NORTEL

Nortel Multiservice Switch 15000, Media
Gateway 15000 and Multiservice Data
Manager in Carrier Voice over IP
Networks

Configuration Overview

PT-AAL1/UA-AAL1/UA-IP

NN10114-511

NØRTEL

Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks

Configuration Overview

PT-AAL1/UA-AAL1/UA-IP

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(I)SN08 and up S1 Standard
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About this document

This document provides a high-level overview of configuration for the following three solutions in the Carrier Voice over IP network:

- Packet Trunking - AAL1 (PT-AAL1)

- Universal Access - AAL1 (UA-AAL1)

- Universal Access - IP (UA-IP)

This document gives an overview of the configuration for: Multiservice Switch 15000 and Media Gateway node including the Nortel Multiservice Data Manager. For an overview of the configuration of the Nortel Multiservice Data Manager software that manages these network elements, see 241-6001-801 *Nortel Multiservice Data Manager Overview*.

Note: Nortel recommends that all configuration changes contained in the Global Bulletin System (GBS) and the Method of Procedure (MOP) for the current release be reflected on the Multiservice Switch 15000 nodes before you perform the configurations described in this document.

All configuration tasks need to be performed using a copy of a completed Network Engineering Specification Book for your site. The Network Engineering Specification Books contain all the customer and site-specific information that the installer is likely to be prompted for when using the Nodal Provisioning templates or entering information marked as customer defined in the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

This document is intended for use with NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/ UA-AAL1/UA-IP*. This document contains sections with overview information for each aspect of the network's configuration. The *Configuration Attribute Summary* contains tables of specific values for each of the sections relating to Multiservice Switch 15000 software configuration in this document.

The following topics are discussed in this section:

- "Who should read this document and why" (page 18)

- "What you need to know" (page 18)

- "How this document is organized" (page 19)

- "What's new in this document" (page 20)

- "Text conventions" (page 23)

- "Related documents" (page 24)

- "How to get more help" (page 26)

Who should read this document and why

This document is intended for people who want an overview of the configuration of Nortel Multiservice Switch 15000 nodes within the Carrier VoIP network's PT-AAL1, UA-AAL1, and UA-IP solutions. It also provides background information for the tables of values contained in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

What you need to know

Before you read this document, it would be helpful to have a general understanding of the concept of the Carrier VoIP network, the solutions within that portfolio, and the roles that ATM nodes play in these solutions. For more information, see the following:

- NN10443-100 *UA-AAL1 Solution-level Basics*

- NN10441-100 *PT-AAL2 Solution-level Basics*

- NN10442-100 *Packet Trunking/Packet Transit - IP Solution-level Basics (PT-IP)*

- NN10446-100 *Universal Access - IP Solution-level Basics (UA-IP)*

- NN10028-111 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Product and Technology Basics PT-AAL1/UA-AAL1/UA-IP*

Some familiarity with the operating principles of Nortel Multiservice Switch systems, ATM, and IP is also beneficial. For more information, see NN10600-030 *Nortel Multiservice Switch 7400/15000/20000 Overview* and NN10600-700 *Nortel Multiservice Switch 7400/15000/20000 ATM Technology Fundamentals*.

How this document is organized

This document begins with a high-level description of the base software of the Nortel Multiservice Switch 15000, including Media Gateway 15000, and configuration of the Nortel Multiservice Data Manager software application. It then provides an overview of the configuration of Multiservice Switch 15000 function processors, and the link distribution between the various Carrier VoIP network components for the following solutions:

- Packet Trunking - AAL1

- Universal Access - AAL1

- Universal Access - IP

Task flows for deploying the MDM servers in a Carrier VoIP network according to either the dedicated or centralized network management approach are provided next followed by an overview of the configuration of the interface between a Multiservice Switch 15000 node and an EdgeLink 100 multiplexor.

A section with high-level overviews of the steps for adding new components to an existing Carrier VoIP network is next. Finally, this document includes an appendix containing a procedure to update the time of day for seasonal time changes on Multiservice Switch 15000 nodes.

