36C   23%   -2.39  -8.21   0     5.83    0.51
 12 Up   12 1310 41C   31%   -2.38  -4.00   0    1310 37C   22%   -2.24  -3.79   0     1.41    1.76
 15 Up   15 1310 46C   49%   -4.25  -1.54   0    1310 37C   64%   -0.76  -4.24   0    -0.01    0.78
 16 Up   16 1310 48C   51%   -4.73  -2.83   0    1310 39C   69%   -0.60  -4.63   0    -0.1     2.23
----------------------------------------------------------------------------------------------------------------------------------


=============================================================================================================================
ID BOARD     SFPLNH PORT VENDOR       VENDORPROD       REV  SERIAL       DATE     ERICSSONPROD     WL   TEMP  TXbs  TXdBm  RXdBm BER
=============================================================================================================================
  4 DUS5201   000100    4 DELTA        LCP-10G3B4HDRM-E A    145209101187 20141224 RDH10265/2 R1A   1310 39C   23%   -2.31  -6.38  0
  5 DUS5201   000100    5 DELTA        LCP-10G3B4HDRM-E A    145209101189 20141224 RDH10265/2 R1A   1310 44C   24%   -2.87  -1.62  0
  6 DUS5201   000100    6 DELTA        LCP-10G3B4HDRM-E A    145209101197 20141224 RDH10265/2 R1A   1310 42C   24%   -1.08  -2.45  0
  7 XMU0301   BXP_0    12 JDSU         JSH-12L1DD1-ES   2    SC41677008C4 20121009 RDH10247/2 R1A   1310 46C   52%   -3.66  -4.22  0
  8 XMU0301   BXP_0    13 JDSU         JSH-12L1DD1-ES   2    SC4067700199 20120927 RDH10247/2 R1A   1310 45C   50%   -5.77  -4.35  0
  8 RRUS32B3  BXP_0_12  0 FINISARCORP. FTLX1370W3BTL-E7 A    US40VQ5      20140724 RDH10265/2 R1A   1310 38C   66%   -0.53  -5.16  0
  7 RRUS32B3  BXP_0_12  1 FINISARCORP. FTLX1370W3BTL-E7 A    US40U5H      20140724 RDH10265/2 R1A   1310 40C   65%   -2.80  -4.47  0
 11 XMU0301   BXP_1    12 DELTA        LCP-10G3B4QDRTJA A    152709M02445 20150706 RDH10265/31 R1A  1310 40C   32%   -2.38  -2.90  NZ
 12 XMU0301   BXP_1    13 DELTA        LCP-10G3B4QDRTJA A    152709M02442 20150706 RDH10265/31 R1A  1310 41C   31%   -2.38  -4.00  0
 12 RRUS32B3  BXP_1_12  0 DELTA        LCP-10G3B4HDRM-E A    145209101193 20141224 RDH10265/2 R1A   1310 37C   22%   -2.24  -3.79  0
 11 RRUS32B3  BXP_1_12  1 DELTA        LCP-10G3B4HDRM-E A    145209101195 20141224 RDH10265/2 R1A   1310 36C   23%   -2.39  -8.21  0
 15 XMU0301   BXP_2    12 JDSU         JSH-12L1DD1-ES   2    SC37677012D1 20120926 RDH10247/2 R1A   1310 46C   49%   -4.25  -1.54  0
 16 XMU0301   BXP_2    13 JDSU         JSH-12L1DD1-ES   2    SC4167700E9E 20121009 RDH10247/2 R1A   1310 48C   51%   -4.73  -2.83  0
 16 RRUS32B3  BXP_2_12  0 FINISARCORP. FTLX1370W3BTL-E7 A    US40VQU      20140724 RDH10265/2 R1A   1310 39C   69%   -0.60  -4.63  0
 15 RRUS32B3  BXP_2_12  1 FINISARCORP. FTLX1370W3BTL-E7 A    US40U84      20140724 RDH10265/2 R1A   1310 37C   64%   -0.76  -4.24  0
  4 RRUS32B7A BXP_3     0 FINISARCORP. FTLX1370W3BTL-E7 A    US40XRP      20140724 RDH10265/2 R1A   1310 41C   67%   -0.58  -2.89  0
  5 RRUS32B7A BXP_4     0 FINISARCORP. FTLX1370W3BTL-E7 A    US40S5W      20140724 RDH10265/2 R1A   1310 36C   61%   -0.59  -2.06  0
  6 RRUS32B7A BXP_5     0 FINISARCORP. FTLX1370W3BTL-E7 A    US410FG      20140724 RDH10265/2 R1A   1310 35C   61%   -0.57  -2.25  0
----------------------------------------------------------------------------------------------------------------------------------
 TN DUS5201   000100    B FINISAR CORP. FTLX1471D3BTL-E7 A   AUC1C1M      150925   RDH10265/3 R1A   1310 42C   37%   -2.01  -11.55
----------------------------------------------------------------------------------------------------------------------------------
```

11.3 COLI printouts

```
RBS33> cpridump all

coli>/labonly/ricm/cpridump all
Basic CPRI info
==============
DU unitId: 1
Filter time: 400 ms
                      CPRI          2-way  O&M                                       Sync over
 Pos  LinkId  UnitId  Shared  Status  Speed  CPRI  Status  Hunt path              Type  CPRI Status
| CPRI Port 1:
   1      1   2048    No      Up      2.5G   No    Up      BXP_0                   RU    Unavailable
| CPRI Port 2:
   1      2   2049    No      Up      2.5G   No    Up      BXP_1                   RU    Unavailable
| CPRI Port 3:
   1      3   2050    No      Up      2.5G   No    Up      BXP_2                   RU    Unavailable
| CPRI Port 4:
| CPRI Port 5:
| CPRI Port 6:
| CPRI Port 7:
| CPRI Port 8:
| CPRI Port 9:
| CPRI Port 10:
RU port info
==============
             Current  Remote  Sync  Preferred  Sync    MM avail   MM sync  MM      MM remote
 RU ID  O&M  port     port    port  sync port  status  status     status   client  hunt path
| CPRI Port 1:
    1   Up        0       1      0          0  Avail   Not avail  Unavail  No      (null)
| CPRI Port 2:
    2   Up        0       1      0          0  Avail   Not avail  Unavail  No      (null)
| CPRI Port 3:
    3   Up        0       1      0          0  Avail   Not avail  Unavail  No      (null)
| CPRI Port 4:
| CPRI Port 5:
| CPRI Port 6:
| CPRI Port 7:
| CPRI Port 8:
| CPRI Port 9:
| CPRI Port 10:
```

| RICI capabilities |

RU ID	Hunt path	O&M	ID	Value	Name	ID	Value	Name	ID	Value	Name
0x1	BXP_0	Up	0x01	0x1	SFP info	0x02	0x1	Delay handling	0x03	0x1	Cascading
			0x04	0x1	Reset link	0x05	0x1	Current port	0x06	0x1	Delay handling 2
			0x08	0x1	CPRI port awareness	0x0A	0x1	Additional ECP addresses	0x0B	0x1	Port pair
			0x10	0x1	Select RE sync port	0x13	0x1	Subscribe RE sync port	0x14	0x1	Delay handling 3
			0x17	0x1	2-way alloc ranges	0x1C	0x1	CPRI monitoring	0x1D	0x1	SFP info 2
			0x1E	0x1	Subscribe port	0x1F	0x1	Subscribe MM port status	0x20	0x1	Get frequency diff
			0x21	0x1	Get RFS diff	0x28	0x1	Get frequency diff 2			

```
| 0x2  | BXP_1   | Up | 0x01 |  0x1 | SFP info           | 0x02 |  0x1 | Delay handling          | 0x03 |  0x1 | Cascading        |
|      |         |    | 0x04 |  0x1 | Reset link         | 0x05 |  0x1 | Current port            | 0x06 |  0x1 | Delay handling 2 |
|      |         |    | 0x08 |  0x1 | CPRI port awareness| 0x0A |  0x1 | Additional ECP addresses| 0x0B |  0x1 | Port pair        |
|      |         |    | 0x10 |  0x1 | Select RE sync port| 0x13 |  0x1 | Subscribe RE sync port  | 0x14 |  0x1 | Delay handling 3 |
|      |         |    | 0x17 |  0x1 | 2-way alloc ranges | 0x1C |  0x1 | CPRI monitoring         | 0x1D |  0x1 | SFP info 2       |
|      |         |    | 0x1E |  0x1 | Subscribe port     | 0x1F |  0x1 | Subscribe MM port status| 0x20 |  0x1 | Get frequency diff|
|      |         |    | 0x21 |  0x1 | Get RFS diff       | 0x28 |  0x1 | Get frequency diff 2    |      |      |                  |
+------+---------+----+------+------+--------------------+------+------+-------------------------+------+------+------------------+
| 0x3  | BXP_2   | Up | 0x01 |  0x1 | SFP info           | 0x02 |  0x1 | Delay handling          | 0x03 |  0x1 | Cascading        |
|      |         |    | 0x04 |  0x1 | Reset link         | 0x05 |  0x1 | Current port            | 0x06 |  0x1 | Delay handling 2 |
|      |         |    | 0x08 |  0x1 | CPRI port awareness| 0x0A |  0x1 | Additional ECP addresses| 0x0B |  0x1 | Port pair        |
|      |         |    | 0x10 |  0x1 | Select RE sync port| 0x13 |  0x1 | Subscribe RE sync port  | 0x14 |  0x1 | Delay handling 3 |
|      |         |    | 0x17 |  0x1 | 2-way alloc ranges | 0x1C |  0x1 | CPRI monitoring         | 0x1D |  0x1 | SFP info 2       |
|      |         |    | 0x1E |  0x1 | Subscribe port     | 0x1F |  0x1 | Subscribe MM port status| 0x20 |  0x1 | Get frequency diff|
|      |         |    | 0x21 |  0x1 | Get RFS diff       | 0x28 |  0x1 | Get frequency diff 2    |      |      |                  |
+------+---------+----+------+------+--------------------+------+------+-------------------------+------+------+------------------+
RU range info
================
              Remote  Range     Control       Traffic
RU ID  O&M    port    support   range         range
| CPRI Port 1:
    1  Up       1        0   Full          Full
| CPRI Port 2:
    2  Up       1        0   Full          Full
| CPRI Port 3:
    3  Up       1        0   Full          Full
| CPRI Port 4:
| CPRI Port 5:
| CPRI Port 6:
| CPRI Port 7:
| CPRI Port 8:
| CPRI Port 9:
| CPRI Port 10:
Debug info
==============
                           Active   CPRI       ATFI        Type of  Cascade  ECP     Inband
Path              RU ID  O&M  state    state      state       unit     word     addr    addr
| CPRI Port 1:
DU_0               1  Up   Active   Active     Connected      4        2        0       0
| CPRI Port 2:
DU_1               2  Up   Active   Active     Connected      4        2        0       0
| CPRI Port 3:
DU_2               3  Up   Active   Active     Connected      4        2        0       0
| CPRI Port 4:
DU_3              -1  Down Idle     Inactive   Not setup      0        0       -1      -1
| CPRI Port 5:
DU_4              -1  Down Idle     Inactive   Not setup      0        0       -1      -1
| CPRI Port 6:
DU_5              -1  Down Idle     Inactive   Not setup      0        0       -1      -1
| CPRI Port 7:
DU_6              -1  Down Idle     Inactive   Not setup      0        0       -1      -1
| CPRI Port 8:
DU_7              -1  Down Idle     Inactive   Not setup      0        0       -1      -1
| CPRI Port 9:
DU_8              -1  Down Idle     Inactive   Not setup      0        0       -1      -1
| CPRI Port 10:
DU_9              -1  Down Idle     Inactive   Not setup      0        0       -1      -1
----------------------------------------------------------------------------------
```

```
|                        Delay components (unit 10ps)                       |
-----------------------------------------------------------------------------
| RU ID | Hunt path | O&M | REC to RE | RTD from REC | Prev RE to RE | RTD from prev RE |
+-------+-----------+-----+-----------+--------------+---------------+------------------+
|   0x1 | BXP_0     | Up  |     51977 |       118815 |           - |                - |
|   0x2 | BXP_1     | Up  |     51888 |       118815 |           - |                - |
|   0x3 | BXP_2     | Up  |     51918 |       118815 |           - |                - |
+-------+-----------+-----+-----------+--------------+---------------+------------------+
-----------------------------------------------------------------------------------------------------------
------------------------
|                                                   PM counters
|
|
-----------------------------------------------------------------------------------------------------------
------------------------
| Hunt path | Unit | Port | LOS | LOF | BER10_8 | BER10_7 | BER10_6 | BER10_5 | SfpTxPower(uW) | SfpRxPower(uW) | SfpTemperature(C) | SfpVoltage(100uV) | SfpTxBias(mA) |
+-----------+------+------+-----+-----+---------+---------+---------+---------+----------------+----------------+-------------------+-------------------+---------------+
| BXP_0     | Near |    1 |   0 |   0 |       0 |       0 |       0 |       0 |              0 |              0 |                 0 |                 0 |             0 |
|           | Far  |    0 |   0 |   0 |       0 |       0 |       0 |       0 |              0 |              0 |                 0 |                 0 |             0 |
+-----------+------+------+-----+-----+---------+---------+---------+---------+----------------+----------------+-------------------+-------------------+---------------+
| BXP_1     | Near |    2 |   0 |   0 |       0 |       0 |       0 |       0 |              0 |              0 |                 0 |                 0 |             0 |
|           | Far  |    0 |   0 |   0 |       0 |       0 |       0 |       0 |              0 |              0 |                 0 |                 0 |             0 |
+-----------+------+------+-----+-----+---------+---------+---------+---------+----------------+----------------+-------------------+-------------------+---------------+
| BXP_2     | Near |    3 |   0 |   0 |       0 |       0 |       0 |       0 |              0 |              0 |                 0 |                 0 |             0 |
|           | Far  |    0 |   0 |   0 |       0 |       0 |       0 |       0 |              0 |              0 |                 0 |                 0 |             0 |
+-----------+------+------+-----+-----+---------+---------+---------+---------+----------------+----------------+-------------------+-------------------+---------------+
--------------------------------------------------------------------------------
|                                 IQ Carriers                                   |
--------------------------------------------------------------------------------
|        | CB | Num  | Ingr | Ingr | Ingr | Ingr | Ingr | Ingr BF | Egr  | Egr  | Egr  | Egr  | Egr | Egr BF |
| UnitId | ID | slots| port | type | slot | subF | fmt  | offset  | port | type | slot | subF | fmt | offset |
+--------+----+------+------+------+------+------+------+---------+------+------+------+------+-----+--------+
-----------------------------------------------------------
|                    IQC Carriers                          |
-----------------------------------------------------------
|        | CB | LC | Ingr | Ingr | Ingr  | Egr  | Egr  | Egr   |
| UnitId | ID | ID | port | type | axcId | port | type | axcId |
+--------+----+----+------+------+-------+------+------+-------+
coli>
```

12 RF connections

12.1 Antenna System
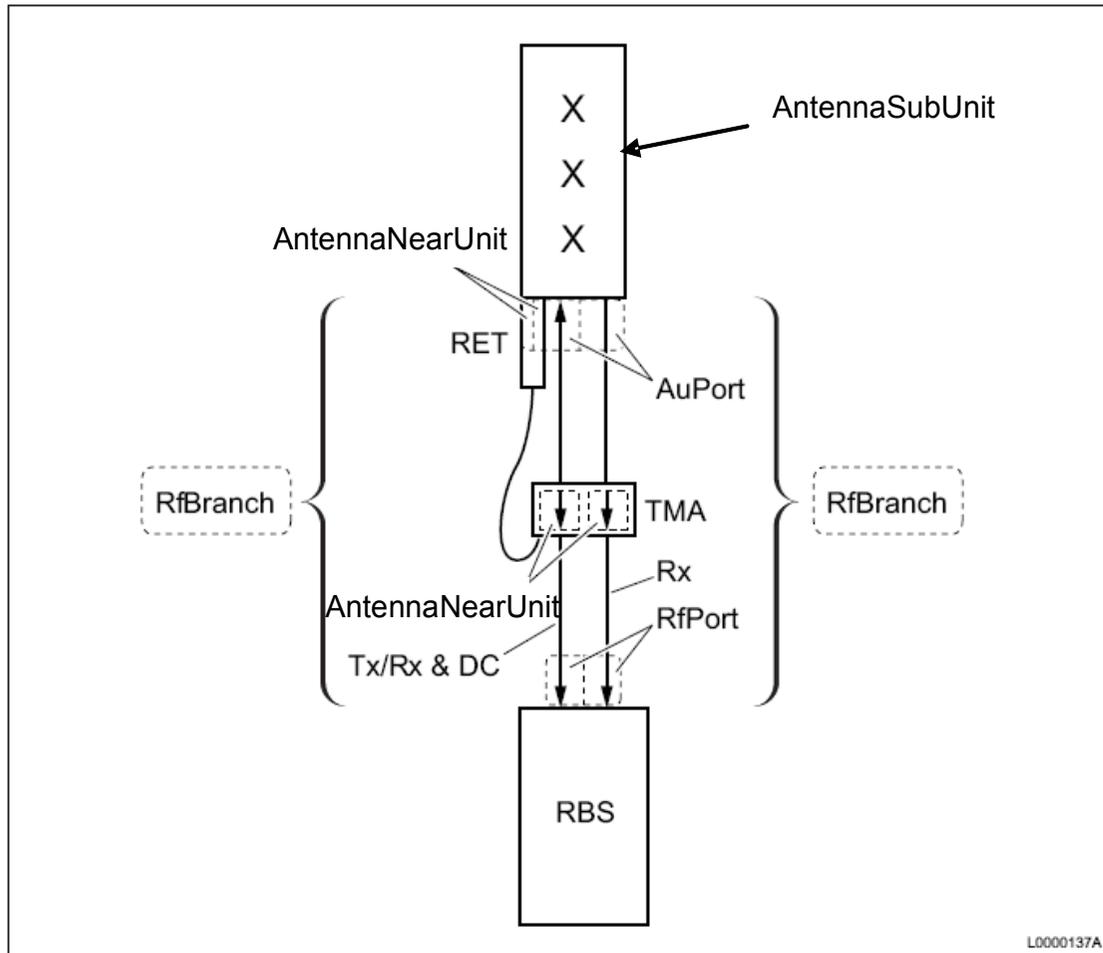

```
MSRBS> momtl antennaunitgroup

--------------------------------
LDNs containing ReqAntennaSystem.AntennaUnitGroup
--------------------------------
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],RetSubUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaNearUnit[0-48],TmaSubUnit[0-6]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8]
```

```
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],AntennaUnit[0-8],AntennaSubunit[0-8],AuPort[0-8]
ManagedElement[1],Equipment[1],AntennaUnitGroup[0-],RfBranch[0-24]

MSRBS> momx antennasystem

###################################################################################################################
MO Class                                          Attribute                 References
###################################################################################################################
ReqAntennaSystem.AntennaSubunit                   retSubunitRef             ReqAntennaSystem.RetSubUnit[0-1]
ReqAntennaSystem.AuPort                           reservedBy[]              ReqAntennaSystem.RfBranch[0-]
ReqAntennaSystem.RetSubUnit                       reservedBy[]              ReqAntennaSystem.AntennaSubunit[0-]
ReqAntennaSystem.RfBranch                         auPortRef[4]             ReqAntennaSystem.AuPort[0-4]
ReqAntennaSystem.RfBranch                         tmaRef                    ReqAntennaSystem.TmaSubUnit[0-1]
ReqAntennaSystem.TmaSubUnit                       reservedBy[]              ReqAntennaSystem.RfBranch[0-]
-------------------------------------------------------------------------------------------------------------------
```

Most RF connections can be printed from RfBranch MO as well as RfPort MO

```
MSRBS> get AntennaUnitGroup=3,RfBranch=700-4

===================================================================================================
2574                             Equipment=1,AntennaUnitGroup=3,RfBranch=700-4
===================================================================================================
auPortRef                        [1] =
 >>> auPortRef = Equipment=1,AntennaUnitGroup=3,AntennaUnit=1,AntennaSubunit=1,AuPort=2
dlAttenuation                    i[9] = 16 16 16 16 16 16 16 16 16
dlTrafficDelay                   i[9] = 192 192 192 192 192 192 192 192 192
reservedBy                       [2] =
 >>> reservedBy = NodeSupport=1,SectorEquipmentFunction=700-3
 >>> reservedBy = ENodeBFunction=1,SectorCarrier=700-3
rfBranchId                       700-4
rfPortRef                        FieldReplaceableUnit=RU-3-4,RfPort=B
tmaRef                           AntennaUnitGroup=3,AntennaNearUnit=TMA-700-2,TmaSubUnit=2
ulAttenuation                    i[9] = 17 17 17 17 17 17 17 17 17
ulTrafficDelay                   i[9] = 202 202 202 202 202 202 202 202 202
userLabel
===================================================================================================
```
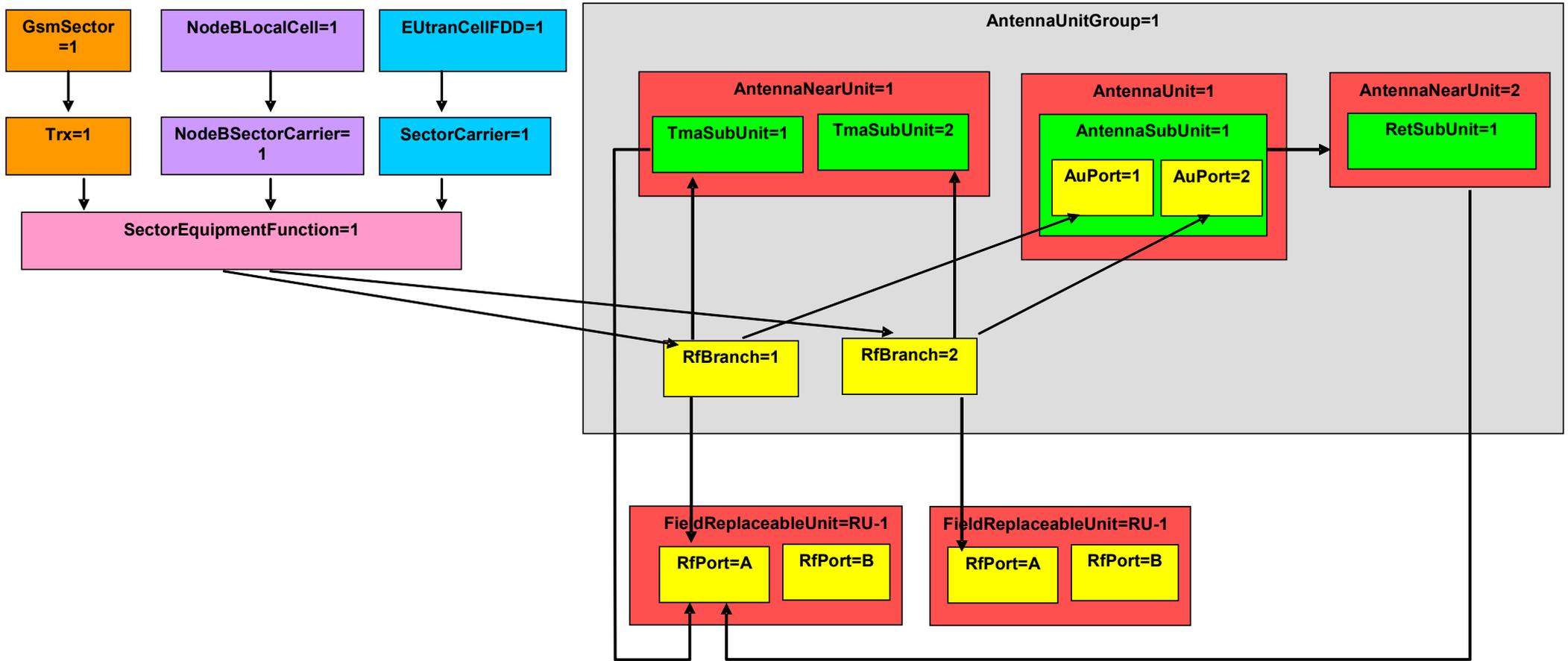
Also the "lk" command can be run on EUtranCell:

```
RBS1286 > lk 32

=================================================================
Proxy  Adm State     Op. State     MOs linked to 32:EUtranCellFDD=1
=================================================================
   32  1 (UNLOCKED)  1 (ENABLED)   EUtranCellFDD=1
  411  1 (UNLOCKED)  1 (ENABLED)   SectorEquipmentFunction=1
  366                              AntennaUnitGroup=1,RfBranch=1
  367                              AntennaUnitGroup=1,RfBranch=2
  368                              AntennaUnitGroup=1,RfBranch=3
  369                              AntennaUnitGroup=1,RfBranch=4
  388  1 (UNLOCKED)  1 (ENABLED)   FieldReplaceableUnit=2,RfPort=A
  389  1 (UNLOCKED)  1 (ENABLED)   FieldReplaceableUnit=2,RfPort=B
  395  1 (UNLOCKED)  1 (ENABLED)   FieldReplaceableUnit=3,RfPort=A
  396  1 (UNLOCKED)  1 (ENABLED)   FieldReplaceableUnit=3,RfPort=B
=================================================================
Total: 10 MOs
```

And there is a table in inv which shows the AntennaNearUnits and their connection to RF port:

```
======================================================================================================================
AntennaNearUnit                                   ST   TYPE   PRODUCTNR      REV       UNIQUEID          RfPort
======================================================================================================================
AntennaUnitGroup=1,AntennaNearUnit=RET-1800-1      1   M-RET  RVVPX310B2.15  332       AR00015CN1038491061  FieldReplaceableUnit=RRU-1800-1-1,RfPort=A
AntennaUnitGroup=1,AntennaNearUnit=RET-1800-2      1   M-RET  RVVPX310B2.15  332       AR00013CN1040626971  FieldReplaceableUnit=RRU-1800-1-1,RfPort=C
AntennaUnitGroup=1,AntennaNearUnit=RET-1800-3      1   M-RET  RVVPX310B2.15  332       AR00013CN1041562371  FieldReplaceableUnit=RRU-1800-1-1,RfPort=A
AntennaUnitGroup=1,AntennaNearUnit=TMA-700-1       1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142403700       FieldReplaceableUnit=RU-1-3,RfPort=A
AntennaUnitGroup=1,AntennaNearUnit=TMA-700-2       1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142400175       FieldReplaceableUnit=RU-1-4,RfPort=B
AntennaUnitGroup=2,AntennaNearUnit=RET-1800-1      1   M-RET  RVVPX310B2.15  332       AR00013cn1040417871  FieldReplaceableUnit=RRU-1800-2-1,RfPort=A
AntennaUnitGroup=2,AntennaNearUnit=RET-1800-2      1   M-RET  RVVPX310B2.15  332       AR00013CN1041058031  FieldReplaceableUnit=RRU-1800-2-1,RfPort=C
AntennaUnitGroup=2,AntennaNearUnit=RET-1800-3      1   M-RET  RVVPX310B2.15  332       AR00013CN1040627491  FieldReplaceableUnit=RRU-1800-2-1,RfPort=A
AntennaUnitGroup=2,AntennaNearUnit=TMA-700-1       1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142004583       FieldReplaceableUnit=RU-2-3,RfPort=A
AntennaUnitGroup=2,AntennaNearUnit=TMA-700-2       1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142400158       FieldReplaceableUnit=RU-2-4,RfPort=B
AntennaUnitGroup=3,AntennaNearUnit=RET-1800-1      1   M-RET  RVVPX310B2.15  332       AR00013CN1040747711  FieldReplaceableUnit=RRU-1800-3-1,RfPort=A
AntennaUnitGroup=3,AntennaNearUnit=RET-1800-2      1   M-RET  RVVPX310B2.15  332       AR00013cn1040747541  FieldReplaceableUnit=RRU-1800-3-1,RfPort=A
AntennaUnitGroup=3,AntennaNearUnit=RET-1800-3      1   M-RET  RVVPX310B2.15  332       AR00013CN1040503861  FieldReplaceableUnit=RRU-1800-3-1,RfPort=C
AntennaUnitGroup=3,AntennaNearUnit=TMA-700-1       1   TMA    TMA2094F01V2-1 ?-R953052 KSAN1153704131       FieldReplaceableUnit=RU-3-3,RfPort=A
AntennaUnitGroup=3,AntennaNearUnit=TMA-700-2       1   TMA    TMA2094F01V1-1 ?-R953052 TRAN1142403735       FieldReplaceableUnit=RU-3-4,RfPort=B
----------------------------------------------------------------------------------------------------------------------
```

And also a table in inv which shows the mapping of RF port to Cell:

```
=============================================================================================================================
FRU LNH        BOARD     RF   TX (W/dBm)  VSWR (RL)     RX (dBm) Sector/Cells (localCellIds/CellIds,PCIs)
=============================================================================================================================
2   BXP_0      RUS01B8   A    2.0 (33.1)  1.12 (24.9)   -99.5    SE=1 GT=S1/S1C1 FDD=S1C1 FDD=S1C2 NB=1/S1C1/1 (1:207, 2:210, 45)
2   BXP_0      RUS01B8   B    N/A         N/A           -99.2    SE=1 GT=S1/S1C1 FDD=S1C1 FDD=S1C2 NB=1/S1C1/1 (1:207, 2:210, 45)
3   BXP_1      RUS01B1   A    2.1 (33.3)  1.09 (27.6)   -99.3    SE=2 FDD=S2C1 FDD=S2C2 NB=1/S2C1/1 (3:213, 4:216, 48)
3   BXP_1      RUS01B1   B    N/A         N/A           -99.4    SE=2 FDD=S2C1 FDD=S2C2 NB=1/S2C1/1 (3:213, 4:216, 48)
4   BXP_2      RUS01B3   A    0.9 (29.7)  1.25 (19.2)   -97.4    SE=3 GT=S4/S7C1 FDD=S3C1 FDD=S3C2 NB=1/S3C1/1 (5:219, 6:222, 53)
4   BXP_2      RUS01B3   B    N/A         N/A           -98.8    SE=3 GT=S4/S7C1 FDD=S3C1 FDD=S3C2 NB=1/S3C1/1 (5:219, 6:222, 53)
5   BXP_3      RUS01B5   A    4.4 (36.4)  1.13 (24.6)   -99.7    SE=4 FDD=S4C1 FDD=S4C2 NB=1/S4C1/1 (7:225, 8:228, 47)
5   BXP_3      RUS01B5   B    N/A         N/A           -97.5    SE=4 FDD=S4C1 FDD=S4C2 NB=1/S4C1/1 (7:225, 8:228, 47)
6   BXP_4      RUS01B5   A    1.8 (32.7)  1.07 (29.9)   -99.5    SE=5 GT=S5/S4C1 FDD=S5C1 FDD=S5C2 NB=1/S5C1/1 (9:231, 10:234, 50)
6   BXP_4      RUS01B5   B    N/A         N/A           -100.1   SE=5 GT=S5/S4C1 FDD=S5C1 FDD=S5C2 NB=1/S5C1/1 (9:231, 10:234, 50)
7   BXP_5      RUS01B5   A    1.8 (32.7)  1.07 (29.0)   -101.9   SE=6 GT=S5/S6C1 FDD=S6C1 FDD=S6C2 NB=1/S6C1/1 (11:237, 12:240, 55)
7   BXP_5      RUS01B5   B    N/A         N/A           -100.8   SE=6 GT=S5/S6C1 FDD=S6C1 FDD=S6C2 NB=1/S6C1/1 (11:237, 12:240, 55)
8   BXP_3_1    RUS02B3   A    0           0                      SE=7 GT=S4/S7C2
8   BXP_3_1    RUS02B3   B    N/A         N/A                    SE=7 GT=S4/S7C2
9   BXP_4_1    RUS01B8A  A    0           0                      SE=8 GT=S1/S8C1 GT=S1/S8C2 GT=S1/S8C3 GT=S1/S8C4
9   BXP_4_1    RUS01B8A  B    N/A         N/A                    SE=8 GT=S1/S8C1 GT=S1/S8C2 GT=S1/S8C3 GT=S1/S8C4
10  BXP_5_1    RUS02B3   A    0           0                      SE=9 GT=S4/S9C1 GT=S4/S9C2
10  BXP_5_1    RUS02B3   B    N/A         N/A                    SE=9 GT=S4/S9C1 GT=S4/S9C2
-----------------------------------------------------------------------------------------------------------------------------
```

12.2 LTE cells

12.2.1 MO mapping

The LTE Radio Network MOs are the same in Gen2 as in Gen1

```
MSRBSV2> momtl \.enodebfunction$

--------------------------------
LDNs containing Lrat.ENodeBFunction
--------------------------------
ManagedElement[1],ENodeBFunction[0-1]
ManagedElement[1],ENodeBFunction[0-1],AdmissionControl[1]
ManagedElement[1],ENodeBFunction[0-1],AirIfLoadProfile[0-24]
ManagedElement[1],ENodeBFunction[0-1],AnrFunction[1]
ManagedElement[1],ENodeBFunction[0-1],AnrFunction[1],AnrFunctionEUtran[1]
ManagedElement[1],ENodeBFunction[0-1],AnrFunction[1],AnrFunctionGeran[1]
ManagedElement[1],ENodeBFunction[0-1],AnrFunction[1],AnrFunctionUtran[1]
ManagedElement[1],ENodeBFunction[0-1],AutoCellCapEstFunction[1]
ManagedElement[1],ENodeBFunction[0-1],CarrierAggregationFunction[1]
...<cut>...
ManagedElement[1],ENodeBFunction[0-1],UlCompGroup[0-24]
ManagedElement[1],ENodeBFunction[0-1],UtraNetwork[0-1]
ManagedElement[1],ENodeBFunction[0-1],UtraNetwork[0-1],UtranFrequency[0-64]
ManagedElement[1],ENodeBFunction[0-1],UtraNetwork[0-1],UtranFrequency[0-64],ExternalUtranCellFDD[0-392]
ManagedElement[1],ENodeBFunction[0-1],UtraNetwork[0-1],UtranFrequency[0-64],ExternalUtranCellTDD[0-392]

MSRBSV2> invx
```

```
============================================================================================================================
FRU          LNH        BOARD      RF  TX (W/dBm)  VSWR (RL)     Sector/Cells (localCellIds/CellIds,PCIs)
============================================================================================================================
RRUS11-1     BXP_1_11   RRUS11     A   0.6 (27.8)  1.17 (21.9)   SE=5 FDD=3 (3:7)
RRUS11-1     BXP_1_11   RRUS11     B   0           0
RRUS11-2     BXP_1_10   RRUS11B1   A   0.7 (28.7)  1.13 (24.0)   SE=5 FDD=3 (3:7)
RRUS11-2     BXP_1_10   RRUS11B1   B   0           0
RRUS11-3     BXP_1_9    RRUS11     A   0.6 (27.6)  1.18 (21.5)   SE=6 FDD=4 (4:10)
RRUS11-3     BXP_1_9    RRUS11     B   0.6 (27.5)  1.31 (17.4)   SE=6 FDD=4 (4:10)
RRUS12-B8-1  BXP_1_8    RRUS12B8   A   0.7 (28.7)  1.10 (26.1)   SE=7 FDD=5 (5:13)
RRUS12-B8-1  BXP_1_8    RRUS12B8   B   0.6 (28.0)  1.11 (25.8)   SE=7 FDD=5 (5:13)
RUS01-B1-1   BXP_0_15   RUS01B1    A   0.5 (27.0)  5.66 (3.1)    SE=1 FDD=1 (1:1)
RUS01-B1-1   BXP_0_15   RUS01B1    B   N/A         N/A
RUS01-B1-5   BXP_2      RUS01B1    A   0.5 (27.3)  1.10 (26.7)   SE=8 FDD=6 (6:16)
RUS01-B1-5   BXP_2      RUS01B1    B   N/A         N/A
RUS01-B1-6   BXP_3      RUS01B1    A   0.5 (27.4)  1.17 (22.0)   SE=8 FDD=6 (6:16)
RUS01-B1-6   BXP_3      RUS01B1    B   N/A         N/A
RUS02-B1-1   BXP_0_15_1 RUS02B1    A   0.6 (27.4)  1.14 (23.6)   SE=1 FDD=1 (1:1)
RUS02-B1-1   BXP_0_15_1 RUS02B1    B   N/A         N/A
RUS02-B1-2   BXP_0_14   RUS02B1    A   1.1 (30.3)  1.16 (22.8)   SE=2 FDD=2 (2:4)
RUS02-B1-2   BXP_0_14   RUS02B1    B   N/A         N/A           SE=2 FDD=2 (2:4)
RUS02-B1-3   BXP_0_13   RUS02B1    A   1.1 (30.3)  1.12 (24.7)   SE=3 FDD=2 (2:4)
RUS02-B1-3   BXP_0_13   RUS02B1    B   N/A         N/A           SE=3 FDD=2 (2:4)
RUS02-B1-4   BXP_0_12   RUS02B1    A   1.1 (30.3)  1.13 (24.6)   SE=4 FDD=2 (2:4)
RUS02-B1-4   BXP_0_12   RUS02B1    B   N/A         N/A           SE=4 FDD=2 (2:4)
mRRUS12-B1-1 BXP_4      RRUS12mB1  A   0.3 (24.4)  0             SE=9 FDD=7 (7:19)
mRRUS12-B1-1 BXP_4      RRUS12mB1  B   0.3 (24.4)  0             SE=9 FDD=7 (7:19)
----------------------------------------------------------------------------------------------------------------------------
```

```
MSRBSV2> hget ^eutrancellfdd= state|[du]lchannelbandwidth|arfcn

================================================================================================
MO                administrativeState dlChannelBandwidth earfcndl earfcnul operationalState ulChannelBandwidth
================================================================================================
EUtranCellFDD=1 1 (UNLOCKED)        20000               300      18300    1 (ENABLED)       20000
EUtranCellFDD=2 1 (UNLOCKED)        10000               300      18300    1 (ENABLED)       10000
EUtranCellFDD=3 1 (UNLOCKED)        5000                300      18300    1 (ENABLED)       5000
EUtranCellFDD=4 1 (UNLOCKED)        15000               300      18300    1 (ENABLED)       15000
EUtranCellFDD=5 1 (UNLOCKED)        15000               3625     21625    1 (ENABLED)       15000
EUtranCellFDD=6 1 (UNLOCKED)        20000               300      18300    1 (ENABLED)       20000
EUtranCellFDD=7 1 (UNLOCKED)        20000               300      18300    1 (ENABLED)       20000
================================================================================================
Total: 7 MOs
```

12.2.2 **COLI printouts**

```
MSRBSV2> ? | grep lrat

/lrat/bbicdump
/lrat/exception
/lrat/getstat
/lrat/hanging_ues
/lrat/histogram-cell
/lrat/mploadctrl
/lrat/mw-cell
/lrat/mw-central
/lrat/mw-monitor
/lrat/pm
/lrat/rrt-cell
/lrat/rrt-central
/lrat/rrt-monitor
/lrat/shared_memory_status
/lrat/ue

MSRBSV2> ? lrat

coli>/misc/help lrat
exception          - exception subcommand [-h]
rrt-monitor        - rrt-monitor [info|sigtrace|system]
rimpool            - rimpool [-h] | -froid <cellFroId>
pm                 - pm startcelltrace|stopcelltrace|trace
rrt-cell           - rrt-cell [info|sigtrace|system]
getstat            - getstat -h | -r/reset | -e/event | -u/uid | [-f/filter <filter>][-a/all][-t/tabs <tabs>][-c/count <count>]
hanging_ues        - hanging_ues
mploadctrl         - mploadctrl short|long|xlong|reset
elasticran         - elasticran printdiag|printids|printbblinks|printallbblinks
mw-monitor         - mw-monitor activate|deactivate|supervisesize|report
mw-central         - mw-central activate|deactivate|supervisesize|report
histogram-cell     - histogram-cell [status|enable|disable|coarse|fine|reset|report]
rrt-central        - rrt-central [info|sigtrace|system]
mw-cell            - mw-cell activate|deactivate|supervisesize|report
shared_memory_st   - shared_memory_status [lsfilters | filterparameters | iseventactive | eventstat]
bbicdump           - Dumps BBIC internal content
exportexcep        - exportexcep -h
```

```
ue                    - ue cap|enable|disable|print|meas|reset|set
coli>


MSRBSV2> lh mp hanging_ues

coli>/fruacc/lhsh 000100 /lrat/hanging_ues
0001: ==== HANGING UES PER CELL ====
0001: cellId    hanging UEs
0001:  1              0
0001:  2              0
0001:  3              0
0001:  4              0
0001:  5              0
0001:  6              0
0001:  7              0
coli>


MSRBSV2> lh mp ue

coli>/fruacc/lhsh 000100 /lrat/ue
0001:  ==== UE Identity Register COLI Commands ====
0001: ue cap -racueref <ueId> -cellid <cellId>                        - Prints a list of capabilities for a specific Ue.
0001:                                                                   When racUeRef is specifyed as idType, cellId needs to be entered.
0001: ue disable -ue -traceref <traceRef>                             - Deactivate Ue selective RBS Ue trace for specific trace ref
0001:                                                                   <traceref> is specified in hexcode (max 6 bytes)
0001: ue disable -cellid <cellId>                                     - Deactivate all cell selective RBS Ue traces in specific cell
0001: ue disable -allcell                                             - Deactivate all cell selective RBS Ue traces in all cells
0001: ue enable -ue -traceref <traceRef> [-timeout <min>]             - Activates Ue selective RBS Ue trace for specific traceRef
0001:                                                                   <traceref> is specified in hexcode (max 6 bytes)
0001:                                                                   Optional -timeout <min> specified in minutes [0 = No Timeout].
Default is 120 minutes.
0001: ue enable -cellid <cellId> <maxUeinCell> [-qci <qci>] [-timeout <min>] - Activates maxUeinCell [1..8]
0001:                                                                   number of cell selective RBS Ue traces in specific cell.
0001:                                                                   if qci is specified only ues with bearers with specified qci will
be traced,
0001:                                                                   Optional -timeout <min> specified in minutes [0 = No Timeout].
Default is 120 minutes.
0001: ue enable -allcell -allUe [-timeout <min>]                      - Activates all cell selective RBS Ue traces in all cells
0001:                                                                   Optional -timeout <min> specified in minutes [0 = No Timeout].
Default is 120 minutes.
0001: ue meas -racueref <ueId> -cellid <cellId> [-detailed]           - For racUeRef cellId needs to be entered.
0001:                                                                   -detailed gives more detailed information
0001: ue print -ue -cellid <cellId> [-qci <qci>] [-v]                 - Print all active Ue:s identities in a specific cell.
0001:                                                                   -qci prints only ues with bearer with specified qci
0001:                                                                   -v adds more Ue data to printout
0001: ue print -ue -allcell [-qci <qci>] [-v]                         - Print all active Ue:s identities in all cells.
0001:                                                                   -qci prints only ues with bearer with specified qci
0001:                                                                   -v adds more Ue data to printout
0001: ue print -bearer -cellid <cellId> [-qci <qci>]                  - Print all data bearers in a specific cell.
0001:                                                                   -qci prints only bearers with specified qci
0001: ue print -bearer -allcell [-qci <qci>]                          - Print all data bearers in all cells.
0001:                                                                   -qci prints only bearers with specified qci
0001: ue print -pending                                               - Print all Ue and Cell pending lists
0001: ue print -admitted                                              - Print all admitted Ue:s and Data Radio Bearers in all cells
0001: ue reset -traceref <traceRef>                                   - Removes Ue selective RBS Ue trace for specific Ue on specific
cell.
```

```
0001:                                                     <traceref> is specified in hexcode (max 6 bytes)
0001: ue set -racueref <UeId> -cellid <cellId> -traceref <traceRef>    - Sets Ue selective RBS Ue trace for specific Ue on specific cell.
0001:                                                     <traceref> is specified in hexcode (max 6 bytes)
coli>

KIENB2053> lh mp ue print -ue -allcell -v;ue print -pending;ue print -admitted;ue print -bearer -allcell

=========================================================================================
coli>/fruacc/lhsh 000100 /lrat/ue print -ue -allcell -v
0001: CellId  RacUeRef  BbUeRef     {traceRef,interfaces,traceDepth,ipAddress}                      TypeOfActiveTrace SetByColi CTSess Crnti
{mmeCode,mmeGi,[mcc,mnc,mncLen]}    S1ApEnbUeId   S1ApMmeUeId   mmeRef   Stmsi          PlmnIndex Spid    TtiBundlingEnabled  ScellIdList
0001: 1      8397613   16863296    X                                                               NO_TRACE         false     18023  1045
{0x1d,0x8010,[0x106,0x50,0x2]}      2686         24759913      2        0x7a53d73cf5   0         1       No
0001: 6      50336328  100748192   X                                                               NO_TRACE         false     576    971
{0x1d,0x8010,[0x106,0x50,0x2]}      2649         23920554      2        0x9c397b5c35   0         1       No
0001: 6      50336329  100748576   X                                                               NO_TRACE         false     577    995
{0x1d,0x8010,[0x106,0x50,0x2]}      2661         17693039      2        0xa7cfaa4742   0         1       No
0001: 6      50336330  100748704   X                                                               NO_TRACE         false     578    1003
{0x1d,0x8010,[0x106,0x50,0x2]}      2665         28245811      2        0x2421828615   0         1       No
...<cut>...
=========================================================================================
coli>/fruacc/lhsh 000100 /lrat/ue print -pending
0001: Timeout in (HH:MM:SS)  TraceRef
0001: Timeout in (HH:MM:SS)  CellId    Max UEs   Qci
=========================================================================================
coli>/fruacc/lhsh 000100 /lrat/ue print -admitted
0001: CellId  #UE:s  #Bearers
0001:    1     1       2
0001:    2     0       0
0001:    3     0       0
0001:    4     0       0
0001:    5     0       0
0001:    6     6      12
0001:    7     0       0
0001:    8     0       0
0001:    9     0       0
0001:   10     0       0
0001:   11     0       0
0001:   12     4       8
=========================================================================================
coli>/fruacc/lhsh 000100 /lrat/ue print -bearer -allcell
0001: CellId  RacUeRef   BbUeRef     E-RAB  S-RAB  ARP   QCI   ServiceType GbrDl         GbrUl         ROHCenabled
TtiBundlingEnabled
0001: 1      8397613    16863296    5      X      2     9     0          0             0             0             No
0001: 1      8397613    16863296    6      X      5     5     0          0             0             0             No
0001: 1      8397613    16863296    X      1      X     X     X          X             X             X             X
0001: 1      8397613    16863296    X      2      X     X     X          X             X             X             X
0001: 6      50336328   100748192   5      X      2     9     0          0             0             0             No
0001: 6      50336328   100748192   6      X      5     5     0          0             0             0             No
0001: 6      50336328   100748192   X      1      X     X     X          X             X             X             X
0001: 6      50336328   100748192   X      2      X     X     X          X             X             X             X
0001: 6      50336329   100748576   5      X      2     9     0          0             0             0             No
0001: 6      50336329   100748576   6      X      5     5     0          0             0             0             No
...<cut>..
0001: 12     100667855  201412640   6      X      5     5     0          0             0             0             No
0001: 12     100667855  201412640   X      1      X     X     X          X             X             X             X
0001: 12     100667855  201412640   X      2      X     X     X          X             X             X             X
coli>


MSRBSV2> lh mp getstat

=========================================================================================
coli>/fruacc/lhsh 000100 /lrat/getstat
```

```
0001: Counted from  Wed Mar  2 13:19:25 2016
0001:         until Thu Mar  3 23:03:58 2016
0001: DownlinkNasTransport                      37  ErabReleaseInfo                        37
0001: EventAdjustAccessMpLoadCtrl           121463  EventCommonHigh                      7309
0001: EventCommonLow                            37  EventLoadControlCcicStatistics      15120
0001: EventLoadControlDcicStatistics          2160  EventRrcLatencyDistribution         15120
0001: EventS1InitialUeMessage                   37  EventUeCrsicCapability                 37
0001: EventUeRegistration                       37  LoadControlStateTransition              1
0001: McRrcConnectionRequest                    37  Paging                                 10
0001: PerBbBbmEvent                           2025  PerBbCellEvent                      14294
0001: PerBbCellMdtM3Event                    14175  PerBbSectorcarrierEvent             18252
0001: PerBbUetrBbmEvent                     121448  PerBbUetrCellEvent                 850136
0001: PerBbUeEvent                              37  PerBbUeEventTa                         37
0001: PerBbUeOnCellLevelEvent                   37  PerMoFootprint                        404
0001: PerProcessorLoad                       12146  PerRrcConnected                    170023
0001: PerS1PagingReceivedDiscarded          100652  PerUeCoverageCount                 170023
0001: ProcRrcConnSetup                          37  ProcS1Setup                             1
0001: ProcS1SigConnSetup                        37  ProcSctpSetup                           1
0001: ProcUeCtxtRelease                         37  RrcConnectionRelease                   37
0001: RrcConnectionRequest                      37  RrcConnectionSetup                     37
0001: RrcConnectionSetupComplete                37  RrcConnSetupAttempt                    37
0001: RrcConnSetupReady                         37  RrcDlInformationTransfer               37
0001: RrcMasterInformationBlock                  7  RrcSystemInformation                    7
0001: RrcSystemInformationBlockType1           14  RrcUlInformationTransfer                8
0001: S1InitialUeMessage                        37  S1SetupAttempt                          1
0001: S1SetupRequest                             1  S1SetupResponse                         1
0001: S1SetupResult                              1  S1UeContextReleaseCommand              37
0001: S1UeContextReleaseComplete                37  SctpSetupAttempt                        1
0001: SctpSetupResult                            1  UeCtxtReleaseReady                     37
0001: UplinkNasTransport                         8
0001: Done!
coli>

MSRBSV2> lh mp histogram-cell report -cellid all

coli>/fruacc/lhsh 000100 /lrat/histogram-cell report -cellid all
0001: Histograms from: -
0001:          until: Thu Mar  3 23:03:17 2016
0001: CellId: all
0001: Histogram 0 - Rrc Connection Setup latency (8ms bins):
0001: Index      0      1      2      3      4      5      6      7      8      9
0001:    0       0      0      0      0      0     36      0      0      0      1
0001:   10       0      0      0      0      0      0      0      0      0      0
0001:   20       0      0      0      0      0      0      0      0      0      0
0001:   30       0      0      0      0      0      0      0      0      0      0
0001:   40       0      0      0      0      0      0      0      0      0      0
0001:   50       0      0      0      0      0      0      0      0      0      0
0001:   60       0      0      0      0      0      0      0      0      0      0
0001:   70       0      0      0      0      0      0      0      0      0      0
0001:   80       0      0      0      0      0      0      0      0      0      0
0001:   90       0      0      0      0      0      0      0      0      0      0
...<cut>>..


ENB006> acc . collectDynamicCellStatus

=================================================================================================
```

```
Proxy  MO                                                      Action                    Nr of Params
=======================================================================================================
   1  ENodeBFunction=1                                        collectDynamicCellStatus    1

Parameter 1 of 1, dynamicCellStatusOutput (enumRef-Lrat.DynamicCellStatusOutput):
   Enter one of the following integers: 0:UNFORMATTED_TEXT, 1:FORMATTED_TEXT: 0
 >>> Return value = null
Cell                UE      SRB      DRB
------------------------------
ENB006c3            LOCKED
ENB006c2            14      28       11
ENB006c1            8       16       7


=======================================================================================================
Total: 1 MOs attempted, 1 MOs actioned


ENB006> lh mp ue print -admitted

=================================================================================
coli>/fruacc/lhsh 000100 /lrat/ue print -admitted
0001: CellId  #UE:s  #Bearers
0001:    1       3        3
coli>
```

12.3 WCDMA Cells

12.3.1 MO mapping

The WCDMA RBS MOs are quite different in Gen2 vs Gen1.
More info:

wratMOM_G2vsG1.p   MOM structure
      ptx   NodeB WCDMA COM

and:

https://erilink.ericsson.se/eridoc/erl/objectId/09004cff8a6fa78a?docno=21/00651-10/FCP1300532Uen&action=current&format=excel12mebook

Aproximate MO mapping:

CPP	COM
BasebandPool	**NodeBLocalCellGroup**
RbsLocalCell	**NodeBLocalCell**


```
MSRBSV2> momtl \.nodebfunction$

------------------------------
LDNs containing Wrat.NodeBFunction
```

```
--------------------------------
ManagedElement[1],NodeBFunction[0-1]
ManagedElement[1],NodeBFunction[0-1],CommunicationContexts[1]
ManagedElement[1],NodeBFunction[0-1],Iub[0-1]
ManagedElement[1],NodeBFunction[0-1],Iub[0-1],IubDataStreams[0-1]
ManagedElement[1],NodeBFunction[0-1],Iub[0-1],NbapCommon[0-1]
ManagedElement[1],NodeBFunction[0-1],Iub[0-1],NbapDedicated[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18],CellResources[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18],CommonChannelResourcesDl[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18],EDchResourcesCell[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18],HsDschResources[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18],NodeBSectorCarrier[0-6]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18],NodeBSectorCarrier[0-6],CommonChannelResourcesUl[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18],NodeBSectorCarrier[0-6],EDchResources[0-1]
ManagedElement[1],NodeBFunction[0-1],NodeBLocalCellGroup[0-8],NodeBLocalCell[0-18],RadioLinks[1]

MSRBSV2> lpr ,nodeb

===========================================================================
Proxy  MO
===========================================================================
    46  NodeBFunction=1
    47  NodeBFunction=1,CommunicationContexts=1
    48  NodeBFunction=1,Iub=1
    49  NodeBFunction=1,Iub=1,IubDataStreams=1
    50  NodeBFunction=1,Iub=1,NbapCommon=1
    51  NodeBFunction=1,Iub=1,NbapDedicated=1
    52  NodeBFunction=1,NodeBLocalCellGroup=1
    53  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1
    54  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,CellResources=1
    55  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,CommonChannelResourcesDl=1
    56  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,HsDschResources=1
    57  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,NodeBSectorCarrier=1
    58  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,NodeBSectorCarrier=1,CommonChannelResourcesUl=1
    59  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,NodeBSectorCarrier=1,EDchResources=1
    60  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,RadioLinks=1
    61  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11
    62  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,CellResources=1
    63  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,CommonChannelResourcesDl=1
    64  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,HsDschResources=1
    65  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,NodeBSectorCarrier=1
    66  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,NodeBSectorCarrier=1,CommonChannelResourcesUl=1
    67  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,NodeBSectorCarrier=1,EDchResources=1
    68  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,RadioLinks=1
    69  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21
    70  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,CellResources=1
    71  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,CommonChannelResourcesDl=1
    72  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,HsDschResources=1
    73  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,NodeBSectorCarrier=1
    74  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,NodeBSectorCarrier=1,CommonChannelResourcesUl=1
    75  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,NodeBSectorCarrier=1,EDchResources=1
    76  NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,RadioLinks=1
    77  NodeBFunction=1,NodeBLocalCellGroup=2
===========================================================================
Total: 32 MOs
```

```
MSRBSV2> st cell

==============================================================================
Proxy  Adm State       Op. State      MO
==============================================================================
   52  1 (UNLOCKED)                   NodeBFunction=1,NodeBLocalCellGroup=1
   53  1 (UNLOCKED)   1 (ENABLED)     NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1
   54                 1 (ENABLED)     NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=1,CellResources=1
   61  1 (UNLOCKED)   1 (ENABLED)     NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11
   62                 1 (ENABLED)     NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=11,CellResources=1
   69  1 (UNLOCKED)   1 (ENABLED)     NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21
   70                 1 (ENABLED)     NodeBFunction=1,NodeBLocalCellGroup=1,NodeBLocalCell=21,CellResources=1
   77  0 (LOCKED)                     NodeBFunction=1,NodeBLocalCellGroup=2
==============================================================================
Total: 8 MOs

MSRBSV2> lhget resources num

===================================================================================================================
MO                                                    numOfBch numOfPccpch numOfPcpich numOfPsch numOfScpich numOfSsch
===================================================================================================================
NodeBLocalCellGroup=1,NodeBLocalCell=1,CellResources=1 1        1           1           1         0           1
NodeBLocalCellGroup=1,NodeBLocalCell=11,CellResources=1 1       1           1           1         0           1
NodeBLocalCellGroup=1,NodeBLocalCell=21,CellResources=1 1       1           1           1         0           1
===================================================================================================================
Total: 3 MOs

===================================================================================================================
MO                                                              numOfAich numOfFach numOfPch numOfPich numOfSccpch
===================================================================================================================
NodeBLocalCellGroup=1,NodeBLocalCell=1,CommonChannelResourcesDl=1  1         2         1        1         2
NodeBLocalCellGroup=1,NodeBLocalCell=11,CommonChannelResourcesDl=1 1         2         1        1         2
NodeBLocalCellGroup=1,NodeBLocalCell=21,CommonChannelResourcesDl=1 1         2         1        1         2
===================================================================================================================
Total: 3 MOs

===================================================================================================================
MO                                                                          numOfPrach numOfRach
===================================================================================================================
NodeBLocalCellGroup=1,NodeBLocalCell=1,NodeBSectorCarrier=1,CommonChannelResourcesUl=1  1          1
NodeBLocalCellGroup=1,NodeBLocalCell=11,NodeBSectorCarrier=1,CommonChannelResourcesUl=1 1          1
NodeBLocalCellGroup=1,NodeBLocalCell=21,NodeBSectorCarrier=1,CommonChannelResourcesUl=1 1          1
===================================================================================================================
Total: 3 MOs

MSRBSV2> invx

===================================================================================================================
FRU LNH       BOARD    RF  TX (W/dBm)  VSWR (RL)    Sector/Cells (localCellIds/CellIds,PCIs)
===================================================================================================================
2   BXP_0     RUS01B1  A   0.2 (23.4)  1.36 (16.4)  SE=1 NB=1/1/1 NB=1/2/1 (21, 24)
2   BXP_0     RUS01B1  B   N/A         N/A
3   BXP_0_1   RUS01B1  A   0.3 (24.2)  0            SE=1 NB=1/1/1 NB=1/2/1 (21, 24)
3   BXP_0_1   RUS01B1  B   N/A         N/A
4   BXP_1     RUS01B1  A   0.3 (24.7)  0            SE=2 NB=1/11/1 NB=1/12/1 (22, 25)
4   BXP_1     RUS01B1  B   N/A         N/A
5   BXP_1_1   RUS01B1  A   0.3 (24.9)  0            SE=2 NB=1/11/1 NB=1/12/1 (22, 25)
5   BXP_1_1   RUS01B1  B   N/A         N/A
```

```
6   BXP_2   RUS01B1  A  0.3 (25.1)  0            SE=3 NB=1/21/1 NB=1/22/1 (23, 26)
6   BXP_2   RUS01B1  B  N/A         N/A
7   BXP_2_1 RUS01B1  A  0.3 (25.0)  0            SE=3 NB=1/21/1 NB=1/22/1 (23, 26)
7   BXP_2_1 RUS01B1  B  N/A         N/A
----------------------------------------------------------------------------------------------------
```

12.3.2 <u>COLI printouts</u>

```
RBS33> ? | grep wrat

/wrat/dump
/wrat/rh
/wrat/uetrace
/wrat/upt/aichmon
/wrat/upt/berdchmeas
/wrat/upt/berdpcchmeas
/wrat/upt/blerdchmeas
/wrat/upt/blerrachmeas
/wrat/upt/hichmon
/wrat/upt/hsdltestmodel
/wrat/upt/pndpdch
/wrat/upt/pnpccpch
/wrat/upt/pnpch
/wrat/upt/sirmeas
/wrat/upt/sirtarget
/wrat/upt/tpcmon

RBS33> ? wrat

coli>/misc/help wrat
memstat          - Report the internal memory state of the application given in the first argument.
dump             - Dump information from the WRAT components.
hspa             - Display information from WRAT HSPA.
rh               - Display information from the WRAT resource handler.
uetrace          - Enabling, disabling, saving settings and printing the status of the selective UE tracing
coli>

RBS33> ? rh

coli>/misc/help /wrat/rh
rh
Display information from the WRAT resource handler.
Usage: rh {ceusage|checkres|rlsinfo}
 Display information from the WRAT resource handler.
 Example: rh ceusage
Arguments:
 ceusage         - Print Channel Element (CE) information. CE Spreading factor consumption ladders, number of RLS' per spreading factor and per
service, and total CE consumption.
 checkres        - List allocated internal resources and parameters of the resource handler.
 rlsinfo         - Print information for existing Radio Link Sets (RLSs), including Communication Context Id (Node and RNC), services used, and
time stamp for creation and last Resource Handler event.
coli>

RBS33> lh mp rh ceusage;rh checkres;rh rlsinfo
```

```
================================================================================
coli>/fruacc/lhsh 000100 /wrat/rh ceusage
0001: Created: 2017-10-18 15:39:08
0001: CE consumption ladders
0001:              SF4        SF8       SF16       SF32       SF64      SF128      SF256 2*SF2+2*SF4     2*SF2       2*SF4
0001:             ----       ----       ----       ----       ----       ----       ----       ----       ----       ----
0001:     Dl Rls     0          8          4          2          1          1          1
0001:     Ul Rls     8          4          2          1          1          1          0
0001:   CchDl Rl     0          0          0          0          0          0          0
0001:   CchUl Rl     0          0          0          0          0          0          0
0001:   EDCH Rls     8          4          2          1          1          1          1         48         32         16
0001: 2ms SF4 Per-HARQ Rls CE cost     : 1
0001: Spreading factor usage
0001:              SF4        SF8       SF16       SF32       SF64      SF128      SF256 2*SF2+2*SF4     2*SF2       2*SF4
0001:             ----       ----       ----       ----       ----       ----       ----       ----       ----       ----
0001:  DL DCH SF     0          0          0          0          0          5          5
0001:  UL DCH SF     0          0          0          0          5          0          0
0001:  UL EUL SF     5          0          0          8          0          0          0          0          0          0
0001: # Active Radio Link Sets
0001:            UL R99     DL R99    EUL 10ms    EUL 2ms         HS     C-EDCH      TOTAL
0001:             ----       ----       ----       ----       ----       ----       ----
0001:                5         10          0          5          5          8         18
0001: CE Usage Summary
0001: -------------
0001: DL Capacity Credit       : 1152
0001: UL Capacity Credit       : 1152
0001: DL Consumed Credit:    7.5
0001: UL Consumed Credit:    5.0
0001: EUL Static Consumed Credit      : 13
0001: UL Static C-Edch   : 8
0001: UL Net Total CE Capacity  : 4096
0001: UL C-EDCH Allocated Dynamic CE     : 0
================================================================================
coli>/fruacc/lhsh 000100 /wrat/rh checkres
0001: Created: 2017-10-18 15:39:08
0001: DcRhOwnerTable.Occupied owner index       : 0
0001: DcRhOwnerTable.Occupied owner index       : 1
...<cut>....
0001: bbSessionIdGen.Occupied serverRef index[3697]     : 18
0001: rDeviceRlsIdGen.Occupied serverRef index[1]       : 0
0001: rDeviceRlsIdGen.Occupied serverRef index[3]       : 17
0001: rDeviceRlsIdGen.Occupied serverRef index[4]       : 14
0001: rDeviceRlsIdGen.Occupied serverRef index[6]       : 25
0001: rDeviceRlsIdGen.Occupied serverRef index[2]       : 5
0001: rDeviceRlsIdGen.Occupied serverRef index[0]       : 56
0001: dbchCellDevIdGen.Occupied serverRef index[0]      : 4
0001: fachDevIdGen.Occupied serverRef index[0]  : 31
0001: pchDevIdGen.Occupied serverRef index[0]   : 30
0001: raDevIdGen.Occupied serverRef index[0]    : 18
================================================================================
coli>/fruacc/lhsh 000100 /wrat/rh rlsinfo
0001: Created: 2017-10-18 15:39:08
0001: Printing Rls resources:
0001:    nodeBCcId    cRncCcId_ueContextId_rncModuleId_sRnti      RlsId             cId     Service      UL CE      DL CE
EqmNameBbL1   EqmIdBbL1   EqmIdBbEul    EqmIdBbHs             Created       Latest RH Event  Latest Failed RH Event
0001:         ----    --------------------------------        ----      ---------------     ----       ----       ----
----         ----       ----        ----     ---------------     ---------------   ---------------
```