This document contains the following sections:

- "Overview of shelf-wide and CP configuration" (page 27)
- "Overview of Multiservice Switch 15000 function processor configuration" (page 43)
- "Overview of Multiservice Switch 15000 interface configuration" (page 49)
- "Overview of MDM server deployment and configuration" (page 97)
- "Overview of the EdgeLink 100 multiplexor to Multiservice Switch 15000 interface configuration" (page 157)
- "Use cases for Network incremental growth" (page 161)
- "Time-of-day updates for seasonal time changes" (page 209)

What's new in this document

This document includes the new features for release SN08 as follows:

- "Internode emergency stand alone (ESA) for MG9000" (page 20)
- "MDM Admin Server configuration for centralized AAA in a VoA network with the Operator Client application" (page 21)
- "Auto-patching of MSS/MG15000 nodes from the MDM" (page 21)
- "Nodal Provisioning Template Audit tool" (page 22)
- "Nodal Provisioning templates for IPSec configuration on switched Media Gateway 15000" (page 22)

Internode emergency stand alone (ESA) for MG9000

The MG9000 can be configured to pass IP traffic between some MG9000 gateways in the same office, in the UA-AAL1 solution. That is, MG9000 internode ESA can be configured to use the MSS15000's flat VR with static routing to route ESA signaling between MG9000s in an ESA group. See "Internode Emergency Stand Alone (ESA) for MG9000" (page 38) for more information.

MDM Admin Server configuration for centralized AAA in a VoA network with the Operator Client application

The Operator Client architecture uses the MDM Admin Server as a user administration server for centralized authentication, authorization, and accounting (centralized AAA). MDM Client-sets can be re-deployed as MDM Admin Servers. The MDM Admin Servers host the full set of MDM servers found on the MDM server-set and user administration servers for the Operator Client application. As well, the MDM Admin server provides the Operator Client GUI with base network information. The new servers that enable Operator Client functionality are installed with the the traditional MDM servers as part of an upgrade or new installation. See "Deploying MDM Admin Servers for centralized AAA in a VoA network with the Operator Client application" (page 136).

Operator Client can also be deployed using an integrated EMS. The Operator Client architecture for a secure VoIP network uses the integrated EMS for centralized AAA. Some configuration is required on the MDM that allows Operator Client sessions to bypass the MDM and use the integrated EMS for authentication and authorization. See NN10180-611 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Security and Administration PT-AAL1/UA-AAL1/UA-IP* for more information.

Auto-patching of MSS/MG15000 nodes from the MDM

Auto-Patch is a scheduled process that automatically applies Released MSS/MG15000 non-disruptive patches to your switches with a single script that is activated and run from a Nortel Multiservice Data Manager. You must activate and configure the auto-patch process using the cron utility and the *ppautopatch* script to schedule the download and application of non-disruptive patches to the nodes. You can configure the MDMs in your office to run the script at different times on the nodes that each manages. As well, the script can be turned on and off when needed. See "Auto-patching for MSS/MG15000 nodes from the MDM" (page 144).

Nodal Provisioning Template Audit tool

The NP Template Audit tool can help locate problems with configuration data on the Multiservice Switch 15000 and Media Gateway 15000 nodes. The tool can be used to display the differences between the on-switch provisioned data and the user inputs in the NP template. See "NP template audit" (page 29).

Nodal Provisioning templates for IPSec configuration on switched Media Gateway 15000

The Ctrl/mg component of the Nsta component now has a SecurityPolicyDatabase (spd) component for H.248 IPSec security protection that is configured using the following two templates:

- *IF-MGC-IPSEC-2pOC3ChSmIrVsp3-o*

- *IF-MGC-IPSEC-ping-2pOC3ChSmIrVsp3-o*

See "Media Gateway 15000 to MGC with H.248 (VSP3-o) interface (UA-IP)" (page 89) for more information.

Branding changes

The following terms have been rebranded in conjunction with the new Nortel brand simplified naming format:

- Preside Multiservice Data Manager (Preside MDM) has been rebranded to Multiservice Data Manager (MDM)

- Passport 8600 (PP8600) has been rebranded to Ethernet Routing Switch 8600 (ERS 8600)

- Nortel Networks has been rebranded to Nortel

- Succession has been rebranded to Carrier Voice over IP (Carrier VoIP)

For more information on the Multiservice Data Manager product rebranding, refer to 241-6001-001 *Nortel Multiservice Data Manager What's New in MDM Documentation*.

For more information on the product rebranding, refer to NN10600-000 *Nortel Networks Multiservice Switch 7400/15000/20000 What's New in PCR6.1*.

Text conventions

This document uses the following text conventions:

- `nonproportional spaced plain type`

  Nonproportional spaced plain type represents system generated text or text that appears on your screen.

- **`nonproportional spaced bold type`**

  Nonproportional spaced bold type represents words that you should type or that you should select on the screen.

- *italics*

  Statements that appear in italics in a procedure explain the results of a particular step and appear immediately following the step.

  Words that appear in italics in text are for naming.

- `[optional_parameter]`

  Words in square brackets represent optional parameters. The command can be entered with or without the words in the square brackets.

- `<general_term>`

  Words in angle brackets represent variables which are to be replaced with specific values.

- UPPERCASE, lowercase (for NMS)

  In Multiservice Data Manager, uppercase and lowercase letters that appear in UNIX commands and parameters must be matched exactly. The system matches upper and lowercase characters differently.

- UPPERCASE, lowercase (for Nortel Multiservice Switch)

  Nortel Multiservice Switch system commands are not case-sensitive and do not have to match commands and parameters exactly as shown in this document, with the exception of string options values (for example, file and directory names) and string attribute values.

- |

    This symbol separates items from which you may select one; for example, ON|OFF indicates that you may specify ON or OFF. If you do not make a choice, a default ON is assumed.

- ...

    Three dots in a command indicate that the parameter can be repeated.

The term absolute pathname refers to the full specification of a path starting from the root directory. Absolute pathnames always begin with the slash (/) symbol. A relative pathname takes the current directory as its starting point, and starts with any alphanumeric character (other than /).

Related documents

See the following documents for related information:

- NN10028-111 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Product and Technology Basics PT-AAL1/UA-AAL1/UA-IP*

- NN10419-461 *Upgrading Nortel Multiservice Switch 15000 and Media Gateway 15000/20000 in Carrier Voice over IP Networks*

- NN10070-461 *Upgrading Nortel Multiservice Switch 15000 in Carrier Voice over IP Networks PT-AAL1/UA-AAL1*

- NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*

- NN10185-461 *Upgrading Nortel Multiservice Data Manager in Carrier Voice over IP Networks*

- 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*

- 241-6001-100 *Nortel Multiservice Data Manager Software Installation and Initial Configuration*

- 241-6001-101 *Nortel Multiservice Data Manager Engineering Overview*

- 241-6001-303 *Nortel Multiservice Data Manager Customization and Administration*

- 241-6001-309 *MDM Management Data Provider User Guide*

- 241-6001-310 *Nortel Multiservice Data Manager Server Reference*

- 241-6001-801 *Nortel Multiservice Data Manager Overview*

- 241-6001-600 *Nortel Multiservice Data Manager Service Provisioning for ATM User Guide*

- 241-6001-611 *Nortel Multiservice Data Manager Configuration Templates Reference*

- NN10600-030 *Nortel Multiservice Switch 7400/15000/20000 Overview*

- NN10600-710 *Nortel Multiservice Switch 7400/15000/20000 ATM Configuration Management*

- Nortel SuperNode Data Manager (SDM) documentation suite for this Carrier VoIP release

- Nortel Integrated Element Management System (Integrated EMS) documentation suite for this Carrier VoIP release