```
0001:       3899                    1028_3211_11_153403       0                    10914    DCH/DCH        1       1
BbEqm2       1        7        5      2017-10-18 15:38:43   2017-10-18 15:38:45                    -
0001:      23903                    1046_6650_11_156842       0                    10914    EUL/HS         1       1
BbEqm4       3        7        5      2017-10-18 15:39:04                    -                    -
0001:      13903                     1049_2409_9_127569       0                    10914    EUL/HS         1       1
BbEqm3       2        7        5      2017-10-18 15:39:06   2017-10-18 15:39:08                    -
0001:      33903                    1047_1801_11_151993       0                    10914    DCH/DCH        1       1
BbEqm1       0        7        5      2017-10-18 15:39:04                    -                    -
0001:       3904                     1048_649_11_150841       0                    10914    EUL/HS         1       1
BbEqm2       1        7        5      2017-10-18 15:39:06                    -                    -
0001:      23904                    1050_2431_11_152623       0                    10914    EUL/HS         1       1
BbEqm4       3        7        5      2017-10-18 15:39:07                    -                    -
0001:      23894                    1010_3668_11_153860       0                    10914    DCH/DCH        1       1
BbEqm4       3        7        5      2017-10-18 15:38:41                    -                    -
0001:      33894                    1011_3792_11_153984       0                    10914    DCH/DCH        1       1
BbEqm1       0        7        5      2017-10-18 15:38:41                    -                    -
0001:       3898                    1024_3047_11_153239       0                    10911    DCH/DCH        1       1
BbEqm2       1        7        4      2017-10-18 15:38:42   2017-10-18 15:38:44                    -
0001:      33896                    1019_2269_11_152461       0                    10914    EUL/HS         1       1
BbEqm1       0        7        5      2017-10-18 15:38:41   2017-10-18 15:38:43                    -
coli>


RBS41> get links noof

==================================================================================================
MO                                                    Attribute         Value
==================================================================================================
NodeBLocalCellGroup=1,NodeBLocalCell=S1C1,RadioLinks=1 noOfRadioLinks    16
NodeBLocalCellGroup=1,NodeBLocalCell=S1C2,RadioLinks=1 noOfRadioLinks    46
NodeBLocalCellGroup=1,NodeBLocalCell=S2C1,RadioLinks=1 noOfRadioLinks    0
NodeBLocalCellGroup=1,NodeBLocalCell=S2C2,RadioLinks=1 noOfRadioLinks    0
NodeBLocalCellGroup=1,NodeBLocalCell=S3C1,RadioLinks=1 noOfRadioLinks    0
NodeBLocalCellGroup=1,NodeBLocalCell=S3C2,RadioLinks=1 noOfRadioLinks    0
==================================================================================================
Total: 6 MOs
```

If we want to run the command "dump" under "/wrat" we will need in this case to specify the prefix in order to not confuse with other "dump" commands

```
RBS33> ? | grep '/dump$'

/diagm/dump
/wrat/dump

RBS33> /wrat/dump

coli>/wrat/dump
dump: Need at least one argument.
Try 'help /wrat/dump' for more information
coli>

RBS33> ? /wrat/dump

coli>/misc/help /wrat/dump
dump
Dump information from the WRAT components.
```

```
Usage: dump { dcrh [tree|treeSF16] | dcdrl | tcdrl | tclcg | tciub | all }
 Dump information from the WRAT components.
 Example: dump all
coli>

RBS33> /wrat/dump all

coli>/wrat/dump all
Created: 2016-03-03 23:13:59
DcRh.BbResourceSet[2].General: localCellGroupId: 0, numberOfEmcas: 2, numberOfBbHs: 3, hwDlCeCapacity: 576, hwUlCeCapacity: 384,
netDlCECapacity: 576, netUlCECapacity: 384
DcRh.BbResourceSet[2].Emca[0].macAddress: 02:00:01:05:00:01
DcRh.BbResourceSet[2].Emca[0].DeviceServerCell: pid: 8388621, type: 2, allocated regional devices: 1201 1202 1203
DcRh.BbResourceSet[2].Emca[0].DeviceServerDbchCell: pid: 8388620, type: 1
DcRh.BbResourceSet[2].Emca[0].DeviceServerFach: pid: 8388624, type: 5
....
```

12.3.3 <u>Traces</u>

https://wcdma-wrat.rnd.ki.sw.ericsson.se/wiki/Trace_tables

12.4 <u>GSM</u>

```
MSRBSV2> ? grat

coli>/misc/help grat
grh              - Display the GSM resource handler allocation information.
ccmd             - To use debug commands in GRAT.
txinfo           - Display the TX information.
tfinfo           - Display the GSM timing and synchronization information.
rxinfo           - Display the RX information.
gxio             - Display the GSM XIO configuration information.
mon              - To read monitors in GRAT.
tbus             - Output the GSM timing bus on the production test connector.
coli>

MSRBSV2> ? | grep grat

/grat/ccmd
/grat/grh
/grat/gxio
/grat/mon
/grat/rxinfo
/grat/tbus
/grat/tfinfo
/grat/txinfo

MSRBSV2> momtl bts

--------------------------------
LDNs containing Grat.BtsFunction
--------------------------------
ManagedElement[1],BtsFunction[0-1]
```

```
ManagedElement[1],BtsFunction[0-1],GsmSector[0-]
ManagedElement[1],BtsFunction[0-1],GsmSector[0-],AbisIp[0-1]
ManagedElement[1],BtsFunction[0-1],GsmSector[0-],Trx[0-12]

MSRBSV2> invx


==========================================================================================================
FRU    LNH     BOARD    RF  TX (W/dBm)  VSWR (RL)     Sector/Cells (localCellIds/CellIds,PCIs)
==========================================================================================================
2      BXP_0   RUS01B8  A   19.9 (43.0) 0             SE=1 GT=1/0 GT=1/1 GT=1/2 GT=1/3
2      BXP_0   RUS01B8  B   N/A         N/A           SE=1 GT=1/0 GT=1/1 GT=1/2 GT=1/3
3      BXP_1   RUS01B8  A   29.5 (44.7) 0             SE=2 GT=2/0 GT=2/1
3      BXP_1   RUS01B8  B   N/A         N/A
4      BXP_4   RUS01B8  A   2.1 (33.1)  0             SE=3 GT=2/2 GT=2/3 GT=2/4 GT=2/5
4      BXP_4   RUS01B8  B   N/A         N/A
5      BXP_2   RUS01B8  A   33.8 (45.3) 0             SE=4 GT=3/0 GT=3/1 GT=3/2 GT=3/3
5      BXP_2   RUS01B8  B   N/A         N/A
6      BXP_3   RUS01B8  A   0           0             SE=5 GT=3/4 GT=3/5 GT=3/6
6      BXP_3   RUS01B8  B   N/A         N/A
----------------------------------------------------------------------------------------------------------
```

12.5 Multi-Standard Node

In the node below:
- EMCA 1 and 3 are serving GSM, while EMCA 2 and 4 are for WCDMA

```
MSRBS_GW> bp all


================================================================================================
Board      BoardType      SwAllocation            BoardGroups
================================================================================================
000100  DUS5201                                   all coremp du mp
000100/bbEqm000001        **GRAT/0                all du gcpu gcpu1
000100/bbEqm000002        **LRAT/1                all du gcpu gcpu2
000100/bbEqm000003        **GRAT/2                all du gcpu gcpu3
000100/bbEqm000004        **WRAT/3                all du gcpu gcpu4
BXP_0                     **RUS01B3               all ru ru1 xp
BXP_0_1                   **RUS01B3               all ru ru2 xp
BXP_0_1_1                 **RUS01B3               all ru ru3 xp
================================================================================================
```

- the first 2 RUs are serving WCDMA, the 3rd RU is serving WCDMA and GSM

```
MSRBS_GW> invx


==========================================================================================================
FRU LNH        BOARD    RF  TX (W/dBm)  VSWR (RL)     Sector/Cells (localCellIds/CellIds,PCIs)
==========================================================================================================
2   BXP_0      RUS01B3  A   0           0             SE=1 NB=1/S1C1/1 (1)
2   BXP_0      RUS01B3  B   N/A         N/A           SE=1 NB=1/S1C1/1 (1)
3   BXP_0_1    RUS01B3  A   0           0             SE=2 NB=1/S2C1/1 (2)
3   BXP_0_1    RUS01B3  B   N/A         N/A           SE=2 NB=1/S2C1/1 (2)
4   BXP_0_1_1  RUS01B3  A   0           0             SE=3 GT=1/S3C1 NB=1/S3C1/1 (3)
```

```
4   BXP_0_1_1 RUS01B3  B  N/A          N/A            SE=3 GT=1/S3C1 NB=1/S3C1/1 (3)
-------------------------------------------------------------------------------------------------------
```

In the node below the first 3 RUs are serving the WCDMA cells, while the last 3 RUs are serving the LTE cells.

```
MSRBS_LW> invx

===========================================================================================================
FRU  LNH     BOARD    RF  TX (W/dBm)  VSWR (RL)    Sector/Cells (localCellIds/CellIds,PCIs)
===========================================================================================================
2    BXP_0   RUS01B8  A   0           0            SE=1 NB=1/S1C1/1 NB=1/S1C2/1 NB=1/S1C3/1 NB=1/S1C4/1 (45, 46, 47, 51)
2    BXP_0   RUS01B8  B   N/A         N/A          SE=1 NB=1/S1C1/1 NB=1/S1C2/1 NB=1/S1C3/1 NB=1/S1C4/1 (45, 46, 47, 51)
3    BXP_1   RUS01B1  A   0           0            SE=2 NB=1/S2C1/1 NB=1/S2C2/1 NB=1/S2C3/1 NB=1/S2C4/1 (48, 49, 50, 52)
3    BXP_1   RUS01B1  B   N/A         N/A          SE=2 NB=1/S2C1/1 NB=1/S2C2/1 NB=1/S2C3/1 NB=1/S2C4/1 (48, 49, 50, 52)
4    BXP_2   RUS01B3  A   0           0            SE=3 NB=1/S3C1/1 NB=1/S3C2/1 NB=1/S3C3/1 NB=1/S3C4/1 (53, 54, 55, 56)
4    BXP_2   RUS01B3  B   N/A         N/A          SE=3 NB=1/S3C1/1 NB=1/S3C2/1 NB=1/S3C3/1 NB=1/S3C4/1 (53, 54, 55, 56)
5    BXP_3   RUS01B5  A   0           0            SE=4 FDD=1 FDD=2 FDD=3 FDD=4 (1:207, 2:210, 3:213, 4:216)
5    BXP_3   RUS01B5  B   N/A         N/A          SE=4 FDD=1 FDD=2 FDD=3 FDD=4 (1:207, 2:210, 3:213, 4:216)
6    BXP_4   RUS01B5  A   0           0            SE=5 FDD=5 FDD=6 FDD=7 FDD=8 (5:219, 6:222, 7:225, 8:228)
6    BXP_4   RUS01B5  B   N/A         N/A          SE=5 FDD=5 FDD=6 FDD=7 FDD=8 (5:219, 6:222, 7:225, 8:228)
7    BXP_5   RUS01B5  A   0           0            SE=6 FDD=10 FDD=11 FDD=12 FDD=9 (10:234, 11:237, 12:240, 9:231)
7    BXP_5   RUS01B5  B   N/A         N/A          SE=6 FDD=10 FDD=11 FDD=12 FDD=9 (10:234, 11:237, 12:240, 9:231)
-------------------------------------------------------------------------------------------------------
```

In the node below four RUs are serving cells of all three RATs. The other RUs are serving one or two RATs.

```
===========================================================================================================
FRU LNH      BOARD     RF  TX (W/dBm)  VSWR (RL)    Sector/Cells (localCellIds/CellIds,PCIs)
===========================================================================================================
2   BXP_0    RUS01B8   A   2.0 (33.1)  1.12 (24.9)  SE=1 GT=S1/S1C1 FDD=S1C1 FDD=S1C2 NB=1/S1C1/1 (1:207, 2:210, 45)
2   BXP_0    RUS01B8   B   N/A         N/A          SE=1 GT=S1/S1C1 FDD=S1C1 FDD=S1C2 NB=1/S1C1/1 (1:207, 2:210, 45)
3   BXP_1    RUS01B1   A   2.1 (33.3)  1.09 (27.6)  SE=2 FDD=S2C1 FDD=S2C2 NB=1/S2C1/1 (3:213, 4:216, 48)
3   BXP_1    RUS01B1   B   N/A         N/A          SE=2 FDD=S2C1 FDD=S2C2 NB=1/S2C1/1 (3:213, 4:216, 48)
4   BXP_2    RUS01B3   A   0.9 (29.7)  1.25 (19.2)  SE=3 GT=S4/S7C1 FDD=S3C1 FDD=S3C2 NB=1/S3C1/1 (5:219, 6:222, 53)
4   BXP_2    RUS01B3   B   N/A         N/A          SE=3 GT=S4/S7C1 FDD=S3C1 FDD=S3C2 NB=1/S3C1/1 (5:219, 6:222, 53)
5   BXP_3    RUS01B5   A   4.4 (36.4)  1.13 (24.6)  SE=4 FDD=S4C1 FDD=S4C2 NB=1/S4C1/1 (7:225, 8:228, 47)
5   BXP_3    RUS01B5   B   N/A         N/A          SE=4 FDD=S4C1 FDD=S4C2 NB=1/S4C1/1 (7:225, 8:228, 47)
6   BXP_4    RUS01B5   A   1.8 (32.7)  1.07 (29.9)  SE=5 GT=S5/S4C1 FDD=S5C1 FDD=S5C2 NB=1/S5C1/1 (9:231, 10:234, 50)
6   BXP_4    RUS01B5   B   N/A         N/A          SE=5 GT=S5/S4C1 FDD=S5C1 FDD=S5C2 NB=1/S5C1/1 (9:231, 10:234, 50)
7   BXP_5    RUS01B5   A   1.8 (32.7)  1.07 (29.0)  SE=6 GT=S5/S6C1 FDD=S6C1 FDD=S6C2 NB=1/S6C1/1 (11:237, 12:240, 55)
7   BXP_5    RUS01B5   B   N/A         N/A          SE=6 GT=S5/S6C1 FDD=S6C1 FDD=S6C2 NB=1/S6C1/1 (11:237, 12:240, 55)
8   BXP_3_1  RUS02B3   A   0           0            SE=7 GT=S4/S7C2
8   BXP_3_1  RUS02B3   B   N/A         N/A          SE=7 GT=S4/S7C2
9   BXP_4_1  RUS01B8A  A   0           0            SE=8 GT=S1/S8C1 GT=S1/S8C2 GT=S1/S8C3 GT=S1/S8C4
9   BXP_4_1  RUS01B8A  B   N/A         N/A          SE=8 GT=S1/S8C1 GT=S1/S8C2 GT=S1/S8C3 GT=S1/S8C4
10  BXP_5_1  RUS02B3   A   0           0            SE=9 GT=S4/S9C1 GT=S4/S9C2
10  BXP_5_1  RUS02B3   B   N/A         N/A          SE=9 GT=S4/S9C1 GT=S4/S9C2
-------------------------------------------------------------------------------------------------------
.
```

13 Support System

13.1 MOM
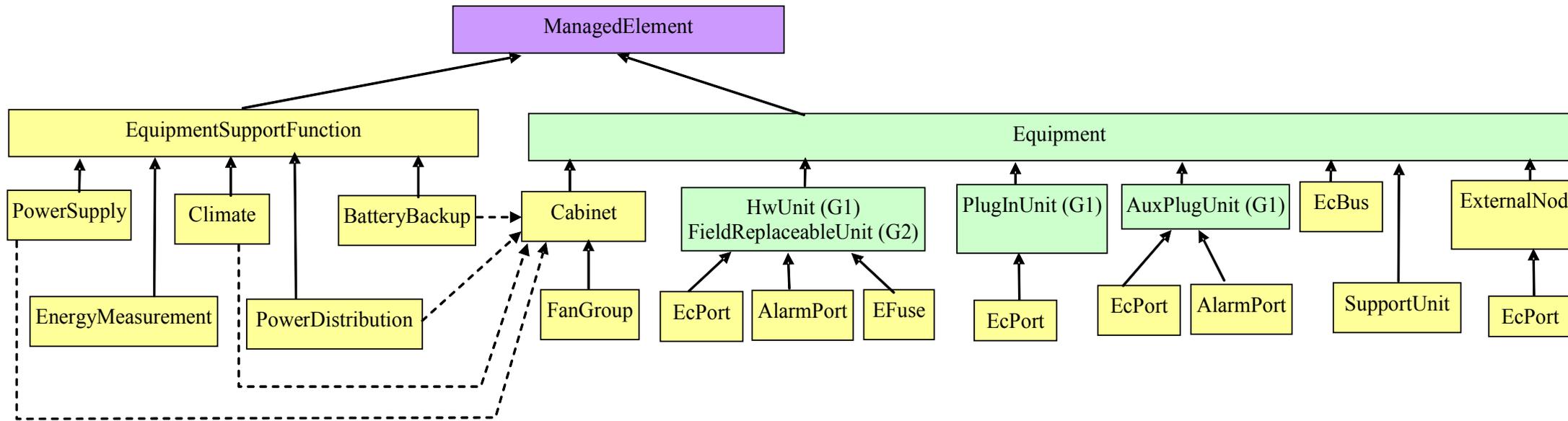

```
ENBG1> momt

EquipmentSupportFunction[0-1] (systemCreated)
        BatteryBackup[0-7]
        Climate[0-7]
        EnergyMeasurement[0-16]
        PowerDistribution[0-7]
        PowerSupply[0-7]

Equipment[1] (systemCreated)
        AuxPlugInUnit[0-]
                EcPort[0-]
                AlarmPort[0-8]
        Cabinet[0-1]
                FanGroup[0-4]
        EcBus[0-7]
        ExternalNode[0-7]
                EcPort[0-2]
        HwUnit[0-]
                AlarmPort[0-32]
                EFuse[0-16]
                EcPort[0-1]
```

```
            PlugInUnit[0-]
                 EcPort[0-]
            SupportUnit[0-]


ENBG1> momd ^(EquipmentSupportFunction|BatteryBackup|Climate|EnergyMeasurement|PowerDistribution|PowerSupply|EcPort|Cabinet|FanGroup|EcBus|
ExternalNode|AlarmPort|EFuse|EcPort|SupportUnit)$ .

##################################################################################################################
MO Class                    Action                         ReturnType            Parameters
##################################################################################################################
BatteryBackup               readBatteryTestResult          structRef:BatteryTestResult  1:testType:enumRef-BatteryTestType
BatteryBackup               readBatteryTestStatus          structRef:BatteryTestStatus  0
BatteryBackup               startBatteryTest               void                  1:forced:boolean
BatteryBackup               startEqualizeCharging          void                  0
BatteryBackup               stopBatteryTest                void                  0
BatteryBackup               stopEqualizeCharging           void                  0
EFuse                       setColdStartup                 void                  1:onAtColdStartup:boolean
EFuse                       setLoadType                    void                  1:loadType:enumRef-EFuseLoadType
EFuse                       setOutput                      void                  1:powerOutputState:enumRef-ApcEFuseOutput
EFuse                       setRemoteControllable          void                  1:remoteControllable:boolean
SupportUnit                 deregisterSupportUnit          void                  0
```

13.2 Inventory

Gen1

....

```
===================================================================================================================
XPBOARD     ST   FAULT OPER MAINT   PRODUCTNUMBER REV   SERIAL/NAME DATE       TEMP MO (LNH)
===================================================================================================================
....<cut>...
RBS6201                             126/BFM901290 R1B   CC43746501  20110128    32  Cabinet=1
FANGROUP         OFF                                                                Cabinet=1,FanGroup=1
FANGROUP         OFF                                                                Cabinet=1,FanGroup=2
FANGROUP         OFF                                                                Cabinet=1,FanGroup=3
PDU0201     1    OFF   ON          BMG980336/4   R2G   C941071960  20101201        HwUnit=PDU-1
PDU0201     1    OFF   ON          BMG980336/4   R2X   Bw97562930  20151015        HwUnit=PDU-2
PDU0104     1    OFF   ON          BMG980336/7   R1D   X051896089  20120927        HwUnit=PDU-3
PDU0104     1    OFF   ON          BMG980336/7   R1E   X052854382  20150430        HwUnit=PDU-4
PSU         1    OFF   ON          BMR910427/1   R3G   Bw92010931  20100820        HwUnit=PSU-1
PSU         1    OFF   ON          BMR910427/1   R3G   Bw92010856  20100820        HwUnit=PSU-2
PSU         1    OFF   ON          BMR910427/1   R3G   Bw92010601  20100820        HwUnit=PSU-3
PSU2401     1    OFF   ON          BMR910427/1   R4A   BR88247767  20130608        HwUnit=PSU-4
PSU2401     1    OFF   ON          BMR910427/1   R4A   BR88247819  20130608        HwUnit=PSU-5
SCU0201     1    OFF   ON          BGM1361006/2  R2A   CD31649337  20101228        HwUnit=SCU
20150803    1    OFF   ON          BML901367/1   P1B   Bw9A600100  20150803        SupportUnit=1 (POWER_SUPPLY)
20151007    1                      BKV           R1A   SC580059417 20151007        SupportUnit=2 (FAN)
-------------------------------------------------------------------------------------------------------------------
```

Gen2

....

```
================================================================================
FRU         LNH        BOARD      ST FAULT OPER MAINT STAT PRODUCTNUMBER  REV    SERIAL      DATE       TEMP
================================================================================
...<cut>...
PDU-1       Z??_01     PDU0202     1  OFF   ON   N/A   N/A  BMG980336/5    R1L    X052305717  20140110
PDU-2       Z??_02     PDU0202     1  OFF   ON   N/A   N/A  BMG980336/5    R1U    BW97900519  20140102
PDU-3       Z??_03     PDU0202     1  OFF   ON   N/A   N/A  BMG980336/5    R1U    BW97900516  20140102
SAU-1       Z??_04     SAU0101     1  OFF   ON   N/A   N/A  ZHY60117/1     R1E    CD39325074  20131228
SCU-1       Z??_05     SCU0301     1  OFF   ON   N/A   N/A  BGM1361006/3   R1B    CD39738173  20140311
SCU-2       Z??_06     SCU0301     1  OFF   ON   N/A   N/A  BGM1361006/3   R1B    CD39718851  20140307
SCU-3       Z??_07     SCU0301     1  OFF   ON   N/A   N/A  BGM1361006/3   R1B    CD39632887  20140224
SUP-1       Z??_08     SUP6601     1  OFF   ON   N/A   N/A  1/BFL901009/4  R1E    BR82207677  20120828
--------------------------------------------------------------------------------


================================================================================
XPBOARD     ST FAULT OPER PRODUCTNUMBER REV SERIAL/NAME DATE       TEMP MO
================================================================================
RBS6202                   102/BFM901351 R4A C824834996  20110708    28  Cabinet=1
FANGROUP       OFF                                                       Cabinet=1,FanGroup=1
FANGROUP       OFF                                                       Cabinet=1,FanGroup=2
RBS6202                   306/BFM901351 R2C CB4T966107  20140606    31  Cabinet=2
FANGROUP       OFF                                                       Cabinet=2,FanGroup=1
FANGROUP       OFF                                                       Cabinet=2,FanGroup=2
RBS6202                   102/BFM901351 R5A CB4N295219  20120716    32  Cabinet=3
FANGROUP       OFF                                                       Cabinet=3,FanGroup=1
FANGROUP       OFF                                                       Cabinet=3,FanGroup=2
RBS6601                   102/BFL901009 R2A BR81844376  20120319    29  Cabinet=4
FANGROUP       OFF                                                       Cabinet=4,FanGroup=1
PSUAC10     1  N/A   N/A  BML901350/1   R1A DF90000020  20150413        SupportUnit=1 (POWER_SUPPLY EXTERNAL_ALARM_PORTS)
FAN01       1  N/A   N/A  BKV106176/2                                   SupportUnit=2 (FAN)
Power6302   1  OFF   ON   BML901367/1   P1C BR84290708  20151016        SupportUnit=3 (POWER_SUPPLY)
--------------------------------------------------------------------------------
```

13.3 <u>Connections</u>

```
ENBG2> get . positionref|controldomainref cabi


==========================================================================================
MO                                                 Attribute        Value
==========================================================================================
FieldReplaceableUnit=DU-1                          positionRef      Cabinet=4
FieldReplaceableUnit=PDU-1                         positionRef      Cabinet=1
FieldReplaceableUnit=PDU-2                         positionRef      Cabinet=2
FieldReplaceableUnit=PDU-3                         positionRef      Cabinet=3
FieldReplaceableUnit=R503-1                        positionRef      Cabinet=1
FieldReplaceableUnit=R503-2                        positionRef      Cabinet=2
FieldReplaceableUnit=R503-3                        positionRef      Cabinet=3
FieldReplaceableUnit=RU-1-3                        positionRef      Cabinet=1
FieldReplaceableUnit=RU-1-4                        positionRef      Cabinet=1
FieldReplaceableUnit=RU-2-3                        positionRef      Cabinet=2
FieldReplaceableUnit=RU-2-4                        positionRef      Cabinet=2
FieldReplaceableUnit=RU-3-3                        positionRef      Cabinet=3
FieldReplaceableUnit=RU-3-4                        positionRef      Cabinet=3
FieldReplaceableUnit=SAU-1                         positionRef      Cabinet=2
```

```
FieldReplaceableUnit=SCU-1                              positionRef        Cabinet=1
FieldReplaceableUnit=SCU-2                              positionRef        Cabinet=2
FieldReplaceableUnit=SCU-3                              positionRef        Cabinet=3
FieldReplaceableUnit=SUP-1                              positionRef        Cabinet=4
Climate=1                                               controlDomainRef   Cabinet=1
Climate=2                                               controlDomainRef   Cabinet=2
Climate=3                                               controlDomainRef   Cabinet=3
Climate=4                                               controlDomainRef   Cabinet=4
PowerDistribution=1                                     controlDomainRef   Cabinet=1
PowerDistribution=2                                     controlDomainRef   Cabinet=2
PowerDistribution=3                                     controlDomainRef   Cabinet=3
PowerSupply=1                                           controlDomainRef   Cabinet=1
PowerSupply=2                                           controlDomainRef   Cabinet=2
PowerSupply=3                                           controlDomainRef   Cabinet=3
=============================================================================================================
Total: 28 MOs

ENBG2> l+m $tempdir/x

Logging to file: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170625-083010_3628/x

ENBG2> get . positionref|controldomainref cab
...
ENBG2> l-

Log close: /home/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20170625-083010_3628/x

ENBG2> l sort -k 3 $logfile | $gawk '{print $3,$1}'

Cabinet=1       FieldReplaceableUnit=R503-1
Cabinet=1       FieldReplaceableUnit=PDU-1
Cabinet=1       FieldReplaceableUnit=RU-1-3
Cabinet=1       FieldReplaceableUnit=RU-1-4
Cabinet=1       FieldReplaceableUnit=SCU-1
Cabinet=1       Climate=1
Cabinet=1       PowerDistribution=1
Cabinet=1       PowerSupply=1

Cabinet=2       FieldReplaceableUnit=R503-2
Cabinet=2       FieldReplaceableUnit=PDU-2
Cabinet=2       FieldReplaceableUnit=RU-2-3
Cabinet=2       FieldReplaceableUnit=RU-2-4
Cabinet=2       FieldReplaceableUnit=SAU-1
Cabinet=2       FieldReplaceableUnit=SCU-2
Cabinet=2       Climate=2
Cabinet=2       PowerDistribution=2
Cabinet=2       PowerSupply=2

Cabinet=3       FieldReplaceableUnit=R503-3
Cabinet=3       FieldReplaceableUnit=PDU-3
Cabinet=3       FieldReplaceableUnit=RU-3-3
Cabinet=3       FieldReplaceableUnit=RU-3-4
Cabinet=3       FieldReplaceableUnit=SCU-3
Cabinet=3       Climate=3
Cabinet=3       PowerDistribution=3
Cabinet=3       PowerSupply=3

Cabinet=4       FieldReplaceableUnit=DU-1
```

```
Cabinet=4        FieldReplaceableUnit=SUP-1
Cabinet=4        Climate=4


ENBG2> hget ecbus= ref|reserv

==================================================================================================
MO        ecBusConnectorRef          reservedBy
==================================================================================================
EcBus=1 FieldReplaceableUnit=R503-1 [2] = FieldReplaceableUnit=SCU-1,EcPort=1 FieldReplaceableUnit=PDU-1,EcPort=1
EcBus=2 FieldReplaceableUnit=R503-2 [4] = FieldReplaceableUnit=SCU-2,EcPort=1 FieldReplaceableUnit=PDU-2,EcPort=1 ExternalNode=1,EcPort=1
FieldReplaceableUnit=SAU-1,EcPort=1
EcBus=3 FieldReplaceableUnit=R503-3 [2] = FieldReplaceableUnit=SCU-3,EcPort=1 FieldReplaceableUnit=PDU-3,EcPort=1
EcBus=4 FieldReplaceableUnit=DU-1   [2] = FieldReplaceableUnit=SUP-1,EcPort=1 FieldReplaceableUnit=DU-1,EcPort=1
==================================================================================================
Total: 4 MOs


ENBG2> hget alarmport= !id$|availabilitys

==================================================================================================
MO                           activeExternalAlarm administrativeState alarmSlogan    normallyOpen operationalState perceivedSeverity
userLabel
==================================================================================================
FieldReplaceableUnit=SAU-1,AlarmPort=1 false          1 (UNLOCKED)        ENTRY ALARM    false        1 (ENABLED)      3 (MAJOR)
FieldReplaceableUnit=SAU-1,AlarmPort=2 false          1 (UNLOCKED)        FIRE ALARM     false        1 (ENABLED)      2 (CRITICAL)
FieldReplaceableUnit=SAU-1,AlarmPort=3 false          1 (UNLOCKED)        MAINS FAIL     false        1 (ENABLED)      2 (CRITICAL)
FieldReplaceableUnit=SAU-1,AlarmPort=4 false          1 (UNLOCKED)        ROOM HIGH TEMP false        1 (ENABLED)      2 (CRITICAL)
FieldReplaceableUnit=SAU-1,AlarmPort=5 false          1 (UNLOCKED)        SITE URGENT    false        1 (ENABLED)      2 (CRITICAL)
FieldReplaceableUnit=SAU-1,AlarmPort=6 false          1 (UNLOCKED)        SITE NON URGENT false       1 (ENABLED)      3 (MAJOR)
FieldReplaceableUnit=SAU-1,AlarmPort=7 false          1 (UNLOCKED)        DC URGENT      false        1 (ENABLED)      2 (CRITICAL)
FieldReplaceableUnit=SAU-1,AlarmPort=8 false          1 (UNLOCKED)        DC NON URGENT  false        1 (ENABLED)      3 (MAJOR)
==================================================================================================
Total: 8 MOs
```

13.4 **Shared Support System**
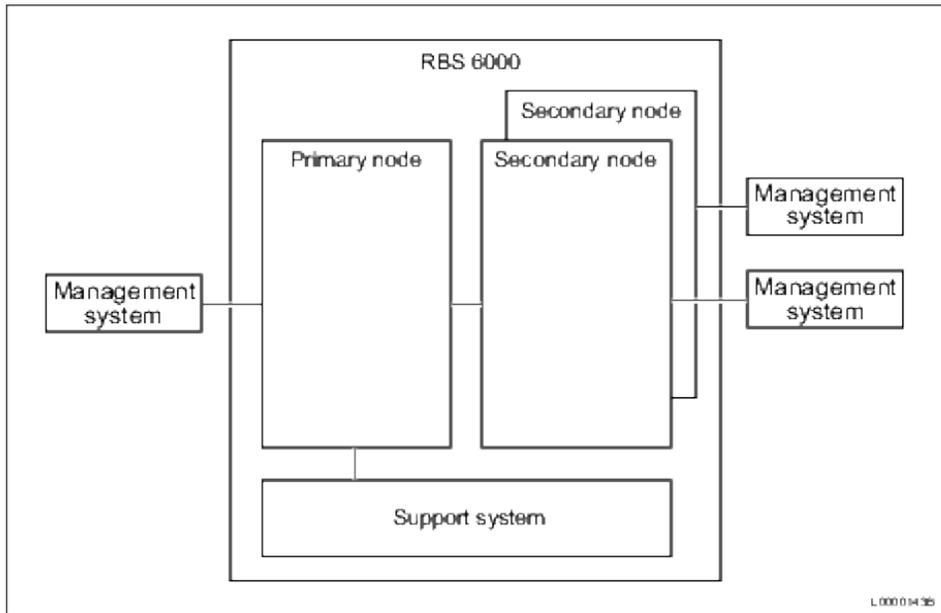
```
PRIMARY> hget supportfunction|externalnode !id$|full

==========================================================================================
MO                          logicalName               radioAccessTechnology supportSystemControl
==========================================================================================
EquipmentSupportFunction=1 VIC_RBS54_Box_Hill_539914 3 (LTE)              true
==========================================================================================
Total: 1 MOs


==========================================================================================
MO              informationOnly logicalName               radioAccessTechnology supportSystemControl
==========================================================================================
ExternalNode=RBS55 false           VIC_RBS55_Box_Hill_539915 3 (LTE)              0 (FALSE)
==========================================================================================

SECONDARY> hget supportfunction|externalnode !id$

==========================================================================================
MO                          logicalName               radioAccessTechnology supportSystemControl
==========================================================================================
EquipmentSupportFunction=1 VIC_RBS55_Box_Hill_539915 3 (LTE)              false
==========================================================================================
Total: 1 MOs


==========================================================================================
MO              informationOnly logicalName               radioAccessTechnology supportSystemControl
==========================================================================================
ExternalNode=RBS54 true            VIC_RBS54_Box_Hill_539914 3 (LTE)              1 (TRUE)
==========================================================================================
Total: 1 MOs
```

14 SW Management

14.1 Restarts

Restart domain	CPP	RCS	Pico
All DUs (= node restart)	ManagedElement.manualRestart()	FieldReplaceableUnit.restartUnit() (since only one DU currently)	RbsUnit.restart()
DU	PlugInUnit.manualRestart()	FieldReplaceableUnit.restartUnit()	
RU/RRU/XMU	AuxPlugInUnit.restartUnit()	FieldReplaceableUnit.restartUnit()	
SUP, SCU, SAU, PSU, etc	HwUnit.restartUnit()	FieldReplaceableUnit.restartUnit()	
RET/TMA	AntennaNearUnit.restartUnit()	AntennaNearUnit. restartUnit()	

Gen1

Restart actions:

```
ENBG1> momd . restart


###############################################################################
MO Class            Action          ReturnType      Parameters
###############################################################################
ManagedElement      manualRestart   void            3:restartRank:restartReason:restartInfo
PlugInUnit          manualRestart   void            3:restartRank:restartReason:restartInfo
PiuDevice           manualRestart   void            3:restartRank:restartReason:restartInfo
Jvm                 restart         void            0
Program             restart         void            0
AntennaNearUnit     restartUnit     void            0
AuxPlugInUnit       restartUnit     void            0
HwUnit              restartUnit     void            0
```

Restart ranks:

```
ENB> mom restartrank .


#########################################################################
Enum                               Values
#########################################################################
RestartRank                        0:RESTART_WARM, 1:RESTART_REFRESH, 2:RESTART_COLD, 3:RESTART_COLDWTEST
-------------------------------------------------------------------------------
 - RESTART_WARM: Restarts the node with the same software. The software is not reloaded from the disk. The traffic is affected least.
 - RESTART_REFRESH: Reloads the software from the disk, restarts the node, and resets parts of the hardware. The traffic is affected more than
for a warm restart.
```

```
    - RESTART_COLD: Reloads the software from the disk, restarts the node, and resets all hardware. The traffic is affected more than for a refresh
restart.
    - RESTART_COLDWTEST: Reloads the software from the disk, restarts the node, and resets and tests the hardware. The traffic is affected most.
    ********************************************************************************
```

At coldWithTest restart, the result is stored in:

```
ENBG1> mom . hwtest


################################################################################
MO Class                    Attribute              Type                    Flags
################################################################################
PlugInUnit                  hwTestResult           string                  readOnly,noNotification
--------------------------------------------------------------------------------
Contains text information from latest performed hardware tests.
Default=""
    ********************************************************************************
PlugInUnit                  hwTestStatus           enumRef:TestStatus       readOnly,noNotification
--------------------------------------------------------------------------------
Indicates the status of hardware tests.
Default=NO_TEST_RESULTS
    ********************************************************************************
```

Gen2

Restart actions:

```
ENBG2> momd . restart


################################################################################
MO Class                                            Action              ReturnType          Parameters
################################################################################
ReqAntennaSystem.AntennaNearUnit                    restartUnit         void                0
ReqFieldReplaceableUnit.FieldReplaceableUnit        restartUnit         void
3:restartRank:restartReason:restartInfo:enumRef-ReqFieldReplaceableUnit.RestartRank:enumRef-ReqFieldReplaceableUnit.RestartReason:string
```

Restart ranks:

```
ENBG2> mom restartrank .


##################################################################################
Enum                                              Values
##################################################################################
ReqFieldReplaceableUnit.RestartRank               0:RESTART_WARM, 1:RESTART_COLD, 2:RESTART_COLDWTEST
----------------------------------------------------------------------------------
Restart ranks
  - RESTART_WARM: Restarts the MO with the same software. The software is not reloaded from the disk. The traffic is affected least as warm
restart is faster and no hardware is reset.
```

- RESTART_COLD: Reloads the software from the disk, restarts the MO, and resets all hardware. The traffic is affected more than for a warm restart.
- RESTART_COLDWTEST: Reloads the software from the disk, restarts the MO, and resets and tests the hardware. The traffic is affected most.
****

At coldWithTest restart, the result is stored in:

```
ENBG2> mom . hwtest


###############################################################################################################################
MO Class                                                         Attribute                       Type
Flags
###############################################################################################################################
ReqFieldReplaceableUnit.FieldReplaceableUnit            hwTestResult                    structRef:ReqFieldReplaceableUnit.HwTestResult
isNillable,readOnly
-------------------------------------------------------------------------------------------------------------------------------
The test result from the latest restart of the FRU (with rank RESTART_COLDWTEST).
isNillable: true
**********************************************************************************************************************************
```

14.1.1 PICO RBS

Node restart

```
PRBS1> acc rbsunit restart


=================================================================================================
Proxy  MO                                                       Action                      Nr of Params
=================================================================================================
  486  RbsUnit=1                                                restart                     1

Parameter 1 of 1, restartType (enumRef-MSRBS_V1_Equipment_RbsUnit.RestartType):
    Enter one of the following integers: 0:RESTART_COLD: 0
 >>> Return value = null


=================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

14.1.2 Gen1

Node Restart

All the DUs will restart but not the XMU/RUs, unless the DU restart takes very long

```
ENBG1> acc 0 manualrestart

Call Action manualrestart on following 1 MOs ?
=================================================================================
    0  ManagedElement=1
INFO: The RBS node OFFLINE_209041_CAPITOL_CENTRE_dcg_k will be restarted on CV: Post_upgrade_R5G18_23:45:13
REMINDER: If the node is being restarted to clear a fault, please make sure to run "dcge" or "dcgm" BEFORE the node restart.
=================================================================================
Call action manualrestart on 1 MOs. Are you Sure [y/n] ? y


=================================================================================
Proxy  MO                                              Action                    Nr of Params
=================================================================================
    0  ManagedElement=1                                manualRestart             3

Parameter 1 of 3, restartRank (enumRef-RestartRank):
    Enter one of the following integers: 0:RESTART_WARM, 1:RESTART_REFRESH, 2:RESTART_COLD, 3:RESTART_COLDWTEST: 2

Parameter 2 of 3, restartReason (enumRef-RestartReason):
    Enter one of the following integers: 0:PLANNED_RECONFIGURATION, 1:UNPLANNED_NODE_EXTERNAL_PROBLEMS, 2:UNPLANNED_NODE_UPGRADE_PROBLEMS,
3:UNPLANNED_O_AND_M_ISSUE, 4:UNPLANNED_CYCLIC_RECOVERY, 5:UNPLANNED_LOCKED_RESOURCES, 6:UNPLANNED_COLD_WITH_HW_TEST,
7:UNPLANNED_CALL_PROCESSING_DEGRADATION, 8:UNPLANNED_LOW_COVERAGE, 30:UPGRADE_BOARD_RESTART, 31:OPERATOR_CLASSIFIED_PROBLEMS: 0

Parameter 3 of 3, restartInfo (string): 0
 >>> Return value = null


=================================================================================
Total: 1 MOs attempted, 1 MOs actioned

ENBG1> pol

Waiting 20 seconds before starting to poll...
MO service not ready, retrying in 10 seconds...
MO service not ready, retrying in 10 seconds...
...

Connected to ENBG1 (ManagedElement=1)
MO service is ready.

ENBG1>
```

DU Restart

```
ENB1> acc 000200 manualrestart


=================================================================================
Proxy  MO                                              Action                    Nr of Params
=================================================================================
 1011  Subrack=1,Slot=2,PlugInUnit=1                   manualRestart             3
```

```
Parameter 1 of 3, restartRank (enumRef-RestartRank):
    Enter one of the following integers: 0:RESTART_WARM, 1:RESTART_REFRESH, 2:RESTART_COLD, 3:RESTART_COLDWTEST: 0

Parameter 2 of 3, restartReason (enumRef-RestartReason):
    Enter one of the following integers: 0:PLANNED_RECONFIGURATION, 1:UNPLANNED_NODE_EXTERNAL_PROBLEMS, 2:UNPLANNED_NODE_UPGRADE_PROBLEMS,
3:UNPLANNED_O_AND_M_ISSUE, 4:UNPLANNED_CYCLIC_RECOVERY, 5:UNPLANNED_LOCKED_RESOURCES, 6:UNPLANNED_COLD_WITH_HW_TEST,
7:UNPLANNED_CALL_PROCESSING_DEGRADATION, 8:UNPLANNED_LOW_COVERAGE, 30:UPGRADE_BOARD_RESTART, 31:OPERATOR_CLASSIFIED_PROBLEMS: 0

Parameter 3 of 3, restartInfo (string): 0
 >>> Return value = null


=======================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

RU/HWU/TMA/RET Restart

```
ENBG1> acl unit restart


=======================================================================================================
Proxy  MO                                                    Action                    Nr of Params
=======================================================================================================
  383  HwUnit=SCU                                            restartUnit               0
  402  AuxPlugInUnit=RRU-R2-4                                restartUnit               0
  421  AuxPlugInUnit=RRU-R2-5                                restartUnit               0
  440  AuxPlugInUnit=RRU-R2-6                                restartUnit               0
  459  AuxPlugInUnit=RRU-R2-7                                restartUnit               0
  518  HwUnit=PDU-1                                          restartUnit               0
  683  AntennaUnitGroup=1,AntennaNearUnit=1                  restartUnit               0
  685  AntennaUnitGroup=1,AntennaNearUnit=2                  restartUnit               0
 ...<cut>...
=======================================================================================================


ENBG1> acc AuxPlugInUnit=RRU-R2-9 restartUnit


=======================================================================================================
Proxy  MO                                                    Action                    Nr of Params
=======================================================================================================
  497  AuxPlugInUnit=RRU-R2-9                                restartUnit               0
 >>> Return value = null


=======================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

Restarting via COLI

- **Node restart:**   restartObj me cold 0
- **Board restart:**   lhsh 00xx00/BXP_xx restart

Restarting all XMU/RU

```
ENBG1> lh ru restart

ENBG1> lh xmu restart
```

Restarting only the MO service in the DU

```
ENBG1> progkill java
```

14.1.3 Gen2

Node Restart:

In RCS, there is no restart action on ManagedElement MO, only possible to restart the individual FieldReplaceableUnit MOs (DUS , XMU, RU)
A node restart can be accomplished by restarting the DUS since currently there is only one DUS.
During DUS restart, the connected XMU/RUs will usually not restart, unless the DUS restart takes very long (> 90 seconds)

```
WRBS691> acc 000100 restartunit


=========================================================================================
Proxy  MO                                                  Action                 Nr of Params
=========================================================================================
  593  FieldReplaceableUnit=1                              restartUnit            3

Parameter 1 of 3, restartRank (enumRef-ReqFieldReplaceableUnit.RestartRank):
   Enter one of the following integers: 0:RESTART_WARM, 1:RESTART_COLD, 2:RESTART_COLDWTEST: 1

Parameter 2 of 3, restartReason (enumRef-ReqFieldReplaceableUnit.RestartReason):
   Enter one of the following integers: 0:PLANNED_RECONFIGURATION, 1:UNPLANNED_NODE_EXTERNAL_PROBLEMS, 2:UNPLANNED_NODE_UPGRADE_PROBLEMS,
3:UNPLANNED_O_AND_M_ISSUE, 4:UNPLANNED_CYCLIC_RECOVERY, 5:UNPLANNED_LOCKED_RESOURCES, 6:UNPLANNED_COLD_WITH_HW_TEST,
7:UNPLANNED_CALL_PROCESSING_DEGRADATION, 8:UNPLANNED_LOW_COVERAGE, 31:OPERATOR_CLASSIFIED_PROBLEMS: 0

Parameter 3 of 3, restartInfo (string): 0
 >>> Return value = null


=========================================================================================
Total: 1 MOs attempted, 1 MOs actioned

RBSG2> pol

Waiting 20 seconds before starting to poll...
Unable to connect to RBSG2:2023
MO service not ready, retrying in 10 seconds, give up in 1190 seconds...
Unable to connect to RBSG2:2023
```

```
MO service not ready, retrying in 10 seconds, give up in 1180 seconds...
Unable to connect to RBSG2:2023
MO service not ready, retrying in 10 seconds, give up in 1170 seconds...
Unable to connect to RBSG2:2023
MO service not ready, retrying in 10 seconds, give up in 1160 seconds...
Unable to connect to RBSG2:2023


Connected to RBSG2 (ManagedElement=G2RBS_23)
MO service is ready.


RBSG2>
```

RU/HWU/TMA/RET Restart

```
ENBG2> acl unit restart


===============================================================================================
Proxy  MO                                                Action                Nr of Params
===============================================================================================
 3165  AntennaUnitGroup=1,AntennaNearUnit=RET-1          restartUnit           0
 3169  AntennaUnitGroup=1,AntennaNearUnit=RET-2          restartUnit           0
 3173  AntennaUnitGroup=1,AntennaNearUnit=TMA-700-1      restartUnit           0
....
 3322  FieldReplaceableUnit=DU-1                         restartUnit           3
 3341  FieldReplaceableUnit=PDU-1                        restartUnit           3
 3354  FieldReplaceableUnit=PDU-2                        restartUnit           3
 3367  FieldReplaceableUnit=PDU-3                        restartUnit           3
 3380  FieldReplaceableUnit=R503-1                       restartUnit           3
 3411  FieldReplaceableUnit=R503-2                       restartUnit           3
 3442  FieldReplaceableUnit=R503-3                       restartUnit           3
 3473  FieldReplaceableUnit=RRU-1800-1-1                 restartUnit           3
 3483  FieldReplaceableUnit=RRU-1800-2-1                 restartUnit           3
 3493  FieldReplaceableUnit=RRU-1800-3-1                 restartUnit           3
 3503  FieldReplaceableUnit=RRU-2600-1-1                 restartUnit           3
 3513  FieldReplaceableUnit=RRU-2600-2-1                 restartUnit           3
 3523  FieldReplaceableUnit=RRU-2600-3-1                 restartUnit           3
 3533  FieldReplaceableUnit=RU-1-3                       restartUnit           3
 3540  FieldReplaceableUnit=RU-1-4                       restartUnit           3
 3547  FieldReplaceableUnit=RU-2-3                       restartUnit           3
 3554  FieldReplaceableUnit=RU-2-4                       restartUnit           3
 3561  FieldReplaceableUnit=RU-3-3                       restartUnit           3
 3568  FieldReplaceableUnit=RU-3-4                       restartUnit           3
 3575  FieldReplaceableUnit=SAU-1                        restartUnit           3
 3585  FieldReplaceableUnit=SCU-1                        restartUnit           3
 3587  FieldReplaceableUnit=SCU-2                        restartUnit           3
 3589  FieldReplaceableUnit=SCU-3                        restartUnit           3
 3591  FieldReplaceableUnit=SUP-1                        restartUnit           3
===============================================================================================


ENBG2> acc FieldReplaceableUnit=RU-3-4 restartunit


===============================================================================================
```

```
Proxy   MO                                                          Action                  Nr of Params
========================================================================================================
 3568   FieldReplaceableUnit=RU-3-4                                 restartUnit             3

Parameter 1 of 3, restartRank (enumRef-ReqFieldReplaceableUnit.RestartRank):
    Enter one of the following integers: 0:RESTART_WARM, 1:RESTART_COLD, 2:RESTART_COLDWTEST: 1

Parameter 2 of 3, restartReason (enumRef-ReqFieldReplaceableUnit.RestartReason):
    Enter one of the following integers: 0:PLANNED_RECONFIGURATION, 1:UNPLANNED_NODE_EXTERNAL_PROBLEMS, 2:UNPLANNED_NODE_UPGRADE_PROBLEMS,
3:UNPLANNED_O_AND_M_ISSUE, 4:UNPLANNED_CYCLIC_RECOVERY, 5:UNPLANNED_LOCKED_RESOURCES, 6:UNPLANNED_COLD_WITH_HW_TEST,
7:UNPLANNED_CALL_PROCESSING_DEGRADATION, 8:UNPLANNED_LOW_COVERAGE, 31:OPERATOR_CLASSIFIED_PROBLEMS: 0

Parameter 3 of 3, restartInfo (string): 0
 >>> Return value = null


========================================================================================================
Total: 1 MOs attempted, 1 MOs actioned


ENBG2> acc AntennaUnitGroup=3,AntennaNearUnit=TMA-700-2 restartunit


========================================================================================================
Proxy   MO                                                          Action                  Nr of Params
========================================================================================================
 3270   AntennaUnitGroup=3,AntennaNearUnit=TMA-700-2                restartUnit             0
 >>> Return value = null


========================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

Restarting via COLI

 - **Node restart:**   `restart -c`
 - **Board restart:**   `lhsh BXP_xx restart`

Restarting all XMU/RU

`ENBG2> lh ru restart`

`ENBG2> lh xmu restart`

14.1.4 restart_confirmation feature

An moshell uservariable allows to add extra confirmation before performing a node restart, or disable node restart completely

From the moshell file description:

```
....
#==============================================================================
#              *  0 = no confirmation needed
#              *  1 = ask for node type on MGW/RNC/RXI
#              * 11 = ask for node type on MGW/RNC/RXI/RBS
#              *  2 = ask for node type and node name on MGW/RNC/RXI
#              * 22 = ask for node type and node name on MGW/RNC/RXI/RBS
#              *  3 = node restart forbidden on MGW/RNC/RXI
#              * 33 = node restart forbidden on MGW/RNC/RXI/RBS
#==============================================================================
restart_confirmation=1
....
```

restart_confirmation = 1 or 11

```
RBS11> acc 000100 restartunit

Call Action manualrestart on following MOs ?
=================================================================================
   593   FieldReplaceableUnit=1
=================================================================================
INFO: The RBS node RBS11 will be restarted.
REMINDER: If the node is being restarted to clear a fault, please make sure to run "dcge" or "dcgm" BEFORE the node restart.
Are you Sure [y/n] ? y
Please confirm the node type [mgw/rnc/rxi/rbs]: rnc
!! Incorrect node type, please check that you are logged in to the correct node.

RBS11> restart -c
Are you sure you want to restart the node?
Please confirm [y/n] ? y
Please confirm the node type [mgw/rnc/rxi/rbs]: rbs
```

restart_confirmation = 2 or 22

```
RBS11> acc 000100 restartunit

Call Action manualrestart on following MOs ?
=================================================================================
   593   FieldReplaceableUnit=1
=================================================================================
INFO: The RBS node RBS11 will be restarted.
REMINDER: If the node is being restarted to clear a fault, please make sure to run "dcge" or "dcgm" BEFORE the node restart.
Are you Sure [y/n] ? y
Please confirm the node type [mgw/rnc/rxi/rbs]: rbs
Please confirm the node name: rbs1
!! Incorrect node name, please check that you are logged in to the correct node.

RBS11> restart -c
```

```
Are you sure you want to restart the node?
Please confirm [y/n] ? y
Please confirm the node type [mgw/rnc/rxi/rbs]: rbs
Please confirm the node name: rbs11
```

restart_confirmation = 3 or 33

```
RBS11> acc 000100 restartunit

==================================================================================
Proxy  MO                                           Action              Nr of Params
==================================================================================
593  FieldReplaceableUnit=1                         restartUnit             3
!!!! Node Restart not allowed.
==================================================================================
Total: 1 MOs attempted, 0 MOs actioned

$ restart -c
Node Restart not allowed.
$

$ lhsh 000100 restart -c
Node Restart not allowed.
$
```

14.2 Backup handling

14.2.1 CPP vs ECIM/COM

More info: SWM_FS document below

SWM_FS.docx

 - In CPP, the configuration database is stored in RAM memory. At node restart the database is deleted from the RAM and reloaded from a backup copy on disk. The backup copy to load at node restart is called "startable CV" and is selected with the "cvset" command.

 - In COM, the configuration database is stored on disk. At node restart, the configuration database is not deleted, it stays the same. To load a different configuration database, use the command "cvre".

CPP	ECIM/COM

Gen1

```
ManagedElement[1],SwManagement[1],ConfigurationVersion[1]
```

Gen2

```
ManagedElement[1],SystemFunctions[1],BrM[1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupHousekeeping[0-1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupLabelStore[0-1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupScheduler[0-1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupScheduler[0-1],BrmCalendarBasedPeriodicEvent[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupScheduler[0-1],BrmPeriodicEvent[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackupScheduler[0-1],BrmSingleEvent[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmBackup[0-]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmBackupManager[0-],BrmFailsafeBackup[1]
ManagedElement[1],SystemFunctions[1],BrM[1],BrmRollbackAtRestore[0-1]
```

```
RBS33> h cvls


********************************************************************************
cvls/cvmk/cvms/cvset/cvrm[u]/cvrbrm/cvcu/cvget[f][u]/cvput/cvls1/cvre/cvfa/cvfd
********************************************************************************
CV backup handling: list, make local, make remote, remove, setstartable.


Command syntax (CPP):
    * cvcu
    * cvls   [<cv-filter>]
    * cvls1
    * cvmk       <cvname> [<operator>] [<comment>]
    * cvset      <cvname>|<cv-Id>
    * cvms       <cvname> [<operator>] [<comment>]
    * cvrm       <cvname>|<cv-filter>|<cv-Id>
    * cvrmu      <UP>
    * cvrbrm     <cvname>|<cv-filter>|<cv-Id>
    * cvget[f]   <cvname>|<cv-filter>|<cv-Id> [<destdir>]
    * cvgetu     <UP>
    * cvput      <zipped-cvfile>
    * cvfa
    * cvfd


Command Description (CPP):
A set of commands similar to the "cv" commands in OSE but operate through MO interface instead of telnet/ssh (ie: no password).
    * cvcu:  display the current cv information only (equivalent of "cv cu").
    * cvls:  display both the current cv information (equivalent of "cv cu") and cv list (equivalent of "cv ls"). It is possible to filter the
output of cvls to only show CVs where the CV name or CV attributes match a certain string. The proxy Id of the CVs can be used in the commands
cvrm and cvget. The display of CV proxy Id can be disabled with command "safe+".
    * cvls1: similar to the cvls command except that it executes via the OSE shell instead of the MO service.
    * cvmk:  create a local cv backup. Operator name and comments (not longer than 40 characters) can be given as argument.
    * cvset: set a cv as startable.
    * cvms:  create a cv and make it startable (combination of cvmk and cvset)
    * cvrm:  remove one or more cv's. If the argument does not match an existing CV then all CVs matching that string will be removed. A
confirmation message is printed before removal. The CV(s) will automatically be removed from rollback list when necessary.
    * cvrmu: remove all CV's connected to a specific UP (same as cvrm but with the UP as argument).
    * cvrbrm: remove one or more cv's from the rollback list. If the argument does not match an existing CV then all CVs matching that string
will be removed. A confirmation message is printed before removal.
    * cvget[f]: make a remote backup of a cv to the workstation. The operation is done with the MO action putToFtpServer unless option "f" has
been specified, in which case the transfer will be done by FTP/SFTP. The second argument is optional. If not given, a default folder is chosen
for the backup ~/moshell_logfiles/logs_moshell/cv/<node>/<date>_<time>/
    * cvgetu  : make a remote backup of all CVs connected to a specific UP (same as cvget but with the UP as argument).
    * cvput: transfer a remote CV backup (zip file) from the workstation to the node. The operation is done with the MO action getFromFtpServer.
    * cvfa:  activate robust reconfiguration (same as MO action Configuration.activateRobustReconfiguration)
    * cvfd:  deactivate robust reconfiguration (same as MO action Configuration.deactivateRobustReconfiguration)


Command syntax (COM):
    * cvcu
    * cvls   [<cv-filter>]
    * cvmk   <cvname>
    * cvre   <cvname>|<cv-Id>
    * cvrm   <cvname>|<cv-filter>|<cv-Id>
    * cvrmu  <UP>
```

```
    * cvget  <cvname>|<cv-filter>|<cv-Id> [<destdir>]
    * cvgetu <UP>
    * cvput  <zipped-cvfile>
    * cvfa
    * cvfd


Command description (COM):
    * cvcu : display the current backup information only.
    * cvls : same as above plus the list of SwVersions, UpgradePackages and BrmBackups. The Id field of the BrmBackup can be used in the
commands cvrm and cvget.
    * cvmk : create a local backup.
    * cvre : restore a backup (equivalent to doing a cvset followed by node restart on CPP)
    * cvrm : remove one or more backups from the node. If the argument does not match an existing backup then all backups matching that string
will be removed. A confirmation message is printed before removal.
    * cvrmu: remove all backups connected to a specific UP (same as cvrm but with the UP as argument).
    * cvget : export a backup to the workstation. The second argument is optional. If not given, a default folder is chosen for the backup
~/moshell_logfiles/logs_moshell/cv/<node>/<date>_<time>/
    * cvgetu: export all backups connected to a specific UP (same as cvget but with the UP as argument).
    * cvput : transfer a backup (zip file) from the workstation to the node.
    * cvfa  : activate failsafe backup (same as MO action BrmFailsafeBackup.activate)
    * cvfd  : deactivate failsafe backup (same as MO action BrmFailsafeBackup.deactivate)


...<cut>...
```

14.2.2 <u>cvls</u>

<u>Gen1</u>

Was loaded at last node restart

Current configuration

Will be loaded at next node restart

Loaded CV **Executing CV** **Startable CV**

acc 0 manualrestart

cvmk

cvset
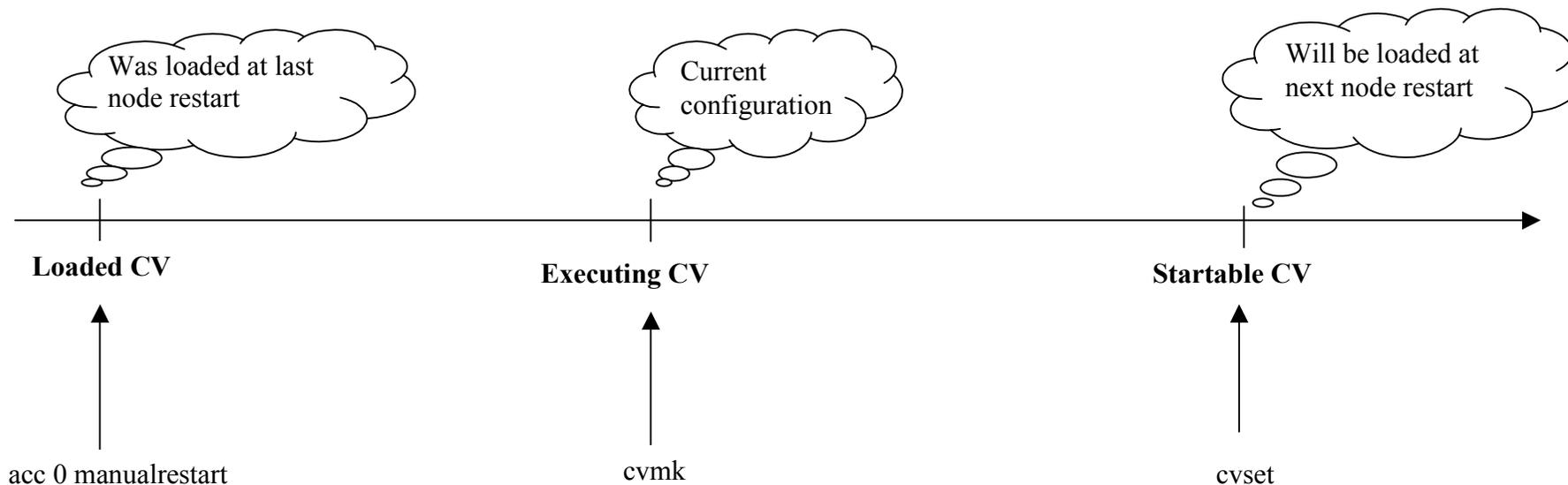
```
ENBG1> cvls


===========================================================================================================
170607-14:53              CV Name                              Upgrade Package        Release
===========================================================================================================
Startable:                Post_upgrade_R5G18_23:45:13          CXP102051/27_R5G18     L17Q1.5 (C17.1_LSV204_PA17)
Loaded:                   SU_CXP102051%27_R5G18_170512_0416    CXP102051/27_R5G18     L17Q1.5 (C17.1_LSV204_PA17)
Executing:                Post_upgrade_R5G18_23:45:13          CXP102051/27_R5G18     L17Q1.5 (C17.1_LSV204_PA17)
Last created:             Post_upgrade_R5G18_23:45:13          CXP102051/27_R5G18     L17Q1.5 (C17.1_LSV204_PA17)
-----------------------------------------------------------------------------------------------------------
Current UpgradePkg:       UpgradePackage=CXP102051/27_R5G18    CXP102051/27_R5G18     L17Q1.5 (C17.1_LSV204_PA17)
AutoCreatedCV:            Enabled. Daily backup at 04:00
Ongoing CV activity:      0 (IDLE)
Rollback status:          Rollback is on
Rollback init timer:      30
Rollback init counter:    5
Rollback counter:         5
Rollback list:            s[5] = Sauve_cv_SMO_Oct_22_2016 Sauve_cv_SMO_Oct_15_2016 Rb_CXP102051%25_R22BU_161010_0510 Sauve_cv_SMO_Oct_8_2016
Sauve_cv_SMO_Oct_1_2016
===========================================================================================================
UP name            ProductData        CVs LMs PrDate LastCV state                   Release                      CompatIndex
===========================================================================================================
CXP102051/27_R5D17 CXP102051/27_R5D17   0 282 170322        IDLE, UPGRADE_COMPLETED L17Q1.2 (C17.1_LSV204_PA9)    17B_1
CXP102051/27_R5F21 CXP102051/27_R5F21  16 282 170422 170512 IDLE, UPGRADE_COMPLETED L17Q1.4 (C17.1-LSV204-EP6-1)  17B_1
CXP102051/27_R5G18 CXP102051/27_R5G18   3 282 170505 170512 IDLE, UPGRADE_COMPLETED L17Q1.5 (C17.1_LSV204_PA17)   17B_1
===========================================================================================================
Id CV Name                          Creation Date    UpgradePackage      Release Type     Operator    Comment
===========================================================================================================
 1 Fi_CXP102051%27_R5F21_170426_0421   2017-04-26 04:21 CXP102051/27_R5F21 L17Q1.4 other     CPP         Final CV autocreated at SU
 2 CV_209041_20170426_1208_R5F21       2017-04-26 17:08 CXP102051/27_R5F21 L17Q1.4 other     emahoso     Auto CV Backup to OSS
 3 CV_209041_20170428_1208_R5F21       2017-04-28 17:08 CXP102051/27_R5F21 L17Q1.4 other     emahoso     Auto CV Backup to OSS
```

```
  4 CV_209041_20170501_1208_R5F21        2017-05-01 17:08 CXP102051/27_R5F21 L17Q1.4 other       emahoso   Auto CV Backup to OSS
  5 CV_209041_20170503_1208_R5F21        2017-05-03 17:08 CXP102051/27_R5F21 L17Q1.4 other       emahoso   Auto CV Backup to OSS
  6 CV_209041_20170505_1208_R5F21        2017-05-05 17:08 CXP102051/27_R5F21 L17Q1.4 other       emahoso   Auto CV Backup to OSS
  7 PRS_Muting_Enabled_AND_ts_MME_Enabled 2017-05-08 05:03 CXP102051/27_R5F21 L17Q1.4 other      mayeju1   none
  8 CV_209041_20170508_1208_R5F21        2017-05-08 17:08 CXP102051/27_R5F21 L17Q1.4 other       emahoso   Auto CV Backup to OSS
  9 Pre_Bb_licCapDistr_170508_1849       2017-05-08 23:49 CXP102051/27_R5F21 L17Q1.4 other       perfgrp   none
 10 CV_209041_20170510_1208_R5F21        2017-05-10 17:08 CXP102051/27_R5F21 L17Q1.4 other       emahoso   Auto CV Backup to OSS
 11 PreUPG_L17Q1_5                       2017-05-11 03:30 CXP102051/27_R5F21 L17Q1.4 other       eerpere   none
 12 Rollback_complete                    2017-05-11 08:25 CXP102051/27_R5F21 L17Q1.4 other       eerpere   none
 13 NLT_11661                            2017-05-11 21:06 CXP102051/27_R5F21 L17Q1.4 other       fraleke   none
 14 PREUPG_L17Q1_5                       2017-05-12 03:39 CXP102051/27_R5F21 L17Q1.4 other       eerpere   none
 15 Au_CXP102051%27_R5F21_170512_0359    2017-05-12 04:00 CXP102051/27_R5F21 L17Q1.4 autocreate  CPP       Daily autocreated CV
 16 Rb_CXP102051%27_R5G18_170512_0412    2017-05-12 04:12 CXP102051/27_R5F21 L17Q1.4 other       CPP       Rollb. CV autocreated at SU
 17 SU_CXP102051%27_R5G18_170512_0416    2017-05-12 04:16 CXP102051/27_R5G18 L17Q1.5 upgrade_tol CPP       Temp. CV autocreated at SU
 18 Fi_CXP102051%27_R5G18_170512_0422    2017-05-12 04:22 CXP102051/27_R5G18 L17Q1.5 other       CPP       Final CV autocreated at SU
 19 Post_upgrade_R5G18_23:45:13          2017-05-12 04:45 CXP102051/27_R5G18 L17Q1.5 other       eerpere   none
==================================================================================================================
>>> Total: 19 CV's, 3 UP's
```

Gen2

```
MSRBS> cvls


==================================================================================================================
160313-06:47               BackupName                                                 SwVersion
==================================================================================================================
LastCreatedBackup:      Final_backup_for_Baseband_CXP9024418/4_R5AS_20160310T075456+0000   CXP9024418/4_R5AS
LastRestoredBackup:     eNB11111_Before_CV_Behavior_Test                                   CXP9024418/4_R4T
------------------------------------------------------------------------------------------------------------------
Current SwVersion:      CXP9024418/4_R5AS (16B)
BrmHouseKeeping:        ENABLED (max: 20 backups)
BrmFailSafe:            IDLE
RestoreEscalationList:  s[2] = Final_backup_for_Baseband_CXP9024418/4_R5AS_20160310T075456+0000
Rollback_backup_Baseband_CXP9024418/4_R4T_20160310T074535+0000
==================================================================================================================
SwVersion          ProductData        ProdDate   Rel  LMs  InstallationDate     ActivationDate       DeactivationDate
==================================================================================================================
CXP9024418/4-R5AS  CXP9024418/4_R5AS  20160301   16B   52  2016-03-10 07:44:04  2016-03-10 07:52:54
==================================================================================================================
UpgradePackage     ProductData        ProdDate   Rel  CreationDate         State
==================================================================================================================
CXP9024418/4-R3L   CXP9024418/4_R3L   20160203   16B  2016-02-05 03:20:38  PREPARE_COMPLETED
CXP9024418/4-R4T   CXP9024418/4_R4T   20160216   16B  2016-02-22 08:28:02  PREPARE_COMPLETED
CXP9024418/4-R5AS  CXP9024418/4_R5AS  20160301   16B  2016-03-10 07:28:08  COMMIT_COMPLETED
==================================================================================================================
Id  BackupName                                   CreationTime         SwVersion          Type    Stat  MO
==================================================================================================================
  1  L16B_CA_Ready1                              2016-02-09 10:29:24  CXP9024418/4_R3L   MANUAL  OK    BrmBackup=23
  2  IP_CHANGE_YORBS56L                          2016-02-09 13:22:25  CXP9024418/4_R3L   MANUAL  OK    BrmBackup=7
  3  G2_Cell_Enabled                             2016-02-15 01:56:44  CXP9024418/4_R3L   MANUAL  OK    BrmBackup=11
  4  LMT1602_before_Upgrade_LMT1603              2016-02-22 08:23:07  CXP9024418/4_R3L   MANUAL  OK    BrmBackup=12
  5  TestCV                                      2016-02-25 05:24:33  CXP9024418/4_R4T   MANUAL  OK    BrmBackup=15
  6  MANUAL-2016-02-25T05:31:50+00:00            2016-02-25 05:31:50  CXP9024418/4_R4T   MANUAL  OK    BrmBackup=16
```

```
 7  Fi_CXP9024418/4_R4T_20160301_1947_dnPrefix                        2016-03-01 10:47:21  CXP9024418/4_R4T   MANUAL OK    BrmBackup=17
 8  eNB11111_Before_CV_Behavior_Test                                  2016-03-02 04:59:50  CXP9024418/4_R4T   MANUAL OK    BrmBackup=18
 9  eNB11111_After_Locked_RU_Cell_B8                                  2016-03-02 05:10:04  CXP9024418/4_R4T   MANUAL OK    BrmBackup=19
10  eNB11111_After_Locked_RU_Cell_B1                                  2016-03-02 05:48:28  CXP9024418/4_R4T   MANUAL OK    BrmBackup=20
11  Temp_CV_02                                                        2016-03-09 09:10:22  CXP9024418/4_R4T   MANUAL OK    BrmBackup=21
12  MSMM_Configuration                                                2016-03-10 04:58:01  CXP9024418/4_R4T   MANUAL OK    BrmBackup=22
13  Rollback_backup_Baseband_CXP9024418/4_R4T_20160310T074535+0000    2016-03-10 07:45:35  CXP9024418/4_R4T   SYSCR  OK    BrmBackup=24
14  Final_backup_for_Baseband_CXP9024418/4_R5AS_20160310T075456+0000  2016-03-10 07:54:56  CXP9024418/4_R5AS  SYSCR  OK    BrmBackup=25
===================================================================================================================================
>>> Total: 14 CV's, 3 UP's
```

14.2.3 <u>cvmk</u>

```
RBSG2> cvmk test


==================================================================================================
Proxy  MO                                               Action               Nr of Params
==================================================================================================
 139  BrM=1,BrmBackupManager=1                          createBackup         1
 >>> Return value = 0


==================================================================================================
Total: 1 MOs attempted, 1 MOs actioned


Waiting 5 seconds before starting to poll...

MO                  ElapsedTime   state               progressCount  progressHeader
BrmBackupManager=1  0s            RUNNING             0/100 (0%)     Creating database backup
BrmBackupManager=1  6s            FINISHED            100/100 (100%) Creating database backup
Waiting 5 seconds before checking result...
MO                  ElapsedTime   $polp_result        $polp_info
BrmBackupManager=1  6s            SUCCESS             BrM=1,BrmBackupManager=1,BrmBackup=2
......
Last MO:  3837. Loaded 3837 MOs. Total:  3838 MOs.


RBSG2> cvls


============================================================
150422-09:02              BackupName      SwVersion
============================================================
LastCreatedBackup:        test            CXP9024418/1_R10GZ
LastRestoredBackup:
------------------------------------------------------------
Current SwVersion:        CXP9024418/1_R10GZ
BrmHouseKeeping:          ENABLED (max: 20 backups)
BrmFailSafe:              IDLE
RestoreEscalationList:    s[0] =
====================================================================================================
SwVersion           ProductData      ProdDate  LMs  InstallationDate     ActivationDate       DeactivationDate
====================================================================================================
CXP9024418/1-R10GZ  CXP9024418/1_R10GZ  20150421   31   2015-04-21 08:09:24  2015-04-21 08:32:16
====================================================================================================
```

```
UpgradePackage        ProductData        ProdDate  CreationDate         State
==========================================================================================
CXP9024418/1-R10GZ   CXP9024418/1_R10GZ  20150421  2015-04-21 08:09:24  COMMIT_COMPLETED
==========================================================================================
Id  BackupName       CreationTime         SwVersion           Type    Stat  MO
==========================================================================================
 1  CV_cell_created  2015-04-21 08:40:11  CXP9024418/1_R10GZ  MANUAL  OK    BrmBackup=1
 2  test             2015-04-22 07:02:24  CXP9024418/1_R10GZ  MANUAL  OK    BrmBackup=2
==========================================================================================
>>> Total: 2 CV's, 1 UP's
```

14.2.4 <u>cvrm</u>

```
RBSG2> cvrm test

Delete following 1 backups?
===============================================================================
 2  test             2015-04-22 07:02:24  CXP9024418/1_R10GZ  MANUAL  OK    BrmBackup=2
===============================================================================
Are you Sure [y/n] ? y

# Deleting backup 1 of 1: test


===============================================================================================
Proxy  MO                                                  Action              Nr of Params
===============================================================================================
 139   BrM=1,BrmBackupManager=1                            deleteBackup        1
 >>> Return value = 0


===============================================================================================
Total: 1 MOs attempted, 1 MOs actioned

Waiting 5 seconds before starting to poll...

MO                  ElapsedTime    state               progressCount  progressHeader
BrmBackupManager=1  0s             FINISHED            100/100 (100%) Action started
Waiting 5 seconds before checking result...
MO                  ElapsedTime    $polp_result        $polp_info
BrmBackupManager=1  0s             SUCCESS             Backup removed
.....
Last MO:  3836. Loaded 3836 MOs. Total:  3837 MOs.


RBSG2> cvls


===========================================================
150422-09:04              BackupName        SwVersion
===========================================================
LastCreatedBackup:       test
LastRestoredBackup:
-----------------------------------------------------------
Current SwVersion:       CXP9024418/1_R10GZ
```

```
BrmHouseKeeping:        ENABLED (max: 100 backups)
BrmFailSafe:            IDLE
RestoreEscalationList:  s[0] =
=====================================================================================================
SwVersion           ProductData         ProdDate  LMs  InstallationDate    ActivationDate       DeactivationDate
=====================================================================================================
CXP9024418/1-R10GZ  CXP9024418/1_R10GZ  20150421  31   2015-04-21 08:09:24  2015-04-21 08:32:16
=====================================================================================================
UpgradePackage      ProductData         ProdDate  CreationDate         State
=====================================================================================================
CXP9024418/1-R10GZ  CXP9024418/1_R10GZ  20150421  2015-04-21 08:09:24  COMMIT_COMPLETED
=====================================================================================================
Id  BackupName      CreationTime         SwVersion            Type    Stat  MO
=====================================================================================================
 1  CV_cell_created 2015-04-21 08:40:11  CXP9024418/1_R10GZ   MANUAL  OK    BrmBackup=1
=====================================================================================================
>>> Total: 1 CV's, 1 UP's
```

14.2.5 <u>cvget</u>

```
RBSG2> cvget 2

Export following 1 backups to /home/eanzmagn/moshell_logfiles/logs_moshell/cv/RBSG2/150422_090301
=====================================================================================================
 2  test            2015-04-22 07:02:24  CXP9024418/1_R10GZ   MANUAL  OK    BrmBackup=2
=====================================================================================================
Are you Sure [y/n] ? y

mkdir lg_20150422_090306_13069  ... OK

# Exporting backup 1 of 1: test (BrmBackup=2)


=====================================================================================================
Proxy  MO                                                       Action                   Nr of Params
=====================================================================================================
  141  BrM=1,BrmBackupManager=1,BrmBackup=2                     export                   2
 >>> Return value = 0


=====================================================================================================
Total: 1 MOs attempted, 1 MOs actioned

Waiting 5 seconds before starting to poll...

MO              ElapsedTime   state             progressCount  progressHeader
BrmBackup=2     0s            FINISHED          100/100 (100%) Transfer complete
Waiting 5 seconds before checking result...
MO              ElapsedTime   $polp_result      $polp_info
BrmBackup=2     0s            SUCCESS           /home/moshki7203/lg_20150422_090306_13069/_test_1_RadioNode_20150422T070311+0000.zip
```

```
get /home/moshki7203/lg_20150422_090306_13069/* /home/eanzmagn/moshell_logfiles/logs_moshell/cv/RBSG2/150422_090301 ... OK
rm /home/moshki7203/lg_20150422_090306_13069/* ... OK
rmdir /home/moshki7203/lg_20150422_090306_13069 ... OK
```

Successful export of test to /home/eanzmagn/moshell_logfiles/logs_moshell/cv/RBSG2/150422_090301/_test_1_RadioNode_20150422T070311+0000.zip

Note:
The CV.zip fetched by cvget cannot be opened in offline with "moshell -d <cv.zip>"
This is because CVs fetched from RCS/COM nodes are encrypted.

14.2.6 cvput


```
RBSG2> cvput /home/eanzmagn/moshell_logfiles/logs_moshell/cv/RBSG2/150422_090301/_test_1_RadioNode_20150422T070311+0000.zip


mkdir lg_20150422_090411_13069  ... OK
put /home/eanzmagn/moshell_logfiles/logs_moshell/cv/RBSG2/150422_090301/_test_1_RadioNode_20150422T070311+0000.zip
/home/moshki7203/lg_20150422_090411_13069 ... OK


=============================================================================================
Proxy  MO                                                       Action                Nr of Params
=============================================================================================
  139  BrM=1,BrmBackupManager=1                                 importBackup          2
 >>> Return value = 0


=============================================================================================
Total: 1 MOs attempted, 1 MOs actioned

Waiting 5 seconds before starting to poll...


MO                     ElapsedTime    state               progressCount  progressHeader
BrmBackupManager=1     0s             RUNNING             96/100 (96%)   Transport complete. Unpacking.
BrmBackupManager=1     6s             FINISHED            100/100 (100%) Import complete
Waiting 5 seconds before checking result...
MO                     ElapsedTime    $polp_result        $polp_info
BrmBackupManager=1     6s             SUCCESS


get /home/moshki7203/lg_20150422_090411_13069/* /home/eanzmagn/moshell_logfiles/logs_moshell/cv/RBSG2/150422_090301 ... OK
rm /home/moshki7203/lg_20150422_090411_13069/* ... OK
rmdir /home/moshki7203/lg_20150422_090411_13069 ... OK


......
Last MO: 3837. Loaded 3837 MOs. Total: 3838 MOs.
Successful import of /home/eanzmagn/moshell_logfiles/logs_moshell/cv/RBSG2/150422_090301/_test_1_RadioNode_20150422T070311+0000.zip to test

RBSG2> cvls


===========================================================
150422-09:06              BackupName      SwVersion
```

```
========================================================
LastCreatedBackup:      test            CXP9024418/1_R10GZ
LastRestoredBackup:
--------------------------------------------------------
Current SwVersion:      CXP9024418/1_R10GZ
BrmHouseKeeping:        ENABLED (max: 100 backups)
BrmFailSafe:            IDLE
RestoreEscalationList:  s[0] =
=================================================================================================
SwVersion           ProductData         ProdDate  LMS  InstallationDate     ActivationDate        DeactivationDate
=================================================================================================
CXP9024418/1-R10GZ  CXP9024418/1_R10GZ  20150421   31  2015-04-21 08:09:24  2015-04-21 08:32:16
=================================================================================================
UpgradePackage      ProductData         ProdDate  CreationDate        State
=================================================================================================
CXP9024418/1-R10GZ  CXP9024418/1_R10GZ  20150421  2015-04-21 08:09:24  COMMIT_COMPLETED
=================================================================================================
Id  BackupName        CreationTime         SwVersion           Type    Stat  MO
=================================================================================================
 1  CV_cell_created   2015-04-21 08:40:11  CXP9024418/1_R10GZ  MANUAL  OK    BrmBackup=1
 2  test              2015-04-22 07:02:24  CXP9024418/1_R10GZ  MANUAL  OK    BrmBackup=2
=================================================================================================
>>> Total: 2 CV's, 1 UP's
```

14.2.7 cvre / cvset+restart

How to rollback or rollforward the node to a different CV/Backup

Gen1

This is done in two steps:
  1) **cvset <cvname>**
  2) **acc 0 manualrestart**

```
ENB11> cvset test


=================================================================================================
Proxy  MO                                                      Action            Nr of Params
=================================================================================================
    1  ConfigurationVersion=1                                  setStartable      1

Parameter 1 of 1, configurationVersionName (string): test
 >>> Return value = null


=================================================================================================
Total: 1 MOs attempted, 1 MOs actioned

ENB11> acc 0 manualrestart
```

```
===============================================================================
Proxy  MO                                                      Action                          Nr of Params
===============================================================================
    0  ManagedElement=1                                        manualRestart                   3

Parameter 1 of 3, restartRank (enumRef-RestartRank):
     Enter one of the following integers: 0:RESTART_WARM, 1:RESTART_REFRESH, 2:RESTART_COLD, 3:RESTART_COLDWTEST: 0

Parameter 2 of 3, restartReason (enumRef-RestartReason):
     Enter one of the following integers: 0:PLANNED_RECONFIGURATION, 1:UNPLANNED_NODE_EXTERNAL_PROBLEMS, 2:UNPLANNED_NODE_UPGRADE_PROBLEMS,
3:UNPLANNED_O_AND_M_ISSUE, 4:UNPLANNED_CYCLIC_RECOVERY, 5:UNPLANNED_LOCKED_RESOURCES, 6:UNPLANNED_COLD_WITH_HW_TEST,
7:UNPLANNED_CALL_PROCESSING_DEGRADATION, 8:UNPLANNED_LOW_COVERAGE, 30:UPGRADE_BOARD_RESTART, 31:OPERATOR_CLASSIFIED_PROBLEMS: 0

Parameter 3 of 3, restartInfo (string): 0
 >>> Return value = null

===============================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

After the restart, the CV will show as loaded
```
ENB11> cvcu

===============================================================================
060709-23:49             CV Name                              Upgrade Package
===============================================================================
Startable:               test                                 CXP9012014_R4J07
Loaded:                  test                                 CXP9012014_R4J07
Executing:               test                                 CXP9012014_R4J07
Last created:            test                                 CXP9012014_R4J07
-------------------------------------------------------------------------------
Current UpgradePkg:      UpgradePackage=CXP9012014_R4J07       CXP9012014_R4J07
CommandLog:              Enabled
AutoCreatedCV:           Disabled
Rollback status:         Rollback is off
Rollback init timer:     30
Rollback init counter:   5
===============================================================================
```

Gen2

This is done with one command: cvre <cvname>
The cvre command restarts the node on the new CV

```
RBSG2> cvls

=======================================================
150422-09:07           BackupName  SwVersion
```

```
=================================================
LastCreatedBackup:      test5
LastRestoredBackup:     test7
-------------------------------------------------
Current SwVersion:      CXP9023001/1_R3B1301
BrmHouseKeeping:        ENABLED (max: 100 backups)
BrmFailSafe:            IDLE
RestoreEscalationList:  s[0] =
===============================================================================================
SwVersion              ProductData           ProdDate  LMs  InstallationDate    ActivationDate       DeactivationDate
===============================================================================================
CXP9023001/1-R3B1301   CXP9023001/1_R3B1301  20141221   30  2015-01-26 07:10:55  2015-04-18 16:48:39
===============================================================================================
UpgradePackage         ProductData           ProdDate  CreationDate         State
===============================================================================================
CXP9023001/1-R3B1301   CXP9023001/1_R3B1301  20141221  2015-01-26 07:10:54  COMMIT_COMPLETED
===============================================================================================
Id  BackupName  CreationTime           SwVersion             Type    Stat  MO
===============================================================================================
 1   test       2015-01-30 07:43:29    CXP9023001/1_R3B1301  MANUAL  OK    BrmBackup=1
 2   test2      2015-02-06 10:42:21    CXP9023001/1_R3B1301  MANUAL  OK    BrmBackup=3
 3   RBSG2_OK   2015-03-17 02:59:04    CXP9023001/1_R3B1301  MANUAL  OK    BrmBackup=5
 4   test3      2015-04-18 02:01:51    CXP9023001/1_R3B1301  MANUAL  OK    BrmBackup=6
 5   test4      2015-04-18 02:09:01    CXP9023001/1_R3B1301  MANUAL  OK    BrmBackup=7
===============================================================================================
>>> Total: 5 CV's, 1 UP's


RBSG2> cvre 5


Restore following backup?
===============================================================================================
5  test4       2015-04-18 02:09:01  CXP9023001/1_R3B1301  MANUAL  OK    BrmBackup=7
===============================================================================================
Are you Sure [y/n] ? y


===============================================================================================
Proxy  MO                                                       Action                   Nr of Params
===============================================================================================
  142  BrM=1,BrmBackupManager=1,BrmBackup=7                     restore                  0
 >>> Return value = 0


===============================================================================================
Total: 1 MOs attempted, 1 MOs actioned


Waiting 5 seconds before starting to poll...


MO                 ElapsedTime   state         progressCount   progressHeader
BrmBackup=7        0s            RUNNING       3/100  (3%)      Last chance to cancel. Restore will commence in 30 seconds
BrmBackup=7        6s            RUNNING       3/100  (3%)      Last chance to cancel. Restore will commence in 30 seconds
BrmBackup=7        12s           RUNNING       3/100  (3%)      Last chance to cancel. Restore will commence in 30 seconds
BrmBackup=7        18s           RUNNING       3/100  (3%)      Last chance to cancel. Restore will commence in 30 seconds
BrmBackup=7        24s           RUNNING       3/100  (3%)      Last chance to cancel. Restore will commence in 30 seconds
BrmBackup=7        30s           RUNNING       45/100 (45%)     Backup restored. Rebooting...
BrmBackup=7        36s           COM.NO_CONTACT 0/100 (0%)      COM.NO_CONTACT
BrmBackup=7        41s           COM.NO_CONTACT 0/100 (0%)      COM.NO_CONTACT
```

```
BrmBackup=7            46s           COM.NO_CONTACT        0/100 (0%)       COM.NO_CONTACT
....
BrmBackup=7            278s (04m38s) COM.NO_CONTACT        0/100 (0%)       COM.NO_CONTACT
BrmBackup=7            283s (04m43s) COM.NO_CONTACT        0/100 (0%)       COM.NO_CONTACT

Connected to RBSG2 (ManagedElement=1)
BrmBackup=7            288s (04m48s) FINISHED              100/100 (100%) Backup restored. Rebooting...
Waiting 5 seconds before checking result...
MO                    ElapsedTime   $polp_result          $polp_info
BrmBackup=7            288s (04m48s) SUCCESS               The backup restore is complete
......
RBSG2> cvls


=======================================================
150422-09:13              BackupName  SwVersion
=======================================================
LastCreatedBackup:        test3       CXP9023001/1_R3B1301
LastRestoredBackup:       test4       CXP9023001/1_R3B1301
-------------------------------------------------------
Current SwVersion:        CXP9023001/1_R3B1301
BrmHouseKeeping:          ENABLED (max: 100 backups)
BrmFailSafe:              IDLE
RestoreEscalationList:    s[0] =
======================================================================================================
SwVersion            ProductData        ProdDate  LMs  InstallationDate     ActivationDate        DeactivationDate
======================================================================================================
CXP9023001/1-R3B1301 CXP9023001/1_R3B1301 20141221  30  2015-01-26 07:10:55  2015-04-22 07:11:46
======================================================================================================
UpgradePackage       ProductData        ProdDate  CreationDate         State
======================================================================================================
CXP9023001/1-R3B1301 CXP9023001/1_R3B1301 20141221  2015-01-26 07:10:54  COMMIT_COMPLETED
======================================================================================================
Id  BackupName  CreationTime         SwVersion              Type    Stat  MO
======================================================================================================
 1  test        2015-01-30 07:43:29  CXP9023001/1_R3B1301   MANUAL  OK    BrmBackup=1
 2  test2       2015-02-06 10:42:21  CXP9023001/1_R3B1301   MANUAL  OK    BrmBackup=3
 3  RBSG2_OK    2015-03-17 02:59:04  CXP9023001/1_R3B1301   MANUAL  OK    BrmBackup=5
 4  test3       2015-04-18 02:01:51  CXP9023001/1_R3B1301   MANUAL  OK    BrmBackup=6
 5  test4       2015-04-18 02:09:01  CXP9023001/1_R3B1301   MANUAL  OK    BrmBackup=7
======================================================================================================
>>> Total: 5 CV's, 1 UP's
```

14.2.8 cvfa/cvfd

Always activate BrmFailsafe before doing any configuration activities that may cause loss of O&M connectivity

```
RBSG2> cvfa

===========================================================================================
Proxy  MO                                              Action              Nr of Params
===========================================================================================
    39  BrM=1,BrmBackupManager=1,BrmFailsafeBackup=1    activate            0
```

```
 >>> Return value = 0


================================================================================
Total: 1 MOs attempted, 1 MOs actioned

Waiting 5 seconds before starting to poll...

MO                      ElapsedTime    state             progressCount   progressHeader
BrmFailsafeBackup=1  0s              FINISHED          100/100 (100%) Creating database backup
Waiting 5 seconds before checking result...
MO                      ElapsedTime    $polp_result      $polp_info
BrmFailsafeBackup=1  0s              SUCCESS           BrM=1,BrmBackupManager=1,BrmBackup=8
.........
Last MO:  4815. Loaded 4815 MOs. Total:  4816 MOs.

RBSG2> cvls

================================================================================
151024-04:54           BackupName                                       SwVersion
================================================================================
LastCreatedBackup:     Failsafe_backup_20151024T025358+0000             CXP9024418/2_R9GN
LastRestoredBackup:    Final_backup_for_Baseband_CXP9024418/2_R9GN_20151015T104427+0000
--------------------------------------------------------------------------------
Current SwVersion:     CXP9024418/2_R9GN (16A)
BrmHouseKeeping:       ENABLED (max: 20 backups)
BrmFailSafe:           BUSY (Time remaining: 1166/1200)
RestoreEscalationList: s[1] = Rollback_backup_Baseband_CXP9024418/2_R5LJ_20151015T102542+0000
================================================================================
SwVersion          ProductData        ProdDate  LMS  InstallationDate     ActivationDate        DeactivationDate
================================================================================
CXP9024418/2-R9GN  CXP9024418/2_R9GN  20151007  44   2015-10-15 10:27:51  2015-10-23 14:05:08
================================================================================
UpgradePackage       ProductData        ProdDate  CreationDate         State
================================================================================
CXP9024418/1-R14TD   CXP9024418/1_R14TD  20150529  2015-06-12 07:33:56  PREPARE_COMPLETED
CXP9024418/2-R5LJ    CXP9024418/2_R5LJ   20150911  2015-09-16 08:15:02  PREPARE_COMPLETED
CXP9024418/2-R9GN    CXP9024418/2_R9GN   20151007  2015-10-15 07:39:49  COMMIT_COMPLETED
CXP9024418/2-R11HH   CXP9024418/2_R11HH  20151022  2015-10-23 14:10:55  INITIALIZED
CXP9024418/2-R11HJ   CXP9024418/2_R11HJ  20151023  2015-10-23 13:59:09  INITIALIZED
================================================================================
Id  BackupName                                                  CreationTime         SwVersion            Type   Stat  MO
================================================================================
 1  sfinx01                                                     2015-07-28 15:04:45  CXP9024418/1_R14TD   MANUAL OK    BrmBackup=1
 2  Rollback_backup_Baseband_CXP9024418/2_R5LJ_20151015T102542+0000  2015-10-15 10:25:42  CXP9024418/2_R5LJ    SYSCR  OK    BrmBackup=4
 3  test                                                        2015-10-16 09:15:22  CXP9024418/2_R9GN    MANUAL OK    BrmBackup=6
 4  test1                                                       2015-10-16 09:28:36  CXP9024418/2_R9GN    MANUAL OK    BrmBackup=7
 5  Failsafe_backup_20151024T025358+0000                        2015-10-24 02:53:58  CXP9024418/2_R9GN    SYSCR  OK    BrmBackup=8
================================================================================
>>> Total: 5 CV's, 5 UP's
```

\<PERFORM CONFIGURATION ACTIVITIES HERE, THEN DEACTIVATE BRMFAILSAFE AFTER SUCCESSFUL COMPLETION\>

```
RBSG2> cvfd

================================================================================
Proxy  MO                                                   Action                Nr of Params
```

```
=====================================================================================================
   40   BrM=1,BrmBackupManager=1,BrmFailsafeBackup=1                    deactivate                    0
 >>> Return value = 0


=====================================================================================================
Total: 1 MOs attempted, 1 MOs actioned

Waiting 5 seconds before starting to poll...

MO                      ElapsedTime    state                    progressCount  progressHeader
BrmFailsafeBackup=1 0s                 FINISHED                 100/100 (100%) Action started
Waiting 5 seconds before checking result...
MO                      ElapsedTime    $polp_result             $polp_info
BrmFailsafeBackup=1 0s                 SUCCESS                  Failsafe configuration function deactivated
........
Last MO:  4814. Loaded 4814 MOs. Total:  4815 MOs.

RBSG2> cvls


=====================================================================================================
151024-04:55                BackupName                                              SwVersion
=====================================================================================================
LastCreatedBackup:      Failsafe_backup_20151024T025358+0000
LastRestoredBackup:     Final_backup_for_Baseband_CXP9024418/2_R9GN_20151015T104427+0000
-----------------------------------------------------------------------------------------------------
Current SwVersion:      CXP9024418/2_R9GN (16A)
BrmHouseKeeping:        ENABLED (max: 20 backups)
BrmFailSafe:            IDLE
RestoreEscalationList:  s[1] = Rollback_backup_Baseband_CXP9024418/2_R5LJ_20151015T102542+0000
=====================================================================================================
SwVersion          ProductData         ProdDate  LMS  InstallationDate     ActivationDate        DeactivationDate
=====================================================================================================
CXP9024418/2-R9GN  CXP9024418/2_R9GN   20151007   44  2015-10-15 10:27:51  2015-10-23 14:05:08
=====================================================================================================
UpgradePackage         ProductData         ProdDate  CreationDate         State
=====================================================================================================
CXP9024418/1-R14TD     CXP9024418/1_R14TD  20150529  2015-06-12 07:33:56  PREPARE_COMPLETED
CXP9024418/2-R5LJ      CXP9024418/2_R5LJ   20150911  2015-09-16 08:15:02  PREPARE_COMPLETED
CXP9024418/2-R9GN      CXP9024418/2_R9GN   20151007  2015-10-15 07:39:49  COMMIT_COMPLETED
CXP9024418/2-R11HH     CXP9024418/2_R11HH  20151022  2015-10-23 14:10:55  INITIALIZED
CXP9024418/2-R11HJ     CXP9024418/2_R11HJ  20151023  2015-10-23 13:59:09  INITIALIZED
=====================================================================================================
Id  BackupName                                               CreationTime         SwVersion           Type    Stat  MO
=====================================================================================================
 1  sfinx01                                                  2015-07-28 15:04:45  CXP9024418/1_R14TD  MANUAL  OK    BrmBackup=1
 2  Rollback_backup_Baseband_CXP9024418/2_R5LJ_20151015T102542+0000  2015-10-15 10:25:42  CXP9024418/2_R5LJ   SYSCR   OK    BrmBackup=4
 3  test                                                     2015-10-16 09:15:22  CXP9024418/2_R9GN   MANUAL  OK    BrmBackup=6
 4  test1                                                    2015-10-16 09:28:36  CXP9024418/2_R9GN   MANUAL  OK    BrmBackup=7
=====================================================================================================
 >>> Total: 4 CV's, 5 UP's

RBSG2>
```

14.2.9 COLI commands

Gen1

```
ENBG1> cv help

$ cv help
Create CV: cv mk <name> [id] [type] [puid] [operator] [comment]
Remove CV: cv rm <name>
Set as startable: cv set <name>
List cv:s: cv ls
Current usage: cv cu
Set rollback init values: cv rbinit <status> <timer> <counter>
- status  : 1=rollback_on, 2=rollback_off
- timer   : 1-10000 minutes
- counter : 1-10000
Set first in rollback list: cv rbset <name>
Remove from rollback list: cv rbrm <name>
Set rollback counter: cv rbcnt <counter> , counter should be > 0
Check if loaded cv is upgrade: cv up
Clean up cv dir: cv clean <level>
- level : 1=remove all cvs except one used by cv pointer.
- level : 2=remove all cvs except one used by cv pointer & rollback list.
- level : 3=remove all cvs on passive side that does not exist on active side.
Synch from active to MP with given lnh name: cv synch <lnh>
List upgrade cv: cv upls <upgrade package id>
Remove upgrade cv: cv uprm <upgrade package id>
Checksum cv: cv csum <name> <mode>
- name: CV name to checksum files for
- mode: active=active Core MP, passive=passive Core MP
Precheck cv: cv prec <number of new CVs>
Get Armament information of CV : cv arma <cv-name>
Start Disk healthcheck : Cv dht
Help : cv help
$
```

Gen2

```
ENBG2> ? | grep swm

/labonly/swm/enable-hsi
/swm/confirmrestore
/swm/fastrestore/expire
/swm/fastrestore/period
/swm/housekeep
/swm/reset-housekeeping-delay
/swm/reset-quarantine
/swm/reset-restore-timer
/swm/reset-rollback-timer
/swm/set-housekeeping-delay
/swm/set-restore-timer
/swm/set-rollback-timer
/swm/signingcertupdate
```

14.3 SW inventory

Gen1

The running SW is represented by Program MOs
The LoadModule MOs represent the SW files on disk, while the Program MOs represent the SW that is running on the boards.

```
ManagedElement[1],SwManagement[1],LoadModule[0-]
ManagedElement[1],Equipment[1],Subrack[0-9],Slot[1-28],PlugInUnit[0-1],Program[0-]
ManagedElement[1],Equipment[1],AuxPlugInUnit[0-],DeviceGroup[0-1],XpProgram[0-2]
```

Gen2

The running SW is represented by SwVersion and SwItem MOs.
A SwVersion is a group of SwItems that belong to the same SW package (equivalent to UpgradePackage in CPP)

```
ManagedElement[1],SystemFunctions[1],SwInventory[1]
ManagedElement[1],SystemFunctions[1],SwInventory[1],SwItem[0-]
ManagedElement[1],SystemFunctions[1],SwInventory[1],SwVersion[0-]
```

```
MSRBSV2> cvcu


====================================================================================
151102-12:23           BackupName                                       SwVersion
====================================================================================
LastCreatedBackup:     After_upgrade_2-R11HN                            CXP9024418/2_R11HN
LastRestoredBackup:    After_upgrade_2-R11HN                            CXP9024418/2_R11HN
------------------------------------------------------------------------------------
Current SwVersion:     CXP9024418/2_R11HN (16A)
BrmHouseKeeping:       ENABLED (max: 20 backups)
BrmFailSafe:           IDLE
RestoreEscalationList: s[2] = Final_backup_for_Baseband_CXP9024418/2_R11HN_20151029T095925+0000
Rollback_backup_Baseband_CXP9024418/2_R9KF_20151029T094947+0000
====================================================================================
```

Gen1

```
ENBG1> inv program
...<cut>...
==================================================================================================
SMN  APN  BOARDTYPE   Cpu  ST  PRODUCTNUMBER_REV      NAME         MO
==================================================================================================
 0    1   DUS4101          1   CXC1736068/19_R1E      lmrprsucacrl 1,Slot=1,PlugInUnit=1,Program=CXC1736068/19_R1E
 0    1   DUS4101          1   CXC1736069/19_R1B      lmrprsucacer 1,Slot=1,PlugInUnit=1,Program=CXC1736069/19_R1B
```

```
0     1    DUS4101         1   CXC1736076/19_R1B      lmrbm1prodc  1,Slot=1,PlugInUnit=1,Program=CXC1736076/19_R1B
0     1    DUS4101         1   CXC1736077/19_R1D      lmrrootcacrl 1,Slot=1,PlugInUnit=1,Program=CXC1736077/19_R1D
0     1    DUS4101         1   CXC1736078/19_R1D      lmrtesucacrl 1,Slot=1,PlugInUnit=1,Program=CXC1736078/19_R1D
...<cut>....
0     2    DUS4101       0   1   CXC1738659_R94F02      dcgagent_mp_ 1,Slot=2,PlugInUnit=1,Program=CXC1738659_R94F02
0     2    DUS4101           1   CXC1323891/6_R94F11    lmbpp_4      1,Slot=2,PlugInUnit=1,Program=CXC1323891/6_R94F11
0     2    DUS4101           1   CXC1329000/5_R94F02    lmatf_1      1,Slot=2,PlugInUnit=1,Program=CXC1329000/5_R94F02
0     2    DUS4101           1   CXC1725398/27_R4G14    bbomLm       1,Slot=2,PlugInUnit=1,Program=CXC1725398/27_R4G14
0     2    DUS4101           1   CXC2010113/1_R6G05     ricm_cat_lm  1,Slot=2,PlugInUnit=1,Program=CXC2010113/1_R6G05
0     2    DUS4101       0   1   CXC1721176_R94F01      pm_agent     1,Slot=2,PlugInUnit=1,Program=CXC1721176_R94F01
0     2    DUS4101       0   1   CXC1727220_R94F03      nsstum2      1,Slot=2,PlugInUnit=1,Program=CXC1727220_R94F03
0     2    DUS4101           1   CXP102145/1_R85B01     LMC_dus41    1,Slot=2,PlugInUnit=1,Program=CXP102145/1_R85B01
0     2    DUS4101           1   CXP9020692/27_R4G14    bbmContDus41 1,Slot=2,PlugInUnit=1,Program=CXP9020692/27_R4G14
0     2    DUS4101       0   1   CXC1733150_R94F17      ipipmcbm3bp_ 1,Slot=2,PlugInUnit=1,Program=CXC1733150_R94F17
0     2    DUS4101       0   1   CXC1733306/27_R4G24    distMonLm    1,Slot=2,PlugInUnit=1,Program=CXC1733306/27_R4G24
0     2    DUS4101       1   1   CXC1725191/27_R4G24    cellLm       1,Slot=2,PlugInUnit=1,Program=CXC1725191/27_R4G24
0     2    DUS4101     255   1   CXC1735546/27_R4G24    lteRbsContro 1,Slot=2,PlugInUnit=1,Program=CXC1735546/27_R4G24
0     2    EtIp=1          1   CXC1735309_R93G01      ip_hwchar_cb 1,Slot=2,PlugInUnit=1,ExchangeTerminalIp=1,Program=CXC1735309_R93G01
------------------------------------------------------------------------------------------------------------



------------------------------------------------------------------------------------------------------------
rus5      -  CXP9013268/9    R65FE   AuxPlugInUnit=RRU-4,DeviceGroup=ru,XpProgram=CXP9013268/9_R65FE_CF81551784
rus5      -  CXP9013268/9    R65FE   AuxPlugInUnit=RRU-5,DeviceGroup=ru,XpProgram=CXP9013268/9_R65FE_CF82106674
rus5      -  CXP9013268/9    R65FE   AuxPlugInUnit=RRU-6,DeviceGroup=ru,XpProgram=CXP9013268/9_R65FE_CF81545388
....<cut>..
xmu_03_01  -  CXP9025194/1   R8KZ    AuxPlugInUnit=XMU03-1,DeviceGroup=xmu,XpProgram=CXP9025194/1_R8KZ_D16R274576
xmu_03_01  -  CXP9025194/1   R8KZ    AuxPlugInUnit=XMU03-2,DeviceGroup=xmu,XpProgram=CXP9025194/1_R8KZ_D16T415422
...<cut>...
xrus      -  CXP9013268/6    R65FY   RbsSubrack=2,RbsSlot=5,AuxPlugInUnit=RU-2-5,DeviceGroup=ru,XpProgram=CXP9013268/6_R65FY_D168893612
xrus      -  CXP9013268/6    R65FY   RbsSubrack=2,RbsSlot=6,AuxPlugInUnit=RU-2-6,DeviceGroup=ru,XpProgram=CXP9013268/6_R65FY_CC43500091
------------------------------------------------------------------------------------------------------------


ENBG1> lh xp lmclist


=====================================================================================
$ lhsh 000100/BXP_0 lmclist
0001BXP_0:    SlotProt State    Size      Curr ProdDate         Seq Type   LMs SwPid
0001BXP_0:  0 Unlocked Working  15728640  No   2011-04-12 15:00 0   Boot   6   CXP901096%12_R27KB
0001BXP_0:  1 Locked   Valid    16777216  No   2011-08-25 12:00 0   Applic 11  CXP9017316%1_R32MU
0001BXP_0:  2 Unlocked Working  16777216  Yes  2016-07-28 11:00 14  Applic 8   CXP9013268%6_R64CA
0001BXP_0:  3 Unlocked Working  16777216  No   2016-02-11 10:00 13  Applic 8   CXP9013268%6_R61CD
=====================================================================================
$ lhsh 000100/BXP_1 lmclist
0001BXP_1:    SlotProt State    Size      Curr ProdDate         Seq Type   LMs SwPid
0001BXP_1:  0 Unlocked Working  15728640  No   2011-04-12 15:00 0   Boot   6   CXP901096%12_R27KB
0001BXP_1:  1 Locked   Valid    16777216  No   2011-08-25 12:00 0   Applic 11  CXP9017316%1_R32MU
0001BXP_1:  2 Unlocked Working  16777216  Yes  2016-07-28 11:00 14  Applic 8   CXP9013268%6_R64CA
0001BXP_1:  3 Unlocked Working  16777216  No   2016-02-11 10:00 13  Applic 8   CXP9013268%6_R61CD
=====================================================================================
$ lhsh 000100/BXP_2 lmclist
0001BXP_2:    SlotProt State    Size      Curr ProdDate         Seq Type   LMs SwPid
0001BXP_2:  0 Unlocked Working  15728640  No   2011-04-12 15:00 0   Boot   6   CXP901096%12_R27KB
0001BXP_2:  1 Locked   Valid    16777216  No   2011-08-25 12:00 0   Applic 11  CXP9017316%1_R32MU
0001BXP_2:  2 Unlocked Working  16777216  Yes  2016-07-28 11:00 14  Applic 8   CXP9013268%6_R64CA
0001BXP_2:  3 Unlocked Working  16777216  No   2016-02-11 10:00 13  Applic 8   CXP9013268%6_R61CD
```

```
....<cut>....
$
```

Gen2

```
MSRBSV2> inv
...<cut>...


==================================================================
SwItems for MSRBS CXP9024418/1 R12UY 2015-05-22T00:47:05
------------------------------------------------------------------
3PPOSSASN1-ARM   CXP9024079/3   R1G      2015-03-23T14:08:30
AIS_GFF          CXP9024813/1   R2H      2015-03-24T10:53:47
AIS_PMFWK        CXP9024940/1   R2X      2015-05-04T14:56:12
APC-ARM          CXP9024886/3   R4CJ     2015-05-13T14:53:05
ARCHSUPP_PLAB    CXP9024812/1   R2Y      2015-04-01T12:51:31
ARCHSUPP_SFA     CXP9024811/1   R4M      2015-03-12T08:20:20
BBI              CXP9023495/2   R3BT     2015-04-20T10:17:43
COBRA            CXP102171/1    R14A01   2015-04-08T17:59:17
EMCLITOOL        CXP9024020/1   R1AD     2015-04-24T10:39:44
EMGUI            CXP9026393/1   R1H      2015-03-25T11:43:55
FRUM             CXP9024280/4   R9AFM    2015-05-07T12:28:15
IELL-ARM         CXP9023113/5   R2BF     2015-05-07T11:30:58
IPT_EBCOM-ARM    CXP9025895/1   R1VA     2015-05-07T11:31:00
IRU              CXP9024578/14  R60GK    2015-05-06T16:07:31
LRAT-ARM         CXP9025671/23  R9JL     2015-05-09T11:14:16
MOFWK_ARM        CXP9024581/24  R24AC    2015-03-03T14:30:16
MOFWK_ARM        CXP9024581/25  R25BJ    2015-05-06T17:20:21
MSRBS_MOMCPI     CXP9024263/1   R10DN    2015-05-09T07:05:43
RBSANTC          CXP9030699/2   R10FA    2015-05-07T13:26:11
RBSNC            CXP9030284/3   R11HH    2015-05-06T12:30:52
RBSRASSECTOR     CXP9024888/2   R10CJ    2015-05-07T05:10:04
RCS-DUS2         CXP9031275/3   R3S04    2015-05-21T23:45:26
RICM             CXP9023064/4   R4GV     2015-05-07T11:49:19
RUS5             CXP9024578/9   R60GK    2015-05-06T16:07:31
RUS5X            CXP9024578/12  R60GK    2015-05-06T16:07:31
SYNC-DUSG2       CXP9030859/1   R7ABB    2015-05-07T11:03:55
TN-DUSG2         CXP9022846/10  R19UG    2015-05-07T02:25:54
TRUS             CXP9024578/10  R60GK    2015-05-06T16:07:31
TRUS5            CXP9024578/13  R60GK    2015-05-06T16:07:31
WRAT             CXP9023271/3   R7LZ     2015-05-08T11:21:24
XRUS             CXP9024578/6   R60GK    2015-05-06T16:07:31
------------------------------------------------------------------


ENBG2> lh xp lmclist


==================================================================
coli>/fruacc/lhsh BXP_0 lmclist
BXP_0:      SlotProt State   SlotSize   Curr ProdDate         Seq      Type   LMs SwPid
BXP_0:  0 Locked   Valid   29360128   No   2015-06-25 11:00 0       Boot   3   CXP9025195%1_R4CJ
BXP_0:  1 Unlocked Valid   33554432   No   2016-04-25 14:00 4       Applic 3   CXP9025194%1_R5KE
BXP_0:  2 Unlocked Valid   33554432   No   2016-07-05 10:00 5       Applic 3   CXP9025194%1_R5KV
BXP_0:  3 Unlocked Valid   33554432   Yes  2016-11-14 17:00 6       Applic 3   CXP9025194%1_R6VZ
```

```
=================================================================================
....<cut>...
=================================================================================
coli>/fruacc/lhsh BXP_4 lmclist
BXP_4:     SlotProt State     Size      Curr ProdDate          Seq Type   LMs SwPid
BXP_4:  0 Unlocked Working   9437184    No   2014-11-20 15:00 0   Boot   4   CXP901096%16_R59EA
BXP_4:  1 Locked   Valid     40632320   No   2015-10-15 10:00 0   Applic 8   CXP9017316%5_R60KE
BXP_4:  2 Unlocked Working   40763392   Yes  2016-11-03 13:00 7   Applic 8   CXP9013268%12_R64GA
BXP_4:  3 Unlocked Working   40763392   No   2016-09-08 10:00 6   Applic 8   CXP9013268%12_R63EX
=================================================================================
coli>/fruacc/lhsh BXP_5 lmclist
BXP_5:     SlotProt State     Size      Curr ProdDate          Seq Type   LMs SwPid
BXP_5:  0 Unlocked Working   9437184    No   2014-11-20 15:00 0   Boot   4   CXP901096%16_R59EA
BXP_5:  1 Locked   Valid     40632320   No   2015-10-15 10:00 0   Applic 8   CXP9017316%5_R60KE
BXP_5:  2 Unlocked Working   40763392   Yes  2016-11-03 13:00 7   Applic 8   CXP9013268%12_R64GA
BXP_5:  3 Unlocked Working   40763392   No   2016-09-08 10:00 6   Applic 8   CXP9013268%12_R63EX
coli>
```

14.4 SW upgrade

14.4.1 CPP vs ECIM/COM

In CPP and RCS, the UpgradePackage MO represents both the SW packages already stored on the node as well as the new SW package to which the node will upgrade. In RCS, there is also a SwVersion MO that represents the SW currently running on the node.

```
RBSg1> cvls
=========================================================================================================
161117-01:48            CV Name                        Upgrade Package        Release
=========================================================================================================
Startable:              selfconfig_autocreated2        CXP102051/25_R22BU     L16B.8 (C16.2-LSV185-EP10-1)
Loaded:                 selfconfig_autocreated1        CXP102051/25_R22BU     L16B.8 (C16.2-LSV185-EP10-1)
Executing:              selfconfig_autocreated2        CXP102051/25_R22BU     L16B.8 (C16.2-LSV185-EP10-1)
Last created:           selfconfig_autocreated2        CXP102051/25_R22BU     L16B.8 (C16.2-LSV185-EP10-1)
---------------------------------------------------------------------------------------------------------
Current UpgradePkg:     UpgradePackage=CXP102051/25_R22BU       CXP102051/25_R22BU     L16B.8 (C16.2-LSV185-EP10-1)
AutoCreatedCV:          Disabled
Ongoing CV activity:    0 (IDLE)
Rollback status:        Rollback is on
Rollback init timer:    30
Rollback init counter:  5
Rollback counter:       5
Rollback list:          s[5] = Sauve_cv_SMO_Oct_22_2016 Sauve_cv_SMO_Oct_15_2016 Rb_CXP102051%25_R22BU_161010_0510 Sauve_cv_SMO_Oct_8_2016
Sauve_cv_SMO_Oct_1_2016
=========================================================================================================
UP name             ProductData        CVs LMs PrDate LastCV state                Release                        CompatIndex
=========================================================================================================
InitialUP           0_0                0   0  0              IDLE, ONLY_DELETEABLE  InitialUP ()
21_R30CT            M/CXP102051/21_R30CT 0 243 150121        IDLE, UPGRADE_COMPLETED L14A (C14.1-EP10-3)           L14A_C14.1_Red
CXP102051/22_R48BF  CXP102051/22_R48BF 0   271 150206        IDLE, UPGRADE_COMPLETED L14B.1.6.0 (C15.0-EP7)        L14B_C15.0
CXP102051/23_R27DC  CXP102051/23_R27DC 3   276 151020 161010 IDLE, UPGRADE_COMPLETED L15B.1.9.0 (C15.1_LSV159_PA73) L15B_2
CXP102051/25_R22BU  CXP102051/25_R22BU 8   286 160915 161025 IDLE, UPGRADE_COMPLETED L16B.8 (C16.2-LSV185-EP10-1)  L16B_1
```

```
==============================================================================================================
```

So in RCS (MSRBS Gen2), there is always:
- **one SwVersion MO that represents the SW running on the node**
- **one UpgradePackage MO that also represents the SW running on the node**
- **zero or more UpgradePackage MOs that represent SW packages that are stored on the node but not running**

RCS restrictions for UP handling:
- **maximum number of UPs: 3**
- **not allowed to delete the current UP nor the previous one**

```
MSRBSg2> cvls

======================================================================================================
171011-08:42            BackupName                                                      SwVersion
======================================================================================================
LastCreatedBackup:      Final_backup_for_BASEBAND_CXP9024418/6_R27A58_20171008T055637+0000  CXP9024418/6_R27A58
LastRestoredBackup:     Failsafe_backup_20170929T091420+0000                            CXP9024418/6_R25A99
------------------------------------------------------------------------------------------------------
Current SwVersion:      CXP9024418/6_R27A58 (17.Q4)
BrmHouseKeeping:        ENABLED (max: 20 backups)
BrmFailSafe:            IDLE
RestoreEscalationList:  s[2] = Final_backup_for_BASEBAND_CXP9024418/6_R27A58_20171008T055637+0000
Rollback_backup_BASEBAND_CXP9024418/6_R25A99_20171008T054502+0000
======================================================================================================
SwVersion           ProductData         ProdDate   Rel    LMs  InstallationDate     ActivationDate       DeactivationDate
======================================================================================================
CXP9024418/6-R27A58 CXP9024418/6_R27A58 20171011   17.Q4  75   2017-10-08 05:42:35  2017-10-08 05:54:24
======================================================================================================
UpgradePackage      ProductData         ProdDate   Rel    CreationDate         State
======================================================================================================
CXP9024418/6-R2A174 CXP9024418/6_R2A174 20161214   17B    2016-12-14 16:45:22  PREPARE_COMPLETED
CXP9024418/6-R25A99 CXP9024418/6_R25A99 20170913   17.Q4  2017-09-14 06:53:15  PREPARE_COMPLETED
CXP9024418/6-R27A58 CXP9024418/6_R27A58 20171011   17.Q4  2017-10-08 05:32:37  COMMIT_COMPLETED
======================================================================================================
```

In Pico RBS, the UpgradePackage MO is only used for the actual install/upgrade procedure. Once the upgrade is completed the UpgradePackage turns into a SwVersion MO.