- NN10600-800 *Nortel Multiservice Switch 7400/15000/20000 IP Technology Fundamentals*

- NN10600-801 *Nortel Multiservice Switch 7400/15000/20000 IP Configuration Management*

- NN10600-780 *Nortel Media Gateway 7480/15000 Technology Fundamentals*

- NN10600-782 *Nortel Media Gateway 7480/15000 Switched Service Configuration Management*

- NN10400-300 *Nortel Multiservice Data Manager Administration Tools*

- NN10600-607 *Nortel Multiservice Data Manager Network Security: Secure Communications Configuration*

- NN10600-606 *Nortel Multiservice Data Manager Network Security: User Access Configuration*

- NN10600-605 *Nortel Multiservice Data Manager Network Security Fundamentals*

- NN10600-601 *Nortel Multiservice Switch 7400/15000/20000 Security Management*

How to get more help

For information on training, problem reporting, and technical support, see the "Nortel support services" section in NN10600-030 *Nortel Multiservice Switch 7400/15000/20000 Overview*.

Chapter 1
Overview of shelf-wide and CP configuration

This section is an overview of the shelf-wide and control processor (CP) configuration required by the Nortel Multiservice Switch 15000 software installed in your Carrier VoIP network. This section is intended for use with the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. The Configuration Attribute Summary contains tables of all the specific values to use when configuring Multiservice Switch 15000 nodes for the supported solutions.

The descriptions of Multiservice Switch 15000 software in this section contain cross-references to the corresponding sections in the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Overview of Multiservice Switch 15000 software

Nortel Multiservice Switch 15000 software includes system functions for command processing, shelf management, file storage, data collection, and network management interfaces.

In a PT-AAL1 or UA-AAL1 solution, configure the shelf software applications of Multiservice Switch 15000 nodes using the PT-AAL1, or *WUA-AAL1 CPeD_Commissioning* template.

In a UA-IP solution, configure the shelf software applications as follows:

- for Multiservice Switch 15000 nodes use the UA-IP *SH-CPED* template to configure ATM routing

- for Media Gateway 15000-only node, use the UA-IP *SH-CPED-PVGnoARTG* template when ATM routing is not required

A shelf commissioning template defines shelf-wide parameters for the following:

- CP-based configuration

- network synchronization with building-integrated timing supply (BITS)

- time of day synchronization

- the data collection system (DCS)

- the network management interface system (NMIS)

- asynchronous transfer mode (ATM) routing

- management virtual router (VR)

- voice services

This chapter provides more information about the functions of the base software applications and their configurations for the Multiservice Switch 15000.

Before you apply a shelf commissioning template, you must manually configure some applications. For information, see the following sections:

- "LP feature configuration" (page 33)

- "OAM connectivity" (page 35)

Next, apply one of the shelf commissioning templates as follows:

- *PT-AAL1 CPeD_Commissioning*

- *WUA-AAL1 CPeD_Commissioning*

- *UA-IP SH-CPED*

- *UA-IP SH-CPED-PVGnoARTG*

The shelf commissioning template configures the components described in the following sections:

- "Access control" (page 30)

- "ATM routing" (page 30) (not the *SH-CPED-PVGnoARTG* template)

- "IP networking (UA-IP)" (page 31)

- "Data collection system" (page 32)

- "Shelf/Module data" (page 34)

- "Network clock synchronization" (page 34)

- "time of day" (page 41)

You may need to perform additional configuration after applying a shelf commissioning template. For more information see your Network Engineering Specification Book. As well, the components for which you must perform additional configuration are described in the following sections:

- "Access control" (page 30)

- "ATM routing" (page 30)

- "IP networking (UA-IP)" (page 31)

- "OAM connectivity" (page 35)

NP template audit

Multiservice Switch / Media Gateway configuration done by NP templates can be audited at a later date using the Nodal Provisioning on-line auditing capability. This allows the user to check if the correct template was used and the values entered in the template were correct, or if the template has been patched since it was originally applied, or if the switch configuration has been manually changed since initial commissioning.

If there is a mismatch between the template data and the on-switch data, the template can be reapplied to override the on-switch data, if desired. For more information on Nodal Provisioning see 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

Access control

Network access control restricts user access to your network and keeps your data secure. Access control on Nortel Multiservice Switch 15000 nodes limits access to those users with the following:

- valid user IDs

- valid passwords

- authorized remote IP access

Access control is set through the configuration of the *AccessControl* component and subcomponents. For the specific values to configure for the *AccessControl* components and subcomponents see: NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

For information on how to administer access control, see NN10180-611 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Security and Administration PT-AAL1/UA-AAL1/UA-IP*.

ATM routing

The ATM routing system is a connection-oriented system that provides dynamic runtime connection setup between Nortel Multiservice Switch 15000 nodes. The system allows them to interwork with other non-Multiservice Switch ATM equipment. Multiservice Switch ATM routing provides the addressing, signaling, and routing facilities to support permanent and switched virtual connections (PVCs and SVCs). These networking facilities allow you to set up ATM connections in real-time.

Hitless ATM routing for CP equipment protection is also supported in the PT-AAL1 and UA-AAL1 solutions only. This capability reduces interruptions to node call processing during

- a Hitless Software Migration (HSM)

- a CP equipment failure (including failure of the OAM Ethernet port or link)

- any maintenance actions resulting from a CP switchover

Hitless ATM routing for CP equipment protection, when provisioned, continuously synchronizes the standby CP routing database to the active CP routing database. The FPs also communicate with the active and standby CPs to ensure that both CPs get all the required port, address, and RCC information.

Configure the *AtmRouting (ARtg)* component to set ATM routing in a PT-AAL1, UA-AAL1, or UA-IP solution. For the specific values to configure this component, see NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

For more information on Multiservice Switch ATM routing system see, NN10600-700 *Nortel Multiservice Switch 7400/15000/20000 ATM Technology Fundamentals* and NN10600-702 *Nortel Multiservice Switch 7400/15000/20000 ATM Routing and Signalling Fundamentals*.

IP networking (UA-IP)

Nortel Multiservice Switch 15000 Virtual Router (VR) system supports industry-standard IP networking for connectionless networking. Carrier VoIP networks support static routing as well as the dynamic routing protocol open shortest path first (OSPF). With OSPF, Multiservice Switch 15000 nodes learn dynamically, from neighboring routers, which routing paths through the network are available. This allows the node to adapt dynamically to faults elsewhere in the network and to calculate the most efficient path for all IP packets.

Carrier VoIP networks support Hitless OSPF for CP equipment protection. Hitless OSPF allows FP cards to continue forwarding, uninterrupted, over OSPF calculated routes during any of the following:

- Hitless Software Migration (HSM)

- CP equipment failure (including failure of the OAM Ethernet port or link)

- any maintenance actions resulting in a CP switchover

Hitless OSPF for CP equipment protection, when provisioned, continuously synchronizes the OSPF routing database of the standby CP with the routing database of the active CP.

Multiservice Switch 15000 nodes support Protected Default Routes. You can specify two next hops, reachable through two different 4pGE FP cards, as the default route when you use Protect Default Routes. This allows the node to change packet forwarding from one next hop to the other in under a second if a 4pGE card, a link, or an adjacent router fails.

In a UA-IP solution, provision IP networking under a Multiservice Switch 15000 Virtual Router component. For the specific values to provision for the Virtual Router component in UA-IP see:

- NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*

- NN10600-800 *Nortel Multiservice Switch 7400/15000/20000 IP Technology Fundamentals*

- NN10600-801 *Nortel Multiservice Switch 7400/15000/20000 IP Configuration Management*

Data collection system

The data collected from each node by the data collection system (DCS) is information that is generated for troubleshooting, performance tuning, and billing. After the DCS collects alarms, logs, state change notifications (SCNs), and real-time statistics from nodes, it can either send the data to an external network management system for analysis or spool the data to the file system (for example, accounting data). In some cases, such as alarms data, the DCS will both spool and send data off-switch.