So in Pico RBS, there is always:
- **one SwVersion MO that represents the SW currently running on the node**
- **zero or more SwVersion MOs that represent SW packages that are stored on the node but not running**
- **zero or one UpgradePackage MO in case an install or upgrade is currently ongoing**

```
PicoRBS> cvls

==============================================================================
161117-01:47            BackupName                  SwVersion
==============================================================================
LastCreatedBackup:      OLMP20_L16A_IP18_20160913   CXP9026658/2_R2AK13
LastRestoredBackup:
```

```
------------------------------------------------------------------
Current SwVersion:      CXP9026658/2_R2AK13 (L16A.18)
BrmHouseKeeping:        ENABLED (max: 5 backups)
BrmFailSafe:
BrmTimeBeforeRollback:  3600/3600
RestoreEscalationList:  s[0] =
=================================================================================================
SwVersion  ProductData           ProdDate   Rel      LMs  InstallationDate     ActivationDate       DeactivationDate
=================================================================================================
3          CXP9026658/2_R1BK01   20160405   L16A.9    16  2016-09-13 20:29:21  2016-09-13 20:37:31  2016-09-13 21:27:53
2          CXP9026658/1_R2CL01   20160419             16  2016-05-19 21:15:40  2016-05-19 21:23:14  2016-09-13 20:37:30
1          CXP9026658/2_R2AK13   20160901   L16A.18   16  2016-09-13 21:16:51  2016-09-13 21:27:53
=================================================================================================
```

14.4.2 Check available Disk space

Gen1

```
ENBG1> invh


====================================================================================================
SMN APN  BOARD     SWALLOCATION  S  FAULT OPER MAINT STAT   c/p   d  PRODUCTNUMBER  REV    SERIAL      DATE       TEMP MO
====================================================================================================
  0   1  DUS4101   main          1  OFF   ON   OFF   OFF   14% 61%  KDU137624/1    R5A/A  D16C066945  20140126   41C 1,Slot=1
  0   2  DUS4101   DU_Extension  1  OFF   ON   OFF   OFF   19% 43%  KDU137624/1    R5A/A  D16A317346  20131002   46C 1,Slot=2
----------------------------------------------------------------------------------------------------
```

Gen2

```
MSRBSV2> ? discspace

coli>/misc/help /sysm/discspace
discspace
[Option]
Inspect the disk space used for software archive, backups, ROP files and logs.
[-p]
     Display the allocated percentage of disk space on the file system.
     If no option specified for this command, -p is assumed.
-c
     Remove applications logs and other unused files to free up disk space on the file system.
coli>

MSRBSV2> discspace

coli>/sysm/discspace
78%
coli>
```

14.4.3 Delete a old UP

Gen1

```
RNC11> cvls

===================================================================================================
090709-08:52          CV Name                               Upgrade Package      Release
===================================================================================================
Startable:            RNC11_P6.1                            CXP9012842_R3BE/6    P6.1.4-9 (EP10-CPP6.1.0.16)
Loaded:               RNC11_P6.1                            CXP9012842_R3BE/6    P6.1.4-9 (EP10-CPP6.1.0.16)
Executing:            RNC11_P6.1                            CXP9012842_R3BE/6    P6.1.4-9 (EP10-CPP6.1.0.16)
Last created:         RNC11_P7                              CXP9012995_R6CF/13   P7.0.1-7 (7.0.1.3 EP12)
---------------------------------------------------------------------------------------------------
Current UpgradePkg:   UpgradePackage=CXP9012842_R3BE%6      CXP9012842_R3BE/6    P6.1.4-9 (EP10-CPP6.1.0.16)
AutoCreatedCV:        Disabled
Rollback status:      Rollback is on
Rollback init timer:  2880
Rollback init counter: 2
Rollback counter:     2
Rollback list:        s[3] = RNC11_P6 Rb_CXP9012123_R10H%12_090528_1204 RNC11_OK5
===================================================================================================
UP name                     ProductData         CVS LMS PrDate LastCV state                        Release                        CompatIndex
===================================================================================================
CXP9012014_R10CD            CXP9012014_R10CD      0 220 090110         IDLE, UPGRADE_COMPLETED P5.0.24-2 (5.1.2.39 EP12)   RNC_P5_AUE4_U3
CXP9012014_R10CJ%A          CXP9012014_R10CJ/A    3 226 090116 090528 IDLE, UPGRADE_COMPLETED P5.0.26-6 (5.1.2.39 EP17)   RNC_P5_AUE4_U5
CXP9012123_R10H/19          CXP9012123_R10H/19    5 272 090407 090615 IDLE, UPGRADE_COMPLETED P6.0.2-25 (EP12-6.0.2.9)    RncMOM_AN1
CXP9012842_R3BE%6           CXP9012842_R3BE/6     4 303 090513 090617 IDLE, UPGRADE_COMPLETED P6.1.4-9 (EP10-CPP6.1.0.16) RncMOM_AU
Virtual_0_of_CXP9012995_R6CF/13 CXP9012995_R6CF/13 3  0 090506 090617 IDLE, ONLY_DELETEABLE   P7.0.1-7 (7.0.1.3 EP12)
===================================================================================================


RNC10> del UpgradePackage=CXP9012014_R10CD

Delete following MOs ?
===================================================================================================
 1033  SwManagement=1,UpgradePackage=CXP9012014_R10CD
===================================================================================================
Warning: Undo Mode is currently inactive !!!!
Are you Sure [y/n] ? y

Deleting (Be patient, may take up to 30 minutes for large UpgradePackage) ...
===================================================================================================
    4 SwManagement=1,UpgradePackage=CXP9012014_R10CD    !!!! Exception :org.omg.CORBA.TIMEOUT: client timeout reached  vmcid: 0x0  minor code:
0  completed: No
*** Timeout while waiting for delete result, checking progress...
UP Deletion ongoing, please wait. Rechecking in 10 seconds...
UP Deletion ongoing, please wait. Rechecking in 10 seconds...
UP Deletion ongoing, please wait. Rechecking in 10 seconds...
UP Deletion ongoing, please wait. Rechecking in 10 seconds...
UP Deletion ongoing, please wait. Rechecking in 10 seconds...
SwManagement=1,UpgradePackage=CXP9012014_R10CD >>> Mo deleted
===================================================================================================
Total: 1 MOs attempted, 1 MOs deleted
```

Gen2

First we must delete the associated backups. Note the UP MO name (in red below) can be different to the UP productNumber and Rev (in blue below)

```
RBS33> cvls

=====================================================================================================
171011-08:42              BackupName                                          SwVersion
=====================================================================================================
LastCreatedBackup:        Final_backup_for_BASEBAND_CXP9024418/6_R27A58_20171008T055637+0000  CXP9024418/6_R27A58
LastRestoredBackup:       Failsafe_backup_20170929T091420+0000                CXP9024418/6_R25A99
-----------------------------------------------------------------------------------------------------
Current SwVersion:        CXP9024418/6_R27A58 (17.Q4)
BrmHouseKeeping:          ENABLED (max: 20 backups)
BrmFailSafe:              IDLE
RestoreEscalationList:    s[2] = Final_backup_for_BASEBAND_CXP9024418/6_R27A58_20171008T055637+0000 Rollback_backup_BASEBAND_CXP9024418/6_R25A99_
=====================================================================================================
SwVersion           ProductData        ProdDate   Rel    LMs  InstallationDate     ActivationDate        DeactivationDate
=====================================================================================================
CXP9024418/6-R27A58 CXP9024418/6_R27A58 20171011  17.Q4   75  2017-10-08 05:42:35  2017-10-08 05:54:24
=====================================================================================================
UpgradePackage      ProductData        ProdDate   Rel    CreationDate         State
=====================================================================================================
CXP9024418/6-R2A174 CXP9024418/6_R2A174 20161214  17B    2016-12-14 16:45:22  PREPARE_COMPLETED
CXP9024418/6-R25A99 CXP9024418/6_R25A99 20170913  17.Q4  2017-09-14 06:53:15  PREPARE_COMPLETED
CXP9024418/6-R27A58 CXP9024418/6_R27A58 20171011  17.Q4  2017-10-08 05:32:37  COMMIT_COMPLETED
=====================================================================================================
Id  BackupName                                                CreationTime        SwVersion           Rel    Type    Stat  MO
=====================================================================================================
 1  newLicense                                                2017-02-07 11:32:41 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=
 2  RBS33_OK                                                  2017-03-24 12:27:15 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=
 3  CXP9024418%6_R12A54_4                                     2017-04-18 11:43:53 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=
 4  CXP9024418_6_R12A54_3                                     2017-05-30 08:40:15 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=
 5  CXP9024418%6_R12A54_31                                    2017-05-30 08:41:38 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=
 6  CXP12345/6_R1234_admin1                                   2017-08-28 15:20:19 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=
 7  R25A99_installed                                          2017-09-14 07:15:43 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=
 8  Rollback_backup_Baseband_CXP9024418/6_R2A174_20170914T071720+0000  2017-09-14 07:17:20 CXP9024418/6_R2A174 17B   SYSCR  OK   BrmBackup=
 9  Failsafe_backup_20170929T091420+0000                      2017-09-29 09:14:20 CXP9024418/6_R25A99 17.Q4 SYSCR  OK   BrmBackup=
10  Rollback_backup_BASEBAND_CXP9024418/6_R27A58_20171008T054502+0000  2017-10-08 05:45:02 CXP9024418/6_R25A99 17.Q4 SYSCR  OK   BrmBackup=
11  Final_backup_for_BASEBAND_CXP9024418/6_R27A58_20171008T055637+0000  2017-10-08 05:56:38 CXP9024418/6_R27A58 17.Q4 SYSCR  OK   BrmBackup=
=====================================================================================================
>>> Total: 11 CV's, 3 UP's

RBS33> cvrmu CXP9024418/6_R2A174

Delete following 8 backups?
=====================================================================================================
 1  newLicense                                                2017-02-07 11:32:41 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=11
 2  RBS33_OK                                                  2017-03-24 12:27:15 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=13
 3  CXP9024418%6_R12A54_4                                     2017-04-18 11:43:53 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=20
 4  CXP9024418_6_R12A54_3                                     2017-05-30 08:40:15 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=21
 5  CXP9024418%6_R12A54_31                                    2017-05-30 08:41:38 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=22
 6  CXP12345/6_R1234_admin1                                   2017-08-28 15:20:19 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=26
 7  R25A99_installed                                          2017-09-14 07:15:43 CXP9024418/6_R2A174 17B   MANUAL OK   BrmBackup=27
 8  Rollback_backup_Baseband_CXP9024418/6_R2A174_20170914T071720+0000  2017-09-14 07:17:20 CXP9024418/6_R2A174 17B   SYSCR  OK   BrmBackup=28
```

```
=================================================================================
!!!! WARNING: Delete 8 backups?
Are you Sure [y/n] ? y

# Deleting backup 1 of 8: newLicense


=================================================================================
Proxy  MO                                                  Action            Nr of Params
=================================================================================
  614  BrM=1,BrmBackupManager=1                            deleteBackup      1
 >>> Return value = null


=================================================================================
Total: 1 MOs attempted, 1 MOs actioned

...<cut>...

RBSG2> acl swm=


=================================================================================
Proxy  MO                                                  Action            Nr of Params
=================================================================================
  470  SwM=1                                               cancel            0
  470  SwM=1                                               createUpgradePackage  2
  470  SwM=1                                               removeSoftwareVersion  1
  470  SwM=1                                               removeUpgradePackage   1
=================================================================================

RBSG2> acc swm removeUpgradePackage


=================================================================================
Proxy  MO                                                  Action            Nr of Params
=================================================================================
  612  SwM=1                                               removeUpgradePackage  1

Parameter 1 of 1, upgradePackage (moRef-RcsSwM.UpgradePackage):
   Enter mo LDN:  SwM=1,UpgradePackage=CXP9024418/6-R2A174
 >>> Return value = true


=================================================================================
Total: 1 MOs attempted, 1 MOs actioned

MO                ElapsedTime    state            progressCount  progressHeader
SwM=1             0s             FINISHED         100/100 (100%) Action complete
Waiting 1 seconds before checking result...
MO                ElapsedTime    $polp_result     $polp_info
SwM=1             0s             SUCCESS
Last MO:   699. Loaded  699 MOs. Total:   700 MOs.

RBSG2>
```

Important:
 - it is not supported to delete the current UP nor the previous one.
 - if the CVs or UP cannot be deleted, make sure that the attribute AutoProvisioning::rbsConfigLevel is set to 4 (READY_FOR_SERVICE)

14.4.4 <u>Additional disk cleanup</u>

<u>Gen1</u>

Remove loadmodules that dont belong in any UP (eg black loadmodules)

```
RNC11> fclean

.....

OK to run following commands ?
============================================================================
lt loadmodule
del ^LoadModule=CXC1323353_R8V01$            (rnc_node_mim)
del ^LoadModule=CXC1329890_R1B01$            (ES_Template)
rm -f /c/loadmodules/CXC1724159_R3BE05       (RncLmUe)
lh mp rm -f /d/loadmodules/CXC1724159_R3BE05 (RncLmUe)


============================================================================
Are you Sure [y/n] ? y
```

<u>Gen2</u>

Remove temporary files

```
RBSG2> discspace -c

coli>/sysm/discspace -c
Allocated disc space: 78%
Removing files ...
Allocated disc space is now: 78%
coli>
```

Remove pmd files

```
RBS33> ? rmdump

coli>/misc/help /labonly/rcs/rmdump
rmdump
-list | [] | number | PATTERN
Remove PMD directories defined by dump directory number,
regular expression for files in dump directories,
or if no argument given, remove all PMD directories.
What PMDs exist is shown with the -list option
ex. rmdump *test*
    rmdump 3
    rmdump
coli>

RBS33> rmdump
```

14.4.5 Create a UP

Gen1

```
RNC11> cr swmanagement=1,upgradepackage

Attribute 1 of 2, ftpServerIpAddress (string): 137.58.194.174

Attribute 2 of 2, upFilePathOnFtpServer (string): /TCM/UP/PLM/WIONA_FP/CXP9013831_R9YC%6/CXP9013831_R9YC%6.xml

Following attributes are optional. Enter attribute value or "d" for default.
Once the MO is created, these attributes cannot be changed (they are restricted).

Attribute 1 of 2, user (string): ftp

Attribute 2 of 2, password (string):

>>>  [Proxy ID = 8630] MO name :ManagedElement=1,SwManagement=1,UpgradePackage=CXP9013831_R9YC/6
```

Gen2

```
RBSG2> acc swm createUpgradePackage

==========================================================================================================
Proxy  MO                                                        Action                    Nr of Params
==========================================================================================================
  612  SwM=1                                                     createUpgradePackage      2

Parameter 1 of 2, uri (string): sftp://moshki7203@137.58.163.229/home/eanzmagn/g2/R3B184

Parameter 2 of 2, password (derivedRef-RcsSwM.EcimPasswordString):
 >>> Return value = 2

==========================================================================================================
Total: 1 MOs attempted, 1 MOs actioned

MO                ElapsedTime    state              progressCount  progressHeader
SwM=1             0s             RUNNING            0/100 (0%)     createUpgradePackage commenced
SwM=1             10s            FINISHED           100/100 (100%) createUpgradePackage complete
Waiting 1 seconds before checking result...
MO                ElapsedTime    $polp_result       $polp_info
SwM=1             10s            SUCCESS            UpgradePackage=CXP9023001/1-R3B184
Last MO:   700. Loaded  700 MOs. Total:   701 MOs.

RBSG2>

RBSG2> pr upgradepack

=============================================================================
Proxy  MO
=============================================================================
  614  SystemFunctions=1,SwM=1,UpgradePackage=CXP9023001/1-R3A714
  615  SystemFunctions=1,SwM=1,UpgradePackage=CXP9023001/1-R3A715
```

```
    616  SystemFunctions=1,SwM=1,UpgradePackage=CXP9023001/1-R3B184
==================================================================================
Total: 3 MOs
```

14.4.6 Perform the SW installation

Gen1

```
RNC11> acl upgradepackage=CXP9013831_R9YC/6 install

==================================================================================
Proxy  MO                                                  Action                      Nr of Params
==================================================================================
    5  UpgradePackage=CXP9013831_R9YC/6                    cancelInstall               0
    5  UpgradePackage=CXP9013831_R9YC/6                    forcedInstall               0
    5  UpgradePackage=CXP9013831_R9YC/6                    install                     0
    5  UpgradePackage=CXP9013831_R9YC/6                    nonBlockingForcedInstall    0
    5  UpgradePackage=CXP9013831_R9YC/6                    nonBlockingInstall          0
    5  UpgradePackage=CXP9013831_R9YC/6                    nonBlockingSelectiveForcedInstall   0
    5  UpgradePackage=CXP9013831_R9YC/6                    nonBlockingSelectiveInstall 0
    5  UpgradePackage=CXP9013831_R9YC/6                    piuTypeForcedInstall        1
    5  UpgradePackage=CXP9013831_R9YC/6                    piuTypeInstall              1
==================================================================================
```

 - **nonBlockingInstall**: same as soft-install in EMAS/OSS . Only the loadmodules that do not exist on the node will be transferred.
 - **nonBlockingForcedInstall**: same as hard-install in EMAS/OSS . All loadmodules are transferred even those that already exist on the node. This takes longer time.
Note: install and forceInstall are obsolete actions, the nonBlocking actions should be used instead.

```
RNC11> acc UpgradePackage=CXP9013831_R9YC/6 nonblockinginstall

==================================================================================
Proxy  MO                                                  Action                      Nr of Params
==================================================================================
 8630  UpgradePackage=CXP9013831_R9YC/6                    nonBlockingInstall          0
 >>> Return value = 183727215

==================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

Follow the progress of the SW installation:

```
RNC11> polu

Waiting 60 seconds before starting to poll...

UpgradePackage=CXP9013831_R9YC/6 ElapsedTime      state                 progressCount progressHeader        stepLabel
UpgradePackage=CXP9013831_R9YC/6 0s               INSTALL_EXECUTING     19/360 (5%)   DOWNLOADING_FILES
UpgradePackage=CXP9013831_R9YC/6 10s              INSTALL_EXECUTING     21/360 (6%)   DOWNLOADING_FILES
UpgradePackage=CXP9013831_R9YC/6 20s              INSTALL_EXECUTING     24/360 (7%)   DOWNLOADING_FILES
...<cut>...
UpgradePackage=CXP9013831_R9YC/6 1846s (30m46s)   INSTALL_EXECUTING     360/360 (100%) DOWNLOADING_FILES
UpgradePackage=CXP9013831_R9YC/6 1856s (30m56s)   INSTALL_EXECUTING     360/360 (100%) DOWNLOADING_FILES
```

```
UpgradePackage=CXP9013831_R9YC/6 1884s (31m24s) INSTALL_EXECUTING       360/360 (100%) SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 1894s (31m34s) INSTALL_EXECUTING       360/360 (100%) SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 1904s (31m44s) INSTALL_COMPLETED       360/360 (100%) SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 1914s (31m54s) INSTALL_COMPLETED       360/360 (100%) IDLE
Waiting 60 seconds before checking result...
UP action result: EXECUTED
additionalInfo  : Number of installed Load Module(s): 360.
```

Gen2

```
RBSG2> acl UpgradePackage=CXP9023001/1-R3B184


==============================================================================================
Proxy  MO                                                     Action                   Nr of Params
==============================================================================================
  616  SwM=1,UpgradePackage=CXP9023001/1-R3B184               activate                 0
  616  SwM=1,UpgradePackage=CXP9023001/1-R3B184               cancel                   0
  616  SwM=1,UpgradePackage=CXP9023001/1-R3B184               confirm                  0
  616  SwM=1,UpgradePackage=CXP9023001/1-R3B184               prepare                  0
  616  SwM=1,UpgradePackage=CXP9023001/1-R3B184               verify                   0
==============================================================================================


RBSG2> acc UpgradePackage=CXP9023001/1-R3B184 prepare


==============================================================================================
Proxy  MO                                                     Action                   Nr of Params
==============================================================================================
  616  SwM=1,UpgradePackage=CXP9023001/1-R3B184               prepare                  0
 >>> Return value = true


==============================================================================================
Total: 1 MOs attempted, 1 MOs actioned

RBSG2> polu

Waiting 10 seconds before starting to poll...
Connected to 10.68.110.44 (ManagedElement=1)

Last MO:   700. Loaded  700 MOs. Total:   701 MOs.


UpgradePackage=CXP9023001/1-R3B184 ElapsedTime      state                progressCount  progressHeader       stepLabel
UpgradePackage=CXP9023001/1-R3B184 3s               PREPARE_IN_PROGRESS  4/100 (4%)     RUNNING (0)          Downloading
FWARE_CXP9023384_1.cxp
UpgradePackage=CXP9023001/1-R3B184 16s              PREPARE_IN_PROGRESS  8/100 (8%)     RUNNING (0)          Downloading
RBSANTC_CXP9030699_1.cxp
UpgradePackage=CXP9023001/1-R3B184 28s              PREPARE_IN_PROGRESS  11/100 (11%)   RUNNING (0)          Downloading MOFWK_PPC-
CXP9024579_23.cxp
UpgradePackage=CXP9023001/1-R3B184 40s              PREPARE_IN_PROGRESS  15/100 (15%)   RUNNING (0)          Downloading trus.cxp
UpgradePackage=CXP9023001/1-R3B184 52s              PREPARE_IN_PROGRESS  19/100 (19%)   RUNNING (0)          Downloading
EMCLITOOL_CXP9024020_1.cxp
UpgradePackage=CXP9023001/1-R3B184 64s (01m04s)     PREPARE_IN_PROGRESS  24/100 (24%)   RUNNING (0)          Downloading
EMCLITOOL_CXP9024020_1.cxp
...<cut>...
```

```
UpgradePackage=CXP9023001/1-R3B184 393s (06m33s)  PREPARE_IN_PROGRESS     94/100 (94%)    RUNNING (0)                Downloading TN_CXP9022846_1-
R9CC.cxp
UpgradePackage=CXP9023001/1-R3B184 406s (06m46s)  PREPARE_IN_PROGRESS     95/100 (95%)    RUNNING (0)                Downloading TN_CXP9022846_1-
R9CC.cxp
UpgradePackage=CXP9023001/1-R3B184 420s (07m00s)  PREPARE_IN_PROGRESS     96/100 (96%)    RUNNING (0)                Downloading TN_CXP9022846_1-
R9CC.cxp
UpgradePackage=CXP9023001/1-R3B184 432s (07m12s)  PREPARE_COMPLETED       100/100 (100%) FINISHED (0)                Preparation complete
Waiting 60 seconds before checking result...
UP action result: SUCCESS
additionalInfo  :

RBSG2>
```

14.4.7 Verify the UpgradePackage

Gen1

The verifyUpgrade action performs the following checks:
- **Verifying that the used PIUs in the node are supported according to the Upgrade Control File**
- **Verifying that the upgrade window defined in the Upgrade Control File allows an upgrade**
- **Verifying that it is possible to create the required number of CV's during the upVgrade phase**
- **Verifying checksum for all load modules that has a checksum value defined in the Upgrade Control File**
- **Verifying that Plug In Units(PIUs)on the node are not faulty before the upgrade is initiated**

```
RNC11> acc CXP9013831_R9YC/6 verifyupgrade

======================================================================================================
Proxy  MO                                                        Action                    Nr of Params
======================================================================================================
 8630  UpgradePackage=CXP9013831_R9YC/6                          verifyUpgrade             0
 >>> Return value = 191422810

======================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

Use the command "polu" to follow the progress of the verifyupgrade action:

```
RNC11> polu

Waiting 60 seconds before starting to poll...
UpgradePackage=CXP9013831_R9YC/6 ElapsedTime   state                progressCount progressHeader          stepLabel
UpgradePackage=CXP9013831_R9YC/6 0s            INSTALL_COMPLETED    0/0           VERIFY_CHECKSUM_FOR_LM
UpgradePackage=CXP9013831_R9YC/6 10s           INSTALL_COMPLETED    0/0           VERIFY_FTC
UpgradePackage=CXP9013831_R9YC/6 24s           INSTALL_COMPLETED    0/0           VERIFY_FTC
UpgradePackage=CXP9013831_R9YC/6 34s           INSTALL_COMPLETED    0/0           VERIFY_LM_FILES
UpgradePackage=CXP9013831_R9YC/6 56s           INSTALL_COMPLETED    0/0           IDLE
Waiting 60 seconds before checking result...
UP action result: EXECUTED
additionalInfo  : Upgrade possible,. current version is supported as from version.. Detailed info:. Action rebootNodeUpgrade supported: true.
Action upgrade supported: false. Action update supported: false.
```

Gen2

```
RBS33> acc CXP9024418/5-R15CE verify

=================================================================================
Proxy  MO                                                Action              Nr of Params
=================================================================================
 6056  SwM=1,UpgradePackage=CXP9024418/5-R15CE           verify              0
 >>> Return value = true

=================================================================================
Total: 1 MOs attempted, 1 MOs actioned

RBS33> polu 1 1

Waiting 1 seconds before starting to poll...

...
UpgradePackage=CXP9024418/5-R15CE 68s (01m08s)   PREPARE_COMPLETED   0/100 (0%)      RUNNING (0)     Starting CS verification
...
UpgradePackage=CXP9024418/5-R15CE 169s (02m49s)  PREPARE_COMPLETED   0/100 (0%)      RUNNING (0)     rbsNcUpgradeEngineLm(CXC2010289
UpgradePackage=CXP9024418/5-R15CE 171s (02m51s)  PREPARE_COMPLETED   100/100 (100%) FINISHED (0)     Verification complete
Waiting 60 seconds before checking result...
UP action result: SUCCESS
additionalInfo  :
```

14.4.8 Perform the SW upgrade

Gen1

```
RNC11> acl upgradepackage=CXP9013831_R9YC/6 upgrade

=================================================================================
Proxy  MO                                        Action                             Nr of Params
=================================================================================
    5  UpgradePackage=CXP9013831_R9YC/6          cancelUpgrade                      0
    5  UpgradePackage=CXP9013831_R9YC/6          clearUpgradeLogFile                0
    5  UpgradePackage=CXP9013831_R9YC/6          confirmUpgrade                     0
    5  UpgradePackage=CXP9013831_R9YC/6          readSupportedUpgradeTypesStatus    0
    5  UpgradePackage=CXP9013831_R9YC/6          rebootNodeUpgrade                  0
    5  UpgradePackage=CXP9013831_R9YC/6          upgrade                            0
    5  UpgradePackage=CXP9013831_R9YC/6          verifyUpgrade                      0
=================================================================================
```

 - **upgrade**: same as soft-upgrade in EMAS/OSS . The new SW is taken into service by restarting every individual board in sequence.
 - **rebootNodeUpgrade**: same as hard-upgrade in EMAS/OSS . The new SW is taken into service by restarting the whole node at once. **This method is recommended.**

```
RNC11> acc CXP9013831_R9YC/6 rebootnodeupgrade

==================================================================================
Proxy  MO                                                    Action                  Nr of Params
==================================================================================
    5  UpgradePackage=CXP9013831_R9YC/6                      rebootNodeUpgrade       0
 >>> Return value = 191844202

==================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

The upgrade progress can be followed with the "polu" command.
The polu command also checks when the upgrade is in state "awaiting confirm" and does the confirmation automatically.
The purpose of the confirm action is in case the upgrade has caused loss of contact with the O&M client (E.G. corruption of ip stack): if the confirm action is not received within 4 hourse (14400 seconds), the upgrade will rollback. this saves a site visit , especially for rbs. The 4 hours timer can be changed by editing the ucf file.

```
RNC11> polu

Waiting 60 seconds before starting to poll...

UpgradePackage=CXP9013831_R9YC/6 ElapsedTime      state                  progressCount progressHeader          stepLabel
UpgradePackage=CXP9013831_R9YC/6 0s               INSTALL_COMPLETED      0/16 (0%)     VERIFY_CHECKSUM_FOR_LM
...
UpgradePackage=CXP9013831_R9YC/6 70s  (01m10s)    INSTALL_COMPLETED      0/16 (0%)     VERIFY_LM_FILES
UpgradePackage=CXP9013831_R9YC/6 97s  (01m37s)    INSTALL_COMPLETED      0/16 (0%)     SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 107s (01m47s)    INSTALL_COMPLETED      0/16 (0%)     SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 117s (01m57s)    INSTALL_COMPLETED      0/16 (0%)     SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 127s (02m07s)    UPGRADE_EXECUTING      0/16 (0%)     ENTER_UPGRADE_MODE
UpgradePackage=CXP9013831_R9YC/6 137s (02m17s)    UPGRADE_EXECUTING      1/16 (6%)     ENTER_UPGRADE_MODE      AddJavaAUEs
UpgradePackage=CXP9013831_R9YC/6 147s (02m27s)    UPGRADE_EXECUTING      1/16 (6%)     JVM_RESTART_REQ         AddJavaAUEs
UpgradePackage=CXP9013831_R9YC/6 157s (02m37s)    CORBA.OBJECT_NOT_EXIST 1/16 (6%)     CORBA.TRANSIENT
UpgradePackage=CXP9013831_R9YC/6 181s (03m01s)    CORBA.OBJECT_NOT_EXIST 1/16 (6%)     CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 191s (03m11s)    CORBA.OBJECT_NOT_EXIST 1/16 (6%)     CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 201s (03m21s)    CORBA.OBJECT_NOT_EXIST 1/16 (6%)     CORBA.OBJECT_NOT_EXIST
....
UpgradePackage=CXP9013831_R9YC/6 382s (06m22s)    CORBA.OBJECT_NOT_EXIST 1/16 (6%)     CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 392s (06m32s)    CORBA.OBJECT_NOT_EXIST 1/16 (6%)     CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 402s (06m42s)    UPGRADE_EXECUTING      1/16 (6%)     ENTER_UPGRADE_MODE      AddJavaAUEs
UpgradePackage=CXP9013831_R9YC/6 415s (06m55s)    UPGRADE_EXECUTING      2/16 (12%)    RECONFIGURE_MOS ReplaceConfigSupportMOsHardCpp6
...
UpgradePackage=CXP9013831_R9YC/6 544s (09m04s)    UPGRADE_EXECUTING      3/16 (19%)    RECONFIGURE_MOS         HardAddCAue_7
UpgradePackage=CXP9013831_R9YC/6 554s (09m14s)    UPGRADE_EXECUTING      3/16 (19%)    PROGRAM_ADD_REMOVE      HardAddCAue_7
UpgradePackage=CXP9013831_R9YC/6 564s (09m24s)    UPGRADE_EXECUTING      3/16 (19%)    PROGRAM_ADD_REMOVE      HardAddCAue_7
UpgradePackage=CXP9013831_R9YC/6 574s (09m34s)    UPGRADE_EXECUTING      3/16 (19%)    PROGRAM_ADD_REMOVE      HardAddCAue_7
UpgradePackage=CXP9013831_R9YC/6 584s (09m44s)    UPGRADE_EXECUTING      4/16 (25%)    PROGRAM_ADD_REMOVE      STARTHardCpp6
UpgradePackage=CXP9013831_R9YC/6 594s (09m54s)    UPGRADE_EXECUTING      5/16 (31%)    APPL_SPECIFIC_ACTION    HardRNC_PRECONFIG1
UpgradePackage=CXP9013831_R9YC/6 604s (10m04s)    UPGRADE_EXECUTING      6/16 (38%)    APPL_SPECIFIC_ACTION    INITIATEHardCpp6
UpgradePackage=CXP9013831_R9YC/6 614s (10m14s)    UPGRADE_EXECUTING      6/16 (38%)    INITIATE_LOADER_INFO    INITIATEHardCpp6
UpgradePackage=CXP9013831_R9YC/6 626s (10m26s)    UPGRADE_EXECUTING      6/16 (38%)    INITIATE_LOADER_INFO    INITIATEHardCpp6
...
```

```
UpgradePackage=CXP9013831_R9YC/6 1223s (20m23s) UPGRADE_EXECUTING        7/16 (44%)  PRELOADING                PRELOADHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1233s (20m33s) UPGRADE_EXECUTING        8/16 (50%)  PRELOADING                HardRNC_PRECONFIG2
UpgradePackage=CXP9013831_R9YC/6 1243s (20m43s) UPGRADE_EXECUTING        8/16 (50%)  APPL_SPECIFIC_ACTION      HardRNC_PRECONFIG2
UpgradePackage=CXP9013831_R9YC/6 1253s (20m53s) UPGRADE_EXECUTING        9/16 (56%)  CONV_OF_PERSISTENT_DATA   CONVERTHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1263s (21m03s) UPGRADE_EXECUTING        9/16 (56%)  CONV_OF_PERSISTENT_DATA   CONVERTHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1273s (21m13s) UPGRADE_EXECUTING       10/16 (62%)  CONV_OF_PERSISTENT_DATA   EXECUTEHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1283s (21m23s) UPGRADE_EXECUTING       10/16 (62%)  TAKE_NEW_SW_INTO_SERVICE  EXECUTEHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1293s (21m33s) UPGRADE_EXECUTING       10/16 (62%)  TAKE_NEW_SW_INTO_SERVICE  EXECUTEHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1303s (21m43s) UPGRADE_EXECUTING       11/16 (69%)  NODE_UPGRADE_REQ          RebootNode_HardCpp6
UpgradePackage=CXP9013831_R9YC/6 1315s (21m55s) UPGRADE_EXECUTING       11/16 (69%)  SAVING_CV                 RebootNode_HardCpp6
UpgradePackage=CXP9013831_R9YC/6 1325s (22m05s) UPGRADE_EXECUTING       11/16 (69%)  SAVING_CV                 RebootNode_HardCpp6
UpgradePackage=CXP9013831_R9YC/6 1335s (22m15s) UPGRADE_EXECUTING       11/16 (69%)  SAVING_CV                 RebootNode_HardCpp6
UpgradePackage=CXP9013831_R9YC/6 1345s (22m25s) UPGRADE_EXECUTING       11/16 (69%)  SAVING_CV                 RebootNode_HardCpp6
UpgradePackage=CXP9013831_R9YC/6 1355s (22m35s) UPGRADE_EXECUTING       11/16 (69%)  NODE_RESTART_REQ          RebootNode_HardCpp6
UpgradePackage=CXP9013831_R9YC/6 1395s (23m15s) CORBA.TRANSIENT         11/16 (69%)  HTTP.NO_CONTACT
UpgradePackage=CXP9013831_R9YC/6 1527s (25m27s) CORBA.OBJECT_NOT_EXIST  11/16 (69%)  CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 1539s (25m39s) CORBA.OBJECT_NOT_EXIST  11/16 (69%)  CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 1550s (25m50s) CORBA.OBJECT_NOT_EXIST  11/16 (69%)  CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 1560s (26m00s) CORBA.OBJECT_NOT_EXIST  11/16 (69%)  CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 1570s (26m10s) CORBA.OBJECT_NOT_EXIST  11/16 (69%)  CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 1580s (26m20s) CORBA.OBJECT_NOT_EXIST  11/16 (69%)  CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 1590s (26m30s) CORBA.OBJECT_NOT_EXIST  11/16 (69%)  CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 1600s (26m40s) CORBA.OBJECT_NOT_EXIST  11/16 (69%)  CORBA.OBJECT_NOT_EXIST
UpgradePackage=CXP9013831_R9YC/6 1610s (26m50s) UPGRADE_EXECUTING       11/16 (69%)  ENTER_UPGRADE_MODE        RebootNode_HardCpp6
UpgradePackage=CXP9013831_R9YC/6 1627s (27m07s) UPGRADE_EXECUTING       12/16 (75%)  FINISH_AND_CLEAN_UP       FINISHHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1647s (27m27s) UPGRADE_EXECUTING       12/16 (75%)  FINISH_AND_CLEAN_UP       FINISHHardCpp6
....
UpgradePackage=CXP9013831_R9YC/6 1858s (30m58s) UPGRADE_EXECUTING       13/16 (81%)  APPL_SPECIFIC_ACTION      HardRNC_POSTCONFIG
UpgradePackage=CXP9013831_R9YC/6 1868s (31m08s) UPGRADE_EXECUTING       13/16 (81%)  APPL_SPECIFIC_ACTION WaitForConfirm_FINISHHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1878s (31m18s) AWAITING_CONFIRMATION   14/16 (88%)  WAIT_FOR_CONF_UPGRADE WaitForConfirm_FINISHHardCpp6

The node has been restarted on a different CV: from RNC11_P7 to SU_CXP9013831_R9YC%6_100224_1941.
Rereading MOM and MIB...

Checking MOM version...RNC_NODE_MODEL_K_9_115
Using MOM version: RNC_NODE_MODEL_K_9_115_COMPLETE
Parsing MOM (cached):
/home/eanzmagn/jarxml/RNC_NODE_MODEL_K_9_115_COMPLETE.xml.cache.gz ....................................
.....Done.
Using paramfile /home/eanzmagn/moshell/commonjars/pm/PARAM_RNC_K_9_90.txt
Parsing file /home/eanzmagn/moshell/commonjars/pm/PARAM_RNC_K_9_90.txt .....Done.
Connected to 137.58.194.147 (ManagedElement=1)
Last MO:  8835. Loaded 8835 MOs. Total:  8836 MOs.


===================================================================================================
Proxy  MO                                            Action                      Nr of Params
===================================================================================================
 2368  UpgradePackage=CXP9013831_R9YC/6              confirmUpgrade              0
 >>> Return value = null


===================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
UpgradePackage=CXP9013831_R9YC/6 1902s (31m42s) UPGRADE_EXECUTING       14/16 (88%)  ENTER_UPGRADE_MODE        WaitForConfirm_FINISHHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1912s (31m52s) UPGRADE_EXECUTING       15/16 (94%)  CONF_NORMAL_WORKING_STATE CONFIRMEDHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1922s (32m02s) UPGRADE_EXECUTING       15/16 (94%)  CONF_NORMAL_WORKING_STATE CONFIRMEDHardCpp6
UpgradePackage=CXP9013831_R9YC/6 1932s (32m12s) UPGRADE_EXECUTING       16/16 (100%) PROGRAM_ADD_REMOVE        HardRemoveCAue_7
UpgradePackage=CXP9013831_R9YC/6 1942s (32m22s) UPGRADE_EXECUTING       16/16 (100%) ENTER_NORMAL_MODE         HardRemoveCAue_7
UpgradePackage=CXP9013831_R9YC/6 1952s (32m32s) UPGRADE_EXECUTING       16/16 (100%) ENTER_NORMAL_MODE
```

```
UpgradePackage=CXP9013831_R9YC/6 1962s (32m42s) UPGRADE_EXECUTING          16/16 (100%)   SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 1972s (32m52s) UPGRADE_EXECUTING          16/16 (100%)   SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 1982s (33m02s) UPGRADE_EXECUTING          16/16 (100%)   SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 1992s (33m12s) UPGRADE_EXECUTING          16/16 (100%)   SAVING_CV
UpgradePackage=CXP9013831_R9YC/6 2002s (33m22s) UPGRADE_COMPLETED          16/16 (100%)   IDLE
Waiting 60 seconds before checking result...
UP action result: EXECUTED

Connected to 137.58.194.147 (ManagedElement=1)
Last MO:  8830. Loaded 8830 MOs. Total:  8831 MOs.
```

IMPORTANT: If the upgrade was initiated from OSSRC SMO application then we should have the moshell setting polu_confirmupgrade=0 to prevent polu from doing the confirmUpgrade action .

```
OFFLINE> uv polu

polu_confirmupgrade       = 1

OFFLINE> uv polu_confirmupgrade=0

polu_confirmupgrade=0
```

<u>Gen2</u>

```
RBSG2> acc r3a715 activate

Call Action activate on following 1 MOs ?
===================================================================================
   471   SystemFunctions=1,SwM=1,UpgradePackage=CXP9023001/1-R3A715
===================================================================================
Call action activate on 1 MOs. Are you Sure [y/n] ? y


===================================================================================================
Proxy  MO                                                      Action                 Nr of Params
===================================================================================================
   471  SwM=1,UpgradePackage=CXP9023001/1-R3A715               activate               0
 >>> Return value = true


===================================================================================================
Total: 1 MOs attempted, 1 MOs actioned

RBSG2> polu

Waiting 10 seconds before starting to poll...
Connected to 10.68.110.44 (ManagedElement=1)

Last MO:   558. Loaded  558 MOs. Total:   559 MOs.

UpgradePackage=CXP9023001/1-R3A715 ElapsedTime   state                    progressCount  progressHeader        stepLabel
UpgradePackage=CXP9023001/1-R3A715 1s            ACTIVATION_IN_PROGRESS 4/100 (4%)       RUNNING (0)           Installing upgrade package
UpgradePackage=CXP9023001/1-R3A715 12s           ACTIVATION_IN_PROGRESS 4/100 (4%)       RUNNING (0)           Installing upgrade package
UpgradePackage=CXP9023001/1-R3A715 24s           ACTIVATION_IN_PROGRESS 4/100 (4%)       RUNNING (0)           Installing upgrade package
```

```
UpgradePackage=CXP9023001/1-R3A715 36s            ACTIVATION_IN_PROGRESS 4/100  (4%)    RUNNING (0)            Installing upgrade package
UpgradePackage=CXP9023001/1-R3A715 47s            ACTIVATION_IN_PROGRESS 4/100  (4%)    RUNNING (0)            Installing upgrade package
UpgradePackage=CXP9023001/1-R3A715 58s            ACTIVATION_IN_PROGRESS 4/100  (4%)    RUNNING (0)            Installing upgrade package
UpgradePackage=CXP9023001/1-R3A715 69s  (01m09s)  ACTIVATION_IN_PROGRESS 4/100  (4%)    RUNNING (0)            Installing upgrade package
UpgradePackage=CXP9023001/1-R3A715 81s  (01m21s)  ACTIVATION_IN_PROGRESS 4/100  (4%)    RUNNING (0)            Installing upgrade package
UpgradePackage=CXP9023001/1-R3A715 94s  (01m34s)  ACTIVATION_IN_PROGRESS 4/100  (4%)    RUNNING (0)            Installing upgrade package
UpgradePackage=CXP9023001/1-R3A715 105s (01m45s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Database backup complete
UpgradePackage=CXP9023001/1-R3A715 116s (01m56s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Loading OS
UpgradePackage=CXP9023001/1-R3A715 130s (02m10s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Loading OS
UpgradePackage=CXP9023001/1-R3A715 142s (02m22s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Loading OS
UpgradePackage=CXP9023001/1-R3A715 155s (02m35s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Loading OS
UpgradePackage=CXP9023001/1-R3A715 166s (02m46s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Loading OS
...<cut>..
UpgradePackage=CXP9023001/1-R3A715 295s (04m55s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Loading OS
UpgradePackage=CXP9023001/1-R3A715 306s (05m06s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Loading OS
UpgradePackage=CXP9023001/1-R3A715 317s (05m17s)  ACTIVATION_IN_PROGRESS 43/100 (43%)   RUNNING (0)            Loading OS
UpgradePackage=CXP9023001/1-R3A715 330s (05m30s)  ACTIVATION_IN_PROGRESS 56/100 (56%)   RUNNING (0)            Switching over
Connection to COM failed. (Connection refused)
Unable to connect to 10.68.110.44:2023
MO service not ready, retrying in 5 seconds, give up in 1195 seconds...
Unable to connect to 10.68.110.44:2023
...<cut>...
MO service not ready, retrying in 5 seconds, give up in 905 seconds...
Connection to COM failed. (Connection refused)
Unable to connect to 10.68.110.44:2023
MO service not ready, retrying in 5 seconds, give up in 900 seconds...
Connection to COM failed. (Connection refused)
Unable to connect to 10.68.110.44:2023
MO service not ready, retrying in 5 seconds, give up in 895 seconds...
Warning: Permanently added '[10.68.110.44]:2023' (DSA) to the list of known hosts.
Connection to 10.68.110.44 closed.

Unable to connect to 10.68.110.44:2023
MO service not ready, retrying in 5 seconds, give up in 890 seconds...

$ssh_pid = 8382


Connected to 10.68.110.44 (ManagedElement=1)
UpgradePackage=CXP9023001/1-R3A715 739s (12m19s)  WAITING_FOR_COMMIT    100/100 (100%) FINISHED (0)           Activation complete


==================================================================================================
Proxy  MO                                                     Action                  Nr of Params
==================================================================================================
  473  SwM=1,UpgradePackage=CXP9023001/1-R3A715               confirm                 0
 >>> Return value = true


==================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
Waiting 60 seconds before checking result...
UP action result:
additionalInfo  :
Connected to 10.68.110.44 (ManagedElement=1)

Last MO:   559. Loaded  559 MOs. Total:   560 MOs.
.......

Parsing MOM: /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20141117-
182020_13610/com_node_mim.xml.gz ......................................................Done.
```

```
Caching MOM to: /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20141117-182020_13610/com_node_mim.xml.cache .....Done.
Compressing to: /proj/tfwlogs_wmr/users/eanzmagn/moshell_logfiles/logs_moshell/tempfiles/20141117-182020_13610/com_node_mim.xml.cache.gz
...Done.

RBSG2>
```

Note: **To prevent moshell from performing the confirm action:**

```
RBSG2> uv polu_confirmupgrade=0

polu_confirmupgrade=0

RBSG2>
```

14.4.9 Check Upgrade logs

Gen1:
 - lgu
 - lgp

Gen2:
There are three logs connected to system upgrade:
 - SWM (customer log) , printed with command: lgu
 - SWMI (part of ESI), printed with command: lgk -x swmi
 - Erlang (part of ESI), printed with command: lgk -x erl
Also check if there were any crashes: lgp

More info: http://lte-plm.rnd.ki.sw.ericsson.se/lte_trsh_wiki/G2P/index.php?n=UseCases.G2Upgrade

Example lgu printout on Gen2:

```
RBSG2> uv polu_confirmupgrade=0
```

Delete UP
```
2017-10-08 05:26:50 UPG  INFO   SwM FieldReplaceableUnit=1: Software audit complete
2017-10-08 05:26:58 UPG  INFO   SwM FieldReplaceableUnit=1: UpgradePackage=CXP9024418/5-R15CE removed
```

Create UP

```
2017-10-08 05:32:29 UPG  INFO   SwM FieldReplaceableUnit=1: createUpgradePackage sftp://ftp@150.132.6.19/proj/wcdmaiov/gen2up/CXP9024418_6-
R27A58/CXP9024418_6-up.xml
2017-10-08 05:32:33 UPG  INFO   SwM FieldReplaceableUnit=1: Software audit complete
2017-10-08 05:32:47 UPG  INFO   SwM FieldReplaceableUnit=1: Action create complete
```

Install (prepare)

```
2017-10-08 05:34:02 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: prepare
2017-10-08 05:34:05 UPG   INFO    SwM FieldReplaceableUnit=1: Software audit complete
2017-10-08 05:36:27 UPG   INFO    BrmBackupManager FieldReplaceableUnit=1: Created BrM=1,BrmBackupManager=1,BrmBackup=31
2017-10-08 05:40:00 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: Action prepare complete
```

Verify

```
2017-10-08 05:41:30 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: verify
2017-10-08 05:41:32 UPG   WARNING SwM FieldReplaceableUnit=1: Software audit concern for RRUL_CXP9017392_1Z2_R6EB
2017-10-08 05:42:38 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: wrataue(CXC2010038/1): OK
2017-10-08 05:42:38 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsNcUpgradeEngineLm(CXC2010289_1): OK: Verify Precondition
2017-10-08 05:42:38 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: gupc(CXC2010031_1): OK
2017-10-08 05:42:38 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsFrumUpgradeEngineLm(CXC2010277_1): CAUTION: The following FRUs
are disabled while unlocked: FieldReplaceableUnit=5
2017-10-08 05:42:38 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: Action verify complete
```

Activate (upgrade)

```
2017-10-08 05:45:02 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: activate
2017-10-08 05:45:38 UPG   WARNING SwM FieldReplaceableUnit=1: Software audit concern for RRUL_CXP9017392_1Z2_R6EB
2017-10-08 05:47:46 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: wrataue(CXC2010038/1): OK
2017-10-08 05:47:46 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsNcUpgradeEngineLm(CXC2010289_1): OK: Verify Upgrade
2017-10-08 05:47:46 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: gupc(CXC2010031_1): OK
2017-10-08 05:47:46 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsFrumUpgradeEngineLm(CXC2010277_1): OK: The following FRUs are
disabled while unlocked: FieldReplaceableUnit=5
2017-10-08 05:47:48 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: wrataue(CXC2010038/1): OK
2017-10-08 05:47:49 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsNcUpgradeEngineLm(CXC2010289_1): OK: Set suppress Recovery on
ActivateStart completed.
2017-10-08 05:47:49 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: gupc(CXC2010031_1): OK
2017-10-08 05:47:49 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsFrumUpgradeEngineLm(CXC2010277_1): OK
2017-10-08 05:50:23 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: wrataue(CXC2010038/1): OK
2017-10-08 05:50:23 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsNcUpgradeEngineLm(CXC2010289_1): OK: Preload completed
successfully for all devices
2017-10-08 05:50:23 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: gupc(CXC2010031_1): OK
2017-10-08 05:50:23 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsFrumUpgradeEngineLm(CXC2010277_1): OK
2017-10-08 05:50:25 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: wrataue(CXC2010038/1): OK
2017-10-08 05:50:25 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsNcUpgradeEngineLm(CXC2010289_1): OK: Undefined Trigger.
2017-10-08 05:50:25 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: gupc(CXC2010031_1): OK
2017-10-08 05:50:25 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsFrumUpgradeEngineLm(CXC2010277_1): OK
2017-10-08 05:52:57 UPG   INFO    SwInventory FieldReplaceableUnit=1: Running upgrade package BASEBAND CXP9024418/6 R27A58 as instance 2
2017-10-08 05:52:57 UPG   INFO    SwInventory FieldReplaceableUnit=1: Consists of COBRA CXP102171/1 R51B01
...<cut>...
2017-10-08 05:54:21 UPG   INFO    BrmBackupManager FieldReplaceableUnit=1: No of backups: 10 Manual: 7 Scheduled: 0 System created: 3
2017-10-08 05:54:24 UPG   INFO    SwInventory FieldReplaceableUnit=1: Running upgrade package BASEBAND CXP9024418/6 R27A58 as instance 2
2017-10-08 05:54:24 UPG   INFO    SwInventory FieldReplaceableUnit=1: Consists of COBRA CXP102171/1 R51B01
...<cut>...
2017-10-08 05:54:24 UPG   INFO    SwInventory FieldReplaceableUnit=1: Consists of RRU2205FB CXP9034873/4 R1A02
2017-10-08 05:55:17 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: Software for KRC 118 75/1, R3A already downloaded and installed
2017-10-08 05:55:56 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: Activation complete
2017-10-08 05:56:01 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: confirm
2017-10-08 05:56:13 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: wrataue(CXC2010038/1): OK
2017-10-08 05:56:14 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsNcUpgradeEngineLm(CXC2010289_1): OK: Timer set. Suppress fault
handling until timer expires.
2017-10-08 05:56:14 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: gupc(CXC2010031_1): OK
2017-10-08 05:56:14 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: rbsFrumUpgradeEngineLm(CXC2010277_1): OK
2017-10-08 05:56:37 UPG   INFO    UP=CXP9024418/6-R27A58 FieldReplaceableUnit=1: confirm complete
```

14.5 Licensing

More info: 1/15553-APR 901 0503/4 "LM System Architecture Description"

14.5.1 MOM

Gen1

```
ManagedElement[1],SystemFunctions[1],Licensing[1]
ManagedElement[1],SystemFunctions[1],Licensing[1],CapacityFeatureLicense[0-]
ManagedElement[1],SystemFunctions[1],Licensing[1],OptionalFeatureLicense[0-]
```
Gen2

```
ManagedElement[1],SystemFunctions[1],Lm[1]
ManagedElement[1],SystemFunctions[1],Lm[1],AutonomousMode[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],EmergencyUnlock[1]
ManagedElement[1],SystemFunctions[1],Lm[1],IntegrationUnlock[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],KeyFileManagement[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],KeyFileManagement[0-1],KeyFileInformation[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],MaintenanceUnlock[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],SystemTriggeredUnlock[0-1]

ManagedElement[1],SystemFunctions[1],Lm[1],CapacityKey[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],CapacityState[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],CapacityState[0-],GracePeriod[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],CapacityState[0-],WarningThreshold[0-1]
ManagedElement[1],SystemFunctions[1],Lm[1],FeatureKey[0-]
ManagedElement[1],SystemFunctions[1],Lm[1],FeatureState[0-]
```

14.5.2 List feature and capacity licenses

invl: same printout format Gen1/Gen2

```
ENB> invl
=================================================================
LicenseState:      NORMAL
FingerPrint:       VIC_AADP15_ARDEER_WEST_533354
InstallationTime:  2017-03-05 20:55:01
SequenceNumber:    1000
AutonomousMode:    INACTIVE
EmergencyUnlock:   INACTIVE
IntegrationUnlock: INACTIVE
-----------------------------------------------------------------

=====================================================================================================================
FeatureName                 FeatureKey   FAJ         LicenseState  FeatureState      ServiceState     ValidFrom   ValidUntil  Description
=====================================================================================================================
IpSec                       CXC4040004   FAJ1213586  1 (ENABLED)   0 (DEACTIVATED)   0 (INOPERABLE)   2017-03-01  NULL        IPSec
```

TrafficManagement	CXC4040005	FAJ1212117	1 (ENABLED)	1 (ACTIVATED)	1 (OPERABLE)	2017-03-01	NULL	Egress Traffic Shaping
Ipv6	CXC4040006	FAJ1210858	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	IPv6
Synchronization:ptpFreq Synchronization	CXC4040007	FAJ1212561	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	PTP Slave for Frequency
Synchronization:ptpTime Synchronization	CXC4040008	FAJ1212022	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	PTP Slave for Time and Phase
Ippm Protocol Responder	CXC4040009	FAJ1212095	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Two-Way Active Measurement
RealTimeSecLog	CXC4040010	FAJ1213234	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Real Time Security Event Logging
Synchronization:SyncEth	CXC4040011	FAJ1213272	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Synchronous Ethernet
IpLicensing:IpFlowMonitoring	CXC4040013	FAJ1214183	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	IP Flow Monitoring
IpLicensing:EthernetOamService	CXC4040014	FAJ1214253/W	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Ethernet OAM Service
AdaptiveRLCPollRetransmission	CXC4012018	FAJ1214570	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Adaptive RLC Poll-Retransmission
...<cut>... Scheduling								
UlInterferenceReporting	CXC4011820	FAJ1214157	1 (ENABLED)	1 (ACTIVATED)	1 (OPERABLE)	2017-03-01	NULL	Uplink Interference Reporting
UlSchedContlForOocUes Out-of-Coverage UEs	CXC4012003	FAJ1214524	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Uplink Scheduling Control for
UlSpectrumAnalyzer	CXC4011929	FAJ1214277	0 (DISABLED)	0 (DEACTIVATED)	0 (INOPERABLE)			Uplink Spectrum Analysis
UlTrigInterFreqMob Mobility	CXC4011072	FAJ1211797	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Uplink-Triggered Inter-Frequency
UpPTSInterferenceReporting	CXC4012023	FAJ1214576	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	UpPTS Interference Reporting
UplinkCarrierAggregation	CXC4011973	FAJ1214425	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Uplink Carrier Aggregation
UplinkMultiUserMIMO	CXC4011943	FAJ1214330	0 (DISABLED)	0 (DEACTIVATED)	0 (INOPERABLE)			Uplink Multiuser MIMO
VarSrCqiPeriodicity	CXC4011258	FAJ1212056	1 (ENABLED)	1 (ACTIVATED)	1 (OPERABLE)	2017-03-01	NULL	Variable SR and CQI Periodicity
VolteFrequencyHopping	CXC4011914	FAJ1214224	1 (ENABLED)	1 (ACTIVATED)	1 (OPERABLE)	2017-03-01	NULL	VoLTE Frequency Hopping
WcdmaHandover triggered	CXC4011011	FAJ1210897	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	WCDMA IRAT handover coverage
WcdmaSessionContinuity Coverage-Triggered	CXC4010616	FAJ1210493	1 (ENABLED)	1 (ACTIVATED)	1 (OPERABLE)	2017-03-01	NULL	WCDMA Session Continuity
	CXC4010619	FAJ1210496	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Clock Source over NTP
	CXC4010621	FAJ1210498	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Support for 3GPP Compatible TMA
	CXC4010622	FAJ1212175	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Support for 3GPP Compatible RET
Antennas	CXC4010798	FAJ1210705	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Support for Cascading of 3GPP
Compatible RET Antennas	CXC4010799	FAJ1210706	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	VSWR
	CXC4010830	FAJ1210736	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Configuration Management of 3GPP
Iuant and AISGv2.0 Compatible ALDs	CXC4010963	FAJ1210863	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	A-GPS User Plane Location
Support	CXC4010964	FAJ1210864	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Enhanced Cell ID User Plane
Location Support	CXC4011036	FAJ1210925	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Firmware Download of Antenna
Line Devices	CXC4011065	FAJ1211789	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Delay-Based Scheduling and Grant
Estimation	CXC4011067	FAJ1211792	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	A-GPS Control Plane Location
Support	CXC4011068	FAJ1211793	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	OTDOA Control Plane Location
Support	CXC4011069	FAJ1211794	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Enhanced Cell ID Control Plane
Location Support	CXC4011077	FAJ1211040	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Cross-Sector Antenna Sharing
Redundancy	CXC4011156	FAJ1211820	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Cascadable Radio Units
	CXC4011512	FAJ1213055	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Multi-Operator RAN
	CXC4011649	FAJ1214727	0 (DISABLED)	0 (DEACTIVATED)	0 (INOPERABLE)			OSPFv2
	CXC4011707	FAJ1214255/W	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Bidirectional Forwarding
Detection	CXC4011710	FAJ1214249/W	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	RAN Grand Master
	CXC4011809	FAJ1213095	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Multicabinet Control
	CXC4011817	FAJ1214142	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	CMPv2
	CXC4011822	FAJ1214162	1 (ENABLED)	0 (DEACTIVATED)	0 (INOPERABLE)	2017-03-01	NULL	Radio DOT System in LTE
	CXC4011823	FAJ1214257/W	1 (ENABLED)	1 (ACTIVATED)	1 (OPERABLE)	2017-03-01	NULL	Virtual Routers

```
                    CXC4011838   FAK1010070   1 (ENABLED)   1 (ACTIVATED)   1 (OPERABLE)     2017-03-01  NULL    10GE Port Capability
                    CXC4011915   FAK1010071   1 (ENABLED)   1 (ACTIVATED)   1 (OPERABLE)     2017-03-01  NULL    Multiple Ethernet Ports
                    CXC4012015   FAJ1214565   1 (ENABLED)   0 (DEACTIVATED) 0 (INOPERABLE)   2017-03-01  NULL    Mixed Mode Baseband LTE
                    CXC4012020   FAJ1214573   0 (DISABLED)  0 (DEACTIVATED) 0 (INOPERABLE)                       Supplemental Downlink with
License-Assisted Access
                    CXC4012034   FAJ1214608   1 (ENABLED)   0 (DEACTIVATED) 0 (INOPERABLE)   2017-03-01  NULL    Elastic RAN
                    CXC4040002   FAJ1211395   0 (DISABLED)  0 (DEACTIVATED) 0 (INOPERABLE)                       Ethernet Link Aggregation
                    CXC4040015   FAJ1214511   0 (DISABLED)  0 (DEACTIVATED) 0 (INOPERABLE)                       Policy Based Routing
                    CXC4040016   FAJ1214557   1 (ENABLED)   0 (DEACTIVATED) 0 (INOPERABLE)   2017-03-01  NULL    Two-Way Active Measurement
Protocol Initiator
                    CXC4040018   FAJ1214755   0 (DISABLED)  0 (DEACTIVATED) 0 (INOPERABLE)                       IEEE 1588 Boundary Clock
-------------------------------------------------------------------------------------------------------------------
```

```
===================================================================================================================
CapacityName               CapacityKey  FAJ          LicenseState  ValidFrom   ValidUntil  currLimit  grantedLevel limitReached  Description (Unit)
===================================================================================================================
5MHzSectorCarriers         CXC4011622   FAJ1213071   1 (ENABLED)   2017-03-01  NULL        96         96           false         Capacity 5MHz Sector Carriers
(Nr of 5MHz Sector Carriers)
ChannelBandwidth10MHz      CXC4010718   FAJ1210668   0 (DISABLED)                          0          0            false         Capacity ChannelBandwidth 10MHz
(Nr of 10000kHz licenses)
ChannelBandwidth15MHz      CXC4010719   FAJ1210669   0 (DISABLED)                          0          0            false         Capacity ChannelBandwidth 15MHz
(Nr of 15000kHz licenses)
ChannelBandwidth20MHz      CXC4010720   FAJ1210670   1 (ENABLED)   2017-03-01  NULL        24         24           false         Capacity ChannelBandwidth 20MHz
(Nr of 20000kHz licenses)
ChannelBandwidth5MHz       CXC4010627   FAJ1210548   0 (DISABLED)                          0          0            false         Capacity ChannelBandwidth 5MHz
(Nr of 5000kHz licenses)
ConnectedUsers             CXC4010608   FAJ1210485   1 (ENABLED)   2017-03-01  NULL        65535      65535        false         Capacity Connected Users (Nr of
Connected Users)
DlBasebandCapacity         CXC4010623   FAJ1210544   1 (ENABLED)   2017-03-01  NULL        65535      65535        false         Downlink Baseband Capacity (1
Mbps (1 000 000 bits/s))
DlPrbCapacity              CXC4011039   FAJ1210927   1 (ENABLED)   2017-03-01  NULL        noLimit    -1           false         Downlink PRB Capacity (1 Number
of PRBs)
IoTCarrier                 CXC4013000   FAJ1214719   1 (ENABLED)   2017-03-01  NULL        1          1            false         IoT Carrier
OutputPower100WTo120W      CXC4011182   FAK1010054   1 (ENABLED)   2017-03-01  NULL        24         24           false         Output Power 100 W to 120 W (Nr
of 100-120W Licenses)
OutputPower120WTo140W      CXC4011620   FAK1010055   1 (ENABLED)   2017-03-01  NULL        24         24           false         Output Power 120 W to 140 W (Nr
of 120-140W Licenses)
OutputPower140WTo160W      CXC4011621   FAK1010056   1 (ENABLED)   2017-03-01  NULL        24         24           false         Output Power 140 W to 160 W (Nr
of 140-160W Licenses)
OutputPower20WTo40W        CXC4010625   FAK1010050   1 (ENABLED)   2017-03-01  NULL        24         24           false         Output Power 20 W to 40 W (Nr of
20-40W Licenses)
OutputPower40WTo60W        CXC4010626   FAK1010051   1 (ENABLED)   2017-03-01  NULL        24         24           false         Output Power 40 W to 60 W (Nr of
40-60W Licenses)
OutputPower60WTo80W        CXC4011161   FAK1010052   1 (ENABLED)   2017-03-01  NULL        24         24           false         Output Power 60 W to 80 W (Nr of
60-80W Licenses)
OutputPower80WTo100W       CXC4011162   FAK1010053   1 (ENABLED)   2017-03-01  NULL        24         24           false         Output Power 80 W to 100 W (Nr
of 80-100W Licenses)
UlBasebandCapacity         CXC4010624   FAJ1210545   1 (ENABLED)   2017-03-01  NULL        65535      65535        false         Uplink Baseband Capacity (1 Mbps
(1 000 000 bits/s))
UlPrbCapacity              CXC4011040   FAJ1210928   1 (ENABLED)   2017-03-01  NULL        noLimit    -1           false         Uplink PRB Capacity (1 Number of
PRBs)
                           CXC4011960                1 (ENABLED)   2017-03-01  NULL        96         96           false
                           CXC4011961   FAK1010069   1 (ENABLED)   2017-03-01  NULL        1          1            false         Baseband HWAC Initial Module
(Initial Utilization blocks)
                           CXC4011962   FAK1010068   1 (ENABLED)   2017-03-01  NULL        7          7            false         Baseband HWAC Expansion Module
(Expansion Utilization blocks)
-------------------------------------------------------------------------------------------------------------------
```

Filtering the inv printout

Example: show only operable licenses

```
RBS579> invl \(opera
```

```
===================================================================================================
FeatureName                FeatureKey   FAJ          LicenseState FeatureState ServiceState  ValidFrom   ValidUntil  Description
===================================================================================================
AdaptiveRLCPollRetransmission CXC4012018 FAJ1214570  1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Adaptive RLC Poll-Retransmission
AutoconfLteBroadcastSFs     CXC4012012   FAJ1214556   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Autoconfiguration of LTE
Broadcast Subframes
CombinedCell                CXC4011368   FAJ1213025   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Combined Cell
CoverageForReducedCapUE     CXC4012013   FAJ1214559   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Coverage for Reduced Capability
UE
EnhancedUplinkIntroduction  CXC4020005   FAJ1211023   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Enhanced Uplink Introduction
Package
Eul2msTti                   CXC4020011   FAJ1211317   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Enhanced Uplink, 2ms TTI
HsdpaDynamicCodeAllocation  CXC4020001   FAJ121967    1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  HSDPA Dynamic Code Allocation
MobilityToCSGCell           CXC4012014   FAJ1214560   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Mobility To CSG Cell
ResourcePartitioning        CXC4012019   FAJ1214571   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Resource Partitioning
Support12Cells              CXC4011356   FAJ1213020   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  7-12 Cell Support
Support6Cells               CXC4011317   FAJ1211821   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  6 Cell Support
                            CXC4012011   FAJ1214554   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Internal2
                            CXC4012015   FAJ1214565   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Mixed Mode Baseband LTE
                            CXC4012016   FAJ1214566   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Mixed Mode Baseband WCDMA
                            CXC4012017   FAJ1214567   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2016-04-04  2017-02-26  Mixed Mode Baseband GSM
---------------------------------------------------------------------------------------------------

===================================================================================================
CapacityName               CapacityKey   FAJ          LicenseState ValidFrom   ValidUntil  currLimit grantedLevel limitReached Description (Unit)
===================================================================================================
---------------------------------------------------------------------------------------------------
```

Example: show features that have a restriction -> those ones should not be activated !