The DCS on Nortel Multiservice Switch 15000 nodes is controlled through the *Collector* component. For the specific values that need to be configured for the *Collector* component, see NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

For more information on the data collection system, see NN10600-561 *Nortel Multiservice Switch 7400/15000/20000 Data Management*.

LP feature configuration

The Software avList is intended to contain only those software applications that are supported. The software applications in the avList for the PT-AAL1/UA-AAL1 solutions include:

- base_CF01SXX

- networking_CF01SXX

- atmNetworking_CF01SXX

- ip_CF01SXX

- wanDte_CF01SXX (for in-band OAM only)

The *wanDte* option depends on whether in-band OAM using AtmMpe is configured or not. If in-band OAM is configured, then *wanDte* needs to be configured as well.

Note 1: Do not include a fabric application version (AV) in the Software avList. The fabric AV is not required in the avList.

Note 2: Some Multiservice Switch (MSS) features and configurations may not be supported on Media Gateway 7480/15000/20000. Please contact your Nortel account representative to determine whether a specific base MSS feature is supported on your Media Gateway 7480/15000/20000 platform.

The software applications in the avList for the UA-IP solution include:

- base_CF01SXX

- networking_CF01SXX

- atmNetworking_CF01SXX

- ip_CF01SXX

- wanDte_CF01SXX

- ethernet_CF01SXX

- pvg_CF01SXX

- aal1Ces_CF01SXX (Required only if VSP3 and 4pOC3TDM cards are to be configured)

Shelf/Module data

Usually, a Nortel Multiservice Switch 15000 shelf name should contain the Common Location Language Identifier (CLLI). CLLI is an industry-standard alphanumeric string to identify equipment location. The CLLI is, at most, 11 characters long. When the CLLI does not uniquely identify a single shelf instance, a twelfth character should be added to the CLLI from the valid character set to make the string unique.

Network clock synchronization

Network clock synchronization (NCS) ensures the accurate transmission and reproduction of synchronous data. NCS is used to synchronize the clocking of multiple ports and nodes by synchronizing to the signal originating from a single internal source or to a source external to the network.

For structured services, the transmit and receive interfaces must be timed from a single, common clock. With structured services, NCS forces the terminating equipment to transmit and receive at the same frequency.

Network clock synchronization is set through the configuration of the *NetworkSynchronization* component. For the specific values that need to be configured for the *NetworkSynchronization* components, see NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

> *Note:* NCS is responsible for clocking on synchronous data links but not with synchronizing the time of day. Network Time Synchronization (NTS) synchronizes the time of day on Nortel MDM workstations and Nortel Multiservice Switch 15000 nodes. For more information on NTS, see NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

OAM connectivity

This section discusses the OAM management topologies, for Nortel MDM and Nortel Multiservice Switch 15000 MSS/MG15000, in a PT-AAL1, UA-AAL1 or UA-IP solution. There are two types of OAM management topologies: out-of-band OAM and in-band OAM.

An out-of-band topology is generally regarded as the typical management topology. Out-of-band management uses dedicated interfaces for management connectivity access via CP Ethernet links.

Out-of-band OAM connectivity

Connectivity can be established through a Communications Server LAN (CS LAN).

The CS LAN links are through the Ethernet ports on each Control Processor card in the Multiservice Switch 15000 shelf. The standard initial commissioning procedures configure out-of-band OAM connectivity, using Startup. Once connectivity is established to a MDM workstation, apply the nodal provisioning (NP) template *PT-AAL1 CPeD_Commissioning, WUA-AAL1 CPeD_Commissioning, UA-IP SH-CPED,* or *UA-IP SH-CPED-PVGnoARTG.* These templates modify the Ethernet port configuration according to the recommended parameters.