```
ENB006> invl \(activated\).*restricted
```

```
========================================================================
------------------------------------------------------------------------

===================================================================================================
FeatureName                FeatureKey   FAJ          LicenseState FeatureState ServiceState  ValidFrom   ValidUntil  Description
===================================================================================================
HoOscCtrlUE                CXC4011157   FAJ1211885   1 (ENABLED)  1 (ACTIVATED) 1 (OPERABLE) 2017-02-08  2018-02-08  UE level oscillating handover
minimization. Restricted. R1 GA: N/A
---------------------------------------------------------------------------------------------------

===================================================================================================
CapacityName               CapacityKey   FAJ          LicenseState ValidFrom   ValidUntil  currLimit grantedLevel limitReached Description (Unit)
===================================================================================================
---------------------------------------------------------------------------------------------------
```

14.5.3 Activate/deactivate feature

Gen1

The MO name of the is the same as the feature name

```
ENBG1> pr license=


================================================================================
Proxy   MO
================================================================================
      8   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=AutomatedMobilityOptimization
      9   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=CarrierAggregationAwareIFLB
     10   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=Support12Cells
     11   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=InterENBCarrierAggregation
     12   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=Pci
     13   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=DifferUlPowerControl
     14   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=Pfs
     15   SystemFunctions=1,Licensing=1,CapacityFeatureLicense=OutputPower40WTo60W
...
    301   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=IdleModeExtendedDrx
    302   SystemFunctions=1,Licensing=1,OptionalFeatureLicense=InterFrequencyOTDOA
================================================================================
Total: 208 MOs
```

Gen2

The MO name of the is the same as the feature key

```
ENBG2> pr featurestate=


================================================================================
Proxy   MO
================================================================================
..
...<cut>...
 4371   SystemFunctions=1,Lm=1,FeatureState=CXC4040009
 4372   SystemFunctions=1,Lm=1,FeatureState=CXC4040010
 4373   SystemFunctions=1,Lm=1,FeatureState=CXC4040011
 4374   SystemFunctions=1,Lm=1,FeatureState=CXC4040013
 4375   SystemFunctions=1,Lm=1,FeatureState=CXC4040014
 4376   SystemFunctions=1,Lm=1,FeatureState=CXC4040015
 4377   SystemFunctions=1,Lm=1,FeatureState=CXC4040016
 4378   SystemFunctions=1,Lm=1,FeatureState=CXC4040018
...
================================================================================
Total: 477 MOs
```

Activate Feature in Gen1

The feature name can be used directly

```
ENBG1> set InterFrequencyOTDOA$ featurestate 1
```

```
========================================================================================
   Id   MO                                                   featureState        Result
========================================================================================
  302   Licensing=1,OptionalFeatureLicense=InterFrequencyOTDOA        1          >>> Set.
========================================================================================
Total: 1 MOs attempted, 1 MOs set
```

Activate Feature in Gen2

Find out the key id with "invl"

```
ENBG2> invl InterFrequencyOTDOA
```

```
=====================================================================================================================
FeatureName                    FeatureKey    FAJ          LicenseState  FeatureState      ServiceState      ValidFrom   ValidUntil  Description
=====================================================================================================================
InterFrequencyOTDOA            CXC4011804    FAJ1213090   1 (ENABLED)   0 (DEACTIVATED)  0 (INOPERABLE)    2017-03-01  NULL        Inter-
Frequency OTDOA
---------------------------------------------------------------------------------------------------------------------
```

Then set the featureState by using the key id

```
ENBG2> set CXC4011804 featurestate 1
```

```
========================================================================================
   Id   MO                                          featureState        Result
========================================================================================
 4286   Lm=1,FeatureState=CXC4011804                        1          >>> Set.
========================================================================================
Total: 1 MOs attempted, 1 MOs set
```

14.5.4 Install License Key File

The fingerprint of the license file must be the same as the fingerprint of the node

Gen1

```
ENBG1> get licensing=
```

```
=====================================================================================================================
7                                       SystemFunctions=1,Licensing=1
```

```
================================================================================
LicensingId                         1
emergencyStateInfo                  Struct{3}
 >>> 1.expiryTime =
 >>> 2.state = 0 (NEVER_USED)
 >>> 3.time = 0
fingerprint                         X911040657
integrationUnlockStateInfo          Struct{3}
 >>> 1.expiryTime =
 >>> 2.remainingTime = 0
 >>> 3.state = 2 (USE_DISABLED)
lastLicensingPiChange               170512-042103
licenseFileUrl                      http://10.198.236.194/keyfiles/Licensing.xml
licenseFileUrlIpv6
userLabel
================================================================================
Total: 1 MOs


ENB11> acc licensing=1 updatelicensekeyfile

================================================================================
Proxy  MO                                       Action              Nr of Params
================================================================================
    1  Licensing=1                              updateLicenseKeyFile  4

Parameter 1 of 4, userId (string): ftp

Parameter 2 of 4, password (string):

Parameter 3 of 4, ipAddress (string): 137.58.214.3

Parameter 4 of 4, sFile (string): /export/home/ftp/wanessa_B/licensing/X911040657_100224_112337.xml
 >>> Return value = null

================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

Gen2

```
ENBG2> get lm=1

================================================================================
3904                                SystemFunctions=1,Lm=1
================================================================================
fingerprint                         ENB_533354
fingerprintUpdateable               false
lastInventoryChange                 2017-03-05T20:55:05
lastLicenseInventoryRefresh         2017-03-28T20:55:05
lmId                                1
lmState                             1 (NORMAL)
referenceToLicenseServer
================================================================================
```

```
ENBG2> acc KeyFileManagement=1 installKeyFile


=======================================================================================
Proxy  MO                                               Action              Nr of Params
=======================================================================================
  109  Lm=1,KeyFileManagement=1                         installKeyFile      2

Parameter 1 of 2, uri (string): sftp://labuser@10.90.1.101/home/labuser/eraenmn/install/ENB_533354_141219_083447.xml

Parameter 2 of 2, password (derivedRef-RcsLM.EcimPasswordString):
>>> Return value = 1


=======================================================================================
Total: 1 MOs attempted, 1 MOs actioned
```

14.5.5 Integration Unlock (eg for nodes without a LKF)

Gen1

```
ENB1> get licensing=
=======================================================================================
6                                    SystemFunctions=1,Licensing=1
=======================================================================================
LicensingId                          1
emergencyStateInfo                   Struct{3}
 >>> 1.expiryTime =
 >>> 2.state = 0 (NEVER_USED)
 >>> 3.time = 0
fingerprint                          X912121598
integrationUnlockStateInfo           Struct{3}
 >>> 1.expiryTime =
 >>> 2.remainingTime = 0
 >>> 3.state = 0 (NEVER_USED)
lastLicensingPiChange                130629-041406
licenseFileUrl
licenseFileUrlIpv6
userLabel
=======================================================================================
Total: 1 MOs

ENB1> license iu activate
$ license iu activate
State                     : ACTIVATED
$

ENB1> get licensing=
=======================================================================================
6                                    SystemFunctions=1,Licensing=1
=======================================================================================
LicensingId                          1
emergencyStateInfo                   Struct{3}
```

```
 >>> 1.expiryTime =
 >>> 2.state = 0 (NEVER_USED)
 >>> 3.time = 0
fingerprint                     X912121598
integrationUnlockStateInfo      Struct{3}
>>> 1.expiryTime = 2013-10-31 07:26:53
>>> 2.remainingTime = 777115
>>> 3.state = 1 (ACTIVATED)
lastLicensingPiChange           130629-041406
licenseFileUrl
licenseFileUrlIpv6
userLabel
================================================================================
Total: 1 MOs
```

Gen2

```
RBS579> get integrationunlock

================================================================================
4379                            SystemFunctions=1,Lm=1,IntegrationUnlock=1
================================================================================
activationState                 0 (INACTIVE)
activationsLeft                 0
expiration
integrationUnlockId             1
================================================================================


RBS579> acc integration activate

================================================================================
Proxy  MO                                       Action            Nr of Params
================================================================================
 1469  Lm=1,IntegrationUnlock=1                 activate          0
 >>> Return value = true

================================================================================
Total: 1 MOs attempted, 1 MOs actioned

RBS579> get integrationunlock

================================================================================
4379                            SystemFunctions=1,Lm=1,IntegrationUnlock=1
================================================================================
activationState                 1 (ACTIVE)
activationsLeft                 0
expiration
integrationUnlockId             1
================================================================================
```

14.5.6 Emergency Unlock (eg for nodes with expired LKF)

Gen1

```
ENB1> get licensing=
==================================================================================================
6                                 SystemFunctions=1,Licensing=1
==================================================================================================
LicensingId                       1
emergencyStateInfo                Struct{3}
 >>> 1.expiryTime =
 >>> 2.state = 0 (NEVER_USED)
 >>> 3.time = 0
fingerprint                       X912121598
integrationUnlockStateInfo        Struct{3}
 >>> 1.expiryTime =
 >>> 2.remainingTime = 0
 >>> 3.state = 0 (NEVER_USED)
lastLicensingPiChange             130629-041406
licenseFileUrl
licenseFileUrlIpv6
userLabel
==================================================================================================
Total: 1 MOs


RNC11> acc licensing setemergencystate
==================================================================================================
Proxy  MO                                         Action                   Nr of Params
==================================================================================================
    6  Licensing=1                                setEmergencyState        0
>>> return value = null

==================================================================================================
Total: 1 MOs attempted, 0 MOs actioned

ENB1> get licensing=
==================================================================================================
6                                 SystemFunctions=1,Licensing=1
==================================================================================================
LicensingId                       1
emergencyStateInfo                Struct{3}
 >>> 1.expiryTime = 2015-05-17
 >>> 2.state = 1 (ACTIVE)
 >>> 3.time = 0
fingerprint                       X912121598
integrationUnlockStateInfo        Struct{3}
 >>> 1.expiryTime =
 >>> 2.remainingTime = 0
 >>> 3.state = 0 (NEVER_USED)
lastLicensingPiChange             130629-041406
licenseFileUrl
licenseFileUrlIpv6
userLabel
==================================================================================================
Total: 1 MOs
```

Gen2

```
RBS579> get emergencyunlock

================================================================================
3946                            SystemFunctions=1,Lm=1,EmergencyUnlock=1
================================================================================
activationState                 0 (INACTIVE)
activationsLeft                 2
emergencyUnlockId               1
expiration
================================================================================

RBS579> acc emergency activate

Call Action activate on following 1 MOs ?
===========================================================================
  861  SystemFunctions=1,Lm=1,EmergencyUnlock=1
===========================================================================
Call action activate on 1 MOs. Are you Sure [y/n] ? y

================================================================================
Proxy  MO                                            Action              Nr of Params
================================================================================
  861  Lm=1,EmergencyUnlock=1                        activate            0
 >>> Return value = true

================================================================================
Total: 1 MOs attempted, 1 MOs actioned

RBS579> get emergencyunlock

================================================================================
3946                            SystemFunctions=1,Lm=1,EmergencyUnlock=1
================================================================================
activationState                 1 (ACTIVE)
activationsLeft                 2
emergencyUnlockId               1
expiration
================================================================================
```

14.6 System Constants

In Gen1 , the System Constants are handled from the **SystemConstants** MO (MO attribute "**systConstants**" and MO actions " **writeSystConst** " and "**resetSystConst**")

In Gen2 , the System Constants are handled via COLI commands " **sysconread**", "**sysconwrite**", and "**sysconreset**"

For both Gen1 and Gen2 it is possible to use moshell command "sc" which aliases to the MO operations or COLI commands, depending on the node type.

```
RBS33> h sc

****************************************************************************
sc[g][w][d] [<parameterlist>]
****************************************************************************
Read/Write/Reset SystemConstants.

Options:
 - g ("get")    : read system constants
 - w ("write")  : set system constants
 - d ("default"): reset system constants

Syntax:
 - scg [const [ > $var]]          : read one or all constants
 - scw const1:val1,const2:val2,... : write one or more constants
 - scd const1,const2,...          : reset one or more constants to default
 - scd all                        : reset all constants to default

Syntax examples:
 >> scg : read all system constants
 >> scg 915 : read the value of system constant "915"
 >> scg 915 > $var : read the value of system constant "915" and store to a variable
 >> scd 915 : reset system constant 915 to its default value
 >> scd 915,2102,2085 : reset system constant 915, 2102, 2085 to their default value
 >> scd all: reset all system constants to their default value
 >> scw 915:14 : set system constant 915 to the value 14
 >> scw 915:14,2102:1,2085:1 : set system constants 915 to 14, 2102 to 1, 2085 to 1
```

Example, Gen1:

```
RAN_IOV_RBS_15> scw 14:1,16:0

facc SystemConstants=1 writeConst 14:s 1:s
=============================================================================================
Proxy  MO                                                    Action                  Nr of Params
=============================================================================================
   1  SystemConstants=1                                     writeConst              2
 >>> Return value = null
=============================================================================================
Total: 1 MOs attempted, 1 MOs actioned

facc SystemConstants=1 writeConst 16:s 0:s
=============================================================================================
Proxy  MO                                                    Action                  Nr of Params
=============================================================================================
   1  SystemConstants=1                                     writeConst              2
 >>> Return value = null
=============================================================================================
```

```
Total: 1 MOs attempted, 1 MOs actioned

RAN_IOV_RBS_15> scg

All: 14:1,16:0
 14 = 1
 16 = 0
Total: 2

RAN_IOV_RBS_15> scd 14,16

facc SystemConstants=1 deleteConst 14:s
=============================================================================================================
Proxy  MO                                                  Action                      Nr of Params
=============================================================================================================
    1  SystemConstants=1                                   deleteConst                 1
 >>> Return value = null
=============================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
facc SystemConstants=1 deleteConst 16:s
=============================================================================================================
Proxy  MO                                                  Action                      Nr of Params
=============================================================================================================
    1  SystemConstants=1                                   deleteConst                 1
 >>> Return value = null
=============================================================================================================
Total: 1 MOs attempted, 1 MOs actioned


RAN_IOV_RBS_15> scd all

facc SystemConstants=1 deleteConst 14:s
=============================================================================================================
Proxy  MO                                                  Action                      Nr of Params
=============================================================================================================
    1  SystemConstants=1                                   deleteConst                 1
 >>> Return value = null
=============================================================================================================
Total: 1 MOs attempted, 1 MOs actioned
facc SystemConstants=1 deleteConst 16:s
=============================================================================================================
Proxy  MO                                                  Action                      Nr of Params
=============================================================================================================
    1  SystemConstants=1                                   deleteConst                 1
 >>> Return value = null
=============================================================================================================
Total: 1 MOs attempted, 1 MOs actioned

RAN_IOV_RBS_15>
```

Example, Gen2:

```
RBS33> scw 915:1,910:2

sysconwrite 915 1;sysconwrite 910 2
```

```
coli>/cm/sysconwrite 915 1
coli>/cm/sysconwrite 910 2
coli>

RBS33> scg

All: 910:2,915:1
910 = 2
915 = 1
Total: 2

RBS33> scd 910,915

sysconreset 910;sysconreset 915

coli>/cm/sysconreset 910
coli>/cm/sysconreset 915
coli>

RBS33>

RBS33> scd all

sysconreset 910;sysconreset 915

coli>/cm/sysconreset 910
coli>/cm/sysconreset 915
coli>

RBS33>
```

14.7 <u>Parameter audits</u>

The moshell command "diff" is used for checking that :
-   **the MO attributes are within the allowed range, according to the value ranges specified in the MOM (command "momr")**
-   **the MO attributes are according to recommended values**

 It can also be used to compare parameters between:
-   **two MO dumps**
-   **two or three MO instances of the same MO class**

```
ENB> h diff

********************************************************************************
diff[a][d][m][o][x][i]/ldiff[a][d][m][o][x][i]
********************************************************************************
Parameter auditing or MO dump comparisons.

 1) Syntax1: diff <proxy1> <proxy2> [<proxy3>]
To compare two or three MOs side by side. MOs must be of same MO class.
```

All attribute values that are different between the MOs will be printed.
Example:
   >> diff 4 32 17
Where 4, 32, 17 are the proxy identities of the MOs that should be compared.

 2) Syntax 2: diff[a][d][m][o][x][i]/ldiff[a][d][m][o][x][i] <moGroup>|<moFilter>|<proxy>|<modumpFile>|<modumpDir> [<baselineFile>|
<modumpFile2>|default] [<outputDir>]
To compare an MO dump with a parameter baseline file or with another MO dump.

...<cut>...

14.7.1 Compare against recommended values in a reference file

Format of the reference file

```
ENB512> ! cat moshell/commonjars/pm/PARAM_ERBS_G_1_0.txt

#Recommended Parameter Settings for ERBS, L16A/L16B
#Document Number:        19706-CXP102051/24-* / 19706-CXP102051/25-*

EUtranCellFDD    crsGain 300
EUtranCellFDD    pdschTypeBGain  1
DrxProfile=0     drxInactivityTimer      15
DrxProfile=0     onDurationTimer 7
DrxProfile=0     longDrxCycle    9
DrxProfile=0     shortDrxCycle   7
DrxProfile=0     shortDrxCycleTimer      4
DrxProfile=0     drxRetransmissionTimer  1
DrxProfile=0     longDrxCycleOnly        7
DrxProfile=1     drxInactivityTimer      3
...<cut>...
QciTable=default,QciProfilePredefined=qci1      drxPriority     98
QciTable=default,QciProfilePredefined=qci2      drxPriority     100
QciTable=default,QciProfilePredefined=qci6      drxPriority     99
QciTable=default,QciProfilePredefined=qci1      drxProfileRef   DrxProfile=1
QciTable=default,QciProfilePredefined=qci6      drxProfileRef   DrxProfile=6
QciTable=default,QciProfilePredefined=qci2      drxProfileRef   DrxProfile=2
QciTable=default,QciProfilePredefined=default   drxProfileRef   DrxProfile=0
Rcs     tInactivityTimer        10
Licensing=1,OptionalFeatureLicense=Rohc featureState     1
QciTable=default,QciProfilePredefined=qci1      rohcEnabled     TRUE
...<cut>....
Sctp    initialAdRecWin 16384
Sctp    numberOfAssociations    320
```

The reference file can support pattern matching on the MO:

```
~Aal2PathVccTp=c.*$    timerCu 3
```

The reference file can support several reference values:

```
Aal1TpVccTp     partialFill     47,50,53
```

Perform the audit

```
ENB512> diff . moshell/commonjars/pm/PARAM_ERBS_G_1_0.txt


=============================================================================================
MOClass              Attribute          Flag      nrMOs  CurrentValue         ReferenceValue
=============================================================================================
EUtranCellFDD        crsGain                       2/2   0                    300
EUtranCellFDD        pdschTypeBGain                2/2   0                    1
QciProfilePredefined schedulingAlgorithm          1/10  0 (RESOURCE_FAIR)    6 (DELAY_BASED)
=============================================================================================


=============================================================================================
MO                                         Attribute            CurrentValue         ReferenceValue
=============================================================================================
EUtranCellFDD=ENB512c1                      crsGain              0                    300
EUtranCellFDD=ENB512c1                      pdschTypeBGain       0                    1
EUtranCellFDD=ENB512c2                      crsGain              0                    300
EUtranCellFDD=ENB512c2                      pdschTypeBGain       0                    1
QciTable=default,QciProfilePredefined=qci1  schedulingAlgorithm  0 (RESOURCE_FAIR)    6 (DELAY_BASED)
=============================================================================================

Checking that the attribute values are within range specified in MOM ("momr")...found 20 inconsistencies:

=============================================================================================
MO                                                                              Attribute                             CurrentValue
AllowedRange
=============================================================================================
EUtraNetwork=1,ExternalENodeBFunction=23596-504,ExternalEUtranCellFDD=23596-504-1  lbmId                              65535
                                                                                                                                   0 to 16
EUtranCellFDD=ENB512c1,EUtranFreqRelation=314,EUtranCellRelation=23596-504-1       mobilityStatus.reason
                                                                                                                                   0,1,2
EUtranCellFDD=ENB512c2                                                             prsMutingPattern
                                                                                                                                   1 to 16
IpAccessHostEt=1                                                                   networkPrefixLength                0            1 to
128
IpSec=1                                                                            certificate.serialNumber
                                                                                                                                   1 to 40
Subrack=1                                                                          operationalProductData.productName
                                                                                                                                   1 to 12
Subrack=1                                                                          operationalProductData.productNumber
                                                                                                                                   1 to 24
Subrack=1                                                                          operationalProductData.productRevision
                                                                                                                                   1 to 7
Subrack=1                                                                          operationalProductData.productionDate
                                                                                                                                   5 to 8
TimeSetting=1                                                                      daylightSavingTimeEndRule.time
                                                                                                                                   5
TimeSetting=1                                                                      daylightSavingTimeStartRule.time
                                                                                                                                   5
=============================================================================================

Saved result in csv format: /proj/wcdmaiov/eanzmagn/moshell_logfiles/logs_moshell/diff/20170627/10.220.72.112_125127.csv ($diffcsvfile)

Created command file to correct differences: /proj/wcdmaiov/eanzmagn/moshell_logfiles/logs_moshell/diff/20170627/10.220.72.112_125127.mos
($diffcmdfile)

Note: to convert command files from moshell format to trun/emas format, execute the command: u! <commandfile>
```

Note: on Gen2 commercial nodes without TESTMOM, the internal Ericsson parameters must be audited with the command "diffi"

Anlyse results and correct discrepancies

Two files are produced, one CSV file showing the discrepancies and one command file which can be run with the "run" command to set the parameters to their correct value.

```
ENB512> ! cat $diffcsvfile

MOClass;Attribute;Flag;nrMOs;CurrentValue;ReferenceValue
EUtranCellFDD;crsGain;;2/2;0;300
EUtranCellFDD;pdschTypeBGain;;2/2;0;1
QciProfilePredefined;schedulingAlgorithm;;1/10;0 (RESOURCE_FAIR);6 (DELAY_BASED)

MO;Attribute;CurrentValue;ReferenceValue
EUtranCellFDD=ENB512c1;crsGain;0;300
EUtranCellFDD=ENB512c1;pdschTypeBGain;0;1
EUtranCellFDD=ENB512c2;crsGain;0;300
EUtranCellFDD=ENB512c2;pdschTypeBGain;0;1
QciTable=default,QciProfilePredefined=qci1;schedulingAlgorithm;0 (RESOURCE_FAIR);6 (DELAY_BASED)
```

The command file can be executed with "run" command or converted to trun or netconf format with "u!"

```
ENB512> ! cat $diffcmdfile

lt all
gs+

lset EUtranCellFDD=ENB512c1$ crsGain 300
lset EUtranCellFDD=ENB512c1$ pdschTypeBGain 1
lset EUtranCellFDD=ENB512c2$ crsGain 300
lset EUtranCellFDD=ENB512c2$ pdschTypeBGain 1
lset QciTable=default,QciProfilePredefined=qci1$ schedulingAlgorithm 6

gs-
```

14.7.2 MO dump comparisons

-diff <dump1> <dump2> : to compare all attributes
-diffo <dump1> <dump2> : to compare only configuration attributes, not readOnly attributes

```
OFFLINE> diffox ./130915_182107/RNC11_modump.zip ./130319_122738/RNC11_modmoump.zip
```

```
==========================================================================================
MO                                Attribute                         Value1              Value2
==========================================================================================
Aal2RoutingCase=Iub-1             numberDirection                   901520004147001     901520004147999
...<cut>...
UtranCell=Iub-36-3                sf4AdmUl                          4                   1000
UtranCell=Iub-37-1                pwrLoadThresholdDlSpeech.amr12200 1                   100
UtranCell=Iub-37-1                pwrLoadThresholdDlSpeech.amr7950  0                   100
UtranCell=Iub-37-1                sf4AdmUl                          4                   1000
UtranCell=Iub-37-2                pwrLoadThresholdDlSpeech.amr12200 1                   100
==========================================================================================
```

```
================================================================================
MOs only found in dump 1:
================================================================================
LoadModule=CXC1320742_R51ST01
...<cut>...
Subrack=MS,Slot=9,PlugInUnit=1,Program=CXC1321447_R51TK01
Subrack=MS,Slot=9,PlugInUnit=1,Program=CXC1322417/12_R51TC01
Subrack=MS,Slot=9,PlugInUnit=1,Program=CXC1322812_R51MM01
Subrack=MS,Slot=9,PlugInUnit=1,Program=CXC1325241/1_R51NK01
Subrack=MS,Slot=9,PlugInUnit=1,Program=CXC1327705_R51SZ01
Subrack=MS,Slot=9,PlugInUnit=1,Program=CXC1720925_R51SX03
UpgradePackage=CXP9012014_R10AY/7
UpgradePackage=CXP9012014_R10CD
UpgradePackage=CXP9012014_R10CJ


================================================================================
MOs only found in dump 2:
================================================================================
LoadModule=CXC1320742_R51MH01
LoadModule=CXC1320781_R51MH01
...<cut>...
Subrack=MS,Slot=9,PlugInUnit=1,Program=CXC1327705_R51LX02
Subrack=MS,Slot=9,PlugInUnit=1,Program=CXC1720925_R51MA03
UpgradePackage=CXP9012014_R10BC
UpgradePackage=Virtual_1_of_CXP9012123_R6F01
UpgradePackage=Virtual_4_of_CXP9012123_R4C15
UtranCell=Iub-5-2,Hsdsch=1,Eul=1
UtranCell=Iub-5-3,Hsdsch=1,Eul=1


================================================================================
Attributes only found in dump 1:
================================================================================
ManagedElementData=1                    ntpBurstFlagThird      false
ManagedElementData=1                    ntpMaxPollThird        0
ManagedElementData=1                    ntpMinPollThird        0
ManagedElementData=1                    ntpServerAddressThird
ManagedElementData=1                    ntpServiceActiveThird  false
UpgradePackage=CXP9012014_R10AT         Action                 Action update supported: false
UpgradePackage=CXP9012014_R10AT         Detailed               Detailed info:
UpgradePackage=CXP9012014_R9AM04        Action                 Action update supported: false
UpgradePackage=CXP9012014_R9AM04        Detailed               Detailed info:


================================================================================
Attributes only found in dump 2:
================================================================================
UpgradePackage=CXP9012014_R10AT         Connected              Connected to PiuType with product revision: R2

Saved result in csv format: /home/eanzmagn/moshell_logfiles/logs_moshell/diff/20081128/kget.log.gz_115957.csv ($diffcsvfile)


Created command file to align parameters in dump 1 against values of dump 2:
/net/rncweb/export/share4/RNC/LOG_SERVER/rnciov/PV/eanzmagn/logs_moshell/diff/20100308/kget.log.gz_173828.mos ($diffcmdfile)

Note: to convert command files from moshell format to trun/emas format, execute the command: u! <commandfile>

RNC11> ! cat $diffcmdfile
```

```
#DoNotEditThisLine: DiffCmdFile 137.58.194.147 8.0b RNC_NODE_MODEL_G_5_30_COMPLETE stopfile=/tmp/10812

#Command file for comparison of modump: modumps/rnc11/kget.log.gz against modump: modumps/rnc11/old/kget.log
#Comparison done on 100308-173828

lt all
gs+
confb+

lset Aal2PathVccTp=Iub-10-39$ timerCu 10
lset Aal2RoutingCase=Iub-1$ numberDirection 901520004147999
....
lset UtranCell=Iub-9-1$ pwrLoadThresholdDlSpeech amr7950=100
lset UtranCell=Iub-9-1$ sf4AdmUl 1000
lset UtranCell=Iub-9-2$ pwrLoadThresholdDlSpeech amr12200=100
lset UtranCell=Iub-9-2$ pwrLoadThresholdDlSpeech amr7950=100
lset UtranCell=Iub-9-2$ sf4AdmUl 1000
lset UtranCell=Iub-9-3$ pwrLoadThresholdDlSpeech amr12200=100
lset UtranCell=Iub-9-3$ pwrLoadThresholdDlSpeech amr7950=100
lset UtranCell=Iub-9-3$ sf4AdmUl 1000

gs-
confb-
```

14.7.3 Individual MO comparisons

```
ENB> st cell.*1$


========================================================================================
Proxy  Adm State      Op. State      MO
========================================================================================
  31  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPAM1
 383  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPBM1
 723  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPEM1
1249  1 (UNLOCKED)  1 (ENABLED)    ENodeBFunction=1,EUtranCellFDD=AADPFM1
========================================================================================
Total: 4 MOs

ENB> diff 31 383 723


=============================================================================================
MO                      EUtranCellFDD=AADPAM1        EUtranCellFDD=AADPBM1        EUtranCellFDD=AADPEM1
=============================================================================================
eUtranCellFDDId         AADPAM1                     AADPBM1                     AADPEM1
threshServingLow        22                          22                          16
dlChannelBandwidth      20000                       20000                       15000
noOfPucchFormat1PrbPairsPerFrame  40                           40                           30
pZeroNominalPusch       -100                        -100                        -103
freqBand                7                           7                           3
pciDetectingCell        t[0] =                      t[0] =                      t[5] =
pciConflictCell         t[0] =                      t[0] =                      t[5] =
timeOfLastModification  2017-03-16 15:09:26          2017-03-02 15:08:23          2017-03-29 02:31:56
cellDownlinkCaCapacity  26000                        26000                        19500
ulChannelBandwidth      20000                       20000                       15000
cellSubscriptionCapacity 26000                        26000                        19500
```

```
pciConflict          i[1] = 1 (NO_CONFLICTING_CELL)  i[1] = 0 (NO)              i[5] = 2 3 2 3 3 (YES YES_CONFLICTING_CELL YES
YES_CONFLICTING_CELL YES_CONFLICTING_CELL)
pZeroNominalPucch    -117                            -117                       -120
reservedBy           [4] =                           [5] =                      [5] =
earfcnul             20950                           21148                      19275
cellId               21                              31                         1
earfcndl             2950                            3148                       1275
sectorCarrierRef     [1] =                           [1] =                      [1] =
=====================================================================================================
```

15 Transport Network

Refer to attached excel file for mapping of Transport MOs CPP vs COM:

DUSgen2_mapping.xl
s

15.1 Network Synchronization
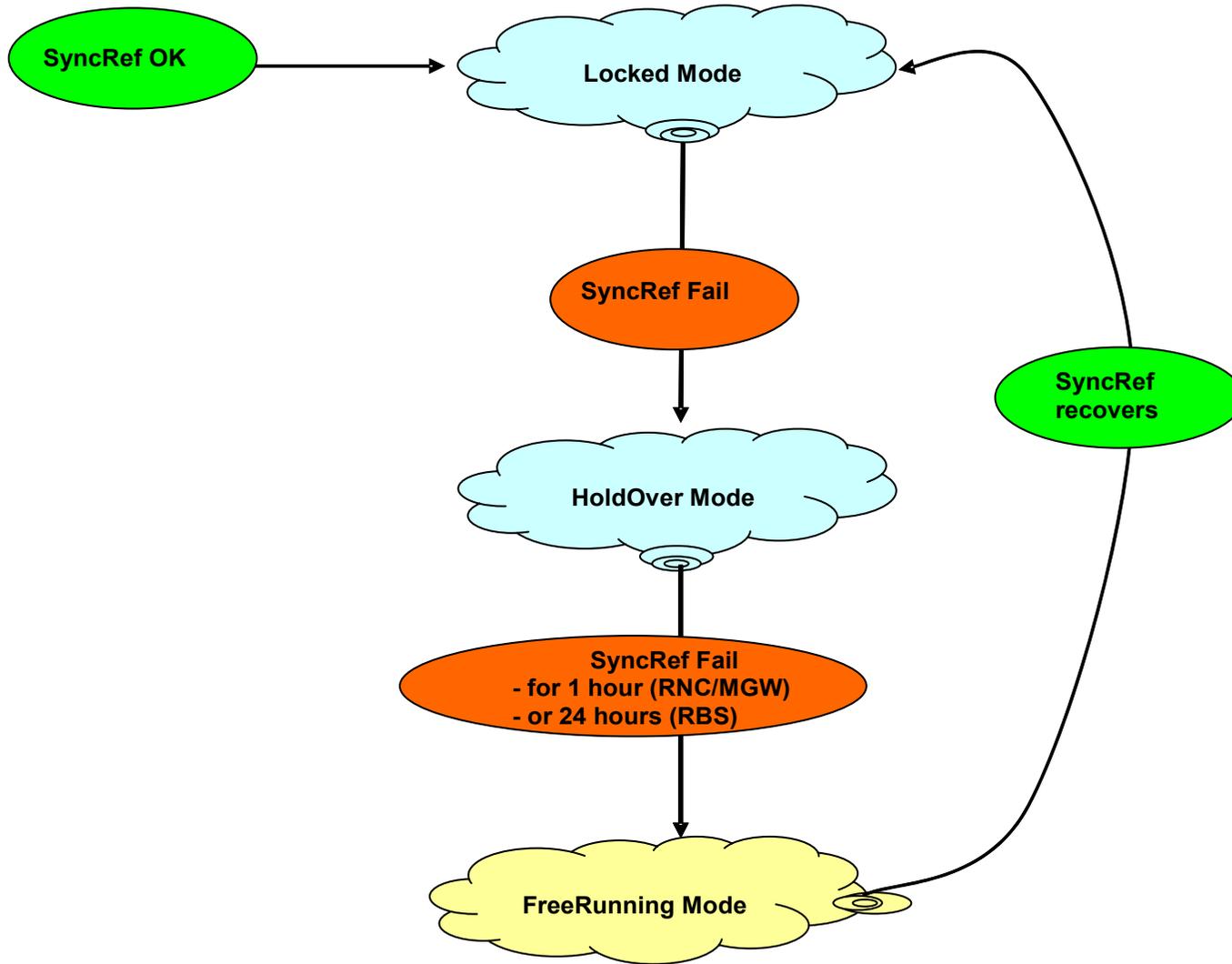
Sync Source	CPP	COM
	Synchronization	Synchronization + RadioEquipmentClock
SNTP	IpSyncRef	NtpFrequencySync
SASE	TuSyncRef	FrequencySyncIO
GPS	GpsSyncRef	TimeSyncIO
SyncEth	GigabitEthernet	EthernetPort

PTP	PacketTimeSyncRef PacketFrequencySyncRef	BoundaryOrdinaryClock

15.1.1 Gen1
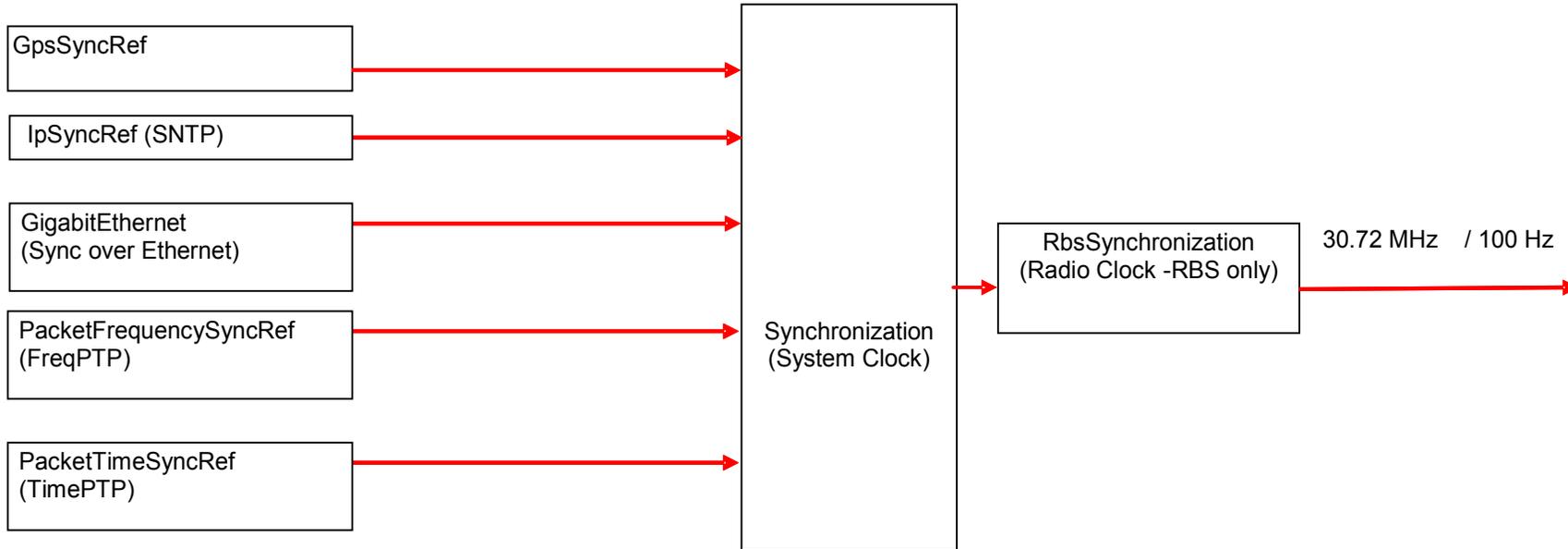
Oversview

Example: RBS synchronized with NTP

```
kienb3001> sts

SystemClock: LOCKED_MODE
-------------------------------------------------------------------------------
Prio  Activity  RefState  AdmState  OpState   SyncReference
-------------------------------------------------------------------------------
1     ACTIVE    OK        UNLOCKED  ENABLED   IpAccessHostEt=1,IpSyncRef=1 (10.62.1.10)
2     INACTIVE  OK        UNLOCKED  ENABLED   IpAccessHostEt=1,IpSyncRef=2 (10.62.1.12)
```

Example: RBS synchronized with synchronous Ethernet

```
RBS01> sts

SystemClock: LOCKED_MODE
-------------------------------------------------------------------------------
Prio  Activity  RefState  AdmState  OpState   SyncReference
-------------------------------------------------------------------------------
```

```
1       ACTIVE   OK        UNLOCKED  ENABLED   Subrack=MS,Slot=1,PlugInUnit=1,ExchangeTerminalIp=1,GigaBitEthernet=1
```

Example: RBS synchronized with GPS and NTP server

```
RBS02> sts

SystemClock: LOCKED_MODE
----------------------------------------------------------------------
Prio  Activity  RefState  AdmState  OpState   SyncReference
----------------------------------------------------------------------
1     ACTIVE    OK        UNLOCKED  ENABLED   Subrack=1,Slot=1,PlugInUnit=1,TimingUnit=1,GpsSyncRef=1
2     INACTIVE  OK        UNLOCKED  ENABLED   IpAccessHostEt=ip-1,IpSyncRef=IpSynch-1 (ntpServerIp=10.62.8.10)
```

Example: RBS synchronized with GPS and Time PTP

```
RBS03> sts

SystemClock: LOCKED_MODE
----------------------------------------------------------------------
Prio  Activity  RefState  AdmState  OpState   SyncReference
----------------------------------------------------------------------
1     ACTIVE    OK        UNLOCKED  ENABLED   Synchronization=1,PacketTimeSyncRef=1
2     INACTIVE  OK        UNLOCKED  ENABLED   Subrack=1,Slot=1,PlugInUnit=1,TimingUnit=1,GpsSyncRef=1
```

More details

```
ENBG1> get synchroniz

==============================================================================================
311                                     TransportNetwork=1,Synchronization=1
==============================================================================================
SynchronizationId                       1
adminQuality                            i[8] = 16 16 16 16 16 16 16 16 (NOT_DEFINED NOT_DEFINED NOT_DEFINED NOT_DEFINED NOT_DEFINED NOT_DEFINED
NOT_DEFINED NOT_DEFINED)
clockOperQuality                        21 (NOT_DEFINED)
clockSettledQuality                     21 (NOT_DEFINED)
degradationIsFault                      0 (DEGR_NOT_FAULT)
featureStatePtpFreq                     0 (DEACTIVATED)
featureStatePtpTime                     0 (DEACTIVATED)
featureStateSyncEth                     0 (DEACTIVATED)
fixedPosition                           true
freqHoldoverAlarmConfig                 Struct{2}
 >>> 1.enable = false
 >>> 2.filterTime = 1
licenseStatePtpFreq                     1 (ENABLED)
licenseStatePtpTime                     1 (ENABLED)
licenseStateSyncEth                     1 (ENABLED)
minQualityLevel                         1 (QL_SSU_A)
nodeGroupRole                           0 (NOT_ACTIVATED_AS_NODE_GROUP_MEMBER)
nodeSystemClock                         2 (LOCKED_MODE)
operQualityLevel                        i[8] = 21 21 21 21 21 21 21 21 (NOT_DEFINED NOT_DEFINED NOT_DEFINED NOT_DEFINED NOT_DEFINED NOT_DEFINED
NOT_DEFINED NOT_DEFINED)
selectionProcessMode                    0 (QL_DISABLED)
```

```
sfnInitializationTime          1980-01-06T00:00:19
syncRefActivity                i[8] = 2 1 1 1 1 1 1 1 (ACTIVE INACTIVE INACTIVE INACTIVE INACTIVE INACTIVE INACTIVE INACTIVE)
syncRefPriority                i[8] = 1 0 0 0 0 0 0 0
syncRefStatus                  i[8] = 3 0 0 0 0 0 0 0 (OK FAILED FAILED FAILED FAILED FAILED FAILED FAILED)
syncReference                  [8] =
 >>> syncReference = Equipment=1,Subrack=1,Slot=1,PlugInUnit=1,TimingUnit=1,GpsSyncRef=1
 >>> syncReference =
 >>> syncReference =
 >>> syncReference =
 >>> syncReference =
 >>> syncReference =
 >>> syncReference =
 >>> syncReference =
telecomStandard                0 (OPTION_I)
testMode                       0 (DISABLED)
timeHoldoverAlarmConfig        Struct{2}
 >>> 1.enable = false
 >>> 2.filterTime = 3
useReceivedQl                  i[8] = 0 0 0 0 0 0 0 0 (FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE)
userLabel
===================================================================================================
Total: 1 MOs


ENB0621> ? | egrep 'gps|nss'

gengpssstatus   Change GpssStatus received in GPppr message
gps01reset      Reset GPS01 receiver and clear positioning data
gps02reset      Command used to clear and/or reset GPS02 receiver
gpscapture      Capture NMEA messages to and from GPS receivers
gpsprot         Change protocol between Furuno and Ericsson Combined
gpsreset        Command used to reset connected GPS receiver
gpsresurvey     Resurvey actions, status and setting
gpssend         Send message to the GPS receiver
gpsskyview      Collect sky-view data.
gpsstatus       Print the status of GPS receiver
nssconfigtimeacc Send the desired time accuracy to SCSPI clients
nssdegraderef   Simulate reference degradation
nssfixfrequency Force regulator to enter fix frequency mode. Synchronization reference should be selected when this command is used, clock
should be in locked mode. Fix frequency mode will automatically end when frequency becomes good enough.
nssgpsreset     initiate reset of GRU or GRM FW on GPS receiver
nssgpsresurvey  Internal coli command for initiating resurvey
nssgpstrace     Dump collected GpsSyncRef and tuReg troubleshooting
nsshist         Get NSS history information
nssholdoverthr  Set holdover threshold in minutes
nssinfo         Get NSS status information
nssmpinfo       Get NSS MP status information
nsspdvthr       Set pdv-threshold for a packet reference
nssprodtest     Access memory in DUXI to enable/disable LA_TEST_BUS or PROD_TEST_CLK_MUX in CCR register
nssreadhist     Reads current hist data from msi and flash disk
nssrefchangeinfo Get 20 latest reference switches
nssremovetime   Reset time state while in Time Holdover
nssscspiinfo    Get all client and subscriber info
nssselectregref Set the specified reference type as selectedreference in tureg and tuhwif.
nsssetcalllimit Set calibration expiration days limit
nsssetfastlock  Setting the jitter/wander tolerance level (R) for EXT REF which changes needed time for clock to become locked to the EXT REF.
nsssetfsyncreg  Set FSYNC transmit interval, pattern and phase alignment.
nsssetsfc       Internal coli command for setting values of SFC and SFN.
nsssysclkinfo   Get 20 latest SystemClock changes
```

```
nsstableinfo     Get NSS MP table information
nsstestloosetimediff Add timeDiff between O&M and SFC time
nsstupktsync     Print useful information for troubleshooting
nsswritehist     Forces writing of hist data to flash disk or msi

ENB0621> nssinfo all;nssmpinfo all;nsstableinfo

$ nssinfo all

****** NSS TUM2 TU_IIF related data ******
    nsPid              : 0x100a6
    procTuiifMpPid     : 0x101f1
    tuiifStartState    : TUIIF_START_RESTART_READY (2)
    firstPriCall       : True (1)
    ownPiuInstanceId   : 1
    ownPiuHwAddr_r.smn : 0
    ownPiuHwAddr_r.apn : 1
    selectedRef        : NTP_REF (3)
    prevSelectedRef    : NO_REF (1)
    lastRegulatorState : NSS_TUIIF_FREQUENCY_LOCKED (3)
    ltrStatus          : False (0)
    savedCbmStatusData.
....
    par_pmHDVB1Pct      : 0
    par_pmHDVB10Pct     : 0
    par_pmHDVB50Pct     : 0

****** NSS TUM2 tumgr_proc related data ******
    hwdiagReturnCode   : NO_ERROR (0)
    temiRestartType    : COLD (2)

****** NSS TUM2 tuhwif related data ******
    fpgaRev            : 50343232
    isRev3             : Not P3
    A1ref              : 4e5
    writeMultNo        : 1

****** NSS TUM2 tumgr_hwdiag related data ******

****** END ******
$ nssmpinfo all


******** Reference Information *******

+ IP REF in position: SMN= 0, APN= 1
  - froId= 1
  - instance= CBMA_IP_REF
  - priority= 5
  - synch state= OK
  - LOSS OF TRACKING= NO
  - reference path state= REF PATH UNKNOWN
  - reference degradation state= REF QUALITY UNKNOWN
  - ref ADM state= ADM UNLOCKED
  - ref OPER state= OPER ENABLED
  - ref AVAIL state= NO STATUS
  - Packet rate= 1
  - ref path configured= True
```

```
    - ref is active= True
    - board present= True
    - available for selection= True

* Total: 1 (1 available)


.....
* Quality reset timer started: NO
* Reference path reset timer started: NO

* LTR recovery timer started: NO

* PM counters subscribed: NO
* Slave alarm timer started: NO

* Unlockable timer started: NO

* Reset unlockable timer started: NO

* Pending reference selection: NO

* Pending master/slave switch: NO


$ nsstableinfo


******** Table Information ********

Various parameters
* CBM_A =        1
* CBM_B =        2
* ET_REF =       0
* CBM_REF =      1
* IP_REF =       2
....
 Object: index (0 -> 1)
 index:                               0               1
 type:                         CBM_A_DED       CBM_B_DED

 activeTxId:                       -               -
 unCommitted.froId:               -               -
 unCommitted.adminState:          -               -
 unCommitted.tuFroId:             -               -
 latestCommitted.froId:           -               -
 latestCommitted.adminState:      -               -
 latestCommitted.tuFroId:         -               -
$
```

15.1.2 Gen2
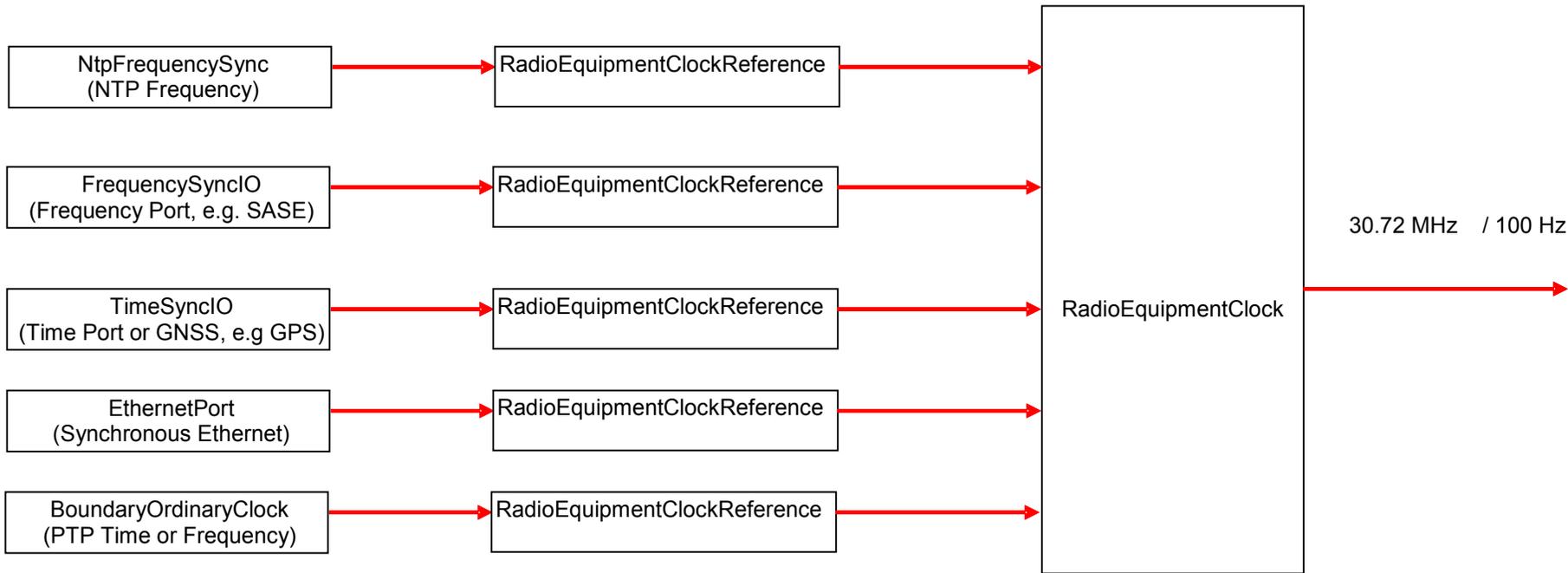
NtpFrequencySync
(NTP Frequency) → RadioEquipmentClockReference →

FrequencySyncIO
(Frequency Port, e.g. SASE) → RadioEquipmentClockReference →

TimeSyncIO
(Time Port or GNSS, e.g GPS) → RadioEquipmentClockReference → RadioEquipmentClock

EthernetPort
(Synchronous Ethernet) → RadioEquipmentClockReference →

BoundaryOrdinaryClock
(PTP Time or Frequency) → RadioEquipmentClockReference →

30.72 MHz / 100 Hz →

```
MSRBSV2> momtl \.transport$
...<cut>...
ManagedElement[1],Transport[0-1]
ManagedElement[1],Transport[0-1],Synchronization[1]
ManagedElement[1],Transport[0-1],Synchronization[1],RadioEquipmentClock[0-1]
ManagedElement[1],Transport[0-1],Synchronization[1],RadioEquipmentClock[0-1],NodeGroupSyncMember[0-1]
ManagedElement[1],Transport[0-1],Synchronization[1],RadioEquipmentClock[0-1],RadioEquipmentClockReference[0-8]
ManagedElement[1],Transport[0-1],Synchronization[1],TimeSyncIO[0-8]
ManagedElement[1],Transport[0-1],Synchronization[1],TimeSyncIO[0-8],GnssInfo[0-1]
ManagedElement[1],Transport[0-1],Synchronization[1],FrequencySyncIO[0-8]
ManagedElement[1],Transport[0-1],Ntp[0-1]
ManagedElement[1],Transport[0-1],Ntp[0-1],NtpFrequencySync[0-8]
ManagedElement[1],Transport[0-1],Ptp[0-1]
ManagedElement[1],Transport[0-1],Ptp[0-1],BoundaryOrdinaryClock[0-9]
ManagedElement[1],Transport[0-1],Ptp[0-1],BoundaryOrdinaryClock[0-9],PtpBcOcPort[0-]


MSRBSV2> mom RadioEquipmentClock clockstate

###############################################################################################################################
MO Class                                                    Attribute                                    Type
Flags
###############################################################################################################################
RsyncRadioEquipmentClock.RadioEquipmentClock        radioClockState
enumRef:RsyncRadioEquipmentClock.RadioEquipmentClockState  readOnly,noNotification
-------------------------------------------------------------------------------------------------------------------------------
The state of the RadioEquipmentClock MO.
Range: 1,2,3,4,5,6,7,8
*******************************************************************************************************************************
```

```
MSRBSV2> mom RadioEquipmentClockState


##########################################################################
Enum                                                  Values
##########################################################################
RsyncRadioEquipmentClock.RadioEquipmentClockState     1:FREE_RUNNING, 2:FREQUENCY_LOCKED, 3:FREQUENCY_HOLDOVER, 4:TIME_OFFSET_LOCKED,
5:TIME_OFFSET_HOLDOVER, 6:RNT_TIME_LOCKED, 7:RNT_TIME_HOLDOVER, 8:UNKNOWN


MSRBSV2> mom syncreftype .


##########################################################################
Enum                                                  Values
##########################################################################
RsyncRadioEquipmentClock.SyncRefType                  1:SYNC_E, 2:FREQUENCY_PORT, 3:TIME_PORT, 4:PTP_TIME, 5:PTP_FREQUENCY, 6:NTP_FREQUENCY,
7:GNSS_RECEIVER
-------------------------------------------------------------------------
The type of a synchronization reference.
 - SYNC_E: Synchronous ethernet.
 - FREQUENCY_PORT: Frequency synchronization via physical synchronization port.
 - TIME_PORT: TIme synchronization via physical synchronization port.
 - PTP_TIME: TIme synchronization via PTP port.
 - PTP_FREQUENCY: Frequency synchronization via PTP port.
 - NTP_FREQUENCY: Frequency synchronization via NTP port.
 - GNSS_RECEIVER: Time synchronization via GNSS receiver.
 ************************************************************************


MSRBSV2> mom RadioEquipmentClockReference encap


#####################################################################################################################################
MO Class                                                Attribute                         Type
Flags
#####################################################################################################################################
RsyncRadioEquipmentClock.RadioEquipmentClockReference   encapsulation                     moRef:ManagedObject
mandatory
-----------------------------------------------------------------------
Reference to the underlying encapsulation.
The underlying encapsulation can be FrequencySyncIO, TimeSyncIO, EthernetPort, BoundaryOrdinaryClock or NtpFrequencySync MO.
Dependencies: Two or more RadioEquipmentClockReference cannot refer to same FrequencySyncIO.
Two or more RadioEquipmentClockReference cannot refer to same TimeSyncIO.
Two or more RadioEquipmentClockReference cannot refer to same EthernetPort.
Two or more RadioEquipmentClockReference cannot refer to same BoundaryOrdinaryClock.
Two or more RadioEquipmentClockReference cannot refer to same NtpFrequencySync.
Attribute encapsulation of a RadioEquipmentClockReference can only refer to a FrequencySyncIO, TimeSyncIO, EthernetPort, BoundaryOrdinaryClock
or NtpFrequencySync with clockType SLAVE_ONLY_ORDINARY_CLOCK.
 *********************************************************************************************************************************
```

Example: synchronization with two reference sources:
 1) SASE

2) NTP server

```
MSRBSV2> lget ,radioeq


======================================================================================================
5218                                    Transport=1,Synchronization=1,RadioEquipmentClock=1
======================================================================================================
clockOperQuality                        15 (QL_UNKNOWN)
clockSettledQuality                     15 (QL_UNKNOWN)
currentRadioClockReference              Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=2
minQualityLevel                         Struct{3}
 >>> 1.qualityLevelValueOptionI = 1 (PRC)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
nodeGroupRole                           0 (NOT_ACTIVATED_AS_NODE_GROUP_MEMBER)
radioClockPriorityTable                 [2] =
 >>> radioClockPriorityTable = Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=1
 >>> radioClockPriorityTable = Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=2
radioClockState                         2 (FREQUENCY_LOCKED)
radioEquipmentClockId                   1
selectionProcessMode                    2 (QL_DISABLED)
======================================================================================================
5219                                    Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=1
======================================================================================================
adminQualityLevel                       Struct{3}
 >>> 1.qualityLevelValueOptionI = 1 (PRC)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
administrativeState                     0 (LOCKED)
availabilityStatus                      i[1] = 1 (FAILED)
encapsulation                           Synchronization=1,FrequencySyncIO=1
holdOffTime                             1000
operQualityLevel                        15 (QL_UNKNOWN)
operationalState                        0 (DISABLED)
priority                                1
radioEquipmentClockReferenceId          1
receivedQualityLevel                    15 (QL_UNKNOWN)
referenceStatus                         3 (LOSS_OF_SIGNAL)
syncRefType                             2 (FREQUENCY_PORT)
useQLFrom                               1 (RECEIVED_QL)
waitToRestoreTime                       60
======================================================================================================
5220                                    Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=2
======================================================================================================
adminQualityLevel                       Struct{3}
 >>> 1.qualityLevelValueOptionI = 2 (SSU_A)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
administrativeState                     1 (UNLOCKED)
availabilityStatus                      0 (NO_STATUS)
encapsulation                           Ntp=1,NtpFrequencySync=1
holdOffTime                             1000
operQualityLevel                        15 (QL_UNKNOWN)
operationalState                        1 (ENABLED)
priority                                2
radioEquipmentClockReferenceId          2
receivedQualityLevel                    15 (QL_UNKNOWN)
```

```
referenceStatus                     1 (NO_FAULT)
syncRefType                         6 (NTP_FREQUENCY)
useQLFrom                           1 (RECEIVED_QL)
waitToRestoreTime                   60
==============================================================================================
Total: 3 MOs
```

Example: synchronization with five reference sources:

1) NTP

2) PTP frequency

3) GPS

4) SyncEth

5) PTP time

```
OFFLINE_10.68.96.11_DCG_K> lget ,radioeq

160315-10:58:34 OFFLINE_10.68.96.11_dcg_k 16.0c MSRBS_NODE_MODEL_301.28741.58_a0fb stopfile=/tmp/5168
==============================================================================================
5717                                Transport=1,Synchronization=1,RadioEquipmentClock=1
==============================================================================================
clockOperQuality                    1 (PRC)
clockSettledQuality                 1 (PRC)
currentRadioClockReference          Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=GPS_TIME
minQualityLevel                     Struct{3}
 >>> 1.qualityLevelValueOptionI = 2 (SSU_A)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
nodeGroupRole                       0 (NOT_ACTIVATED_AS_NODE_GROUP_MEMBER)
radioClockPriorityTable             [5] =
 >>> radioClockPriorityTable = Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=NTP
 >>> radioClockPriorityTable = Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=PTP_FREQUENCY
 >>> radioClockPriorityTable = Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=GPS_TIME
 >>> radioClockPriorityTable = Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=SyncE
 >>> radioClockPriorityTable = Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=PTP_TIME
radioClockState                     4 (TIME_OFFSET_LOCKED)
radioEquipmentClockId               1
selectionProcessMode                1 (QL_ENABLED)
==============================================================================================
5718                                Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=GPS_TIME
==============================================================================================
adminQualityLevel                   Struct{3}
 >>> 1.qualityLevelValueOptionI = 2 (SSU_A)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
administrativeState                 1 (UNLOCKED)
availabilityStatus                  0 (NO_STATUS)
encapsulation                       Synchronization=1,TimeSyncIO=GPS
holdOffTime                         1000
operQualityLevel                    1 (PRC)
operationalState                    1 (ENABLED)
priority                            5
radioEquipmentClockReferenceId      GPS_TIME
receivedQualityLevel                1 (PRC)
referenceStatus                     1 (NO_FAULT)
```

```
syncRefType                       7 (GNSS_RECEIVER)
useQLFrom                         1 (RECEIVED_QL)
waitToRestoreTime                 60
===================================================================================================
5719                              Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=NTP
===================================================================================================
adminQualityLevel                 Struct{3}
 >>> 1.qualityLevelValueOptionI = 2 (SSU_A)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
administrativeState               1 (UNLOCKED)
availabilityStatus                i[2] = 1 6 (FAILED DEGRADED)
encapsulation                     Ntp=1,NtpFrequencySync=1
holdOffTime                       1000
operQualityLevel                  15 (QL_UNKNOWN)
operationalState                  0 (DISABLED)
priority                          2
radioEquipmentClockReferenceId    NTP
receivedQualityLevel              15 (QL_UNKNOWN)
referenceStatus                   6 (NTP_FAULT)
syncRefType                       6 (NTP_FREQUENCY)
useQLFrom                         1 (RECEIVED_QL)
waitToRestoreTime                 60
===================================================================================================
5720                              Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=PTP_FREQUENCY
===================================================================================================
adminQualityLevel                 Struct{3}
 >>> 1.qualityLevelValueOptionI = 2 (SSU_A)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
administrativeState               1 (UNLOCKED)
availabilityStatus                i[1] = 1 (FAILED)
encapsulation                     Ptp=1,BoundaryOrdinaryClock=PTP_FREQUENCY
holdOffTime                       1000
operQualityLevel                  15 (QL_UNKNOWN)
operationalState                  0 (DISABLED)
priority                          3
radioEquipmentClockReferenceId    PTP_FREQUENCY
receivedQualityLevel              15 (QL_UNKNOWN)
referenceStatus                   7 (PTP_FAULT)
syncRefType                       5 (PTP_FREQUENCY)
useQLFrom                         1 (RECEIVED_QL)
waitToRestoreTime                 60
===================================================================================================
5721                              Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=PTP_TIME
===================================================================================================
adminQualityLevel                 Struct{3}
 >>> 1.qualityLevelValueOptionI = 2 (SSU_A)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
administrativeState               0 (LOCKED)
availabilityStatus                i[3] = 1 9 5 (FAILED DEPENDENCY_LOCKED DEPENDENCY)
encapsulation                     Ptp=1,BoundaryOrdinaryClock=PTP_TIME
holdOffTime                       1000
operQualityLevel                  15 (QL_UNKNOWN)
operationalState                  0 (DISABLED)
priority                          7
radioEquipmentClockReferenceId    PTP_TIME
```

```
receivedQualityLevel              15 (QL_UNKNOWN)
referenceStatus                   7 (PTP_FAULT)
syncRefType                       4 (PTP_TIME)
useQLFrom                         1 (RECEIVED_QL)
waitToRestoreTime                 60
=====================================================================================================
5722                              Transport=1,Synchronization=1,RadioEquipmentClock=1,RadioEquipmentClockReference=SyncE
=====================================================================================================
adminQualityLevel                 Struct{3}
 >>> 1.qualityLevelValueOptionI = 2 (SSU_A)
 >>> 2.qualityLevelValueOptionII = 2 (STU)
 >>> 3.qualityLevelValueOptionIII = 1 (UNK)
administrativeState               0 (LOCKED)
availabilityStatus                i[1] = 1 (FAILED)
encapsulation                     EthernetPort=TN_B
holdOffTime                       1000
operQualityLevel                  4 (SSU_A_OR_TNC)
operationalState                  0 (DISABLED)
priority                          6
radioEquipmentClockReferenceId    SyncE
receivedQualityLevel              13 (INV)
referenceStatus                   4 (LOSS_OF_ESMC)
syncRefType                       1 (SYNC_E)
useQLFrom                         2 (ADMIN_QL)
waitToRestoreTime                 60
=====================================================================================================
Total: 6 MOs
```

COLI printouts:

```
G2RBS_19> ? | grep sync

/fruacc/xmu/syncport
/netsync/gps01reset
/netsync/gps02reset
/netsync/gpscapture
/netsync/gpspower
/netsync/gpsprot
/netsync/gpssend
/netsync/gpsskyview
/netsync/gpsstatus
/netsync/ntppdv
/netsync/synccentral
/netsync/syncethcentral
/netsync/syncethlocal
/netsync/synclocal
/netsync/syncngsmcentral
/netsync/syncngsmlocal
/netsync/syncntpcentral
/netsync/syncntplocal
/netsync/syncportcentral
/netsync/syncportlocal
/netsync/syncptpcentral
/netsync/syncptplocal
```

```
/netsync/synctestport

G2RBS_19> ? netsync

coli>/misc/help netsync
synclocal          - synclocal info MODULE
synccentral        - synccentral info MODULE
syncngsmlocal      - syncngsmlocal info TYPE
gpssend            - gpssend nmea nmea_message_string
syncngsmcentral    - syncngsmcentral info TYPE
gps01reset         - gps01reset  execute
gpsprot            - gpsprot chprot [Furuno | Ericomb]
gps02reset         - gps02reset [buffer | module | all]
syncportlocal      - syncportlocal info TYPE
syncntpcentral     - syncntpcentral info TYPE
syncethlocal       - syncethlocal info TYPE
ntppdv             - ntppdv
syncportcentral    - syncportcentral info TYPE
gpspower           - gpspower [on | off]
gpscapture         - gpscapture capture | start [-tx | -rx] [number]
syncptplocal       - syncptplocal info TYPE
gpsstatus          - gpsstatus [ 0 - 100 ]
gpsskyview         - gpsskyview [start | stop]
synctestport       - synctestport [off|fsync|1pps|1pps_tl|cbfn|esb|tuclk|info] [freq|period] [offset] [nonvolatile]
syncethcentral     - syncethcentral info TYPE
syncptpcentral     - syncptpcentral info TYPE
syncntplocal       - syncntplocal info TYPE
coli>

RBS33> synccentral info all;synclocal info all

coli>/netsync/synccentral info all
****** Sync Central Version ******
 sha-id: ef5ebcf
****** Node ******
TelecomStandard OPTION_I
Main Processor id of the master TU: 1
****** Sync-central global radio clock related data ******
Global Radio Clock Id = 1
isEnabled = true
RadioClockState = FREQUENCY_LOCKED
State Change Log:
---------------
2016-03-08 13:49:15: State=<FREQUENCY_LOCKED>,
2016-03-08 13:49:11: State=<LOCKING>,
2016-03-08 13:49:11: State=<UNKNOWN>,
DEBUG info for handle=1:
------------------------
****** Sync-central recref list related data ******
holdoff scale factor: 1
...<cut>....
 current  frequency offset = 3.5e+02 ppt
 adjusted frequency offset =    0 ppb at YYYY-MM-DD
------------------------------------------------------------------------
 completed at 2016-03-13 08:02:27
 show description about ppm, ppb, ppt and ppq units
 --------------------------------------------------------------------
 Prefix   Factor                     Fraction
```

```
         ----------------------------------------------------------------
 milli    1e-3                         1/1,000 (part per thousand)
 micro    1e-6                     1/1,000,000 (ppm, part per million)
 nano     1e-9                 1/1,000,000,000 (ppb, part per billion)
 pico     1e-12            1/1,000,000,000,000 (ppt, part per trillion)
 femto    1e-15      1/1,000,000,000,000,000 (ppq, part per quadrillion)
         ----------------------------------------------------------------
 completed at 2016-03-13 08:02:27
****** SPM IF CLIENT DATA ************
 object: ref_name = , ngns_id = 0, user_id = 0, owner_id = 0, monitor_id = 0, mailbox_id = 0, status = 0 (UNDEFINED)
****** CPRI PLL OBJ DATA ************
State History:
***** END *****
coli>
```

15.2 <u>Node Group Synchronization</u>

FIXME

CPRI_sync_NodeGro
up.ppt

and: CPI 55/1553-LZA7016014/1 (Manage NodeGroup Synchronization)

15.3 <u>Ethernet</u>

Aproximate MO mapping:

CPP	COM
GigabitEthernet	**TnPort**
	EthernetPort
IpInterface (vlan part)	**VlanPort**

<u>Gen1</u>

```
ENB302> ste

================================================================================================================
Board Position Speed Conf AutNg  Mastr Prot  DfRSw S12 ActiveLink  Link  Frame Vlans      DscpPbitMap
================================================================================================================
DUL   1-01-2  1G_F  1G_F true    true  false       110 1 (PRIMARY) FRONT 2DIX  1026,1027 000000000010...00000000000000
================================================================================================================
```

```
Total: 1 MOs
```

Gen2

```
MSRBSV2> momtl \.transport$
...<cut>..
ManagedElement[1],Transport[0-1],BfdProfile[0-64]
ManagedElement[1],Transport[0-1],Bridge[0-256]
ManagedElement[1],Transport[0-1],EthernetOamLocalMep[0-16]
ManagedElement[1],Transport[0-1],EthernetOamLocalMep[0-16],EthernetOamRemoteMep[0-510]
ManagedElement[1],Transport[0-1],EthernetPort[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QoSClassifier[1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QoSClassifier[1],PcpToQueueMap[1-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QoSClassifier[1],PcpToQueueMap[1-],PcpSetToQueue[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QueueRed[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],QueueTailDrop[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],QueueRed[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],QueueTailDrop[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],QueueRed[0-4]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],QueueTailDrop[0-4]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],SchedulerDwrr[0-4]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],SchedulerDwrr[0-4],QueueRed[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],SchedulerDwrr[0-4],QueueTailDrop[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],SchedulerDwrr[0-4],SchedulerSp[0-]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerDwrr[0-1],SchedulerSp[0-],QueueRed[0-4]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],SchedulerSp[0-1]
ManagedElement[1],Transport[0-1],EthernetPort[0-],QueueSystem[0-1],Shaper[0-1]
ManagedElement[1],Transport[0-1],VlanPort[0-]
...<cut>..

MSRBSV2> lget ,(tn|ethernet|vlan)port=


=====================================================================================
421                                     Equipment=1,FieldReplaceableUnit=1,TnPort=TN_B
=====================================================================================
reservedBy                  [1] =
 >>> reservedBy = Transport=1,EthernetPort=TN_B
tnPortId                                TN_B
userLabel
=====================================================================================
5680                                    Transport=1,EthernetPort=TN_B
=====================================================================================
admOperatingMode                        6 (1G_FULL)
administrativeState                     1 (UNLOCKED)
autoNegEnable                           true
availabilityStatus                      0 (NO_STATUS)
egressQosClassification
egressQosMarking
egressQosQueueMap
encapsulation                           FieldReplaceableUnit=1,TnPort=TN_B
ethernetPortId                          TN_B
```

```
holdDownTimer
macAddress                              A4:A1:C2:64:61:39
mtu                                     9000
operOperatingMode                       6 (1G_FULL)
operationalState                        1 (ENABLED)
reservedBy                              [1] =
 >>> reservedBy = Transport=1,VlanPort=1
userLabel
===================================================================================================
5705                                    Transport=1,VlanPort=1
===================================================================================================
egressQosClassification
egressQosMarking
egressQosQueueMap
encapsulation                           EthernetPort=TN_B
isTagged                                false
reservedBy                              [1] =
 >>> reservedBy = Transport=1,Router=1,InterfaceIPv4=1
userLabel
vlanId                                  3129
vlanPortId                              1
===================================================================================================
Total: 3 MOs


ENBG2> ? | grep /tn


/tn/debug-ospf-disable
/tn/debug-ospf-enable
/tn/ip-dump
/tn/loopback-mode
/tn/npu-health-check
/tn/npu-health-check-full
/tn/sctp
/tn/show-arp
/tn/show-bfd-info
/tn/show-ers
/tn/show-ike-config
/tn/show-ip-bfd
/tn/show-ip-interface
/tn/show-ip-ospf
/tn/show-ip-route
/tn/show-nc
/tn/show-netstat-linux
/tn/show-ospf-debug
/tn/show-processing-resource
/tn/tnrh-client
/tn/tnrh-gtp-path
/tn/tnrh-ip
/tn/tnrh-pcep
/tn/tnrh-session
/tn/tnrh-session-counters
/tn/tnrh-startup
```

15.4 IP

Aproximate MO mapping:

CPP	COM
IpInterface	InterfaceIPv4/VlanPort/RouteTableIPv4Static/Dst
Ipv6Interface	InterfaceIPv6/VlanPort/RouteTableIPv6Static/Dst
IpAccessHostEt / IpHostLink	AddressIPv4 / AddressIpv6
IpRoutingTable	Router

Gen1:
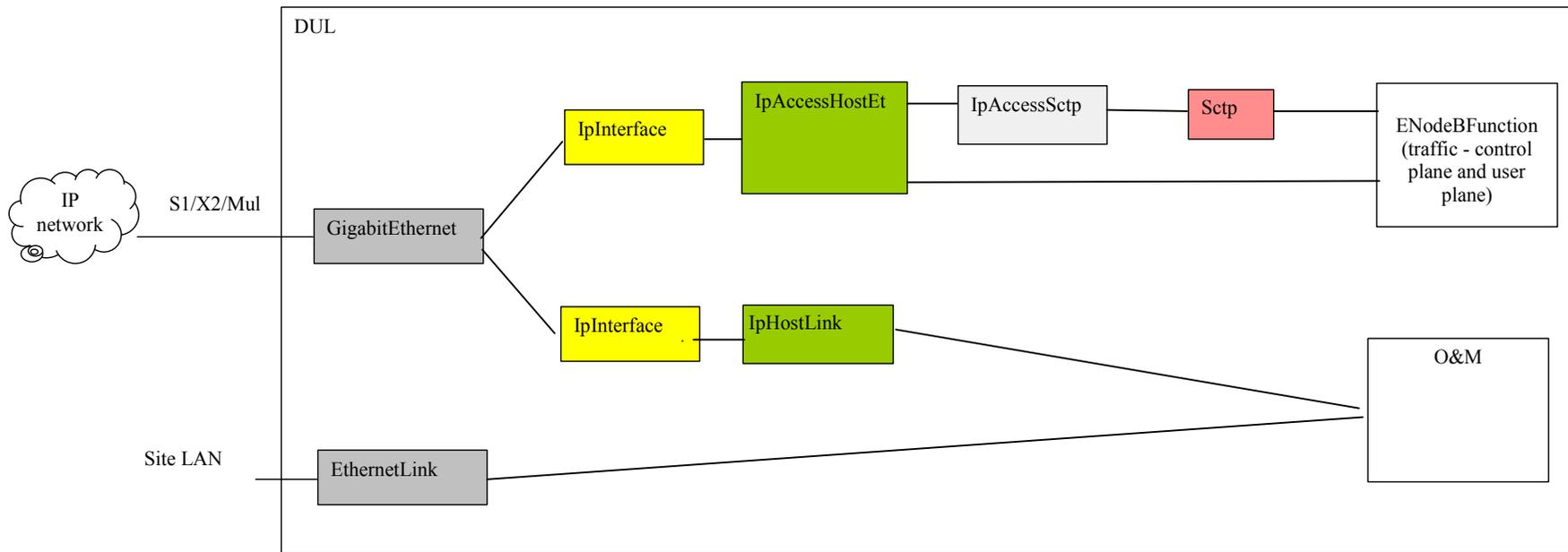

```
ENB302> stip

===================================================================================================
Board     Interface  Vid    Subnet          DefaultRouter  Rps    IRP  H  IpHosts
===================================================================================================
DUL2001   1-01-1     1026   10.62.7.0/24    (O) 10.62.7.1  false  1-1  1  Link=lh0
DUL2001   1-01-2     1027   10.62.8.0/24    (O) 10.62.8.1  false  1-1  1  Et=1-01-2
===================================================================================================
Total: 2 MOs


===================================================================================================
ET          Host  MOName  Lnh    Ntp  Fro  HostIp     Vid    HIRP  IpAccessHostPool/IpAccessSctp
```

```
========================================================================================================
DUL2001   Link=lh0   1         000100   -            10.62.7.11   1026   11-1
DUL2001   Et=1-01-2  1         000100   -            10.62.8.11   1027   11-1   1-01
========================================================================================================
Total: 2 MOs
```

Gen2:

```
MSRBSV2> momtl \.transport$
...<cut>..
ManagedElement[1],Transport[0-1],Ikev2PolicyProfile[0-1]
ManagedElement[1],Transport[0-1],IpsecProposalProfile[0-1]
ManagedElement[1],Transport[0-1],Router[0-8]
ManagedElement[1],Transport[0-1],Router[0-8],BfdProfile[0-64]
ManagedElement[1],Transport[0-1],Router[0-8],BfdSessionIPv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],DhcpRelayIPv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],DnsClient[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],AclIpv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],AclIpv4[0-],AclEntryIpv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],AclIpv6[0-]
ManagedElement[1],Transport[0-1],Router[0-8],AclIpv6[0-],AclEntryIpv6[0-]
ManagedElement[1],Transport[0-1],Router[0-8],IpsecTunnel[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],IpsecTunnel[0-1],Ikev2Session[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],IpsecTunnel[0-1],IpsecPolicy[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],InterfaceIPv4[0-256]
ManagedElement[1],Transport[0-1],Router[0-8],InterfaceIPv4[0-256],AddressIPv4[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],InterfaceIPv6[0-256]
ManagedElement[1],Transport[0-1],Router[0-8],InterfaceIPv6[0-256],AddressIPv6[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32],Area[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32],Area[0-1],Interface[0-]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32],Area[0-1],Nssa[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],Ospfv2[0-32],Area[0-1],Stub[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],RoutingPolicyIpv4[0-16]
ManagedElement[1],Transport[0-1],Router[0-8],RoutingPolicyIpv4[0-16],RoutingRuleIpv4[0-8]
ManagedElement[1],Transport[0-1],Router[0-8],RoutingPolicyIpv4[0-16],RoutingRuleIpv4[0-8],NextHop[1-2]
ManagedElement[1],Transport[0-1],Router[0-8],PeerIPv4[0-]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv4Static[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv4Static[0-1],Dst[0-]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv4Static[0-1],Dst[0-],NextHop[0-]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv6Static[0-1]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv6Static[0-1],Dst[0-]
ManagedElement[1],Transport[0-1],Router[0-8],RouteTableIPv6Static[0-1],Dst[0-],NextHop[0-]
ManagedElement[1],Transport[0-1],Router[0-8],TwampLightResponder[0-8]
ManagedElement[1],Transport[0-1],QosProfiles[1]
ManagedElement[1],Transport[0-1],QosProfiles[1],DscpPcpMapDefault[1]
ManagedElement[1],Transport[0-1],QosProfiles[1],DscpPcpMap[0-]



RBSG2> lpr router=


================================================================================
```

```
Proxy   MO
==================================================================================
10845   Transport=1,Router=OAM
10846   Transport=1,Router=OAM,DnsClient=1
10847   Transport=1,Router=OAM,DnsClient=1,DomainFilter=1
10848   Transport=1,Router=OAM,InterfaceIPv4=1
10849   Transport=1,Router=OAM,InterfaceIPv4=1,AddressIPv4=1
10850   Transport=1,Router=OAM,RouteTableIPv4Static=1
10851   Transport=1,Router=OAM,RouteTableIPv4Static=1,Dst=1
10852   Transport=1,Router=OAM,RouteTableIPv4Static=1,Dst=1,NextHop=1
10853   Transport=1,Router=vr_LTE
10854   Transport=1,Router=vr_LTE,InterfaceIPv4=2
10855   Transport=1,Router=vr_LTE,InterfaceIPv4=2,AddressIPv4=1
10856   Transport=1,Router=vr_LTE,RouteTableIPv4Static=1
10857   Transport=1,Router=vr_LTE,RouteTableIPv4Static=1,Dst=1
10858   Transport=1,Router=vr_LTE,RouteTableIPv4Static=1,Dst=1,NextHop=1
10859   Transport=1,Router=vr_LTE,TwampResponder=TN_A_4001
10860   Transport=1,Router=vr_LTE,TwampResponder=TN_A_4002
10861   Transport=1,Router=vr_LTE,TwampResponder=TN_A_4004
==================================================================================
Total: 17 MOs


RBSG2> get 10848 10849 10852


==========================================================================================
10848                              Transport=1,Router=OAM,InterfaceIPv4=1
==========================================================================================
aclEgress
aclIngress
arpTimeout                         300
availabilityStatus                 i[0] =
bfdProfile
bfdStaticRoutes                    0 (DISABLED)
egressQosMarking                   QosProfiles=1,DscpPcpMap=2
encapsulation                      VlanPort=Mul_VLAN
ingressQosMarking
interfaceIPv4Id                    1
loopback                           false
mtu                                1500
operationalState                   1 (ENABLED)
pcpArp                             1
reservedBy                         [0] =
routesHoldDownTimer
routingPolicyIngress
userLabel
==========================================================================================
10849                              Transport=1,Router=OAM,InterfaceIPv4=1,AddressIPv4=1
==========================================================================================
address                            10.33.102.14/23
addressIPv4Id                      1
configurationMode                  0 (MANUAL)
dhcpClientIdentifier
dhcpClientIdentifierType           0 (AUTOMATIC)
reservedBy                         [1] =
 >>> reservedBy = SystemFunctions=1,SysM=1,OamAccessPoint=1
usedAddress                        10.33.102.14/23
userLabel
```

```
=================================================================================
10852                              Transport=1,Router=OAM,RouteTableIPv4Static=1,Dst=1,NextHop=1
=================================================================================
address                            10.33.102.1
adminDistance                      1
bfdMonitoring                      false
discard                            false
nextHopId                          1
reference

=================================================================================
Total: 3 MOs
```

15.5 <u>Ethernet and IP operations with mcl/mcc</u>

15.5.1 <u>Gen1</u>

In Gen1, the Ethernet and IP trouble shooting can be done via COLI.

Example: to ping/traceroute from the O&M interface:

```
KIENB1327> ping

$ ping
usage: ping <destination host>
$

KIENB1327> traceroute

$ traceroute
usage: traceroute <destination host>
$
```

Example: to ping/traceroute from the traffice interface:

```
KIENB1327> iacrh

$ iacrh
Supported commands:
iacrh dumpconfig
iacrh traceroute6 -dst <destination ip> -src <source ip> [-m <maxhops> -w <waittime> -f <firsthop> -q <nqueries> -size <probe size> ]
iacrh ping6 -dst <destination ip> -src <source ip> [-n <count> -m <ttl> -i <interval> -W <waitTime> ]
iacrh traceroute -dst <destination ip> -src <source ip> [-m <maxhops> -w <waittime> -f <firsthop> -q <nqueries> -size <probe size> ]
iacrh ping -dst <destination ip> -src <source ip> [-n <count> -m <ttl> -i <interval> -W <waitTime> -s <packetsize> ]
iacrh ipif -froid <FRO identifier>
iacrh host -froid <FRO identifier>
dhcpclientrh all
$
```

15.5.2 Gen2

In Gen2, there are also some COLI commands for TN trouble-shooting but mostly the MO-Context COMCLI commands are used for certain transport operations like printing the routing table, ping, traceroute, etc
- mcl[d]: list of all the MO-context COMCLI commands. Type "h mcl" for info.
- mcc/lmcc: perform a MO-context COMCLI command. Allows to run transparent COMCLI commands on any given MO(s). Type "h mcc" for info.

Examples, mcl :

```
RBSG2> h mcl

***************************************************************************
- mcl[d] [<moClass-filter>]  [<command-filter>]
***************************************************************************
List MO-Context COMCLI commands.

List the available MO-Context COMCLI commands.

Examples:
List all MO-Context COMCLI commands
  >> mcl
List all MO-Context COMCLI commands available on MO class "Bridge"
  >> mcl bridg
List all MO-Context COMCLI commands matching the word "clear"
  >> mcl . clear
List only the MO-Context COMCLI commands without parameter description
  >> mcld

RBSG2> mcld

###############################################################################################################################
MO Context              Command                    Description
###############################################################################################################################
Bridge                  clear mac-table            This command clears the mac table.
Bridge                  show mac-table             This command shows L2 forwarding table in virtual router.
Ikev2Session            show ikesa                 This command shows Ikev2 SA information for a specified IKE session.
IpsecPolicy,Ikev2Session  show childsa             This command shows IpsecChild SA information for a given Ikev2Session/IpsecPolicy in
the Managed Element.
Ospfv2                  show ip ospf database      This command shows the link state database of the OSPFv2 instance navigated to.
Ospfv2                  show ip ospf interface     This command shows the OSPFv2 interface of the instance navigated to.
Ospfv2                  show ip ospf neighbor      This command shows OSPF neighbors for a given OSPFv2 object in the Managed Element.
Ospfv2                  show ip ospf route         This command shows OSPF routing table for specified instance.
Router                  arping <ip-address>        Ping destination on device interface by ARP packets, using source address source.
Router                  clear arp-cache            This command flushes dynamic IPv4 ARP entries.
Router                  clear nd-neighbor          This command flushes dynamic IPv6 Neighbor Cache entries.
Router                  ping <ip-address>          Implementation of ICMP ping.
Router                  ping6 <ip-address>         Implementation of ICMP ping6.
Router                  show arp-cache             This command shows the ARP cache for the given Router MO.
Router                  show icmp counters         This command shows the ICMP counters for the given Router MO.
Router                  show nd-neighbor           This command shows the NDP neighbor cache for the given Router MO.
Router                  tracepath <ip-address>     This command is a diagnostic tool for displaying the route (path) along with MTU
discovery across an Internet Protocol (IP) network.
Router                  tracepath6 <ip-address>    This command is a diagnostic tool for displaying the route (path) along with MTU
discovery across an Internet Protocol (IP) network.
```

```
Router                    traceroute <ip-address>        This command is a diagnostic tool for displaying the route (path) and measuring
transit delays of packets across an Internet Protocol (IP) network.
Router                    traceroute6 <ip-address>       This command is a diagnostic tool for displaying the route (path) and measuring
transit delays of packets across an Internet Protocol (IP) network.
Transport                 show port details [<tn_port>]  This command shows port information. (Argument values: TN_A|TN_B|TN_C|TN_D|TN_E|TN_F|
TN_G|TN_H|TN_J|TN_K|TN_L|TN_M|TN_N)
Transport,Router          show ip interface              This command shows IP interface related information.
Transport,Router          show ip route                  This command shows route-related information for a given Router in the Managed
Element.

RBSG2> mcl bridge

###############################################################################################################################
MO Context                Command                        Description
###############################################################################################################################
Bridge                    clear mac-table                This command clears the mac table.
-------------------------------------------------------------------------------------------------------------------------------
--port <string>                  Clear mac entries on this ethernet port
--vlan <string>                  Clear mac entries on this vlan
*******************************************************************************************************************************
Bridge                    show mac-table                 This command shows L2 forwarding table in virtual router.
-------------------------------------------------------------------------------------------------------------------------------
--port <string>                  List mac entries filtered by this ethernet port
--vlan <string>                  List mac entries filtered by this vlan port
*******************************************************************************************************************************

RBSG2> mcl . clear

###############################################################################################################################
MO Context                Command                        Description
###############################################################################################################################
Bridge                    clear mac-table                This command clears the mac table.
-------------------------------------------------------------------------------------------------------------------------------
--port <string>                  Clear mac entries on this ethernet port
--vlan <string>                  Clear mac entries on this vlan
*******************************************************************************************************************************
Router                    clear arp-cache                This command flushes dynamic IPv4 ARP entries.
-------------------------------------------------------------------------------------------------------------------------------
--to <ipv4addr>                  Deletes the entry with the given IPv4 address
--if <string>                    Deletes the entries for the given InterfaceIPv4 MO LDN
*******************************************************************************************************************************
Router                    clear nd-neighbor              This command flushes dynamic IPv6 Neighbor Cache entries.
-------------------------------------------------------------------------------------------------------------------------------
--to <string>                    Deletes the entry with the given IPv6 address
--if <string>                    Deletes the entries for the given InterfaceIPv6 MO LDN
*******************************************************************************************************************************

RBSG2> mcld . show

###############################################################################################################################
MO Context                Command                        Description
###############################################################################################################################
Bridge                    show mac-table                 This command shows L2 forwarding table in virtual router.
Ikev2Session              show ikesa                     This command shows Ikev2 SA information for a specified IKE session.
IpsecPolicy,Ikev2Session  show childsa                   This command shows IpsecChild SA information for a given Ikev2Session/IpsecPolicy in
the Managed Element.
Ospfv2                    show ip ospf database          This command shows the link state database of the OSPFv2 instance navigated to.
Ospfv2                    show ip ospf interface         This command shows the OSPFv2 interface of the instance navigated to.
```

```
Ospfv2                     show ip ospf neighbor       This command shows OSPF neighbors for a given OSPFv2 object in the Managed Element.
Ospfv2                     show ip ospf route          This command shows OSPF routing table for specified instance.
Router                     show arp-cache              This command shows the ARP cache for the given Router MO.
Router                     show icmp counters          This command shows the ICMP counters for the given Router MO.
Router                     show nd-neighbor            This command shows the NDP neighbor cache for the given Router MO.
Transport                  show port details [<tn_port>]  This command shows port information. (Argument values: TN_A|TN_B|TN_C|TN_D|TN_E|TN_F|
TN_G|TN_H|TN_J|TN_K|TN_L|TN_M|TN_N)
Transport,Router           show ip interface           This command shows IP interface related information.
Transport,Router           show ip route               This command shows route-related information for a given Router in the Managed
Element.
```

Examples, mcc :

```
RBSG2> h mcc

***************************************************************************************
mcc/lmcc <moGroup>|<moFilter>|<proxy(s)>  <comcli commands(s)> [|<unix-cmds>]
***************************************************************************************
Execute MO Context-sensitive COMCLI commands.

Execute a COMCLI command from within a specific MO.

Examples:
List all COMCLI commands applicable to all Router MOs and their children (the command ? or \t can be used to list COMCLI commands)
  >> lmcc router= ?
  >> lmcc router= \t
Print more help on the ping command in the MO InterfaceIPv4=TNA
  >> mcc interfaceipv4=tna ping ?
Run the ping command from all AddressIPv4 MOs and pipe the output through grep
  >> mcc addressip ping --count 3 10.18.30.2  | grep transmitted


RBSG2> mcld . show

#####################################################################################################################################
MO Context              Command                  Description
#####################################################################################################################################
Bridge                  show mac-table           This command shows L2 forwarding table in virtual router.
Ikev2Session            show ikesa               This command shows Ikev2 SA information for a specified IKE session.
IpsecPolicy,Ikev2Session  show childsa           This command shows IpsecChild SA information for a given Ikev2Session/IpsecPolicy in
the Managed Element.
Ospfv2                  show ip ospf database    This command shows the link state database of the OSPFv2 instance navigated to.
Ospfv2                  show ip ospf interface   This command shows the OSPFv2 interface of the instance navigated to.
Ospfv2                  show ip ospf neighbor    This command shows OSPF neighbors for a given OSPFv2 object in the Managed Element.
Ospfv2                  show ip ospf route       This command shows OSPF routing table for specified instance.
Router                  show arp-cache           This command shows the ARP cache for the given Router MO.
Router                  show icmp counters       This command shows the ICMP counters for the given Router MO.
Router                  show nd-neighbor         This command shows the NDP neighbor cache for the given Router MO.
Transport               show port details [<tn_port>]  This command shows port information. (Argument values: TN_A|TN_B|TN_C|TN_D|TN_E|TN_F|
TN_G|TN_H|TN_J|TN_K|TN_L|TN_M|TN_N)
Transport,Router        show ip interface        This command shows IP interface related information.
Transport,Router        show ip route            This command shows route-related information for a given Router in the Managed
Element.

RBSG2>
```

```
RBSG2> mcc router= show ip route


==========================================================================================================
  Id   MO                                                       Command             Result
==========================================================================================================
10845  Router=OAM                                               show ip route
>ManagedElement=VIC_AADP15_ARDEER_WEST_533354,Transport=1,Router=OAM
>show ip route

Codes: K - kernel, C - connected, S - static
       O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       R - RIP, RNG - RIPNG
       > - selected route, * - FIB route, p - stale info

Type       Destination                                     Next Hop              Adm-Dist  Metric  Port       VLAN

S    >*    default                                         10.33.102.1           1         0       TN_B       4003
C    >*    10.33.102.0/23                                                        0         0       TN_B       4003
C    >*    127.0.0.0/8                                                           0         0       lo
C    >*    ::1                                                                   0         0       lo


10853  Router=vr_LTE                                            show ip route
>ManagedElement=VIC_AADP15_ARDEER_WEST_533354,Transport=1,Router=vr_LTE
>show ip route

Codes: K - kernel, C - connected, S - static
       O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       R - RIP, RNG - RIPNG
       > - selected route, * - FIB route, p - stale info

Type       Destination                                     Next Hop              Adm-Dist  Metric  Port       VLAN

S    >*    default                                         173.2.240.1           1         0       TN_B       4002
C    >*    127.0.0.0/8                                                           0         0       lo
C    >*    173.2.240.0/23                                                        0         0       TN_B       4002
C    >*    ::1                                                                   0         0       lo
==========================================================================================================
Total: 2 MOs


RBSG2> mcc transport=1 show port details

Run COMCLI command(s) on following 1 MOs ?
==========================================================================================================
   403  Transport=1
==========================================================================================================
Run COMCLI commands(s) on 1 MOs. Are you Sure [y/n] ? y


==========================================================================================================
  Id   MO                                                       Command             Result
==========================================================================================================
   403  Transport=1                                             show port details
>ManagedElement=TCU03_61,Transport=1
```

```
>show port details
Port               : TN_A
  Port enabled     : NO
  Link state       : DOWN
  Port type        : SFP
  Loss of signals  : 0
  Configuration
    Auto-negotiation : ON
    Speed/Duplex   : [1G FULL]
    Master/Slave   : [N/A]
  State
    Speed/Duplex   :
    Fault          : 0x00000000
    Loss of Signal : NO
  Capabilities
    Auto negotiation : [1G FULL]
    Fixed mode     : [1G FULL] | [10G FULL]
    Link Speed     : [1G FULL] | [10G FULL]
    Master/Slave   :
  SFP module present : NO
  MAC address      : 74:c9:9a:a7:01:a0

..<cut>..

Port               : TN_L
  Port enabled     : YES
  Link state       : UP
  Port type        : RJ45
  Loss of signals  : 0
  Configuration
    Auto-negotiation : ON
    Speed/Duplex   : [1G FULL]
    Master/Slave   : [AUTO]
  State
    Speed/Duplex   : [1G FULL]
    Fault          : 0x00000000
    Loss of Signal : NO
  Capabilities
    Auto negotiation : [100M FULL] | [1G FULL]
    Fixed mode     : [100M FULL] | [1G FULL]
    Link Speed     : [100M FULL] | [1G FULL]
    Master/Slave   : [AUTO] | [MASTER] | [SLAVE]
  SFP module present : NO
  MAC address      : 74:c9:9a:a7:01:aa

=====================================================================================
Total: 1 MOs


RBSG2> mcc router=1 show arp-cache

Run COMCLI command(s) on following 1 MOs ?
=======================================================================
  428  Transport=1,Router=1
=======================================================================
Run COMCLI commands(s) on 1 MOs. Are you Sure [y/n] ? y
```

```
================================================================================
  Id    MO                                               Command            Result
================================================================================
  428   Router=1                                         show arp-cache
>ManagedElement=TCU03_61,Transport=1,Router=1
>show arp-cache
IpAddress        Device                   LinkLayerAddress   State
10.90.61.225     EthernetPort=TN_L.3617   10:f3:11:37:b8:11  REACHABLE
Total arp cache entries: 1
================================================================================
Total: 1 MOs


RBSG2> mcl . ping

##################################################################################################################
MO Context                    Command                   Description
##################################################################################################################
Router                        arping <ip-address>       Ping destination on device interface by ARP packets, using source address source.
------------------------------------------------------------------------------------------------------------------
--quit                                  Quit on first reply
--quiet                                 Be quiet
--broadcasting                          Keep broadcasting(do not go unicast)
--duplicate                             Duplicate address detection mode
--unsolicited                           Unsolicited ARP mode, update your neighbors
--ARP                                   ARP answer mode, update your neighbors
--count <integer>                       How many packets to send
--timeout <integer>                     How long to wait for a reply
--source <string>                       Source IPv4 Address (LDN of an AddressIPv4 MO)
******************************************************************************************************************
Router                        ping <ip-address>         Implementation of ICMP ping.
------------------------------------------------------------------------------------------------------------------
--broadcast                             Allow broadcast ping
--count <string>                        Number of packets to be sent (integer greater than 0)
--interval <string>                     Interval in seconds between packets (0.2-2147483)
--preload <integer>                     Number of packets without reply (maximum is 3)
--pattern <string>                      Padding bytes (up to 16)
--packetsize <string>                   Number of bytes to be sent (default is 56) (0-65507)
--ttl <string>                          IP Time to Live (1-255)
--deadline <string>                     Timeout (in seconds)
--interface <string>                    Source IPv4 Address (LDN of an AddressIPv4 MO)
--MtuStrategy <do|want|dont>            Path MTU Discovery Strategy
--Tos <string>                          Set Quality of Service related bits (0-255)
--sndbuf <integer>                      Set socket sndbuf
--timeout <string>                      Time to wait for response (in seconds) (0.0-2147.0)
******************************************************************************************************************
Router                        ping6 <ip-address>        Implementation of ICMP ping6.
------------------------------------------------------------------------------------------------------------------
--broadcast                             Allow broadcast ping
--count <string>                        Number of packets to be sent (integer greater than 0)
--interval <string>                     Interval in seconds between packets (0.2-2147483)
--preload <integer>                     Number of packets without reply (maximum is 3)
--pattern <string>                      Padding bytes (up to 16)
--packetsize <string>                   Number of bytes to be sent (default is 56) (0-65507)
--ttl <string>                          IP Time to Live (1-255)
--deadline <string>                     Timeout (in seconds)
--interface <string>                    Source IPv6 Address (LDN of an AddressIPv6 MO)
--MtuStrategy <do|want|dont>            Path MTU Discovery Strategy
--Tclass <string>                       Set Quality of Service related bits (0x0-0xff)
```

```
--sndbuf <integer>              Set socket sndbuf
--timeout <string>              Time to wait for response (in seconds) (0.0-2147.0)
************************************************************************************************************
```

<u>Example, ping the moshell workstation</u>:

```
RBS33> pr router=


======================================================================================
Proxy  MO
======================================================================================
  6946  Transport=1,Router=IUB
  6952  Transport=1,Router=OaM
======================================================================================
Total: 2 MOs

RBS33> mcc router=oam ping --count 2 --packetsize 1000 $ws_ip

Run COMCLI command(s) on following 1 MOs ?
======================================================================================
  6952  Transport=1,Router=OaM
======================================================================================
Run COMCLI commands(s) on 1 MOs. Are you Sure [y/n] ? y


===================================================================================================
  Id   MO                                                 Command                 Result
===================================================================================================
  6952  Router=OaM                                        ping --count 2 --packetsize 1000 150.132.6.28
>ManagedElement=1,Transport=1,Router=OaM
>ping --count 2 --packetsize 1000 150.132.6.28
PING 150.132.6.28 (150.132.6.28) 1000(1028) bytes of data.
1008 bytes from 150.132.6.28: icmp_seq=1 ttl=60 time=0.509 ms
1008 bytes from 150.132.6.28: icmp_seq=2 ttl=60 time=0.629 ms

--- 150.132.6.28 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 0.509/0.569/0.629/0.060 ms
===================================================================================================
Total: 1 MOs
```

<u>Example, ping the RNC</u>:

```
RBS33> pr router=


======================================================================================
Proxy  MO
======================================================================================
  6946  Transport=1,Router=IUB
  6952  Transport=1,Router=OaM
======================================================================================
Total: 2 MOs

RBS33> hget sctpassociation= remoteip
```

```
================================================================================================
MO                                                        remoteIpAddress
================================================================================================
SctpEndpoint=C-NBAP,SctpAssociation=65025-10.72.131.130 s[2] = 10.72.131.130 10.72.131.131
SctpEndpoint=D-NBAP,SctpAssociation=65027-10.72.131.130 s[2] = 10.72.131.130 10.72.131.131
================================================================================================
Total: 2 MOs



RBS33> mcc router=iub ping --count 2 --packetsize 1000 10.72.131.130


==============================================================================
 6946  Transport=1,Router=IUB
==============================================================================
Run COMCLI commands(s) on 1 MOs. Are you Sure [y/n] ? y


=================================================================================================
  Id   MO                                                 Command               Result
=================================================================================================
 6946  Router=IUB                                         ping --count 2 --packetsize 1000 10.72.131.130
>ManagedElement=1,Transport=1,Router=IUB
>ping --count 2 --packetsize 1000 10.72.131.130
PING 10.72.131.130 (10.72.131.130) 1000(1028) bytes of data.
1008 bytes from 10.72.131.130: icmp_seq=1 ttl=252 time=0.411 ms
1008 bytes from 10.72.131.130: icmp_seq=2 ttl=252 time=0.386 ms

--- 10.72.131.130 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
rtt min/avg/max/mdev = 0.386/0.398/0.411/0.023 ms
=================================================================================================
Total: 1 MOs
```

Example, ping the MME:

```
ENB66> hget termpointtomme=mme_01 ipaddress


=========================================================================================
MO                              ipAddress1      ipAddress2 usedIpAddress
=========================================================================================
TermPointToMme=MME_010064193109 10.64.193.109   0.0.0.0     10.64.193.109
TermPointToMme=MME_010064193113 10.64.193.113   0.0.0.0     10.64.193.113
=========================================================================================
Total: 2 MOs

ENB66> hget sctpassociation= remoteip


=========================================================================================
```

```
MO                                                              remoteIpAddress
=================================================================================================================
SctpEndpoint=1,SctpAssociation=36412-10.64.193.109 s[2] = 10.64.193.109 10.64.193.110
SctpEndpoint=1,SctpAssociation=36412-10.64.193.113 s[2] = 10.64.193.113 10.64.193.114
=================================================================================================================
Total: 2 MOs


ENB66> pr router=


=================================================================================================================
Proxy   MO
=================================================================================================================
19558   Transport=1,Router=OaM
19565   Transport=1,Router=UP
=================================================================================================================
Total: 2 MOs




ENB66> mcc router=up ping --count 2 --packetsize 1000 10.64.193.109


Run COMCLI command(s) on following 1 MOs ?
=================================================================================================================
19565   Transport=1,Router=UP
=================================================================================================================
Run COMCLI commands(s) on 1 MOs. Are you Sure [y/n] ? y


==================================================================================================================
 Id    MO                                                      Command                  Result
==================================================================================================================
19565   Router=UP                                             ping --count 2 --packetsize 1000 10.64.193.109
>ManagedElement=1,Transport=1,Router=UP
>ping --count 2 --packetsize 1000 10.64.193.109
PING 10.64.193.109 (10.64.193.109) 1000(1028) bytes of data.
1008 bytes from 10.64.193.109: icmp_seq=1 ttl=62 time=5.70 ms
1008 bytes from 10.64.193.109: icmp_seq=2 ttl=62 time=5.65 ms

--- 10.64.193.109 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 5.653/5.679/5.706/0.079 ms
==================================================================================================================
Total: 1 MOs
```

15.6 SCTP

Gen1

```
kienb4005> stip

...<cut>..


==================================================================================================================
```

```
LocalIp:Port              RemoteIp:Port           StandbyRemoteIp  TSHP  Assoc  TermPoint
=============================================================================================================
10.62.11.15:36422         10.62.11.16:36422                        1111     5   ENB=4006
10.62.11.15:36422         10.62.8.14:36422                         1111    10   ENB=kienb3004
10.62.11.15:36422         10.64.193.81:36412      10.64.193.82     1111     1   Mme=MME010064193081
10.62.11.15:36422         10.64.193.91:36412      10.64.193.92     1111     4   Mme=MME010064193091
=============================================================================================================
```

Gen2

```
MSRBSV2> momtl \.transport$
...<cut>....
ManagedElement[1],Transport[0-1],SctpEndpoint[0-]
ManagedElement[1],Transport[0-1],SctpEndpoint[0-],SctpAssociation[0-]
ManagedElement[1],Transport[0-1],SctpProfile[0-]
ManagedElement[1],Transport[0-1],Sctp[0-1]
```

Printing SCTP associations on Iub

```
MSRBSV2> lhgetm iub= state|sctp


=============================================================================================================
MO                    operationalState sctpEndpointRef
=============================================================================================================
Iub=1,NbapCommon=1    1 (ENABLED)       SctpEndpoint=C-NBAP
Iub=1,NbapDedicated=1 1 (ENABLED)       SctpEndpoint=D-NBAP
=============================================================================================================
Total: 2 MOs


Added 2 MOs to group: hget_group

MSRBSV2> hget sctpass state|port|primary


===============================================================================================================================================
MO                                               associationState localPortNumber localPrimaryAddress remotePortNumber remotePrimaryAddress
===============================================================================================================================================
SctpEndpoint=C-NBAP,SctpAssociation=2-10.204.210.3 3 (ESTABLISHED)  5113            10.204.210.132      2                10.204.210.3
SctpEndpoint=D-NBAP,SctpAssociation=4-10.204.210.3 3 (ESTABLISHED)  5114            10.204.210.132      4                10.204.210.3
===============================================================================================================================================
Total: 2 MOs
```

Printing SCTP associations on S1/X2

```
MSRBSV2> hgetm TermPoint usedip|admin|opera


=============================================================================================================
```

```
MO                                                                        administrativeState operationalState usedIpAddress
================================================================================================================================
EUtraNetwork=1,ExternalENodeBFunction=4505-75779,TermPointToENB=4505-75779 1 (UNLOCKED)       1 (ENABLED)      38.190.43.79
EUtraNetwork=1,ExternalENodeBFunction=4505-75788,TermPointToENB=4505-75788 1 (UNLOCKED)       1 (ENABLED)      38.184.175.31
TermPointToMme=DS_MME_62                                                    1 (UNLOCKED)       1 (ENABLED)      38.107.60.60
TermPointToMme=DS_MME_63                                                    1 (UNLOCKED)       1 (ENABLED)      38.107.60.63
TermPointToMme=TP_MME_55                                                    1 (UNLOCKED)       1 (ENABLED)      38.187.60.12
TermPointToMme=TP_MME_64                                                    1 (UNLOCKED)       1 (ENABLED)      38.107.60.101
================================================================================================================================
Total: 6 MOs


MSRBSV2> hget sctpass state|port|primary


================================================================================================================================
MO                                             associationState localPortNumber localPrimaryAddress remotePortNumber remotePrimaryAddress
================================================================================================================================
SctpEndpoint=1,SctpAssociation=36412-38.107.60.101 3 (ESTABLISHED) 36422        38.190.43.83        36412            38.107.60.101
SctpEndpoint=1,SctpAssociation=36412-38.107.60.60  3 (ESTABLISHED) 36422        38.190.43.83        36412            38.107.60.60
SctpEndpoint=1,SctpAssociation=36412-38.107.60.63  3 (ESTABLISHED) 36422        38.190.43.83        36412            38.107.60.63
SctpEndpoint=1,SctpAssociation=36412-38.187.60.12  3 (ESTABLISHED) 36422        38.190.43.83        36412            38.187.60.12
SctpEndpoint=1,SctpAssociation=36422-38.184.175.31 3 (ESTABLISHED) 36422        38.190.43.83        36422            38.184.175.31
SctpEndpoint=1,SctpAssociation=36422-38.190.43.75  0 (CLOSED)      36422        38.190.43.83        36422            38.190.43.75
SctpEndpoint=1,SctpAssociation=36422-38.190.43.79  3 (ESTABLISHED) 36422        38.190.43.83        36422            38.190.43.79
================================================================================================================================
Total: 7 MOs
```

SCTP COLI printouts

Gen1

```
ENB512> ? | grep sctp


sctp_config      prints some SCTP-ROF configuration data
sctpadm          cmd sctpadm lists info about all Sctp Associations in SCTP ADM
sctpadm_config   cmd sctpadm_config lists some configuration data in SCTP ADM.
sctpadm_info     cmd sctpadm_info lists all process info in SCTP ADM
sctpadmrofcmd    cmd sctpadmrofcmd send trace settings to user plane.
sctphost         Prints some SCTP-ROF configuration data, statistical information and lists association or endpoint info in SCTP Host.
sctphost_info    cmd sctphost_info lists association or endpoint info in SCTP HOST
sctphost_stat    cmd sctphost_stat prints some statistical information
sctphosttrace    Configure log filtering and dumping internal log.


ENB512> sctphost_info -assoc -all


170629-15:07:56 10.220.72.112 17.0g ERBS_NODE_MODEL_J_1_2_COMPLETE stopfile=/tmp/28940
$ sctphost_info -assoc -all


sctphost - START.
|---------------------------------------------------------|
|--------------------- SCTP HOST --------------------|
```

```
|RpuId:             6
|SctpInstId:        0
|Base State:        SCTP_STARTED
|Host State:        A|C|R|X|IA
|Non-M3UA clients: 1
|Top 5 profiles:   No profiles configured
|Host type:        CBM
|---------------- SCTP ASSOCIATION   5 ----------------|
|------------------------------------------------------|
| state:                    ESTABLISHED
| localPort:                36422
| remotePort:               36412
| dscp:                     24
| ulpKey:                   0x00000007
| switchbackThreshold:      1
| recentSuccessfulHBs:      0
| amr:                      20
| rtxCounter:               0
| mBufferUsed:              0 B(0%)
| rwndFree:                 16384 B(100%)
| numOfPrimaryPathChange:0
| sctpProfileId:            0
|----------------Path Information---------------------|
|  10.218.210.140 - 10.219.31.16    | preferred and active primary | last used | active   (+) | pmr: 0 | sRTT:   23 ms | first data bit: off
|  10.218.210.140 - 10.219.31.17    |                              |           | active   (+) | pmr: 0 | sRTT:   10 ms | first data bit: off


...<cut>...
```

Gen2

```
MSRBS> sctp

coli>/tn/sctp
Usage :
    sctp -all
    sctp [sctpInstId#] -assoc [<<associd>[-<associd>] | -all | -unreach> [-list | -stat]]
    sctp [sctpInstId#] -config
    sctp [sctpInstId#] -ep [<ldn1> [<ldn2> ...] | <epId1> [<epId2> ...] | -all]
    sctp [sctpInstId#] -errcodes [-day]
    sctp [sctpInstId#] -ext [-stat | <client_identity> | -undef]
    sctp [sctpInstId#] -profile [[<ldn1 ldn2 ...>] | -all>]
    sctp [sctpInstId#] -stat
Command Description
 o. sctpInstId# : the identifier of SCTP server (0 ~ 7)
coli>

MSRBS> sctp -all

coli>/tn/sctp -all
sctp - START.
|------------------------------------------------------|
|-------------------- SCTP SERVER ------------------|
|SctpInstId:        0
```

```
|itcMailboxId:      72351746
|Base State:        SCTP_STARTED
|State:             A|C|R|X
|Num of clients:    1
|-- sctp -ext : --|
|--------------- Current information about clients ---------------|
| Client 0 (pv1): clientId[1], pid[0x4d00015]
| Common SCTP events ---------------------------------------------|
 Fri Mar 11 10:57:14 2016  InitiateServiceReq  clientId[1] signalRevision[1] PVs[1 0 0] needReply[1]
...<cut>...


#LOGLDIPA = localhost:6999
# This parameter specifies the max time between emptying the
# internal log buffer. Time in 0.1 s. Default = 100 (10 s)
#LOGFLUSHTIME = 100
# This parameter specifies whether to use Management
# logging or not, and
# also tells which id Management has. If LOGALARM tag
# is present in the cnf
# file, Management logging is used, otherwise not.
LOGALARM = MGMT
############### End of Logging section ##############
#MSGEND
---- END----
coli>
```

16 Tracing

- **http://lte-plm.rnd.ki.sw.ericsson.se/lte_trsh_wiki/G2P/index.php?n=G2P.TraceAndError**

- **http://airlink.internal.ericsson.com/ltetutorial.php**
- **http://airlink.internal.ericsson.com/lteobservability.php**
- **http://airlink.internal.ericsson.com/ltebaseband.php**

16.1 te/fte commands

16.1.1 Command help

- **te is a coli command available on all processors via lhsh (MP, baseband, XMU/RU)**
- **fte is a moshell wrapper command to provide some extended functionality to the "te" command**

"te" help (Gen1)

```
ENBG1> man te
```

```
$ man te
Name
        te - manage tracing


Synopsis
        te <subcmd> <operands>


Description
        This  command manages the Trace and Error function. The subcommands are
        described  in  separate  man  pages  that can be read using command man
        te_<subcmd> .


Subcommands
        alt         Operate on alternate trace group setting.


        config
                Configure saved traced groups.


        default
                Set trace groups to default.


        disable
                Disable trace groups.


        enable
                Enable trace groups.
...<cut>....
$


ENBG1> man te_enable


$ man te_enable
te enable(1)                                                      te enable(1)


Name
        te  enable  -  enable  trace groups or generation of a Post Mortem Dump
        (PMD)


Synopsis
        te enable <group> ... <item>


        te enable restart <group> ... <item> [<string>]


...<cut>...


$
```

"te" help (Gen2)

```
ENBG2> te

coli>/diagm/te
Shell command to manage the T&E session. The te command interacts with
trace points created via LTTng and with traces created via TRI interface.
Generated traces are saved in buffers, separate buffers for each CPU and
user group of program generating the trace. The traces are displayed from
all buffers and printed in chronological order. Each of the buffers are
wrap around buffers, which means that oldest traces will disappear when
respective buffer is full.
Usage: te <cmd> <param> ...
Commands <cmd>:
    enable <group/event> ... [<process/provider>]
        Enable trace groups/LTTng events.
    disable <group/event> .. [<process/provider>]
        Disable trace groups/LTTng events.
    status [-restart|-preset|-u] [<process/provider>] [-l <program>]
        Display tracing status.
        '-l' lists registered LTTng events for the specifed program.
        '-restart' prints the saved Preset list.
        '-preset'  prints the Preset list.
        '-u'   prints the available user groups to use when reading T&E.
    default [-preset|-restart][<process/provider>|'*']
        Set trace groups/LTTng events back to default.
        '-restart' removes all the saved preset list.
...<cut>....
coli>
```

"fte" help

```
ENB> h fte

*******************************************************************************
fte <te_command> [<trace-groups>|all] [<string>] [|<unix-cmds>]
*******************************************************************************
Filtered te (trace and error) command.


This command is a wrapper for the COLI commands "te" or "bbte" and works in two ways:
 - fte s [all] : to print trace status.
Without the option "all", only the trace objects and processes who have additional trace conditions are shown (supercedes "cabe" command).
With option "all", all traces objects and processes are shown, even those whose trace conditions are default. To filter this printout, pipe it
to "grep".
 - fte <subcommand> [<trace-groups>|all] [<string>]
Any "te" subcommand can be specified, e.g. "e" (enable), "save", "config", "default", "preset", "default", etc.
The string is matched against all processes and trace objects in that board and a list of te commands are run against every matching process.
The pattern matching follows regular expression syntax and is non-case sensitive.


Examples:
  - List all non-default trace conditions in all boards of the node
```

```
>> lh all fte s
  - List all trace conditions in boards that belong to the board-group "mp" and pipe the output to grep lines matching the word ose
>> lh mp fte s all | grep -i ose
  - Enable all traces on processes and trace objects that match the string "dsp.*meas" on board 000800
>> lhsh 000800 fte e all dsp.*meas
  - Enable and save bus_send and bus_receive on trace objects and processes matching the string nbap|rrc|ranap on all boards of board group
"mod"
>> lh mod fte config -run bus_send bus_receive rrc|nbap|ranap
  - Enable all traces on MSRBS BB processors for trace objects whose name matches "hspa"
>> lh gcpu fte e all hspa
```

16.1.2 **Command usage**

Print the contents of the T&E (Trace&Error) log

```
$ te log read
[2008-06-04 07:06:54.964] sshd_handler_150.236.178.94:2190 packet.c:926 INFO:Connection closed by 150.236.178.94
[2008-06-04 11:20:47.000] Sys_OMCSF_teGlobal te_global.c:2050 INFO:Process not found: NBAP
[2008-06-04 11:35:05.272] Osa_sysmgr_proc sysmgr.c:4979 INFO:Node uptime 3 days
[2008-06-04 11:35:29.692] TargetMonitor_router_proc te_monitor_router_proc.c:212 INFO:Starting up a new Trace & Error Target Monitor Router
[2008-06-04 11:35:29.692] TargetMonitor_router_proc te_monitor_router_proc.c:212 INFO:Starting up a new
[2008-06-04 11:37:20.740] TargetMonitor_router_proc te_monitor_router_proc.c:111 INFO:Target monitor router process 0x16306e2 is being terminat
```

Date | Time | The path of the source code file, relative to the directory of the user who compiled the code. | Trace group | Trace printout

[2004-06-30 13:28:36.683] dcsSchTopC   ../src/DcsSchTopC.cpp:447   INFO: dcsSchTopC incarnated on physical thread

Name of the process executing at the time of the printout.

The line in the source code file holding the trace printout
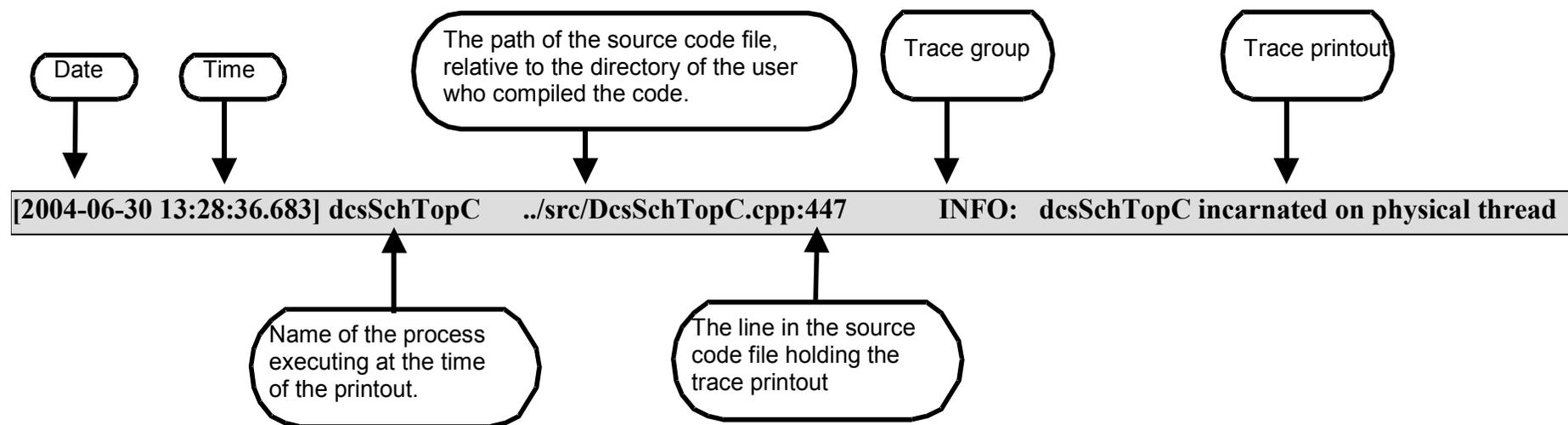
To read only the last xx seconds of the trace log, specify the number of seconds at the end of the command, eg:

```
RBS33> te log read 30
....
```

Check what trace groups are enabled on each process or trace object

Trace objects are usually in all caps, while processes are usually in mix of uppercase and lowercase

Default trace groups:
- **info**: Used for tracing informational messages. The intention is to use it only for important events, e.g. during a system start to generate some sort of start report.
- **error**: This primitive is used for tracing errors.

Also **check**, **interface**, and **object** are default but not used much.

Non-default trace groups:
- **bus_send, bus_receive**: messages sent and received on external interfaces
- **enter**: Used for tracing a call to a function.
- **return**: Used for tracing a return from a function.
- **rec_sig**: Used for tracing reception of a signal.
- **send_sig**: Used for tracing sending of a signal.
- **param**: This primitive is used for logging of formatted parameters and other values that can be presented as ASCII.
- **state_change**: Used for tracing state changes on a process level.
- **trace1 to trace9**: various purposes

```
$ te s
     pid name                              enabled groups
00000081 ns_main                           check error info interface object
00000083 ose_ns                            check error info interface object
000000f3 GOAM_MO_HANDLER                   check error info interface object
000000f6 GOAM_CG_HANDLER                   check error info interface object
000000a1 CaptHook                          check error info interface object
000000eb CaptHook                          check error info interface object
00000159 CaptHook                          check error info interface object
000000a2 ncadriver                         check error info interface object
000000a7 GSC_INIT                          check error info interface object
00000127 GSC_SECTOR_FACTORY                check error info interface object
       - hwim                              check error info interface object
       - hwim                              check error info interface object
       - ncSfpMgr                          check error info interface object
       - ncSfpOmF                          check error info interface object
       - ncSfpMoF                          check error info interface object
       - ncSfpHwiClient                    check error info interface object
       - ulSpectrumAnalyzerCtrlSwU         check error info interface object
...<cut>...
       - LTE_EXCEPTION                     check error enter return info trace1 trace2 trace3 trace4 trace5 trace6 trace7 trace8 trace9
state_change bus_send bus_receive rec_sig send_sig param interface object user1 user2 user3 user4
       - Ft_S1AP_ASN                       check error info bus_send bus_receive interface object
       - Ft_X2AP_ASN                       check error info bus_send bus_receive interface object
       - Ft_RRC_ASN                        check error info bus_send bus_receive interface object
       - Ft_M3AP_ASN                       check error info interface object
```

Check what trace groups are saved on each process or trace object

```
$ te s -restart
     pid name               enabled groups
       - LTE_EXCEPTION       check error enter return info trace1 trace2 trace3 trace4 trace5 trace6 trace7 trace8 trace9 state_change bus_send
bus_receive rec_sig send_sig param interface object user1 user2 user3 user4
       - Ft_LTE_EXCEPTION    check error enter return info trace1 trace2 trace3 trace4 trace5 trace6 trace7 trace8 trace9 state_change bus_send
bus_receive rec_sig send_sig param interface object user1 user2 user3 user4
       - Ft_S1AP_ASN         check error info bus_send bus_receive interface object
       - Ft_X2AP_ASN         check error info bus_send bus_receive interface object
       - Ft_RRC_ASN          check error info bus_send bus_receive interface object
```

Check what non-default trace groups are enabled and/or saved on all processes or trace objects

```
ENB> fte s


Process                           Status    AddedTraceConditions
LTE_EXCEPTION                     ena&saved  all
Ft_LTE_EXCEPTION                  ena&saved  all
Ft_S1AP_ASN                       enabled    bus_send bus_receive
Ft_X2AP_ASN                       enabled    bus_send bus_receive
Ft_RRC_ASN                        enabled    bus_send bus_receive


ENB> lh all fte s


Position    Board     Process                         Status    AddedTraceConditions
0001        DUS5201   LTE_EXCEPTION                    ena&saved  all
0001        DUS5201   Ft_LTE_EXCEPTION                 ena&saved  all
0001        DUS5201   Ft_S1AP_ASN                      enabled    bus_send bus_receive
0001        DUS5201   Ft_X2AP_ASN                      enabled    bus_send bus_receive
0001        DUS5201   Ft_RRC_ASN                       enabled    bus_send bus_receive
0001bb1               check                            enabled    enter return trace1 trace2 trace3
0001bb2               check                            enabled    enter return trace1 trace2 trace3
0001bb3               check                            enabled    enter return trace1 trace2 trace3
0001bb4               check                            enabled    enter return trace1 trace2 trace3
```

Enable/Disable/Save traces with "te"

"te e": to enable some trace groups on a particular process or trace object **.** When a board restarts, all trace conditions are put back to default

```
ENBG2> te e bus_send bus_receive Ft_RRC_ASN


coli>/diagm/te e bus_send bus_receive Ft_RRC_ASN
coli>
```

te save:

to save all trace conditions defined on a particular process or trace object , so that they survive a board restart.

It is not recommended to save the trace conditions as this can lead to cyclic board restart in case these traces are causing high CPU load

```
$ te save Ft_S1AP_ASN
$ lhsh 000200 te save Ft_S1AP_ASN
```

te disable: to disable some trace groups on particular process or trace object

```
$ lhsh 001400 te d trace1 trace2 Ft_LTE_EXCEPTION
```

te default: to reset all enabled trace conditions back to default

```
$ lhsh 001400 te default
```

te default -restart: to reset all saved trace conditions back to default

```
$ lhsh 001400 te default -restart
```

Enable/Disable/Save traces with "fte"

Same as "te" but allows to run on many processes or trace objects by using regular expressions:

```
ENBG2> fte e bus_send bus_receive ft_.*_asn

coli>/diagm/te e bus_send bus_receive  Ft_LPPA_ASN
coli>/diagm/te e bus_send bus_receive  Ft_M3AP_ASN
coli>/diagm/te e bus_send bus_receive  Ft_RANAP_ASN
coli>/diagm/te e bus_send bus_receive  Ft_RRC_ASN
coli>/diagm/te e bus_send bus_receive  Ft_S1AP_ASN
coli>/diagm/te e bus_send bus_receive  Ft_X2AP_ASN
coli>


G2RBS_19> fte d bus_send ft_.*_asn

coli>/diagm/te d bus_send  Ft_LPPA_ASN
coli>/diagm/te d bus_send  Ft_M3AP_ASN
coli>/diagm/te d bus_send  Ft_RANAP_ASN
coli>/diagm/te d bus_send  Ft_RRC_ASN
coli>/diagm/te d bus_send  Ft_S1AP_ASN
coli>/diagm/te d bus_send  Ft_X2AP_ASN
coli>


G2RBS_19> fte save ft_.*_asn

coli>/diagm/te save  Ft_LPPA_ASN
coli>/diagm/te save  Ft_M3AP_ASN
coli>/diagm/te save  Ft_RANAP_ASN
coli>/diagm/te save  Ft_RRC_ASN
```

```
coli>/diagm/te save  Ft_S1AP_ASN
coli>/diagm/te save  Ft_X2AP_ASN
coli>


G2RBS_19> fte default ft_.*_asn


coli>/diagm/te default  Ft_LPPA_ASN
coli>/diagm/te default  Ft_M3AP_ASN
coli>/diagm/te default  Ft_RANAP_ASN
coli>/diagm/te default  Ft_RRC_ASN
coli>/diagm/te default  Ft_S1AP_ASN
coli>/diagm/te default  Ft_X2AP_ASN
coli>



G2RBS_19> fte default -restart


coli>/diagm/te default -restart
coli>
```

Running te/fte on board groups


```
RBS33> lh gcpu te s

===============================================================================
coli>/fruacc/lhsh 000100/bbEqm000003 /diagm/bbte log s bbEqm000003
0001bb3: ok
0001bb3: Agent is connected
0001bb3: Trace object name                    Enabled groups
0001bb3: BbiMcsTraceFilter                    check error info interface
0001bb3: WBBL1_L1SpreaderDrvEul               check error info interface
...<cut>...
0001bb4: BbiItcMhp                            check error info interface
0001bb4: WBBL1_UE_RLS                         check error info interface
0001bb4: BbiCommStackEth                      check error info interface
0001bb4: WBBL1_L1SpreaderDrvDch               check error info interface
0001bb4: WBBL1_UlCrDrv                        check error info interface
0001bb4: BbiItcRlnh                           check error info interface
0001bb4: WBBL1_SapRaAC                        check error info interface
0001bb4: BbiTraceInternal                     check error info interface
0001bb4: LPP_TRACE_BIN                        check error info interface
coli>

RBS33> lh gcpu te log read

===============================================================================
coli>/fruacc/lhsh 000100/bbEqm000003 /diagm/bbte log read bbEqm000003
0001bb3: ok
0001bb3: [2016-04-06 01:42:34.617] LPP_TRACE_BIN -:0 :
0001bb3: 0000   00 05 67 0B 0D D1 00 00 FF FF FF FF FF FF FF FF '..g.............'
0001bb3: 0010   FF FF FF FF 01 03 3F 01 00 00 00 DA 00 DA 20 00 '......?....... .'
```

```
0001bb3: 0020   00 27 00 36 11 71 D4 2B 00 00 20 00 03 47 00 3D '.'.6.q.+.. ..G.='
0001bb3: 0030   11 72 45 B4 01 04 00 04 20 00 03 9B 00 3D 11 72 '.rE..... ....=.r'
...<cut>....
0001bb4: [2016-04-06 16:18:36.511] LPP_TRACE_BIN -:0 :
0001bb4: 0000   00 05 67 0B 0D D1 00 5A D8 87 90 50 57 05 36 D2 '..g....Z...PW.6.'
0001bb4: 0010   00 0D C1 B1 01 04 00 01 00 00 00 0F 00 0F 20 00 '.............. .'
0001bb4: 0020   00 11 00 1C 14 97 61 80 09 00 00 08 00 06 00 0A '......a.........'
0001bb4: 0030   02 00 01 02 00 01 00 00 00 00 00 06 '............'
0001bb4: [2016-04-06 16:20:03.183] LPP_TRACE_BIN -:0 :
0001bb4: 0000   00 05 67 0B 0D D1 00 5B 0B 07 96 10 57 05 37 2C '..g....[....W.7,'
0001bb4: 0010   00 0D C1 C3 01 04 00 01 00 00 00 0F 00 0F 20 00 '.............. .'
0001bb4: 0020   00 11 00 1C 32 48 FF 67 09 00 00 08 00 06 00 0A '....2H.g........'
0001bb4: 0030   02 00 01 02 00 01 00 00 00 00 00 06 '............'
coli>

RBS33> lh gcpu fte s

Position    Board      Process                                   Status      AddedTraceConditions


RBS33> lh gcpu fte e bus_send hspa

coli>/fruacc/lhsh 000100/bbEqm000003 /diagm/bbte log e bbEqm000003 WBBL1_HSPA_DATA bus_send
ok
coli>/fruacc/lhsh 000100/bbEqm000003 /diagm/bbte log e bbEqm000003 WBBL1_UE_HSPA_DATA bus_send
ok
coli>/fruacc/lhsh 000100/bbEqm000004 /diagm/bbte log e bbEqm000004 WBBL1_HSPA_DATA bus_send
ok
coli>/fruacc/lhsh 000100/bbEqm000004 /diagm/bbte log e bbEqm000004 WBBL1_UE_HSPA_DATA bus_send
ok
coli>

RBS33> lh gcpu fte s

Position    Board      Process                                   Status      AddedTraceConditions
0001bb3                WBBL1_HSPA_DATA                            enabled     bus_send
0001bb3                WBBL1_UE_HSPA_DATA                         enabled     bus_send
0001bb4                WBBL1_HSPA_DATA                            enabled     bus_send
0001bb4                WBBL1_UE_HSPA_DATA                         enabled     bus_send

RBS33>
```

16.2 Trace streaming Gen1

CPP trace streaming uses the target monitor program in main MP which supports four modes:

Note: use mon option "s" to allow the monitoring session to survive a node restart

```
ENB512> h mon

*********************************************************************************
mon[?][d][u][f][s][t][k][a][-] [<board(s)|<boardGroup(s)>] [</path/to/logfile>]
```

```
********************************************************************************
Start/stop/check CPP target monitor or Linux monitor session in TCP mode, UDP mode, or disk mode.

The "mon" command issues a set of COLI commands ("tm", or "ts") in order to open TCP or UDP ports from the boards on the node to the client.
The boards address and/or board groups are given as argument to specify which boards the client will connect to.

Arguments:
**********
 - board(s)/boardgroup(s): the list of board or board groups to monitor. See examples further down.
 - path to logfile: only applicable with option "u" ("monu"). The logfile must have the extension ".pcap" or ".log".
If the logfile has extension ".pcap", then "moshell/capture" will be used as trace client. If the logfile has extension ".log", then "ltng-
decoder" will be used as trace client. Note that the path of "ltng-decoder" shall be specified in the uservariable "ltedecoder".

...<cut>.....
```

Options for CPP (OSE) nodes:
****
 - mon?: print the target monitor status (TCP or UDP) and list of monitored boards.
 - mon[s]: start the OSE target monitor in TCP mode.
In TCP mode, only one session can be connected to a specific board and the "mon" command must be run before each time a new monitor client will
be started.
The TCP monitor client is "nc6" but it is possible to use "monitor6054" instead by setting the uservariable "use_monitor6054" to 1.
Option "s" is to save the target monitor configuration so the monitoring session will survive a board restart.
Note: If the target monitor is already running on the node in UDP or DISK mode, then the existing mode is kept and the respective monitor client
command will be shown.
 - monu[s]: start the monitor in UDP mode with router/viewer or router/capture. By default router/viewer will be used, unless the path to .pcap
logfile has been specified, in which case router/capture will be used instead, and the output will be saved in a pcap logfile instead of
displayed on screen.
In UDP mode, unlimited number of sessions can be connected to the same board(s). The "monu" command does not have to be run again if a handle is
already open to the board(s) that will be monitored.
Option "s" is to save the target monitor configuration so the monitoring session will survive a board restart.
 - mond: start the monitor in UDP mode with dispatcher/monitor. Currently assumes the dispatcher is already running and starts only the monitor.
Currently only supported with dispatcher/monitor installed in AFS (/app/monitor/0/bin).
 - monf[s]: start the monitor in DISK mode. The output will be saved locally on the hard disk of the node, the path will be shown in the monf
printout.
Option "s" is to save the target monitor configuration so the monitoring session will survive a board restart.
 - mona[s]: start the monitor in RAMDISK mode. The output will be saved locally on the ram disk of the node, the path will be shown in the mona
printout.
Option "s" is to save the target monitor configuration so the monitoring session will survive a board restart.
Note: RAMDISK monitor is only applicable for CBM3 based LTE targets (DUS, mRBS, ODS41)
 - mon[s]-: close all monitoring handles on the node. Option "s" is to also disable any saved monitoring sessions.

```
Examples:
>> mon 000800 000900 --> open a monitoring session in TCP mode to the boards 000800 and 000900
>> mons coremp       --> open, and save, a monitoring session in TCP mode to the boards in board group "coremp"
>> monu mod tu       --> open a monitoring session in UDP mode with router/viewer to the boards belonging to board groups "mod" and "tu"
>> monu 000100 $logdir/board01.pcap --> open a monitoring session in UDP mode with router/capture to the board 000100 and save to a file called
board01.pcap
>> mond mod tu       --> open a monitoring session in UDP mode with dispatcher/monitor to the boards belonging to board groups "mod" and "tu"
>> monf mp et        --> open a monitoring session in DISK mode for all boards in the groups "mp" and "et"
>> monas mp          --> open, and save, a monitoring session in RAMDISK mode on all boards in the group "mp".
>> mon-              --> close all active monitoring sessions
>> mons-             --> close all active monitoring sessions and also remove any saved sessions.
>> mon?              --> print monitor sessions

The command to start the monitor client is printed on the screen and also it is stored in the scripting variable $moncommand.
```

It is usually better to run the monitor client in a separate window than the moshell window but if this is not possible then it is also possible to run it from the moshell prompt, either in foreground or in background, eg:
```
 >> l $moncommand
 >> l $moncommand > $logdir/mylogfile &
```
The second method is especially useful when running moshell scripts. Then it is possible to put a "wait" statement while monitor is storing the traces in the logfile, then kill the monitor process using the command "l kill -9 $background_pid", since the PID of the background process has been automatically stored in the variable $background_pid.