In-band OAM connectivity

An in-band management topology has Nortel Multiservice Switch 15000 nodes acting as gateways for remote nodes to send or receive OAM data.

For information on the supported in-band OAM topology and for definitions of terms, such as gateway node, used to describe in-band OAM configurations, see NN10028-111 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Product and Technology Basics PT-AAL1/UA-AAL1/UA-IP.*

"A sample in-band OAM configuration" (page 37) illustrates a typical in-band OAM configuration. Multiservice Switch 15000 nodes are numbered 1, 2, and 3. Multiservice Switch 15000 node1 and 2 identify Gateway nodes. Multiservice Switch 15000 3 identifies a Remote node.

S1, S2, S3, S4 and S5 identify IP subnets. For each node there are two diverse static routes configured. For example, in the diagram, Multiservice Switch 15000 1, which is a Gateway node has the following diverse routes to MDM-0 and MDM-1: a.b.c.d/nn and a.b.c.c/nn. In the diagram, Multiservice Switch 15000 3, which is a Remote node, has the diverse routes to MDM-0 and MDM-1 through a.b.x.1./nn and a.b.x.2/nn.

In the diagram, node/routers are identified as R1 and R2.

Figure 1
A sample in-band OAM configuration

MDM client

MDM client

IP LAN/WAN

S1

S2

MDM-0

R1

R2

MDM-1

R3

R4

S3

S4

Remote site B

a.b.c.d/nn

Remote site A

S5

a.b.x.3/nn

a.b.c.c/nn

a.b.x.1/nn

a.b.x.2/nn

Multiservice Switch 15000 (3)

Multiservice Switch 15000 (1)

Multiservice Switch 15000 (2)

ATM network

Multiservice Switch 15000

CS2000

Standby ethernet link

Active ethernet link

OC*n* PNNI link

Subnet

<IP add >/<mask>

MSS 3390 002 AB
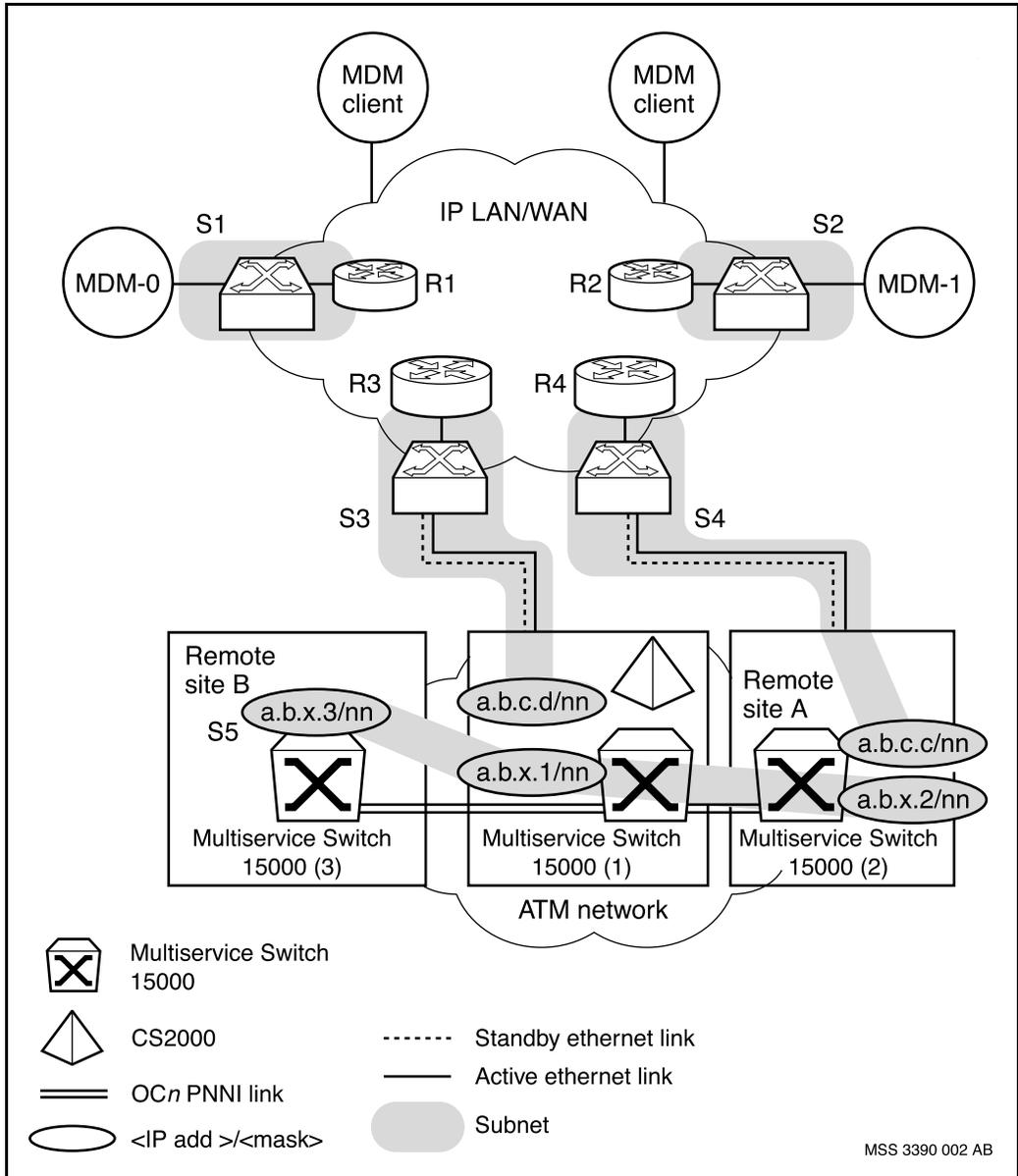
The remote Multiservice Switch 15000 nodes are managed by way of in-band connectivity to each other and to the gateways.