Notes:
 - more information about the OSE target monitor: type "tm" from moshell prompt, or refer to the document 6/15518-CRX10201/1
 - more information about the Linux trace monitor: type "ts" from moshell prompt.

16.2.1 <u>TCP mode</u>
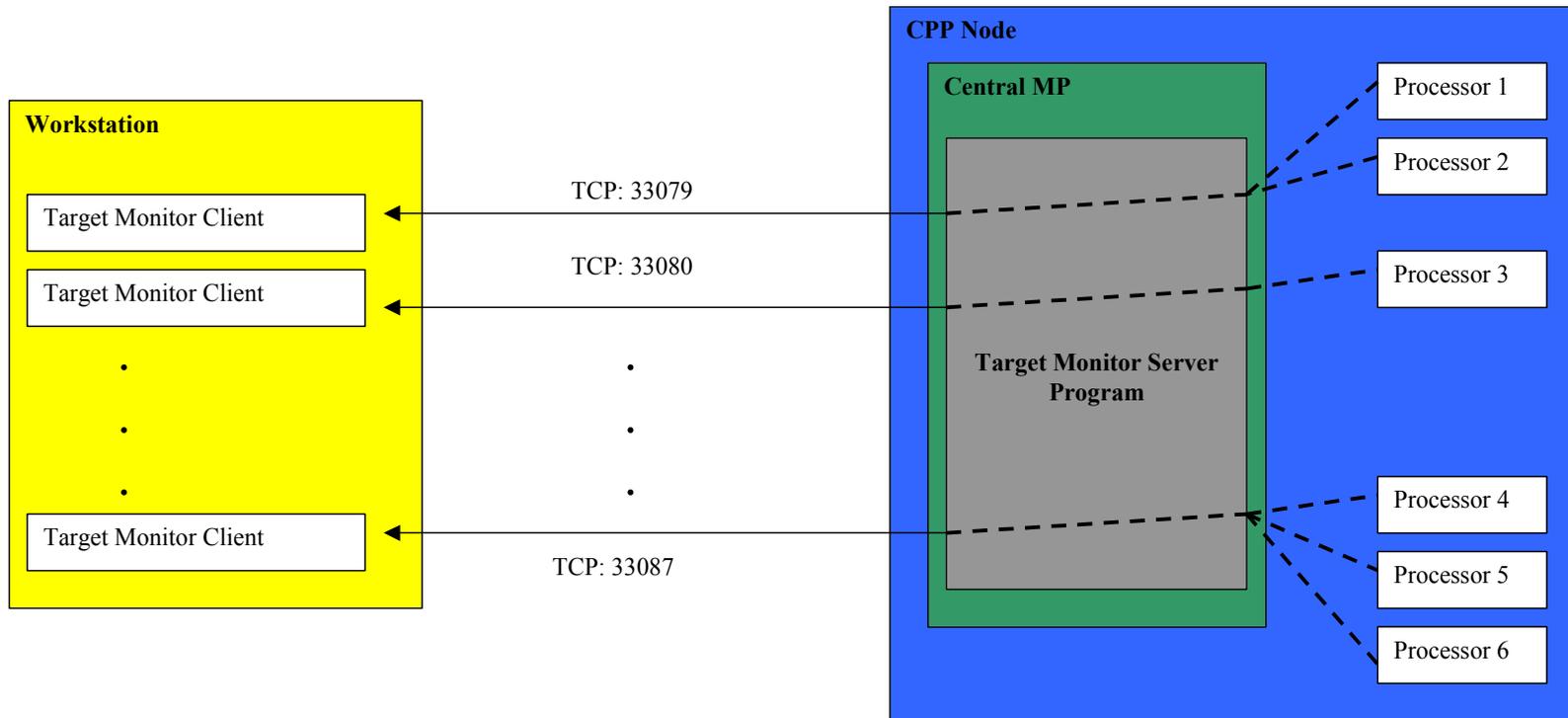

```
ENB512> mon?

$ lhsh 000100 tm -status

Target Monitor Status
=====================
Channel is No channel
No monitors are active
$
```

```
ENB512> mon mp gcpu

******** Opening new handle:
$ lhsh 000100 tm -tcp -win 1
Monitor router process is listening to port 33077.
To attach link handlers, use handle 1.
$ Connection to 10.220.72.112 closed by remote host.

******** Attaching boards to handle:
$ lhsh 000100 tm -attach 1   000100 000100/gcpu00256 000100/gcpu00512 000100/gcpu00768 000100/gcpu01024
Hunting for link handler 000100 from monitor handle 1
Hunting for link handler 000100/gcpu00256 from monitor handle 1
Hunting for link handler 000100/gcpu00512 from monitor handle 1
Hunting for link handler 000100/gcpu00768 from monitor handle 1
Hunting for link handler 000100/gcpu01024 from monitor handle 1
Transferred: sent 1632, received 2056 bytes, in 0.5 seconds
Bytes per second: sent 3352.0, received 4222.9
$

To start the monitor client, run the following command (type "h mon" for more info):
/home/eanzmagn/moshell/commonjars/nc6.linux 10.220.72.112 33077


$moncommand = /home/eanzmagn/moshell/commonjars/nc6.linux 10.220.72.112 33077

ENB512> mon?

$ lhsh 000100 tm -status

Target Monitor Status
=====================
Channel is TCP-channel connected

Monitor Information:
===================
Monitor handle 1 active, absolute time stamp

Link handler information:
========================
No.:  Link handler: PV:              State:  Handle:    TE lost:  Membuff lost:  Filter:
  0          000100    1             connected     1            0              0      off
  1  000100/gcpu00256   0             connected     1           --              0      off
  2  000100/gcpu00512   0             connected     1           --              0      off
  3  000100/gcpu00768   0             connected     1           --              0      off
  4  000100/gcpu01024   0             connected     1           --              0      off
$

ENB512> ! $moncommand

[Trying to contact the Trace & Error Log via link handler '000100'...]
[Contact established with the Trace & Error Log via link handler '000100']
[Connection accepted by the Trace & Error Log via link handler '000100']
[Trying to contact the Trace & Error Log via link handler '000100/gcpu00256'...]
[Contact established with the Trace & Error Log via link handler '000100/gcpu00256']
[Connection accepted by the Trace & Error Log via link handler '000100/gcpu00256']
[Trying to contact the Trace & Error Log via link handler '000100/gcpu00512'...]
[Contact established with the Trace & Error Log via link handler '000100/gcpu00512']
[Connection accepted by the Trace & Error Log via link handler '000100/gcpu00512']
```

```
[Trying to contact the Trace & Error Log via link handler '000100/gcpu00768'...]
[Contact established with the Trace & Error Log via link handler '000100/gcpu00768']
[Connection accepted by the Trace & Error Log via link handler '000100/gcpu00768']
[Trying to contact the Trace & Error Log via link handler '000100/gcpu01024'...]
[Contact established with the Trace & Error Log via link handler '000100/gcpu01024']
[Connection accepted by the Trace & Error Log via link handler '000100/gcpu01024']
^C

ENB512> mon-

$ lhsh 000100 tm -disconnect
All monitored boards are disconnected and Target Monitor has shut down.
$

ENB512>
```

16.2.2 **UDP mode and HiCap**
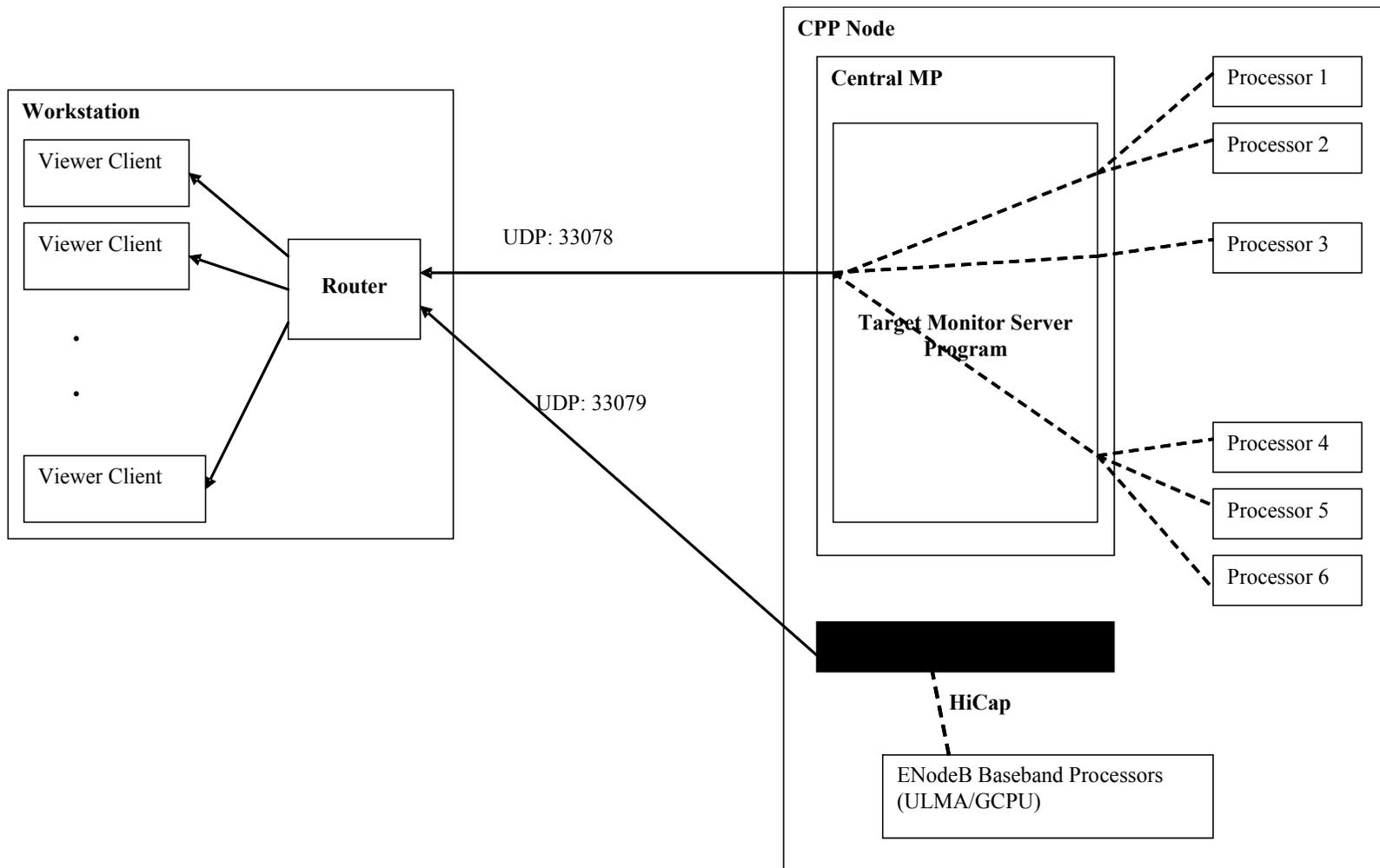
UDP target monitor (traces sent over O&M interface)

```
ENB512> monu mp gcpu

******** Opening new UDP handle to current workstation:
$ lhsh 000100 tm -disconnect
All monitored boards are disconnected and Target Monitor has shut down.
$ lhsh 000100 tm -udp 150.132.6.28
Udp Port opened, data will be transmitted on port 33078.
To attach link handlers, use handle 2.


******** Starting router process on current workstation:
```

```
nohup /home/eanzmagn/moshell/router &

******** Attaching boards to handle:
$ lhsh 000100 tm -attach 2  000100 000100/gcpu00256 000100/gcpu00512 000100/gcpu00768 000100/gcpu01024
Hunting for link handler 000100 from monitor handle 2
Hunting for link handler 000100/gcpu00256 from monitor handle 2
Hunting for link handler 000100/gcpu00512 from monitor handle 2
Hunting for link handler 000100/gcpu00768 from monitor handle 2
Hunting for link handler 000100/gcpu01024 from monitor handle 2
Transferred: sent 1632, received 2056 bytes, in 0.5 seconds
Bytes per second: sent 3358.4, received 4230.9
$

The target monitor is connected in UDP mode to the router process in host: 150.132.6.28

To start the monitor client, run the following command (type "h mon" for more info):
/home/eanzmagn/moshell/viewer -m 10.220.72.112 -r 150.132.6.28


$moncommand = /home/eanzmagn/moshell/viewer -m 10.220.72.112 -r 150.132.6.28

ENB512> mon?

$ lhsh 000100 tm -status

Target Monitor Status
=====================
Channel is UDP-channel: hostname = 150.132.6.28

Monitor Information:
===================
Monitor handle 2 active, absolute time stamp

Link handler information:
========================
No.:  Link handler:  PV:           State:   Handle:    TE lost:  Membuff lost:  Filter:
  0       000100      1         connected     2           0             0        off
  1   000100/gcpu00256   0       connected     2          --             0        off
  2   000100/gcpu00512   0       connected     2          --             0        off
  3   000100/gcpu00768   0       connected     2          --             0        off
  4   000100/gcpu01024   0       connected     2          --             0        off
$
```

HiCap monitor (for baseband processors only - traces sent over Traffical interface)

http://airlink.internal.ericsson.com/ltebaseband.php#hicap

AIR>LINK

Experience Access Support

LTE Baseband

- Introduction
- Required Tools
- Hicap Logging
- Baseband Decoding

Baseband Traces

- MIB and SIB
- PCFICH and DCI format
- PHICH Ack Info
- Downlink Scheduling
- Uplink Scheduling and PUSCH
- Uplink Report, RSSI and SINR
- Random Access

Baseband Filter

- Traces and Values
- Downlink Information
- Uplink Information
- CSV Format

Hicap is a method of tracing the GCPU's. It emables the traces to go via the S1 link, which are then routed to the O&M.

> Note: for this to be possible your O&M network should have access to the S1 link.

First thing you need to do, if you've already attached the GCPU's to the target monitor, you need to detach them.

```
VIC_BXM0ET1_BOXHILL_310003> tm –detach gcpu00256 gcpu00512 gcpu00768 gcpu01024

$ tm –detach gcpu00256 gcpu00512 gcpu00768 gcpu01024
Disconnecting link handler gcpu00256 from monitor handle 2
Disconnecting link handler gcpu00512 from monitor handle 2
Disconnecting link handler gcpu00768 from monitor handle 2
Disconnecting link handler gcpu01024 from monitor handle 2
```

The next step is to enable Hicap towards the O&M server, using the UDP monitor port, and DSCP 0. In order to do this, you need to know the source IP address. It is recommended to have the node's S1 IP Interface. To find this, you need to check the `IpAccessHostEt=1` MO:

```
VIC_BXM0ET1_BOXHILL_310003> get ipaccesshost ipaddr

===================================================================
====================
MO                                         Attribute      Value
===================================================================
====================
IpAccessHostEt=1                           ipAddress      10.32.222.98
===================================================================
====================
Total: 1 MOs
```

Now, we can enable hicap. We do this using the following command:

```
VIC_BXM0ET1_BOXHILL_310003> hicap enable –ip 10.9.6.203 –udp 33079 –dscp 0 –srcIp 10.32.222.98
```

16.2.3 <u>Disk mode:</u>

The traces are saved on a file on /d/usr/cello/telogs:

```
ENBG1> tm -getpar

$ tm -getpar
Parameters are currently
===================================
disk_quota:     10000 kB
log_directory:  /gzip/d/usr/cello/telogs
file_size:      1000 kB
filter_mask:    check  error  info  interface  object
flush_size:     128 kB
flush_timer:    60 min
buffer_size:    2000 kB
$

ENBG1> monfs mp


******** Opening new DISK handle
$ lhsh 000100 tm -disconnect
All monitored boards are disconnected and Target Monitor has shut down.
$ lhsh 000100 tm -disk activate
Disk mode activated, data will be written to disk
To attach linkhandlers, use handle 12.

******** Attaching boards to handle:
$ lhsh 000100 tm -attach 12  000100
Hunting for link handler 000100 from monitor handle 12
Transferred: sent 1560, received 1632 bytes, in 0.5 seconds
Bytes per second: sent 3199.8, received 3347.5
$
```

The target monitor is connected in DISK mode, logfiles stored on: /d/usr/cello/telogs, can be collected with command "lg2".

$tmdiskpath = /d/usr/cello/telogs

Once the tracing is finished, disconnect the monitor:

```
ENBG1> mon-

$ lhsh 000100 tm -disconnect
All monitored boards are disconnected and Target Monitor has shut down.
$
```

Fetch the trace logs

```
ENBG1> lg2

.
....<cut>....
```

```
2014-02-07 09:17:42.388  TED [001400]RncLmUePT rlibTraceTraceFunctions.cc:214 INFO:<key 285837625603368 part 1>"ExceptionCode = 554; TIMER
dchSynchReconfTimer has expired; InterfaceTimout (Internal); N/A;RRCConRel;Dropped Call Release;callProc = RabHandling;UeRef = 3497; IMSI =
14700170014005; cellId = 1087; cellFroId = 71; hsCellId = 1087; hsCellFroId = 71; spId = dc:s:32770:0; rhRncModuleId = 0; RLs in DRNC = 0; Best
RL in DRNC: "
2014-02-07 09:17:42.388  TED [001400]RncLmUePT rlibTraceTraceFunctions.cc:214 INFO:<key 285837625603368 part 2>"No; S-RNTI = 9729; causecode =
UNDEF;No IMEISV received;sourceConnType = uehPacket64Hs; sGCP=00000000000000000000;targetConnType = uehPsInt16Hs;
tGCP=00000000000000000000;UE Cap = Rel6-00000000000000000000000000000011;fileName = ../UehRabHandlingC.cpp;line = 6608;Previous state =
WaitForUlInd;Current state = UeConfig"
2014-02-07 09:17:42.392  TED [001600]RncLmUePT rlibTraceTraceFunctions.cc:205 INFO:< Segmenting traces for key 285861640008293, 3 parts will
follow >
2014-02-07 09:17:42.392  TED [001600]RncLmUePT rlibTraceTraceFunctions.cc:214 INFO:<key 285861640008293 part 1>"ExceptionCode = 554; TIMER
dchSynchReconfTimer has expired; InterfaceTimout (Internal); N/A;RRCConRel;Dropped Call Release;callProc = RabHandling;UeRef = 2820; IMSI =
14700180014005; cellId = 1029; cellFroId = 13; hsCellId = 1029; hsCellFroId = 13; spId = dc:s:32785:0; rhRncModuleId = 1; RLs in DRNC = 0; Best
RL in DRNC: "
2014-02-07 09:17:42.392  TED [001600]RncLmUePT rlibTraceTraceFunctions.cc:214 INFO:<key 285861640008293 part 2>"No; S-RNTI = 15284; causecode =
UNDEF;No IMEISV received;sourceConnType = uehPacket64Hs; sGCP=00000000000000000000;targetConnType = uehPsInt16Hs;
tGCP=00000000000000000000;UE Cap = Rel6-00000000000000000000000000000011;fileName = ../UehRabHandlingC.cpp;line = 6608;Previous state =
WaitForUlInd;Current state = UeConfi"
2014-02-07 09:17:42.432  TED [001400]RncLmUePT rlibTraceTraceFunctions.cc:205 INFO:< Segmenting traces for key 285910900803369, 3 parts will
follow >
...<cut>...
```

16.2.4 RamDisk mode

```
ENBG1> mona mp

******** Opening new RAMDISK handle
$ lhsh 000100 tm -disconnect
All monitored boards are disconnected and Target Monitor has shut down.
$ lhsh 000100 tm -ramdisk activate
RamDisk mode activated, data will be written to ramdisk
To attach linkhandlers, use handle 14.

******** Attaching boards to handle:
$ lhsh 000100 tm -attach 14   000100
Hunting for link handler 000100 from monitor handle 14
Transferred: sent 1560, received 1632 bytes, in 0.5 seconds
Bytes per second: sent 3204.9, received 3352.9
$

The target monitor is connected in RAMDISK mode, logfiles stored on: /r000100/telogs, can be collected with command "lg2".

$tmdiskpath = /r000100/telogs
```

Once the tracing is finished, disconnect the monitor:

```
ENBG1> mon-

$ lhsh 000100 tm -disconnect
All monitored boards are disconnected and Target Monitor has shut down.
$
```

Fetch the trace logs

```
ENBG1> lg2
```

```
.
....<cut>....

2014-02-07 09:17:42.388   TED [001400]RncLmUePT rlibTraceTraceFunctions.cc:214 INFO:<key 285837625603368 part 1>"ExceptionCode = 554; TIMER
dchSynchReconfTimer has expired; InterfaceTimout (Internal); N/A;RRCConRel;Dropped Call Release;callProc = RabHandling;UeRef = 3497; IMSI =
14700170014005; cellId = 1087; cellFroId = 71; hsCellId = 1087; hsCellFroId = 71; spId = dc:s:32770:0; rhRncModuleId = 0; RLs in DRNC = 0; Best
RL in DRNC: "
2014-02-07 09:17:42.388   TED [001400]RncLmUePT rlibTraceTraceFunctions.cc:214 INFO:<key 285837625603368 part 2>"No; S-RNTI = 9729; causecode =
UNDEF;No IMEISV received;sourceConnType = uehPacket64Hs; sGCP=00000000000000000000;targetConnType = uehPsInt16Hs;
tGCP=00000000000000000000;UE Cap = Rel6-00000000000000000000000000000011;fileName = ../UehRabHandlingC.cpp;line = 6608;Previous state =
WaitForUlInd;Current state = UeConfig"
2014-02-07 09:17:42.392   TED [001600]RncLmUePT rlibTraceTraceFunctions.cc:205 INFO:< Segmenting traces for key 285861640008293, 3 parts will
follow >
2014-02-07 09:17:42.392   TED [001600]RncLmUePT rlibTraceTraceFunctions.cc:214 INFO:<key 285861640008293 part 1>"ExceptionCode = 554; TIMER
dchSynchReconfTimer has expired; InterfaceTimout (Internal); N/A;RRCConRel;Dropped Call Release;callProc = RabHandling;UeRef = 2820; IMSI =
14700180014005; cellId = 1029; cellFroId = 13; hsCellId = 1029; hsCellFroId = 13; spId = dc:s:32785:0; rhRncModuleId = 1; RLs in DRNC = 0; Best
RL in DRNC: "
2014-02-07 09:17:42.392   TED [001600]RncLmUePT rlibTraceTraceFunctions.cc:214 INFO:<key 285861640008293 part 2>"No; S-RNTI = 15284; causecode =
UNDEF;No IMEISV received;sourceConnType = uehPacket64Hs; sGCP=00000000000000000000;targetConnType = uehPsInt16Hs;
tGCP=00000000000000000000;UE Cap = Rel6-00000000000000000000000000000011;fileName = ../UehRabHandlingC.cpp;line = 6608;Previous state =
WaitForUlInd;Current state = UeConfi"
2014-02-07 09:17:42.432   TED [001400]RncLmUePT rlibTraceTraceFunctions.cc:205 INFO:< Segmenting traces for key 285910900803369, 3 parts will
follow >
...<cut>...
```

16.3 <u>Trace streaming Gen2</u>

- **MP traces can only be streamed over TCP**
- **Baseband traces can only be streamed over UDP/HiCap**
- **XP traces (RU/XMU) cannot be monitored**

Note: to allow the trace streaming session to survive a node restart, use mon option "s"

```
G2RBS_19>  h mon

*********************************************************************************
mon[?][d][u][f][s][t][k][a][-] [<board(s)|<boardGroup(s)>] [</path/to/logfile>]
*********************************************************************************
Start/stop/check CPP target monitor or Linux monitor session in TCP mode, UDP mode, or disk mode.

The "mon" command issues a set of COLI commands ("tm", or "ts") in order to open TCP or UDP ports from the boards on the node to the client.
The boards address and/or board groups are given as argument to specify which boards the client will connect to.

Arguments:
**********
 - board(s)/boardgroup(s): the list of board or board groups to monitor. See examples further down.
 - path to logfile: only applicable with option "u" ("monu"). The logfile must have the extension ".pcap" or ".log".
If the logfile has extension ".pcap", then "moshell/capture" will be used as trace client. If the logfile has extension ".log", then "ltng-
decoder" will be used as trace client. Note that the path of "ltng-decoder" shall be specified in the uservariable "ltedecoder".
```

```
TCP Monitor for Linux nodes (EvoC8300, MSRBSv2, TCU):
*****************************************************
T&E Trace Streaming for Linux nodes is performed by using lttng-relayd (as server) and babeltrace/babelwrap (as client).
The TCP ports 5342 (control) and 5343 (data) are used by default for transfer of traces from the node to the lttng server on the workstation.
If those ports are occupied, then other consecutive ports will be automatically selected in the range up until 6342.
The moshell uservariables lttng_port and lttng_range can be modified in order to change the starting TCP port and port range used for lttng
trace streaming.
The traces are flushed every 1 second for EvoC8300, and every 2 seconds for MSRBSv2/TCU. This can be changed via the uservariables
lttng_flush_cpp/lttng_flush_rcs (value is in microseconds).
The default buffer size is 4x4 MB for EvoC8300 and 4x1 MB for MSRBSv2/TCU. This can be changed via the uservariables
lttng_buff_cpp/lttng_buff_rcs (value is in MB).

Applicable options:
 - mon?      : to print the list of trace streaming sessions defined on the node
 - mon[s] [<boards>|<boardgroup>]   : to start a trace streaming session.
If boards or board groups are not specified then the monitor is started on the core MPs only.
Option "s" is for saving the streaming session so it will survive a board restart.
With option "s", babelwrap is used as client instead of babeltrace as it has reconnect capability.
 - mont[s] [<boards>|<boardgroup>]  : to start a monitor session in tunnel mode, can be used in case the firewall is blocking the TCP ports for
lttng. For option "s", see above.
 - monk     : to kill all lttng-relayd and ssh port forwarding processes on the workstation (only those processes belonging to the current user
and which were started by mon command will be affected).
 - mon[s]-   : to kill all active lttng sessions on the node. Option "s" is to also disable any saved streaming sessions.
 - mon[s]k-  : same as monk and mon[s]- combined

UDP Monitor for MSRBSv2 (HiCap):
*****************************
On MSRBSv2, the TCP monitor can only be used for trace streaming of MP traces.
Baseband traces are monitored via the UDP HiCap monitor which uses router (as server) and viewer/capture/ltng-decoder (as client).
By default:
 - moshell tries to start the trace router on the current workstation. It is possible to specify a different workstation by specifying its ip
address in the uservariable "bbte_router". But in that case the router process must be started manually on that workstation as it cannot be
started remotely by moshell.
 - viewer is used as client, unless the path to a .pcap or .log file has been specified as argument, then capture or ltng-decoder will be used
instead and the output will be saved to a .pcap/.log file instead of being displayed on screen.
 - buffered mode is used with bitrate of 200000 kb/s but this can be changed in the uservariable "bbte_buffer_rate". In order to not used
buffered mode, then set the uservariable bbte_buffer_rate to 0.
 - the UDP port used for transfering the baseband traces from the node the router process is by default 33079. To use a different port, set the
uservariable "bbte_port".

Applicable options:
 - monu      : to start a HiCap trace monitor session on the O&M interface.
 - monut     : to start a HiCap trace monitor session on the Traffic interface.
 - monu[k]- : to stop a HiCap trace monitor session. Option "k" can be used to kill the user's router process on the workstation.
 - monu?     : to check whether the trace monitor is using buffered mode or not.

....<cut>...
```

16.3.1 <u>MP trace streaming</u>
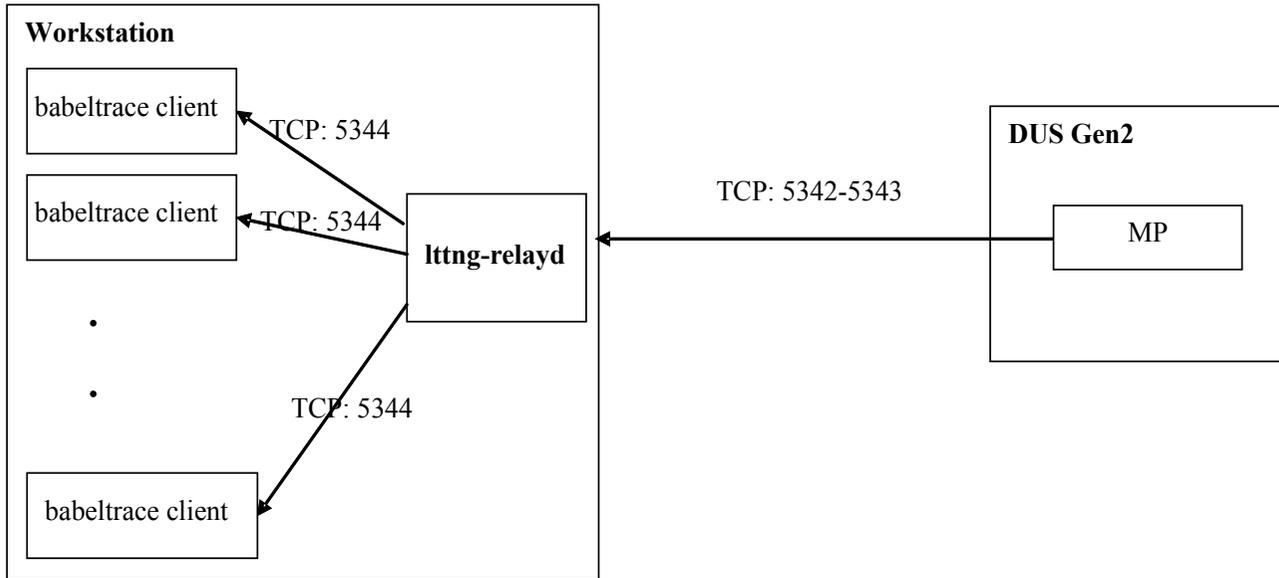
```
MSRBSV2> mon?

0001: Lttng Session   :mon_10.67.22.8
0001: Time of creation:Mon 2015-09-28 08:46:38 UTC
0001: Session ID      :1
0001: Status          :active
0001: Enabled events:
0001:     * (loglevel: TRACE_INFO)
0001:     com_ericsson_tri* (loglevel: TRACE_DEBUG)
0001:     com_ericsson_plf_trace_util* (loglevel: TRACE_INFO)
0001: All the TRI events have default group mask

MSRBSV2> monk-

==================================================================================================
coli>/fruacc/lhsh 000100 /diagm/ts destroy 1
coli>

MSRBSV2> bp all

==================================================================================================
Board   BoardType       SwAllocation                    BoardGroups
==================================================================================================
000100  DUS5201                                         all coremp mp
==================================================================================================
Total: 1 boards

MSRBSV2> mon mp

==================================================================================================
coli>/fruacc/lhsh 000100 /diagm/ts ip 10.67.22.50:5342:5343 mon_10.67.22.8
```

```
0001: session_name : mon_10.67.22.8 sessionId : 1
coli>

To start the monitor client, run the following command (type "h mon" for more info):
/home/eanzmagn/moshell/commonjars/babeltrace.linux --clock-date -i lttng-live net://localhost:5344/host/du1/mon_10.67.22.8


$moncommand = /home/eanzmagn/moshell/commonjars/babeltrace.linux --clock-date -i lttng-live net://localhost:5344/host/du1/mon_10.67.22.8

MSRBSV2> ! $moncommand

[2015-09-30 12:12:26.176921629] (+93.833638950) du1 com_ericsson_triobjif:TRACE5: { cpu_id = 9 }, { procname = "Nci_control_pro" },
{ processAndObjIf = "Nci_control_proc(RICM_CONFIG)", fileAndLine = "ricm_config_common.c:1484", msg = "config_common_pc_to_path: portNo: 1,
cascadeNo: 1, result: DU_0." }
[2015-09-30 12:12:26.177072816] (+0.000151187) du1 com_ericsson_triobjif:TRACE5: { cpu_id = 9 }, { procname = "Nci_control_pro" },
{ processAndObjIf = "Nci_control_proc(RICM_CONFIG)", fileAndLine = "ricm_config_common.c:1351", msg = "config_common_path_to_pc: *portNo: 1,
*cascadeNo: 1, path: DU_0." }
[2015-09-30 12:12:26.177095894] (+0.000023078) du1 com_ericsson_triobjif:TRACE4: { cpu_id = 9 }, { procname = "Nci_control_pro" },
{ processAndObjIf = "Nci_control_proc(RICM_CONFIG)", fileAndLine = "ricm_config_common.c:3125", msg = "config_common_getDependentRu: path: DU_0,
previous: DU_0." }
[2015-09-30 12:12:26.177143769] (+0.000047875) du1 com_ericsson_triobjif:TRACE4: { cpu_id = 9 }, { procname = "Nci_control_pro" },
{ processAndObjIf = "Nci_control_proc(RICM_CONFIG)", fileAndLine = "ricm_config_common.c:3164", msg = "config_common_getDependentRu: No
candidates." }
.....<cut>...
```

16.3.2 **Baseband trace streaming**

Reference: EMCA Diagnostics UG (180/198 17-CSH 103 17/1)

http://calstore.internal.ericsson.com/alexserv?AC=LINKEXT&ID=21930&ST=INSTANT&PA=emca&FN=180_19817-CSH10317_1Uen.PJ2.html
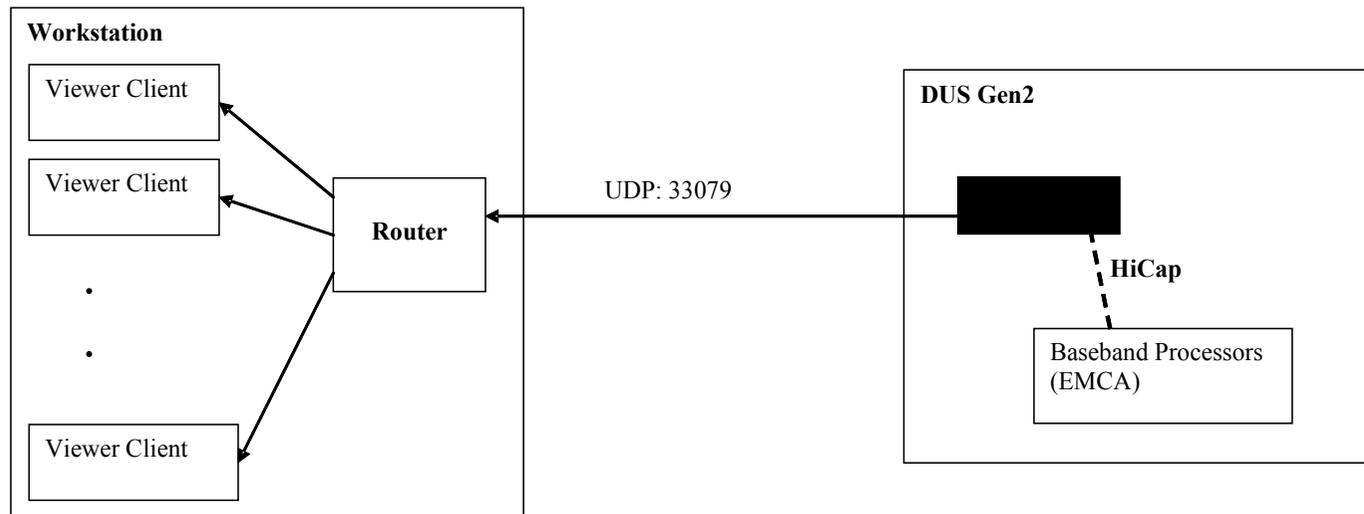

```
RBS33> monu?
```

```
================================================================================
coli>/fruacc/lhsh 000100 /diagm/bbte log getreport
0001: ok
0001: Buffered trace not ongoing
>coli

RBS33> monu


******** Starting router process on current workstation:
nohup /home/eanzmagn/moshell/router &
Router process started with PID 30459

$background_pid = 30459
================================================================================
coli>/fruacc/lhsh 000100 /diagm/bbte log setdest --buffer cpm
0001: error
0001: Stop failure: emca buffered trace TN streaming not ongoing
================================================================================
coli>/fruacc/lhsh 000100/bbEqm000003 /diagm/bbte log setdest bbEqm000003 --buffer cpm
0001bb3: ok
================================================================================
coli>/fruacc/lhsh 000100/bbEqm000004 /diagm/bbte log setdest bbEqm000004 --buffer cpm
0001bb4: ok
coli>

lh mp bbte log setdest --buffer emca --ip ManagedElement=1,Transport=1,Router=OaM,InterfaceIPv4=OaM,AddressIPv4=1 137.58.215.50 33079 -bitrate
200000
================================================================================
coli>/fruacc/lhsh 000100 /diagm/bbte log setdest --buffer emca --ip ManagedElement=1,Transport=1,Router=OaM,InterfaceIPv4=OaM,AddressIPv4=1
137.58.215.50 33079 -bitrate 200000
0001: ok
0001: emca buffered trace stream setup successful!
coli>

To start the monitor client, run the following command (type "h mon" for more info):
/home/eanzmagn/moshell/viewer -m 10.72.253.52 -r 137.58.215.50


$moncommand = /home/eanzmagn/moshell/viewer -m 10.72.253.52 -r 137.58.215.50

RBS33> monu?


================================================================================
coli>/fruacc/lhsh 000100 /diagm/bbte log getreport
0001: ok
0001: mode:        normal
0001: bitrate:     200000 kbit/s
0001: rep:         infinite
0001: delay:       1 ms
0001: minrectime:  0 ms
0001: destination: 137.58.215.50 33079
>coli

RBS33> monuk-

lh du bbte log setdest --buffer cpm
================================================================================
```

```
coli>/fruacc/lhsh 000100 /diagm/bbte log setdest --buffer cpm
0001: ok
0001: emca buffered trace stop successful! Traces redirected to CPM buffer (bbte log read)
================================================================================
coli>/fruacc/lhsh 000100/bbEqm000003 /diagm/bbte log setdest bbEqm000003 --buffer cpm
0001bb3: ok
================================================================================
coli>/fruacc/lhsh 000100/bbEqm000004 /diagm/bbte log setdest bbEqm000004 --buffer cpm
0001bb4: ok
coli>


******** Found a router process on the current workstation:
USER       PID  PPID STIME COMMAND
eanzmagn 30459 30411 20:16 /app/j2re/1.7.0_55/LMWP3/bin/java -Dmonrouter -classpath /home/eanzmagn/moshell/commonjars/commons-cli-
1.2.jar:/home/eanzmagn/moshell/commonjars/com.ericsson.ltt.jar:/home/eanzmagn/moshell/commonjars/com.ericsson.ltetracetools.version.jar:/home/ea
nzmagn/moshell/commonjars/com.ericsson.usage.jar com.ericsson.ltt.router.TraceRouter
kill 30459
kill 30411

RBS33> monu?


================================================================================
coli>/fruacc/lhsh 000100 /diagm/bbte log getreport
0001: ok
0001: Buffered trace not ongoing
>coli

RBS33>
```

16.4 Install the LTNG decoder and flowfox

Download LTNG decoder from https://wcdma-confluence.rnd.ki.sw.ericsson.se/display/PB/LTNG

Download flowfox from http://airlink.internal.ericsson.com/downloads.php#flowfox

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Flowfox 3

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NOTE! Flowfox is no longer funded for development. It is distributed here for people wishing to download the latest version. Support will be at the authors discretion (best effort).

Flowfox 3 Latest Release

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16.5 Example: activating and decoding MP traces

Example: WCDMA

Reference: https://wcdma-wrat.rnd.ki.sw.ericsson.se/wiki/Tracing_guidelines

1) Activating trace

```
RBS33> te s | grep NBAP

        - NBAP                                 check error info interface object
        - NBAP_MEASURE                         check error info interface object
        - NBAP_DL_POWER                        check error info interface object
        - UE_NBAP_DL_POWER                     check error info interface object
        - NBAP_RESOURCE                        check error info interface object
        - NBAP_SYSTEM_INFO                     check error info interface object
        - NBAP_RL_HANDLING                     check error info interface object
        - UE_NBAP_RL_HANDLING                  check error info interface object
        - NBAP_RL_MEAS                         check error info interface object
        - UE_NBAP_RL_MEAS                      check error info interface object
        - NBAP_CELL_CHANNEL                    check error info interface object
        - NBAP_ERROR                           check error info interface object

RBS33> fte e bus_send bus_receive NBAP

coli>/diagm/te e bus_send bus_receive  NBAP
coli>/diagm/te e bus_send bus_receive  NBAP_CELL_CHANNEL
coli>/diagm/te e bus_send bus_receive  NBAP_DL_POWER
coli>/diagm/te e bus_send bus_receive  NBAP_ERROR
coli>/diagm/te e bus_send bus_receive  NBAP_MEASURE
coli>/diagm/te e bus_send bus_receive  NBAP_RESOURCE
coli>/diagm/te e bus_send bus_receive  NBAP_RL_HANDLING
coli>/diagm/te e bus_send bus_receive  NBAP_RL_MEAS
coli>/diagm/te e bus_send bus_receive  NBAP_SYSTEM_INFO
coli>/diagm/te e bus_send bus_receive  UE_NBAP_DL_POWER
coli>/diagm/te e bus_send bus_receive  UE_NBAP_RL_HANDLING
coli>/diagm/te e bus_send bus_receive  UE_NBAP_RL_MEAS
coli>

RBS33> fte s

Process                         Status      AddedTraceConditions
NBAP                            enabled     bus_send bus_receive
NBAP_MEASURE                    enabled     bus_send bus_receive
NBAP_DL_POWER                   enabled     bus_send bus_receive
UE_NBAP_DL_POWER                enabled     bus_send bus_receive
NBAP_RESOURCE                   enabled     bus_send bus_receive
NBAP_SYSTEM_INFO                enabled     bus_send bus_receive
NBAP_RL_HANDLING                enabled     bus_send bus_receive
UE_NBAP_RL_HANDLING             enabled     bus_send bus_receive
NBAP_RL_MEAS                    enabled     bus_send bus_receive
```

```
UE_NBAP_RL_MEAS                         enabled    bus_send bus_receive
NBAP_CELL_CHANNEL                       enabled    bus_send bus_receive
NBAP_ERROR                              enabled    bus_send bus_receive
```

2) Reading the trace log and passing to decoder and flow

```
RBS33> mon mp

/home/eanzmagn/moshell/commonjars/lttng-relayd.linux -C tcp://0.0.0.0:5345 -D tcp://0.0.0.0:5346 -L net://localhost:5347 -o
/home/eanzmagn/moshell/moshell_logfiles/logs_moshell/lttng-traces -b
===============================================================================
coli>/fruacc/lhsh 000100 /diagm/ts ip 10.74.144.10:5345:5346 mon_10.72.253.52
0001: session_name : mon_10.72.253.52 sessionId : 1
coli>

To start the monitor client, run the following command (type "h mon" for more info):
/home/eanzmagn/moshell/commonjars/babeltrace.linux --clock-gmt --clock-date -i lttng-live net://localhost:5347/host/du1/mon_10.72.253.52


$moncommand = /home/eanzmagn/moshell/commonjars/babeltrace.linux --clock-gmt --clock-date -i lttng-live
net://localhost:5347/host/du1/mon_10.72.253.52

RBS33> ! $moncommand | ~/ltetools/ltng-decoder -s | ~/decoder/flow.pl

[23:43:33.970747214]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5080L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:33.980776494]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5080L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:33.990798930]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5080L) (measID=16642) (txCarrierPwrnotHS=18%)
[23:43:34.970856373]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5081L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:34.980761169]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5081L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:34.990846339]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5081L) (measID=16642) (txCarrierPwrnotHS=18%)
[23:43:35.970992252]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5082L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:35.980895219]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5082L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:35.990800827]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5082L) (measID=16642) (txCarrierPwrnotHS=18%)
[23:43:36.970780037]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5083L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:36.980822910]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5083L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:36.990811643]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5083L) (measID=16642) (txCarrierPwrnotHS=18%)
[23:43:37.970875088]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5084L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:37.980828321]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5084L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:37.990899695]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5084L) (measID=16642) (txCarrierPwrnotHS=18%)
[23:43:38.970873999]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5085L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:38.980911014]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5085L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:38.990860090]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5085L) (measID=16642) (txCarrierPwrnotHS=18%)
[23:43:39.970904786]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5086L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:39.980806597]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5086L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:39.990810533]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5086L) (measID=16642) (txCarrierPwrnotHS=18%)
[23:43:40.970765839]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5087L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:40.980736462]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5087L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:40.990858680]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5087L) (measID=16642) (txCarrierPwrnotHS=18%)
[23:43:41.970845783]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5088L) (measID=24832) (txCarrierPwrnotHS=18%)
[23:43:41.980740219]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5088L) (measID=20737) (txCarrierPwrnotHS=18%)
[23:43:41.990829874]        <<---<<    (NBAP)  CommonMeasurementReport (tID=5088L) (measID=16642) (txCarrierPwrnotHS=18%)
```

3) Deactivating trace

```
RBS33> te default

coli>/diagm/te default
coli>
```

Example: LTE

1) Activating trace

```
ENBG2> te s | grep ASN | sort | uniq

    - Ft_LPPA_ASN                          check error info interface object
    - Ft_M3AP_ASN                          check error info interface object
    - Ft_RANAP_ASN                         check error info interface object
    - Ft_RRC_ASN                           check error info interface object
    - Ft_S1AP_ASN                          check error info interface object
    - Ft_X2AP_ASN                          check error info interface object

ENBG2> fte e bus_send bus_receive ft_.*_asn

coli>/diagm/te e bus_send bus_receive  Ft_LPPA_ASN
coli>/diagm/te e bus_send bus_receive  Ft_M3AP_ASN
coli>/diagm/te e bus_send bus_receive  Ft_RANAP_ASN
coli>/diagm/te e bus_send bus_receive  Ft_RRC_ASN
coli>/diagm/te e bus_send bus_receive  Ft_S1AP_ASN
coli>/diagm/te e bus_send bus_receive  Ft_X2AP_ASN
coli>

ENBG2> ue

coli>/lrat/ue
....<cut>...
ue enable -ue -traceref <traceRef> [-timeout <min>]         - Activates Ue selective RBS Ue trace for specific traceRef
                                                              <traceref> is specified in hexcode (max 6 bytes)
                                                              Optional -timeout <min> specified in minutes [0 = No Timeout]. Default
is 120 minutes.
ue enable -cellid <cellId> <maxUeinCell> [-qci <qci>] [-timeout <min>] - Activates maxUeinCell [1..8]
                                                              number of cell selective RBS Ue traces in specific cell.
                                                              if qci is specified only ues with bearers with specified qci will be
traced,
                                                              Optional -timeout <min> specified in minutes [0 = No Timeout]. Default
is 120 minutes.
ue enable -allcell -allUe [-timeout <min>]                  - Activates all cell selective RBS Ue traces in all cells
                                                              Optional -timeout <min> specified in minutes [0 = No Timeout]. Default
is 120 minutes.
...<cut>...
coli>

ENBG2> ue enable -allcell -allUe

coli>/lrat/ue enable -allcell -allUe
Enable Cell OK!
coli>
```

2) Reading the trace log and passing to decoder and flow

```
RBS33> mon mp

/home/eanzmagn/moshell/commonjars/lttng-relayd.linux -C tcp://0.0.0.0:5345 -D tcp://0.0.0.0:5346 -L net://localhost:5347 -o
/home/eanzmagn/moshell_logfiles/logs_moshell/lttng-traces -b
================================================================================
coli>/fruacc/lhsh 000100 /diagm/ts ip 10.74.144.10:5345:5346 mon_10.72.253.52
0001: session_name : mon_10.72.253.52 sessionId : 1
coli>

To start the monitor client, run the following command (type "h mon" for more info):
/home/eanzmagn/moshell/commonjars/babeltrace.linux --clock-gmt --clock-date -i lttng-live net://localhost:5347/host/du1/mon_10.72.253.52


$moncommand = /home/eanzmagn/moshell/commonjars/babeltrace.linux --clock-gmt --clock-date -i lttng-live
net://localhost:5347/host/du1/mon_10.72.253.52


ENB15> ! $moncommand | ~/ltetools/ltng-decoder -s | ~/ltetools/lteflowfox.pl -lac

#==============================================================================#
# LTE Flowfox v2.23                                                            #
# Designed by: Dusan Simic (dusan.simic@ericsson.com)                          #
# *** This is only list view, to create an HTML document, remove -l option *** #
#==============================================================================#
Timestamp      LH       eNBid   UE    eNB   TeNB   MME   racUeRef        Message
[18:55:47.292]000100         |    |<===========|              (S1AP) UEContextReleaseCommand mmeUeS1ApId:77993949 cause:radioNetwork:release-due-
to-eutran-generated-reason
[18:55:47.772]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:498 phCellId:179
estCause:otherFailure
[18:55:47.772]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:498 phCellId:179
estCause:otherFailure
[18:55:47.772]000100         |<====|    |      |              (RRC)  rrcConnectionReestablishmentReject
[18:55:47.844]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:498 phCellId:179
estCause:otherFailure
[18:55:47.844]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:498 phCellId:179
estCause:otherFailure
[18:55:47.844]000100         |<====|    |      |              (RRC)  rrcConnectionReestablishmentReject
[18:55:47.912]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:498 phCellId:179
estCause:otherFailure
[18:55:47.912]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:498 phCellId:179
estCause:otherFailure
.....
[18:57:35.012]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:511 phCellId:179
estCause:otherFailure
[18:57:35.012]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:511 phCellId:179
estCause:otherFailure
[18:57:35.012]000100         |<====|    |      |              (RRC)  rrcConnectionReestablishmentReject
[18:57:35.080]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:511 phCellId:179
estCause:otherFailure
[18:57:35.080]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:511 phCellId:179
estCause:otherFailure
[18:57:35.080]000100         |<====|    |      |              (RRC)  rrcConnectionReestablishmentReject
[18:57:35.152]000100         |====>|    |      |              (RRC)  rrcConnectionReestablishmentRequest cRNTI:511 phCellId:179
estCause:otherFailure
```

```
[18:57:35.152]000100          |====>|     |       |         (RRC)  rrcConnectionReestablishmentRequest cRNTI:511 phCellId:179
estCause:otherFailure
[18:57:35.152]000100          |<====|     |       |         (RRC)  rrcConnectionReestablishmentReject
::::::::::::::::::::::::::::::|:::::|:::::|:::::::|         ...... RRC Connection Request
[18:57:35.372]000100          |====>|     |       |         (RRC)  rrcConnectionRequest mTMSI:E0009981 estCause:mo-Signalling
[18:57:35.500]000100          |     |<==========|         (S1AP) DownlinkNASTransport enbUeS1ApId:498
[18:57:35.500]000100          |     |<==========|         (S1AP) UEContextReleaseCommand mmeUeS1ApId:79443625 cause:nas:normal-release
[18:57:35.500]000100          |<====|     |       |         (RRC)  dlInformationTransfer
[18:57:35.500]000100          |<===============|         (NAS)  TrackingAreaUpdateAccept
::::::::::::::::::::::::::::::|:::::|:::::|:::::::|         ...... RRC Connection Request
[18:57:37.640]000100          |====>|     |       |         (RRC)  rrcConnectionRequest mTMSI:E0009981 estCause:mo-Data
```

3) Deactivating trace

```
RBS33> te default

coli>/diagm/te default
coli>
```

17 Other commands

17.1 Logging to file

Open a log with the "l+" command. Output will be written to screen and to log. Stop logging with "l-".
To mute the output , use option "m". More info in "h l+". Examples:

 - Regular logging

```
COM87> l+

Logging to file: /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-220915_COM87.log

COM87> get 0

Connected to 10.64.88.87 (ManagedElement=1)
===================================================================================================
0                              ManagedElement=1
===================================================================================================
ldateTimeOffset
dnPrefix
localDateTime
managedElementId               1
networkManagedElementId
productIdentity                t[0] =
siteLocation
timeZone
```

```
userLabel                         this is a COM node
=================================================================================
Total: 1 MOs


COM87> l-

Log close: /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-220915_COM87.log
```

- Show the logfile

```
COM87> ! cat $logfile

Log start: 120904-220915 - 10.64.88.87 - moshell 9.0p - /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-220915_COM87.log

COM87> get 0

Connected to 10.64.88.87 (ManagedElement=1)
=================================================================================
0                                 ManagedElement=1
=================================================================================
dateTimeOffset
dnPrefix
localDateTime
managedElementId                  1
networkManagedElementId
productIdentity                   t[0] =
siteLocation
timeZone
userLabel                         this is a COM node
=================================================================================
Total: 1 MOs


Log close: 120904-220918 - /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-220915_COM87.log
```

- Mute logging

```
COM87> l+m

Logging to file: /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-220930_COM87.log

COM87> get 0
.
COM87> l-
```

```
Log close: /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-220930_COM87.log
```

- Show the logfile

```
COM87> ! cat $logfile

Log start: 120904-220930 - 10.64.88.87 - moshell 9.0p - /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-220930_COM87.log

COM87> get 0


===================================================================================================
0                                      ManagedElement=1
===================================================================================================
dateTimeOffset
dnPrefix
localDateTime
managedElementId                       1
networkManagedElementId
productIdentity                        t[0] =
siteLocation
timeZone
userLabel                              this is a COM node
===================================================================================================
Total: 1 MOs



Log close: 120904-220933 - /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-220930_COM87.log
```

- Help

```
COM87> h l+

******************************************************************************
l+[m][m][s][o]/l-/l?    [<logfile>]
******************************************************************************
Open/close moshell logfiles.

  * l+ is to open a logfile. If no logfile is given, then a default logfile is chosen.
The path of the default logfile is ~/moshell_logfiles/logs_moshell/sessionlog/DATE-TIME_NODE.log
The "m" option is for mute, ie: no output will be displayed on the screen until the log is closed. All output will go to the logfile.
The "mm" option is for extra mute, even less will be displayed on screen than with l+m.
The "s" option is for not printing the header "log open/log close". Can also be set with the "loginfo_print" uservariable.
The "o" option is for overwriting the logfile, otherwise it is appended.
  * l- is for closing the logfile.
  * l? is for checking if a logfile is currently open.
It is possible to open several logfiles but only one at a time will be active.
When one logfile is closed, logging will resume in the previous one.
Each time a logfile is open the scripting variable $logfile is set to the new logfile (see chapter 6 for more info on scripting).
Example:
```

```
>> l+ logfile1  (starts logging to logfile1. $logfile is set to "logfile1")
>> get
>> pr
>> l+ logfile2  (stops logging to logfile1 and starts logging to logfile2. $logfile is set to "logfile2")
>> vii
>> l-          (stops logging to logfile2 and resumes logging to logfile1. $logfile is set to "logfile1")
>> vols
>> l-          (stops logging to logfile1. $logfile stays set to "logfile1" which is the last file that was being logged to)
In this example, logfile1 will contain the printouts from "get", "pr" and "vols", while logfile2 will contain the printout from "vii"
```

17.2 Measure command execution time

The "time" command can be run on a logfile or on a individual command

```
COM87> time /home/eanzmagn/moshell_logfiles/logs_moshell/sessionlog/120904-221344_COM87.log


-------------------------------------------------------------------------------
Duration           %  Start->End        Command
-------------------------------------------------------------------------------
49s            100.0%  22:13:44->22:14:33  Total time
37s             75.5%  22:13:46->22:14:23  lt all
7s              14.3%  22:14:23->22:14:30  get moclass_group
0s               0.0%  22:14:33->22:14:33  st .



COM87> time get moclass_group . unlocked


=================================================================================
MO                                          Attribute       Value
=================================================================================
SysM=1,Snmp=1                               administrativeState 1 (UNLOCKED)
=================================================================================
Total: 1 MOs


$duration = 4
```

17.3 Moshell scripting

Refer to the chapter "scripting" in UserGuide.pdf and "MoshellAdvanced.doc" on http://utran01.au.ao.ericsson.se/moshell/training

Here is a example of a little script to find out which Role MO has the role "RW" (of course this could be done in a much simpler way but it is just to show what type of scripting functionality there is). Scripts can be stored in a command file and executed with "run" command. More examples of scripts can be found in the folder moshell/commonjars/scripts and moshell/examples/scripting

```
COM87> ma rolegroup role=

Added 3 MOs to group: rolegroup

COM87> pr rolegroup


================================================================================
Proxy   MO
================================================================================
  1023   SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_NOACCESS
  1024   SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_R
  1026   SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_RW
================================================================================
Total: 3 MOs


COM87> get rolegroup


=========================================================================================================
1023                                SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_NOACCESS
=========================================================================================================
roleId                              FileM_NOACCESS
roleName                            FileM_NOACCESS
userLabel                           FileM User with no access rights
=========================================================================================================
1024                                SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_R
=========================================================================================================
roleId                              FileM_R
roleName                            FileM_R
userLabel                           FileM User with R only rights
=========================================================================================================
1026                                SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_RW
=========================================================================================================
roleId                              FileM_RW
roleName                            FileM_RW
userLabel                           FileM User with RW rights
=========================================================================================================
Total: 3 MOs



COM87> for $mo in rolegroup
Enter commands (one per line), then type "done"
> get $mo rolename > $rolename
> if $rolename ~ RW
> $rwrole = ldn($mo)
> break
> fi
> done


-------------------------------------------------------------------------------
120904-18:01:21    MO 1 of 3: SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_RW
-------------------------------------------------------------------------------
```

```
COM87> get $mo rolename > $rolename


===============================================================================================
MO                                                       Attribute          Value
===============================================================================================
SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_RW roleName              FileM_RW
===============================================================================================
Total: 1 MOs

$rolename = FileM_RW


COM87> if $rolename ~ RW
Enter commands (one per line), then type "fi"
> $rwrole = ldn($mo)
> break
> fi


COM87> $rwrole = ldn($mo)

$rwrole = SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_RW


COM87> break


COM87>


COM87> pv $rwrole


$rwrole = SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=FileM_RW
```

17.4 COM specific settings

```
RBSG2> uv comcli|port


comcli                      = 2
comcli_cfg                  = /opt/com/etc/com.cfg
comcli_columns              = 1000
comcli_model                = /opt/com/etc/model/model_file_list.cfg
comcli_mom                  = 2
comcli_mompath              = /oss/models
comcli_port                 = 2023
comcli_portfile             = 0
comcli_portfilepath         = /local/scratch/eanzmagn/RCS_ROOT/home/eanzmagn/releases/*/port.conf
comcli_retry_interval       = 5
comcli_retry_maxtime        = 1200
comcli_timeout              = 120
corba_port                  = 56834
diffm_exclude_attributes    =
administrativeState,user,password,userLabel,remoteSctpPortNbapC,remoteSctpPortNbapD,selectionPriority,egressAtmMcr,ingressAtmMcr,egressAtmPcr,in
gressAtmPcr,ipAddress,ipAddress1,ipAddress2,ownIpAddressActive,ownIpAddressPassive,piuGroupNumber,upgradeGroupId,radioBuildingBlock,alarmStatus
```

```
export_dir              =
export_method           = 2
export_password         = ********
export_server           = 137.58.163.229
export_username         = moshki7203
ftp_port                = 2024
http_port               = 8080
netconf_port            = 2022
portbase                =
scorba_port             = 56836
secure_port             = 4192
smart_comcli            = 1
sql_port                = 8002
sshd_port               = 10001
telnet_port             = 4192


RBSG2>
```

Descriptions for each setting can be found in the moshell file

17.5 <u>File tree</u>

The command ftree/ftreef/ftreed can recursively show the contents of a folder on the node.

```
PRBS417> ftreef /var/persistent


-rw-r--r--         12  24 Nov 2013 15:33:00   /var/persistent/tmp/snmpPwdFile
-rw-r--r--         11  24 Nov 2013 14:55:00   /var/persistent/log/crashtimes.log
-rw-r-----          0  18 Nov 2013 13:21:00   /var/persistent/log/oss/pm/no-backup
...<cut>..
-rw-r-----        932  24 Nov 2013 14:04:00   /var/persistent/log/oss/pm/PerformanceManagementReportFiles/A20131124.1245+0000-
1300+0000_PRBS417.xml
-rw-r-----        932  24 Nov 2013 14:19:00   /var/persistent/log/oss/pm/PerformanceManagementReportFiles/A20131124.1300+0000-
1315+0000_PRBS417.xml
-rw-r-----        932  24 Nov 2013 14:34:00   /var/persistent/log/oss/pm/PerformanceManagementReportFiles/A20131124.1315+0000-
1330+0000_PRBS417.xml
-rw-r-----        932  24 Nov 2013 14:49:00   /var/persistent/log/oss/pm/PerformanceManagementReportFiles/A20131124.1330+0000-
1345+0000_PRBS417.xml
-rw-r--r--      12780  24 Nov 2013 15:19:00   /var/persistent/log/oss/pm/PerformanceManagementReportFiles/A20131124.1400+0000-
1415+0000_PRBS417.xml
-rw-r--r--      12780  24 Nov 2013 15:34:00   /var/persistent/log/oss/pm/PerformanceManagementReportFiles/A20131124.1415+0000-
1430+0000_PRBS417.xml
-rw-rw----        660  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/filesystem_status
-rw-rw----        910  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/sysevent
-rw-rw----       1292  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/ethernet_status
-rw-rw----       2960  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/process_list
-rw-rw----       5395  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/AutointegrationLog.txt
-rw-rw----       6843  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/SWUpgradeLog.txt
-rw-rw----     663551  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/runtime
-rw-rw----          0  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/log/lastlog
-rw-rw----          0  28 Jun 2013 19:16:00   /var/persistent/log/oss/diag1/log/no-backup
```

```
-rw-rw----       407  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag1/log/security
-rw-rw----       768  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag1/log/wtmp
-rw-rw----      9183  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag1/log/error
-rw-rw----     53520  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag1/log/middleware
-rw-rw----    663551  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag1/log/runtime
-rw-rw----   2130585  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag1/coredump/core.1372439791.p1871.u0.g0.s9.!opt!OAM!eoam!bin!eoam_aim.gz
-rw-rw----       660  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/filesystem_status
-rw-rw----       980  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/sysevent
-rw-rw----      1300  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/ethernet_status
-rw-rw----      2923  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/process_list
-rw-rw----      6174  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/AutointegrationLog.txt
-rw-rw----      6843  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/SWUpgradeLog.txt
-rw-rw----    558450  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/runtime
-rw-rw----         0  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/log/lastlog
-rw-rw----         0  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/log/no-backup
-rw-rw----       407  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/log/security
-rw-rw----       768  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/log/wtmp
-rw-rw----      4908  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/log/error
-rw-rw----     14677  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/log/middleware
-rw-rw----    558450  28 Jun 2013 19:16:00  /var/persistent/log/oss/diag2/log/runtime
-rw-------       668   4 Jul 2013 20:59:00  /var/persistent/ssh-keys/ssh_host_dsa_key
-rw-------      1679   4 Jul 2013 20:59:00  /var/persistent/ssh-keys/ssh_host_rsa_key
-rw-r--r--       394   4 Jul 2013 20:59:00  /var/persistent/ssh-keys/ssh_host_rsa_key.pub
-rw-r--r--       602   4 Jul 2013 20:59:00  /var/persistent/ssh-keys/ssh_host_dsa_key.pub


Total: 6.3 MB (6604534 bytes), 24 directories, 139 files.


PRBS417> h ftree


*******************************************************************************
ftree[f][d][1] [<lnh>/][<directory>] [| <unix-cmds>]
*******************************************************************************
Recursive listing of a directory on the file system of the node or the workstation.


This command first checks if the directory exists on the workstation and if yes, its contents is printed from the workstation.
Otherwise the command logs into the OSE shell of the node, checks if the directory exists on the node and prints its contents.


The directory can be entered either as a relative path or an absolute path.
To list a directory on a different board, enter the linkhandler of the board followed by the absolute path.
If no directory is entered then the current working directory will be listed.


 * The option "d" is for printing the subdirectories only.
 * The option "f" is for printing files only. Mainly useful on /c/pmd for increased speed and sorting by timestamp.
 * The option "1" is for non-recursive listing of a folder, same as "ls -l".


It is possible to pipe the output to a unix command for filtering/sorting purposes.


Example:
 >> ftree /home/myuserid/moshell ---> list all files and directories from the local folder /home/myuserid/moshell on the workstation.
 >> ftree /c/loadmodules_norepl  ---> list all files and directories from the folder /c/loadmodules_norepl on the node.
 >> ftree /c/loadmodules_norepl | grep xml  --> all files/directories matching "xml" are listed
 >> ftree 001900/f  --> all files and directories in the /f drive on board 001900 are listed
 >> ftreef /c/pmd   ---> list all PMD files, sorted by date and time
 >> ftreed /var     ---> list all the subdirectories under /var in the PRBS node
```

```
It is possible to run ftree on several boards by using the lh command.
Example:
 >> ba bp 0-9999  ---> put all boards in a group called "bp"
 >> br bp gpb     ---> remove all gpb boards from the "bp" group
 >> lh bp ftree /f ---> recursive listing of the /f drive on all bp boards
```

17.6 <u>File transfer</u>

Example: transferring the contents of a folder from the node to the workstation
(Applicable for nodes that have a SFTP server.)

```
COM87> ftget /opt/com/etc/model /home/eanzmagn/tmp


get /opt/com/etc/model/test.txt /home/eanzmagn/tmp/model/test.txt ... OK
get /opt/com/etc/model/model_file_list.cfg /home/eanzmagn/tmp/model/model_file_list.cfg ... OK
get /opt/com/etc/model/ComSecM.xml /home/eanzmagn/tmp/model/ComSecM.xml ... OK
get /opt/com/etc/model/ComSysM.xml /home/eanzmagn/tmp/model/ComSysM.xml ... OK
get /opt/com/etc/model/ECIM_CommonLibrary.xml /home/eanzmagn/tmp/model/ECIM_CommonLibrary.xml ... OK
get /opt/com/etc/model/ComLocalAuthorization.xml /home/eanzmagn/tmp/model/ComLocalAuthorization.xml ... OK
get /opt/com/etc/model/ComLdapAuthentication.xml /home/eanzmagn/tmp/model/ComLdapAuthentication.xml ... OK
get /opt/com/etc/model/ComTop.xml /home/eanzmagn/tmp/model/ComTop.xml ... OK
get /opt/com/etc/model/ComFileM.xml /home/eanzmagn/tmp/model/ComFileM.xml ... OK
get /opt/com/etc/model/ComFm.xml /home/eanzmagn/tmp/model/ComFm.xml ... OK
get /opt/com/etc/model/ComSnmp.xml /home/eanzmagn/tmp/model/ComSnmp.xml ... OK
get /opt/com/etc/model/mp.dtd /home/eanzmagn/tmp/model/mp.dtd ... OK


COM87> ! find /home/eanzmagn/tmp/model -ls


25522644    4 drwxrwxrwx   2 eanzmagn rnd          4096 Sep  4 21:04 /home/eanzmagn/tmp/model
25522645    0 -rw-r--r--   1 eanzmagn rnd            16 Sep  4 21:04 /home/eanzmagn/tmp/model/test.txt
25522646    4 -rwxr-xr-x   1 eanzmagn rnd           316 Sep  4 21:04 /home/eanzmagn/tmp/model/model_file_list.cfg
25522647   12 -rwxr-xr-x   1 eanzmagn rnd         10129 Sep  4 21:04 /home/eanzmagn/tmp/model/ComSecM.xml
25522648   12 -rwxr-xr-x   1 eanzmagn rnd         10696 Sep  4 21:04 /home/eanzmagn/tmp/model/ComSysM.xml
25522649   16 -rwxr-xr-x   1 eanzmagn rnd         13729 Sep  4 21:04 /home/eanzmagn/tmp/model/ECIM_CommonLibrary.xml
25522650   16 -rwxr-xr-x   1 eanzmagn rnd         14913 Sep  4 21:04 /home/eanzmagn/tmp/model/ComLocalAuthorization.xml
25522651   20 -rwxr-xr-x   1 eanzmagn rnd         17223 Sep  4 21:04 /home/eanzmagn/tmp/model/ComLdapAuthentication.xml
25522652   24 -rwxr-xr-x   1 eanzmagn rnd         22528 Sep  4 21:04 /home/eanzmagn/tmp/model/ComTop.xml
25522653   24 -rwxr-xr-x   1 eanzmagn rnd         23754 Sep  4 21:04 /home/eanzmagn/tmp/model/ComFileM.xml
25522654   24 -rwxr-xr-x   1 eanzmagn rnd         24162 Sep  4 21:04 /home/eanzmagn/tmp/model/ComFm.xml
25522655   28 -rwxr-xr-x   1 eanzmagn rnd         26742 Sep  4 21:04 /home/eanzmagn/tmp/model/ComSnmp.xml
25522656   32 -rwxr-xr-x   1 eanzmagn rnd         31403 Sep  4 21:04 /home/eanzmagn/tmp/model/mp.dtd


COM87> h ftget


****************************************************************************
ftget[c]/ftput[c]/ftdel [<options>] <source> [<destination>]
****************************************************************************
Transfer files or directories to/from the node, using ftp or sftp.
```

```
Syntax:
******
   * ftput[c] [<options>] localfile/localdir   [remotefile/remotedir]
   * ftget[c] [<options>] remotefile/remotedir [localfile/localdir]
   * ftdel    [<options>] remotefile/remotedir
Where "local" refers to the workstation and "remote" refers to the CPP node.
It is possible to transfer a whole directory to/from the node by specifying a source directory instead of a source file.
The "c" switch stands for conditional and means that if the file already exists on the workstation/node, it will not be overwritten.
The options can be place anywhere on the comand line but the source must be given before the destination. If the destination is omitted then the
current working directory is chosen.
The ftdel command removes an individual file or a set of files inside a folder.


Filtering option:
****************
The "-f" option allows to specify a regular expression to only transfer the files matching that expression. See examples below.


Time options:
************
The "-s" and "-e" options are used for specifying an absolute timespan: -s gives the starting date and -e gives the ending date. The format is
yyyymmdd[.hhmm], for instance 20071230, or 20071230.0800.
The "-m" and "-p" options are used for specifying a timespan relative to today's date: -m gives how long time backward and -p gives how long
time forward. The format is in days, hours, or minutes, eg. 10d (10 days), 2h (2 hours), 30m (30 minutes).


Examples:
********
>> ftget /c/logfiles  --> fetch the folder /c/logfiles and all of its contents and store it in the current working directory on the workstation
>> ftget /c/logfiles /home/eric  --> fetch the folder /c/logfiles and all of its contents and store it in the folder /home/eric on the
workstation
>> ftputc /home/eric/rnc10/configuration/cv/cv-10 /d/configuration/cv  --> put the folder cv-10 from the workstation to the node, files that
already exist on the node will not be overwritten (conditional transfer)
>> ftget -f A.*xml.gz -m 3h /c/pm_data /home/eric/rnc10   --> download files from the folder /c/pm_data whose path matches the string A.*xml.gz
and whose timestamp is from the last 3 hours.
>> ftget /c/loadmodules_norepl /home/eric/rnc10 -f (xml|jar)$ --> fetch all files matching who have the extension "xml" or "jar" from the folder
/c/loadmodules_norepl and any of its subfolders.
>> ftdel /c/pm_data -f .tmp$ -m 900 -p 870  --> delete files with the extension ".tmp" in the folder /c/pm_data , with timestamp older than 30
days.


Notes:
* Only active mode is supported for unsecure ftp. If active mode is not allowed by the firewall, then use secure_ftp instead (see chap 2.6 for
info about secure_shell/secure_ftp).
* By running ftput/ftget from mobatch, it is possible to get/put files to/from many nodes in parallel.
```

Editing a file directly on the node: the file will be transferred to the workstation, opened in the editor specified in the moshell uservariable "editor" and transferred back to the node after editing.

```
COM87> h edit


*********************************************************************************
edit <remotefile>
*********************************************************************************
Edit a file on the node.
```

Moshell will download the file, spawn your editor allowing you to edit it and then upload it once you have finished.

The editor is specified in the "editor" user variable. By default, "editor" is set to the bash environment variable $EDITOR. If $EDITOR is not set, then "vi" will be used. To use another editor, add the following line in the ~/.moshellrc file:
editor=/path/to/your/favorite/editor

```
COM87> uv editor

editor                = vi

COM87> edit /opt/com/etc/model/test.txt

get /opt/com/etc/model/test.txt /home/eanzmagn/moshell_logfiles/logs_moshell/other/test.txt.10.64.88.87.120904_210601 ... OK
Spawning editor. Exit editor to return to moshell.
vi /home/eanzmagn/moshell_logfiles/logs_moshell/other/test.txt.10.64.88.87.120904_210601
.....
:wq

"/home/eanzmagn/moshell_logfiles/logs_moshell/other/test.txt.10.64.88.87.120904_210601" 2 lines, 16 characters
put /home/eanzmagn/moshell_logfiles/logs_moshell/other/test.txt.10.64.88.87.120904_210601 /opt/com/etc/model/test.txt ... OK

COM87> ls -l /opt/com/etc/model/test.txt

SC-1:~ # ls -l /opt/com/etc/model/test.txt
-rw-r--r-- 1 root root 16 Sep  4 21:06 /opt/com/etc/model/test.txt
SC-1:~ # exit
Connection to 10.64.88.87 closed.
$
```

17.7 <u>MoBatch</u>

To run commands on many nodes in parallel, the mobatch utility can be used.
Example:

```
**:srld7246@~> which mobatch
/home/eanzmagn/moshell/mobatch


**:srld7246@~> mobatch moshell_logfiles/all_com 'lt all;prm moclass_group'

Sitefile = moshell_logfiles/all_com. Number of sites = 77
Command = lt all;prm moclass_group
Timeout set to 30 minutes (default value)
Wait interval set to 2.5 seconds
Maximum number of parallel processes set to 10 (default value)

Logfiles stored in /home/eanzmagn/moshell_logfiles/logs_mobatch/2012-09-04/all_com/17-01
```

```
######################################################################
>>>>> STARTED (pid)
** FINISHED (result)            STATUS (started, finished, queue, running, sites running)
######################################################################
>>>>> com11 (13159)              1s  0f 76q  1r: com11
>>>>> com12 (13161)              2s  0f 75q  2r: com11 com12
>>>>> com13 (13164)              3s  0f 74q  3r: com11 com12 com13
>>>>> com14 (13167)              4s  0f 73q  4r: com11 com12 com13 com14
>>>>> com15 (13168)              5s  0f 72q  5r: com11 com12 com13 com14 com15
>>>>> com16 (13169)              6s  0f 71q  6r: com11 com12 com13 com14 com15 com16
>>>>> com17 (13170)              7s  0f 70q  7r: com11 com12 com13 com14 com15 com16 com17
>>>>> com18 (13171)              8s  0f 69q  8r: com11 com12 com13 com14 com15 com16 com17 com18
>>>>> com0 (13172)               9s  0f 68q  9r: com0 com11 com12 com13 com14 com15 com16 com17 com18
>>>>> com1 (13173)              10s  0f 67q 10r: com0 com1 com11 com12 com13 com14 com15 com16 com17 com18
** com16 (no contact)          10s  1f 67q  9r: com0 com1 com11 com12 com13 com14 com15 com17 com18
** com13 (no contact)          10s  2f 67q  8r: com0 com1 com11 com12 com14 com15 com17 com18
>>>>> com2 (13764)             11s  2f 66q  9r: com0 com1 com11 com12 com14 com15 com17 com18 com2
>>>>> com3 (13766)             12s  2f 65q 10r: com0 com1 com11 com12 com14 com15 com17 com18 com2 com3
** com18 (OK)                 12s  3f 65q  9r: com0 com1 com11 com12 com14 com15 com17 com2 com3
** com17 (OK)                 12s  4f 65q  8r: com0 com1 com11 com12 com14 com15 com2 com3
>>>>> com4 (14032)            13s  4f 64q  9r: com0 com1 com11 com12 com14 com15 com2 com3 com4
>>>>> com5 (14034)            14s  4f 63q 10r: com0 com1 com11 com12 com14 com15 com2 com3 com4 com5
** com1 (OK)                 14s  5f 63q  9r: com0 com11 com12 com14 com15 com2 com3 com4 com5
** com12 (OK)                14s  6f 63q  8r: com0 com11 com14 com15 com2 com3 com4 com5
>>>>> com6 (14138)           15s  6f 62q  9r: com0 com11 com14 com15 com2 com3 com4 com5 com6
>>>>> com7 (14139)           16s  6f 61q 10r: com0 com11 com14 com15 com2 com3 com4 com5 com6 com7
** com11 (OK)               16s  7f 61q  9r: com0 com14 com15 com2 com3 com4 com5 com6 com7
** com15 (OK)               16s  8f 61q  8r: com0 com14 com2 com3 com4 com5 com6 com7
** com0 (OK)                16s  9f 61q  7r: com14 com2 com3 com4 com5 com6 com7
>>>>> com8 (14255)           17s  9f 60q  8r: com14 com2 com3 com4 com5 com6 com7 com8
>>>>> com9 (14258)           18s  9f 59q  9r: com14 com2 com3 com4 com5 com6 com7 com8 com9
>>>>> com10 (14259)          19s  9f 58q 10r: com10 com14 com2 com3 com4 com5 com6 com7 com8 com9
** com14 (OK)               19s 10f 58q  9r: com10 com2 com3 com4 com5 com6 com7 com8 com9
>>>>> com67 (14382)          20s 10f 57q 10r: com10 com2 com3 com4 com5 com6 com67 com7 com8 com9
** com2 (OK)                20s 11f 57q  9r: com10 com3 com4 com5 com6 com67 com7 com8 com9
>>>>> com68 (14668)          21s 11f 56q 10r: com10 com3 com4 com5 com6 com67 com68 com7 com8 com9
** com4 (OK)                21s 12f 56q  9r: com10 com3 com5 com6 com67 com68 com7 com8 com9
** com3 (OK)                21s 13f 56q  8r: com10 com5 com6 com67 com68 com7 com8 com9
>>>>> com69 (14858)          22s 13f 55q  9r: com10 com5 com6 com67 com68 com69 com7 com8 com9
>>>>> com70 (14861)          23s 13f 54q 10r: com10 com5 com6 com67 com68 com69 com7 com70 com8 com9
** com5 (OK)                23s 14f 54q  9r: com10 com6 com67 com68 com69 com7 com70 com8 com9
>>>>> com71 (14971)          24s 14f 53q 10r: com10 com6 com67 com68 com69 com7 com70 com71 com8 com9
** com6 (OK)                24s 15f 53q  9r: com10 com67 com68 com69 com7 com70 com71 com8 com9
>>>>> com72 (15076)          25s 15f 52q 10r: com10 com67 com68 com69 com7 com70 com71 com72 com8 com9
** com8 (OK)                25s 16f 52q  9r: com10 com67 com68 com69 com7 com70 com71 com72 com9
** com7 (OK)                25s 17f 52q  8r: com10 com67 com68 com69 com70 com71 com72 com9
** com9 (OK)                25s 18f 52q  7r: com10 com67 com68 com69 com70 com71 com72
>>>>> com73 (15197)          26s 18f 51q  8r: com10 com67 com68 com69 com70 com71 com72 com73
>>>>> com74 (15198)          27s 18f 50q  9r: com10 com67 com68 com69 com70 com71 com72 com73 com74
>>>>> com75 (15203)          28s 18f 49q 10r: com10 com67 com68 com69 com70 com71 com72 com73 com74 com75
** com10 (OK)               28s 19f 49q  9r: com67 com68 com69 com70 com71 com72 com73 com74 com75
>>>>> com76 (15297)          29s 19f 48q 10r: com67 com68 com69 com70 com71 com72 com73 com74 com75 com76
** com71 (OK)               29s 20f 48q  9r: com67 com68 com69 com70 com72 com73 com74 com75 com76
>>>>> com77 (15661)          30s 20f 47q 10r: com67 com68 com69 com70 com72 com73 com74 com75 com76 com77
** com68 (OK)               30s 21f 47q  9r: com67 com69 com70 com72 com73 com74 com75 com76 com77
** com72 (OK)               30s 22f 47q  8r: com67 com69 com70 com73 com74 com75 com76 com77
```

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>>>>> com78 (15723)          31s 22f 46q  9r: com67 com69 com70 com73 com74 com75 com76 com77 com78
>>>>> com79 (15724)          32s 22f 45q 10r: com67 com69 com70 com73 com74 com75 com76 com77 com78 com79
** com69 (OK)                32s 23f 45q  9r: com67 com70 com73 com74 com75 com76 com77 com78 com79
** com74 (OK)                32s 24f 45q  8r: com67 com70 com73 com75 com76 com77 com78 com79
>>>>> com80 (15841)          33s 24f 44q  9r: com67 com70 com73 com75 com76 com77 com78 com79 com80
>>>>> com81 (15842)          34s 24f 43q 10r: com67 com70 com73 com75 com76 com77 com78 com79 com80 com81
** com70 (OK)                34s 25f 43q  9r: com67 com73 com75 com76 com77 com78 com79 com80 com81
** com73 (OK)                34s 26f 43q  8r: com67 com75 com76 com77 com78 com79 com80 com81
>>>>> com82 (15992)          35s 26f 42q  9r: com67 com75 com76 com77 com78 com79 com80 com81 com82
>>>>> com83 (15994)          36s 26f 41q 10r: com67 com75 com76 com77 com78 com79 com80 com81 com82 com83
** com75 (OK)                36s 27f 41q  9r: com67 com76 com77 com78 com79 com80 com81 com82 com83
>>>>> com84 (16081)          37s 27f 40q 10r: com67 com76 com77 com78 com79 com80 com81 com82 com83 com84
** com76 (OK)                37s 28f 40q  9r: com67 com77 com78 com79 com80 com81 com82 com83 com84
>>>>> com85 (16199)          38s 28f 39q 10r: com67 com77 com78 com79 com80 com81 com82 com83 com84 com85
** com77 (OK)                38s 29f 39q  9r: com67 com78 com79 com80 com81 com82 com83 com84 com85
>>>>> com86 (16277)          39s 29f 38q 10r: com67 com78 com79 com80 com81 com82 com83 com84 com85 com86
** com78 (OK)                39s 30f 38q  9r: com67 com79 com80 com81 com82 com83 com84 com85 com86
>>>>> com87 (16360)          40s 30f 37q 10r: com67 com79 com80 com81 com82 com83 com84 com85 com86 com87
** com79 (OK)                40s 31f 37q  9r: com67 com80 com81 com82 com83 com84 com85 com86 com87
>>>>> com88 (16421)          41s 31f 36q 10r: com67 com80 com81 com82 com83 com84 com85 com86 com87 com88
** com80 (OK)                41s 32f 36q  9r: com67 com81 com82 com83 com84 com85 com86 com87 com88
>>>>> com89 (16508)          42s 32f 35q 10r: com67 com81 com82 com83 com84 com85 com86 com87 com88 com89
** com81 (OK)                42s 33f 35q  9r: com67 com82 com83 com84 com85 com86 com87 com88 com89
>>>>> com90 (16573)          43s 33f 34q 10r: com67 com82 com83 com84 com85 com86 com87 com88 com89 com90
** com82 (OK)                43s 34f 34q  9r: com67 com83 com84 com85 com86 com87 com88 com89 com90
>>>>> com91 (16665)          44s 34f 33q 10r: com67 com83 com84 com85 com86 com87 com88 com89 com90 com91
** com85 (OK)                44s 35f 33q  9r: com67 com83 com84 com86 com87 com88 com89 com90 com91
** com83 (OK)                44s 36f 33q  8r: com67 com84 com86 com87 com88 com89 com90 com91
>>>>> com92 (16839)          45s 36f 32q  9r: com67 com84 com86 com87 com88 com89 com90 com91 com92
>>>>> com93 (16842)          46s 36f 31q 10r: com67 com84 com86 com87 com88 com89 com90 com91 com92 com93
** com86 (OK)                46s 37f 31q  8r: com67 com87 com88 com89 com90 com91 com92 com93
** com84 (OK)                46s 38f 31q  8r: com67 com87 com88 com89 com90 com91 com92 com93
>>>>> com94 (16933)          47s 38f 30q  9r: com67 com87 com88 com89 com90 com91 com92 com93 com94
>>>>> com95 (16934)          48s 38f 29q 10r: com67 com87 com88 com89 com90 com91 com92 com93 com94 com95
** com89 (no contact)        48s 39f 29q  9r: com67 com87 com88 com90 com91 com92 com93 com94 com95
>>>>> com96 (17096)          49s 39f 28q 10r: com67 com87 com88 com90 com91 com92 com93 com94 com95 com96
** com90 (no contact)        49s 40f 28q  9r: com67 com87 com88 com91 com92 com93 com94 com95 com96
>>>>> com97 (17152)          50s 40f 27q 10r: com67 com87 com88 com91 com92 com93 com94 com95 com96 com97
** com88 (OK)                50s 41f 27q  9r: com67 com87 com91 com92 com93 com94 com95 com96 com97
>>>>> com98 (17250)          51s 41f 26q 10r: com67 com87 com91 com92 com93 com94 com95 com96 com97 com98
** com91 (OK)                51s 42f 26q  9r: com67 com87 com92 com93 com94 com95 com96 com97 com98
>>>>> com99 (17337)          52s 42f 25q 10r: com67 com87 com92 com93 com94 com95 com96 com97 com98 com99
** com92 (OK)                52s 43f 25q  9r: com67 com87 com93 com94 com95 com96 com97 com98 com99
** com93 (OK)                52s 44f 25q  8r: com67 com87 com94 com95 com96 com97 com98 com99
>>>>> com100 (17478)         53s 44f 24q  9r: com100 com67 com87 com94 com95 com96 com97 com98 com99
>>>>> com101 (17480)         54s 44f 23q 10r: com100 com101 com67 com87 com94 com95 com96 com97 com98 com99
** com95 (OK)                54s 45f 23q  9r: com100 com101 com67 com87 com94 com96 com97 com98 com99
>>>>> com102 (17582)         55s 45f 22q 10r: com100 com101 com102 com67 com87 com94 com96 com97 com98 com99
** com94 (OK)                55s 46f 22q  9r: com100 com101 com102 com67 com87 com96 com97 com98 com99
>>>>> com103 (17640)         56s 46f 21q 10r: com100 com101 com102 com103 com67 com87 com96 com97 com98 com99
** com96 (OK)                56s 47f 21q  9r: com100 com101 com102 com103 com67 com87 com97 com98 com99
>>>>> com104 (17697)         57s 47f 20q 10r: com100 com101 com102 com103 com104 com67 com87 com97 com98 com99
** com97 (OK)                57s 48f 20q  9r: com100 com101 com102 com103 com104 com67 com87 com98 com99
** com98 (OK)                57s 49f 20q  8r: com100 com101 com102 com103 com104 com67 com87 com99
>>>>> com105 (17758)         58s 49f 19q  9r: com100 com101 com102 com103 com104 com105 com67 com87 com99
>>>>> com106 (17759)         59s 49f 18q 10r: com100 com101 com102 com103 com104 com105 com106 com67 com87 com99
** com99 (OK)                59s 50f 18q  9r: com100 com101 com102 com103 com104 com105 com106 com67 com87
>>>>> com107 (17882)         60s 50f 17q 10r: com100 com101 com102 com103 com104 com105 com106 com107 com67 com87
```

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**  com87 (OK)                    60s 51f 17q  9r: com100 com101 com102 com103 com104 com105 com106 com107 com67
>>>>> com108 (18002)              61s 51f 16q 10r: com100 com101 com102 com103 com104 com105 com106 com107 com108 com67
**  com102 (OK)                   61s 52f 16q  9r: com100 com101 com103 com104 com105 com106 com107 com108 com67
>>>>> com109 (18157)              62s 52f 15q 10r: com100 com101 com103 com104 com105 com106 com107 com108 com109 com67
**  com103 (OK)                   62s 53f 15q  9r: com100 com101 com104 com105 com106 com107 com108 com109 com67
>>>>> com110 (18198)              63s 53f 14q 10r: com100 com101 com104 com105 com106 com107 com108 com109 com110 com67
**  com105 (OK)                   63s 54f 14q  9r: com100 com101 com104 com106 com107 com108 com109 com110 com67
>>>>> com111 (18276)              64s 54f 13q 10r: com100 com101 com104 com106 com107 com108 com109 com110 com111 com67
**  com104 (OK)                   64s 55f 13q  9r: com100 com101 com106 com107 com108 com109 com110 com111 com67
>>>>> com112 (18351)              65s 55f 12q 10r: com100 com101 com106 com107 com108 com109 com110 com111 com112 com67
**  com101 (OK)                   65s 56f 12q  9r: com100 com106 com107 com108 com109 com110 com111 com112 com67
**  com107 (OK)                   65s 57f 12q  8r: com100 com106 com108 com109 com110 com111 com112 com67
>>>>> com113 (18423)              66s 57f 11q  9r: com100 com106 com108 com109 com110 com111 com112 com113 com67
>>>>> com114 (18425)              67s 57f 10q 10r: com100 com106 com108 com109 com110 com111 com112 com113 com114 com67
**  com108 (no contact)           67s 58f 10q  9r: com100 com106 com109 com110 com111 com112 com113 com114 com67
>>>>> com115 (18549)              68s 58f  9q 10r: com100 com106 com109 com110 com111 com112 com113 com114 com115 com67
**  com111 (OK)                   68s 59f  9q  9r: com100 com106 com109 com110 com112 com113 com114 com115 com67
>>>>> com116 (18660)              69s 59f  8q 10r: com100 com106 com109 com110 com112 com113 com114 com115 com116 com67
**  com112 (OK)                   69s 60f  8q  8r: com100 com106 com110 com113 com114 com115 com116 com67
**  com110 (OK - WrongPw)         69s 61f  8q  7r: com100 com106 com113 com114 com115 com116 com67
**  com109 (OK - WrongPw)         69s 62f  8q  7r: com100 com106 com113 com114 com115 com116 com67
>>>>> com117 (18717)              70s 62f  7q  8r: com100 com106 com113 com114 com115 com116 com117 com67
>>>>> com118 (18718)              71s 62f  6q  9r: com100 com106 com113 com114 com115 com116 com117 com118 com67
>>>>> com119 (18721)              72s 62f  5q 10r: com100 com106 com113 com114 com115 com116 com117 com118 com119 com67
**  com113 (OK - WrongPw)         72s 63f  5q  9r: com100 com106 com114 com115 com116 com117 com118 com119 com67
**  com114 (no contact)           72s 64f  5q  8r: com100 com106 com115 com116 com117 com118 com119 com67
>>>>> com120 (18880)              73s 64f  4q  9r: com100 com106 com115 com116 com117 com118 com119 com120 com67
>>>>> com121 (18883)              74s 64f  3q 10r: com100 com106 com115 com116 com117 com118 com119 com120 com121 com67
**  com115 (OK)                   74s 65f  3q  9r: com100 com106 com116 com117 com118 com119 com120 com121 com67
>>>>> com122 (19030)              75s 65f  2q 10r: com100 com106 com116 com117 com118 com119 com120 com121 com122 com67
**  com117 (OK)                   75s 66f  2q  9r: com100 com106 com116 com118 com119 com120 com121 com122 com67
>>>>> com123 (19207)              76s 66f  1q 10r: com100 com106 com116 com118 com119 com120 com121 com122 com123 com67
**  com119 (OK)                   76s 67f  1q  9r: com100 com106 com116 com118 com120 com121 com122 com123 com67
>>>>> com124 (19295)              77s 67f  0q 10r: com100 com106 com116 com118 com120 com121 com122 com123 com124 com67
**  com122 (OK)                   77s 68f  0q  9r: com100 com106 com116 com118 com120 com121 com123 com124 com67
**  com121 (OK)                   77s 69f  0q  8r: com100 com106 com116 com118 com120 com123 com124 com67
**  com120 (OK)                   77s 70f  0q  7r: com100 com106 com116 com118 com123 com124 com67
**  com123 (OK)                   77s 71f  0q  6r: com100 com106 com116 com118 com124 com67
**  com124 (OK)                   77s 72f  0q  5r: com100 com106 com116 com118 com67
**  com100 (OK)                   77s 73f  0q  4r: com106 com116 com118 com67
**  com106 (OK)                   77s 74f  0q  3r: com116 com118 com67
**  com116 (OK)                   77s 75f  0q  2r: com118 com67
**  com118 (OK)                   77s 76f  0q  1r: com67
**  com67 (OK)                    77s 77f  0q  0r:
################################################################################

OK            0m33s    com11
OK            0m31s    com12
no contact    0m21s    com13
OK            0m36s    com14
OK            0m33s    com15
no contact    0m21s    com16
OK            0m28s    com17
OK            0m28s    com18
OK            0m33s    com0
OK            0m31s    com1
OK            0m28s    com2
```

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OK              0m36s    com3
OK              0m28s    com4
OK              0m31s    com5
OK              0m31s    com6
OK              0m34s    com7
OK              0m31s    com8
OK              0m31s    com9
OK              0m34s    com10
OK              16m31s   com67
OK              0m36s    com68
OK              0m32s    com69
OK              0m36s    com70
OK              0m24s    com71
OK              0m23s    com72
OK              0m29s    com73
OK              0m23s    com74
OK              0m31s    com75
OK              0m34s    com76
OK              0m21s    com77
OK              0m20s    com78
OK              0m23s    com79
OK              0m26s    com80
OK              0m26s    com81
OK              0m26s    com82
OK              0m33s    com83
OK              0m31s    com84
OK              0m26s    com85
OK              0m23s    com86
OK              0m59s    com87
OK              0m29s    com88
no contact      0m18s    com89
no contact      0m18s    com90
OK              0m20s    com91
OK              0m21s    com92
OK              0m21s    com93
OK              0m23s    com94
OK              0m21s    com95
OK              0m21s    com96
OK              0m20s    com97
OK              0m18s    com98
OK              0m18s    com99
OK              1m50s    com100
OK              0m33s    com101
OK              0m21s    com102
OK              0m20s    com103
OK              0m24s    com104
OK              0m18s    com105
OK              1m50s    com106
OK              0m20s    com107
no contact      0m18s    com108
OK - WrongPw    0m18s    com109
OK - WrongPw    0m18s    com110
OK              0m12s    com111
OK              0m13s    com112
OK - WrongPw    0m15s    com113
no contact      0m15s    com114
OK              0m15s    com115
OK              1m51s    com116
```

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OK              0m15s   com117
OK              2m26s   com118
OK              0m20s   com119
OK              0m26s   com120
OK              0m23s   com121
OK              0m15s   com122
OK              0m13s   com123
OK              0m13s   com124


Total mobatch duration: 17m13s
Logfiles stored in /home/eanzmagn/moshell_logfiles/logs_mobatch/2012-09-04/all_com/17-01


**:srld7246@~/moshell_logfiles/logs_mobatch/2012-09-04/all_com/17-01> grep 'Loaded' *
com0.log:Last MO:    27. Loaded    27 MOs. Total:     28 MOs.
com1.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
com10.log:Last MO:    35. Loaded    35 MOs. Total:     36 MOs.
com101.log:Last MO:    68. Loaded    68 MOs. Total:     69 MOs.
com11.log:Last MO:    44. Loaded    44 MOs. Total:     45 MOs.
com121.log:Last MO:    64. Loaded    64 MOs. Total:     65 MOs.
com124.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
com2.log:Last MO:    28. Loaded    28 MOs. Total:     29 MOs.
com3.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
com4.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
com5.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
com6.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
com67.log:Last MO:  1260. Loaded 1260 MOs. Total:   1261 MOs.
com69.log:Last MO:    67. Loaded    67 MOs. Total:     68 MOs.
com7.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
com75.log:Last MO:   265. Loaded   265 MOs. Total:    266 MOs.
com8.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
com87.log:Last MO:  1056. Loaded 1056 MOs. Total:   1057 MOs.
com9.log:Last MO:    26. Loaded    26 MOs. Total:     27 MOs.
```

Mobatch help:

```
**:srld7246@~> mobatch
Usage:  mobatch [options] <sitefile>|<sitelist>|<dumpdir>  <command(s)>|<commandfile>|<commanddir> [logdirectory]


        Purpose: To send moshell commands to several nodes in parallel.


        Arguments:
         - The first argument is the sitefile, sitelist, or dumpdir.
        The sitefile is a file containing the list of sites to connect to. Each line in the sitefile contains:
                * the IP/DNS addresses and/or site names whose IP address are defined in the IP database.
                * optionally: the uservariables/scriptingvariables to input with -v option.
        See example of sitefile and ipdatabase in: moshell/examples/mobatch_files/
        If using the sitelist, the sites are listed on the command line and separated by commas.
        The dumpdir is a directory containing:
                * MO dumps (format: <kget.log.gz> or <modump.zip>)
                * or CVs/dbdat files (format: <cv.zip> or <db.dat>) -> only supported with option "-d"
         - The second argument is the commmands or commandfile.
        See example of commands below and commandfile in moshell/examples/mobatch_files
        If a directory is given, then a different commandfile will be used for each node:
```

```
                 the name of each commandfile should be <node-name>.cmd or <node-name>.mos
                 the <node-name> should be the same as given in the sitefile.
                 example: node-name is rbs602 ==> commandfile should be rbs602.cmd or rbs602.mos
        - The third argument (logdirectory) is optional. If no logdirectory is specified, a default one will be used.


        Options:
        - t <minutes>      Specify the number of minutes before timing out. Set to 0 for no timeout (default=20 minutes)
        - p <processes>    Specify the maximum number of moshell sessions that will run in parallel (default=10 parallel sessions)
        - i <seconds>      Specify the interval in seconds between spawning of each moshell session (default=0 seconds)
        - w <seconds>      Specify the interval in seconds between the checks on running sessions (default= 2.5 seconds)
        - v <userVariables> Specify moshell uservariables. Type "moshell" on its own for more info about this option.
        - o                Print output of every moshell session both to screen and to logfile.
        - s                Silent. No output is printed.
        - d                Run moshell in sql mode. Only applicable when first argument is a directory ("dumpdir")
        - r                Recursive folder search. Only applicable when first argument is a directory ("dumpdir").


        Examples:
              mobatch -p 15 -t 60 ~/sitefiles/victoria-sites 'lt all ; get'
              mobatch 10.1.128.10 ./cmdfiles/kget.mos
              mobatch 10.1.128.10,rnc34,rbs10,mgw1.ericsson.se ./cmdfiles/kget.mos
              mobatch ./sitefiles/all-rbs.txt ./cmdfiles/do_healthCheck.mos
              mobatch -p 5 -t 1 ./sitefiles/all-rbs.txt 'cv cu ; rbs'
              mobatch ./sitefiles/all-rnc.txt 'lt ^utrancell ; st cell'
              mobatch ./sitefiles/all-bsc.txt ~/bsc-commandfiles/
              mobatch -v security_method=2,sa_credential=~/sam.pbe,sa_password=oemas -p 20 ./all_mgw.txt 'hc'
              mobatch -v ip_database=~/utran_network/ipdatabase ~/utran_network/ipdatabase 'lt all ; get '
              mobatch modumpfolder/ 'str;std;sti;stv;inv'
              mobatch -r modumpfolder/ 'str;std;sti;stv;inv'
              mobatch -dr dbdatfolder/ dbc
```

17.8 References

For more information about MO command syntax in moshell (using regular expression filters etc), refer to:
- **moshell training material document "MoshellBasic.doc" on http://utran01.au.ao.ericsson.se/moshell/training**
- **moshell user guide in the moshell folder moshell/UserGuide.pdf or on moshell homepage http://utran01.au.ao.ericsson.se/moshell**

PICO
LTE FDD RBS6401 L14A http://cpistore.internal.ericsson.com/alexserv?id=17029
WCDMA RBS6401 W14.1 http://cpistore.internal.ericsson.com/alexserv?id=29931

MSRBS Gen2
- **Troubleshooting Wiki: http://lte-plm.rnd.ki.sw.ericsson.se/lte_trsh_wiki/G2P/index.php**
- **RCS documents: https://ericoll.internal.ericsson.com/sites/RBS_CS_Info/Pages/home.aspx**
- **RBS6000 Gen2 links:**
    o   **https://lte-wiki.rnd.ki.sw.ericsson.se/mediawiki/index.php/RBS6000-G2**

- o **https://ericoll.internal.ericsson.com/sites/RBS6000-GEN2-SYSTEM/default.aspx**
- o **https://lte-wiki.rnd.ki.sw.ericsson.se/mediawiki/index.php/RBS6000-G2/CIsupport**
- o **https://lte-wiki.rnd.ki.sw.ericsson.se/mediawiki/index.php/RBS6000-G2/CIsupport/Troubleshooting**

LTE Documentation
- **LTE Training Material https://ericoll.internal.ericsson.com/sites/lte_competence_space/LTE_worksp/Development%20files/Forms/AllItems.aspx**
- **LTE Trouble-Shooting course:**
  ftp://ftp.lmera.ericsson.se/pub/incoming/plmlte/LTE-basic-troubleshoooting
  ftp://ftp.lmera.ericsson.se/pub/incoming/plmlte/LTE-Advanced-Troubleshooting
  https://ericoll.internal.ericsson.com/sites/PLM/LTE_RAN/Pages/PLM_Courses.aspx
- **LTE Academy** https://ericoll.internal.ericsson.com/sites/PLM/LTE_RAN/Pages/PLM_Courses.aspx
- **Troubleshooting Wiki: http://lte-plm.rnd.ki.sw.ericsson.se/lte_trsh_wiki/**
- **Feature Troubleshooting Wiki: https://lte-wiki.rnd.ki.sw.ericsson.se/mediawiki/index.php/FeatureTroubleShooting**
- **LTE Guidelines https://ericoll.internal.ericsson.com/sites/RAN_Methods_Guidelines/LTE/Pages/home.aspx**
- **LTE Deliveries, release notes: https://ericoll.internal.ericsson.com/sites/PLM/LTE_RAN/LTE_RAN_L12/Pages/Deliveries.aspx**
- **LTE PLM Melbourne:** http://utran01.au.ao.ericsson.se/utranwiki/LtePlmMelbourne
- **LTE Melbourne Wiki:** http://utran01.au.ao.ericsson.se/utranwiki/LteInformation
- **LTE RAN GCC wiki:** https://ericoll.internal.ericsson.com/sites/Global_Deployment_for_Competence_Domains/LTERAN/Pages/LTERANGCCWiki.aspx
- **Knowledge base:** https://ericoll.internal.ericsson.com/sites/LTERAN/default.aspx
- **CPI L12B:** http://cpistore.internal.ericsson.com/alexserv?id=24179
- **LTE tracing tutorials:** http://airlink.internal.ericsson.com/ltetutorial.php , http://airlink.internal.ericsson.com/lteobservability.php ,
  http://airlink.internal.ericsson.com/ltebaseband.php
- **LTE RN helpdesk:** http://internal.ericsson.com/page/hub_net/unit/unit_01/u_13/lte_rn_helpdesk/index.jsp
- **LTE Product Configuration and Integration course:** http://utran01.au.ao.ericsson.se/utranwiki/LtePciCourse
  http://utran01.au.ao.ericsson.se/~epathj/GCC_PCI/

LTE Tools
- **LTE toolbox: http://plm-ltemsrbs-toolbox.lmera.ericsson.se**
- **LTE LogTool : http://selilttd.lmera.ericsson.se/wiki/doku.php?id=logtool:main**
- **Flowfox:** http://utran01.au.ao.ericsson.se/flowfox/index.php#lteflowfox
- **Layer 3 Signalling flow reference:** http://utran01.au.ao.ericsson.se/~esimlum/lte-ref/
- **Toolbox:** https://ericoll.internal.ericsson.com/sites/PLM_LTE_Toolbox_in_field/Delivery%20page/default.aspx
- **Toolkit:** http://utran01.au.ao.ericsson.se/ltetoolkit
- **Melbourne lab setup:** http://utran01.au.ao.ericsson.se/utranwiki/BETE_LTE_Lab
- **LTE PMD/CDA dump decoding** https://lte-webtools.rnd.ki.sw.ericsson.se
- **LTE LogTool download** http://www.lmera.ericsson.se/ltett/logtool/download.html

- **LTE LogTool presentation** ftp://anonymous@ftp.lmera.ericsson.se/pub/incoming/plmlte/epkguon/ltelogtool/presentations
- **DCG parser** http://www.lmera.ericsson.se/ltett/dcg/
- **LTE Tools** http://ltng.lmera.ericsson.se/forums/

17.9 Roadmap

Planned moshell commands to be supported for MSRBS nodes :
- sts/sti/ste
- implement "uer" command to show ongoing calls/radio links
- implement "str" command to show cell status and configuration
- support cr and del commands on UpgradePackage MO
- inv : show carriers and frequencies on each RF port
- implement "te default" on BB processors (bbte currently does not support this)
- new option "1" on cr/del/rdel/bl/deb (cr1, del1, rdel1) to create/delete/lock/unlock several MOs in one transaction
- moshell "-d" to read the mnesia_esi.log
- dbc

18 Appendix

18.1 Connecting to other types of COM nodes

BSP8100: moshell -v comcli=31 <nodeip>
PGM: moshell -v comcli=32 <nodeip>
APG43L: moshell -v comcli=34 <nodeip>
EPG/SSR: moshell -v comcli=35 <nodeip>

Other node type (IPWORKS, HSS, CSCF, MTAS, etc): moshell -v comcli=1 <nodeip>

Example, APG43L :
Note: the APG43L does not have a COLI interface like MSRBSV2. However it has additional commands in COMCLI.
To see the list of COMCLI commands, use "\t" , see below.
To run MML commands on the CP, use "mml", see below.

```
=> moshell -vcomcli=34 lmbsc022c


##################################################################
#            Welcome to MoShell 11.0q (LPA108514/1_R11Q)         #
#              Finn Magnusson, Jan Pettersson                    #
#              http://utran01.au.ao.ericsson.se/moshell          #
```

```
#           Contact: Finn.Magnusson@ericsson.com               #
#                    Joakim.xo.Ostlund@ericsson.com             #
################################################################


Checking ip contact...OK


HELP MENU            : h
BASIC MO COMMANDS    : m
OTHER MO COMMANDS    : n
OTHER COMMANDS       : o
PM COMMANDS          : p
QUIT                 : q


BSC022C> lt all


Please enter Username: ts_iov
Please enter ts_iov's Node Password:


Connected to BSC022 (ManagedElement=BSC022)
.
Checking MOM version...AXE_NODE_MODEL_174.72.15_7d3a
Parsing MOM (cached): /home/eanzmagn/jarxml/AXE_NODE_MODEL_174.72.15_7d3a.xml.cache.gz .....................Done.


Last MO:  5757. Loaded 5757 MOs. Total:  5758 MOs.


BSC022> prm moclass_group


================================================================================
Proxy  MimName                     MO
================================================================================
    0  ComTop                      ManagedElement=BSC022
    1  ComTop                      SystemFunctions=1
    2  AxeFunctions                SystemFunctions=1,AxeFunctions=1
    3  AxeFunctions                SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1
    4  AxeDataTransfer             SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataTransferM=1
    5  AxeDataTransfer             SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataTransferM=1,BlockTransferManager=1
    6  AxeDataTransfer             SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataTransferM=1,FileTransferManager=1
   29  AxeDataTransfer
SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataTransferM=1,FileTransferManager=1,FileTransferQueue=RIRTRQ
   30  AxeDataTransfer
SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataTransferM=1,FileTransferManager=1,FileTransferQueue=RIRTRQ,AdvancedFileTransferQueueIn
fo=RIRTRQ
   34  AxeDataTransfer
SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataTransferM=1,FileTransferManager=1,RespondingDestinationSet=BSSOMCSTSDESTSET
   35  AxeDataTransfer
SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataTransferM=1,FileTransferManager=1,RespondingDestinationSet=BSSOMCSTSDESTSET,AdvancedRe
spondingParameters=BSSOMSTSCDESTSET
   36  AxeDataTransfer
SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataTransferM=1,FileTransferManager=1,RespondingDestinationSet=BSSOMCSTSDESTSET,PrimaryRes
pondingDestination=BSSOMCSTS
   37  AxeExternalMedia            SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,ExternalMediaM=1
   38  AxeNbiFolders              SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,NbiFoldersM=1
   39  AxeDataRecord              SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataRecordM=1
   47  AxeDataRecord              SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,DataRecordM=1,MessageStore=CHS7
```

```
  48  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1
  49  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,CapacityInfo=1
  50  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,MeasurementPrograms=1
  53  AxeStatisticalCounter
SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,MeasurementPrograms=1,MeasurementProgram=1002
  54  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,ObjectTypes=1
3875  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,ObjectTypes=1,ObjectType=TRH
3885  AxeStatisticalCounter
SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,ObjectTypes=1,ObjectType=TRH,Counter=G2TRH9100LOAD
3886  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,Reports=1
3889  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,Reports=1,Report=2002
3890  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,ScrFileManager=1
3891  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,ScrFileManager=1,InUse=1
3892  AxeStatisticalCounter
SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,ScrFileManager=1,InUse=1,ScrFile=lascs
3893  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,ScrFileManager=1,ReadyToUse=1
3894  AxeStatisticalCounter      SystemFunctions=1,AxeFunctions=1,DataOutputHandling=1,StatisticalCounterM=1,TranslationTable=1
3895  AxeFunctions               SystemFunctions=1,AxeFunctions=1,SecurityHandling=1
3896  AxeApSessionManagement     SystemFunctions=1,AxeFunctions=1,SecurityHandling=1,ApSessionM=1
3897  AxeAuditLogging            SystemFunctions=1,AxeFunctions=1,SecurityHandling=1,AuditLoggingM=1
3898  AxeLocalTsUsersPolicy      SystemFunctions=1,AxeFunctions=1,SecurityHandling=1,LocalTsUsersPolicyM=1
3899  AxeMmlAuthorization        SystemFunctions=1,AxeFunctions=1,SecurityHandling=1,MmlAuthorizationM=1
3900  AxeFunctions               SystemFunctions=1,AxeFunctions=1,SupervisionHandling=1
3901  AxeExtNetworkSurveillance  SystemFunctions=1,AxeFunctions=1,SupervisionHandling=1,ExternalNetworkSurveillanceM=1
3902  AxeAlarmDisplay            SystemFunctions=1,AxeFunctions=1,SupervisionHandling=1,AlarmDisplayM=1
3903  AxeAlarmDisplay            SystemFunctions=1,AxeFunctions=1,SupervisionHandling=1,AlarmDisplayM=1,LampProperty=1
3904  AxeAlarmDisplay            SystemFunctions=1,AxeFunctions=1,SupervisionHandling=1,AlarmDisplayM=1,SoundProperty=1
3905  AxeExternalAlarmReceiver   SystemFunctions=1,AxeFunctions=1,SupervisionHandling=1,ExternalAlarmReceiverM=1
3906  AxeFunctions               SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1
3907  BladeSwManagement          SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,BladeSwM=1
3908  AxeEquipment               SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1
3909  AxeEquipment               SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,HardwareMgmt=1
3910  AxeEquipment               SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,HardwareMgmt=1,Shelf=15.0.0.0
3917  AxeEquipment
SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,HardwareMgmt=1,Shelf=15.0.0.0,ApBlade=20
3918  AxeEquipment
SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,HardwareMgmt=1,Shelf=15.0.0.0,ApBlade=20,ApBladeInfo=20
3923  AxeEquipment
SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,HardwareMgmt=1,Shelf=15.0.0.0,CpBlade=22
3925  AxeEquipment
SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,HardwareMgmt=1,Shelf=15.0.0.0,OtherBlade=0,Lag=1
3926  AxeEquipment
SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,HardwareMgmt=1,Shelf=15.0.0.0,OtherBlade=25
3927  AxeEquipment               SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,LogicalMgmt=1
3928  AxeEquipment               SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,LogicalMgmt=1,Apg=AP1
3929  AxeEquipment               SystemFunctions=1,AxeFunctions=1,SystemComponentHandling=1,EquipmentM=1,LogicalMgmt=1,DualSidedCp=CP1
3930  AxeFunctions               SystemFunctions=1,AxeFunctions=1,SystemHandling=1
3931  AxeAlphanumericDevice      SystemFunctions=1,AxeFunctions=1,SystemHandling=1,AlphanumericDeviceM=1
3932  AxeAlphanumericDevice      SystemFunctions=1,AxeFunctions=1,SystemHandling=1,AlphanumericDeviceM=1,MmlSessions=1
3934  AxeAlphanumericDevice      SystemFunctions=1,AxeFunctions=1,SystemHandling=1,AlphanumericDeviceM=1,MmlSessions=1,MmlSession=AD-431
3935  AxeAlphanumericDevice      SystemFunctions=1,AxeFunctions=1,SystemHandling=1,AlphanumericDeviceM=1,PdsManager=1
3936  AxeAlphanumericDevice      SystemFunctions=1,AxeFunctions=1,SystemHandling=1,AlphanumericDeviceM=1,PdsManager=1,PdsIpClient=AD-20
3937  AxeLicenseManagement       SystemFunctions=1,AxeFunctions=1,SystemHandling=1,LicenseM=1
4009  AxeLicenseManagement       SystemFunctions=1,AxeFunctions=1,SystemHandling=1,LicenseM=1,ElectronicKey=FAT1024025/262
4010  AxeCpReload                SystemFunctions=1,AxeFunctions=1,SystemHandling=1,CpReloadM=1
4011  AxeCpReload                SystemFunctions=1,AxeFunctions=1,SystemHandling=1,CpReloadM=1,DualSidedCp=1
4012  AxeFunctionDistribution    SystemFunctions=1,AxeFunctions=1,SystemHandling=1,FunctionDistributionM=1
4013  AxeFunctionDistribution    SystemFunctions=1,AxeFunctions=1,SystemHandling=1,FunctionDistributionM=1,Apg=AP1
```

```
4021  AxeFunctionDistribution      SystemFunctions=1,AxeFunctions=1,SystemHandling=1,FunctionDistributionM=1,Apg=AP1,Function=CHS7
4022  AxeTimeReference             SystemFunctions=1,AxeFunctions=1,SystemHandling=1,TimeReferenceM=1
4023  AxeCpFileSystem              SystemFunctions=1,AxeFunctions=1,SystemHandling=1,CpFileSystemM=1
4614  AxeCpFileSystem              SystemFunctions=1,AxeFunctions=1,SystemHandling=1,CpFileSystemM=1,CpVolume=RELVOLUMSW,CompositeFile=RELFSW99
4619  AxeCpFileSystem
SystemFunctions=1,AxeFunctions=1,SystemHandling=1,CpFileSystemM=1,CpVolume=RELVOLUMSW,CompositeFile=RELFSW99,CompositeSubFile=SDD
4620  AxeCpFileSystem              SystemFunctions=1,AxeFunctions=1,SystemHandling=1,CpFileSystemM=1,CpVolume=RELVOLUMSW,InfiniteFile=RODCRFILE
4621  AxeCpFileSystem              SystemFunctions=1,AxeFunctions=1,SystemHandling=1,CpFileSystemM=1,CpVolume=TEMPVOLUME
4622  BrM                          SystemFunctions=1,BrM=1
4623  BrM                          SystemFunctions=1,BrM=1,BrmBackupManager=SYSTEM_DATA
4624  BrM                          SystemFunctions=1,BrM=1,BrmBackupManager=SYSTEM_DATA,BrmBackupHousekeeping=SYSTEM_DATA
4625  BrM                          SystemFunctions=1,BrM=1,BrmBackupManager=SYSTEM_DATA,BrmBackupLabelStore=SYSTEM_DATA
4626  BrM                          SystemFunctions=1,BrM=1,BrmBackupManager=SYSTEM_DATA,BrmBackupScheduler=SYSTEM_DATA
4627  ComFileM                     SystemFunctions=1,FileM=1
4628  ComFileM                     SystemFunctions=1,FileM=1,LogicalFs=1
5132  ComFileM                     SystemFunctions=1,FileM=1,LogicalFs=1,FileGroup=sw_package,FileGroup=SCXB,FileInformation=19089-
CXP9021997_X_AJ_PKZIPV2R04.zip
5134  ComFileM                     SystemFunctions=1,FileM=1,LogicalFs=1,FileGroup=tools
5135  ComFm                        SystemFunctions=1,Fm=1
5137  ComFm                        SystemFunctions=1,Fm=1,FmAlarm=163
5159  ComFm                        SystemFunctions=1,Fm=1,FmAlarmModel=coreMw
5163  ComFm                        SystemFunctions=1,Fm=1,FmAlarmModel=coreMw,FmAlarmType=ComSaProxyStatusOfAComponentChangedToUnproxied
5164  HealthCheck                  SystemFunctions=1,HealthCheckM=1
5165  HealthCheck                  SystemFunctions=1,HealthCheckM=1,RuleFileManager=1
5166  HealthCheck                  SystemFunctions=1,HealthCheckM=1,RuleFileManager=1,InUse=1
5167  HealthCheck                  SystemFunctions=1,HealthCheckM=1,RuleFileManager=1,ReadyToUse=1
5168  ComSecM                      SystemFunctions=1,SecM=1
5169  ComSecM                      SystemFunctions=1,SecM=1,Tls=1
5170  ComSecM                      SystemFunctions=1,SecM=1,UserManagement=1
5171  ComLdapAuthentication        SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1
5172  ComLdapAuthentication        SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1
5173  ComLdapAuthentication        SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1,EricssonFilter=1
5174  ComLdapAuthentication        SystemFunctions=1,SecM=1,UserManagement=1,LdapAuthenticationMethod=1,Ldap=1,Filter=1
5175  ComLocalAuthorization        SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1
5512  ComLocalAuthorization        SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=SystemSecurityAdministrator
5571  ComLocalAuthorization
SystemFunctions=1,SecM=1,UserManagement=1,LocalAuthorizationMethod=1,Role=SystemSecurityAdministrator,Rule=Top_5
5572  SEC_CertM                    SystemFunctions=1,SecM=1,CertM=1
5573  SEC_CertM                    SystemFunctions=1,SecM=1,CertM=1,CertMCapabilities=1
5574  SEC_CertM                    SystemFunctions=1,SecM=1,CertM=1,NodeCredential=1
5577  SEC_CertM                    SystemFunctions=1,SecM=1,CertM=1,TrustedCertificate=3
5578  ComSysM                      SystemFunctions=1,SysM=1
5616  ComSysM                      SystemFunctions=1,SysM=1,Schema=SEC_CertM
5617  ComSnmp                      SystemFunctions=1,SysM=1,Snmp=1
5618  CmwPm                        SystemFunctions=1,Pm=1
5635  CmwPm                        SystemFunctions=1,Pm=1,PmGroup=OSProcessingUnit
5657  CmwPm                        SystemFunctions=1,Pm=1,PmGroup=OSProcessingUnit,MeasurementType=Swap.Used
5658  CmwPm                        SystemFunctions=1,Pm=1,PmMeasurementCapabilities=1
5659  CmwSwIM                      SystemFunctions=1,SwInventory=1
5753  CmwSwIM                      SystemFunctions=1,SwInventory=1,SwItem=ERIC-STS_STSPROVBIN-CXC1371456-R1E
5754  CmwSwIM                      SystemFunctions=1,SwInventory=1,SwVersion=APG43L-2.2.0-R1A
5755  CmwSwM                       SystemFunctions=1,SwM=1
5756  CmwSwM                       SystemFunctions=1,SwM=1,SwVersionMain=APG43L-2.2.0-R1A
5757  ComTop                       Transport=1
===============================================================================
Total: 117 MOs
```

```
BSC022> \t

>
ManagedElement=BSC022
acease
aehls
afpls
alist
alogfind
aloglist
alogpchg
alogpls
alogset
bios_set
bioschg
bupidls
burbackup
burrestore
cfeted
clhls
clhtran
cmdlls
configure
cpdtest
cpfrm
cqrhils
cqrhlls
crdls
csadm
date
dn
dsdls
exit
fixerls
fwprint
fwupgexec
gmlog
hcstart
help
history
hwcls
hwiprint
hwmscbls
hwmxls
ipmifwprint
ipmiupgexec
ipnaadm
ipsecdef
ipsecls
ipsecrm
ispprint
ldapdef
length
misclhls
mktr
mml
msdls
```

```
mtzln
ncdef
netdef
netls
opensession
pfmfwprint
pfmupgexec
ping
prcboot
prcstate
prompt
psdef
psls
psrm
raidmgr
rifdef
rifls
rifrm
rpls
rpmo
rptran
rtrch
rtrdef
rtrfe
rtrls
rtrrm
scriptmode
sells
seltran
show
show-config
show-dn
show-mib
show-table
snrinit
stmotd
stmpts
tcdef
tesrvls
tesrvtran
top
traceroute
tzch
tzls
unzip
up
vlanch
vlandef
vlanls
vlanrm
width
wssadm
xcountls
xpuls
xputran

BSC022> al
```

```
========================================================================================================
Sever Specific Problem                    MO (Cause/AdditionalInfo)
========================================================================================================
Maj   COM SA, AMF Component Cleanup Failed SaAmfSG.safSg=2N,SaAmfSU.safSu=SC-1,SaAmfComp.safComp=ClusterMonitor (Cleanup of Component
safComp=ClusterMonitor,safSu=SC-1,safSg=2N,safApp=ERIC-CoreMW failed)
Maj   LOTC Time Synchronization          ERIC-LINUX_CONTROL-ANA90139_3-R7H01 (Time servers not reachable: SC-2-1 (rejected at initial
selection))
>>> Total: 2 Alarms (0 Critical, 2 Major)


BSC022>


BSC022> plldp


>mml plldp
PROCESSOR LOAD DATA
INT PLOAD CALIM OFFDO OFFDI FTCHDO FTCHDI OFFMPH OFFMPL FTCHMPH FTCHMPL
  1    3  72000    77    29     77     29     66     45     66      45
  2    3  72000    63    28     63     28     67    185     67     185
  3    2  72000    52    19     52     19     57     50     57      50
  4    3  72000    60    23     60     23     59     52     59      52
  5    3  72000    58    31     58     31     57     45     57      45
  6    3  72000    55    16     55     16     59     68     59      68
  7    3  72000    48    23     48     23     73     51     73      51
  8    3  72000    64    27     64     27     58    144     58     144
  9    2  72000    54    27     54     27     50     43     50      43
 10    2  72000    46    18     46     18     70     69     70      69
 11    3  72000    56    28     56     28     65     37     65      37
 12    3  72000    55    23     55     23     53     66     53      66


INT OFFTCAP FTDTCAP
  1       0       0
  2       0       0
  3       0       0
  4       0       0
  5       0       0
  6       0       0
  7       0       0
  8       0       0
  9       0       0
 10       0       0
 11       0       0
 12       0       0
END




LMBSC022C> rlcrp:cell=all


>mml rlcrp:cell=all
CELL RESOURCES


CELL      BCCH  CBCH  SDCCH  NOOFTCH  QUEUED  ECBCCH
022090C      2     1      7   58-116       0       0
```

```
022090B        1    1    11    30- 60        0        0
022090A        2    1     7    29- 58        0        0
022089C        1    1     7    28- 56        0        0
022089B        1    1    11    44- 88        0        0
022089A        1    1    11    28- 56        0        0
022088C        1    1     7    28- 56        0        0
...<cut>...
222C1          1    1     7    22- 44        0        0
222C7          1    1     7   190-380        0        0
222C8          1    1     7   126-252        0        0
221C5          1    1     7    22- 44        0        0
221C4          1    1     7    14- 28        0        0
221C3          1    1     7    30- 60        0        0
221C2          1    1     7    14- 28        0        0
221C1          1    1     7    30- 60        0        0
END
```

The script rlcrp.mos shows the number of BUSY TCH for each CELL

```
BSC022> run $scripts/rlcrp.mos
```

CELL	BCCH	CBCH	SDCCH	NOOFTCH	QUEUED	ECBCCH	BUSYTCH
022090C	2	1	7	58-116	0	0	17
022090B	1	1	11	30- 60	0	0	20
022090A	2	1	7	29- 58	0	0	18
022089C	1	1	7	28- 56	0	0	10
022089B	1	1	11	44- 88	0	0	18
022089A	1	1	11	28- 56	0	0	4
022088C	1	1	7	28- 56	0	0	7
022088B	4	1	7	11- 22	0	0	7
022088A	4	1	7	11- 22	0	0	9
...<cut>..							
022020A	3	1	7	20- 40	0	0	14
222C4	1	1	3	7- 14	0	0	0
222C3	1	1	7	22- 44	0	0	10
222C2	1	1	7	62-124	0	0	1
222C1	1	1	7	22- 44	0	0	10
222C7	1	1	7	190-380	0	0	72
222C8	1	1	7	126-252	0	0	52
221C5	1	1	7	22- 44	0	0	8
221C4	1	1	7	14- 28	0	0	1
221C3	1	1	7	30- 60	0	0	21
221C2	1	1	7	14- 28	0	0	1
221C1	1	1	7	30- 60	0	0	12

```
BSC022>
```

18.2 Trace tools in pico

In LTE pico: /usr/bin/ucli (available on the node)

In WCDMA pico: femtolog

Femtologger
helper.txt