Note: Where multiple gateways exist for redundancy, one gateway can appear as a remote to another.

In-band connectivity uses ATMMPE (ATM Multi-Protocol Encapsulation) to encapsulate the OAM IP traffic over PNNI trunks. ATMMPE can be configured on the following cards, except where otherwise noted:

- 16pOC3SmIrAtm (PT-AAL1 and UA-AAL1 only)

- 4pOC3SmIrAtm

- 4pOC12SmIrAtm

- 12pDS3Atm (UA-AAL1 only)

Within the ATMMPE subnet, a Gateway node must have a direct ATMMPE ATM (PVC) link to every other node, including the other Gateway node.

The customer-owned IP LAN/WAN must be configured with dynamic routing. Each MDM server must have a diverse path (when compared to the other server) through the IP LAN/WAN to the nodes. The routers connected to the Gateway node (identified in the diagram as R3 and R4) must each have a static route to the underlying ATMMPE subnet.

The dynamic routing protocol must be configured within the IP LAN/WAN such that it routes around any single failure of equipment or facilities within the domain.

Note: In-band connectivity is only supported over the ATM inter-shelf links. It is not supported over Gigabit Ethernet (GE) links.

Internode Emergency Stand Alone (ESA) for MG9000

InterNode ESA is supported in both the UA-AAL1 and UA-IP solutions and can support a maximum of 15 MG9000 nodes. MG9000 internode ESA uses the MSS15000's flat VR with static routing (RFC 1483 AtmMpe) to route ESA signaling between MG9000s in an ESA group. A new ATM connection is setup specifically to support ESA mode. In ESA mode each MG9000 has a separate IP address that is dedicated to the ESA function.

To support MG9000 internode ESA, you must provision the attributes described in the following tables of the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/ UA-AAL1/UA-IP*:

• "LP feature configuration (PT-AAL1/UA-AAL1) with internode ESA"

• "Vr for bearer and control traffic with internode ESA"

Figure 2, "Typical deployment for Internode ESA" (page 40) shows a typical deployment scenario for this feature in a collapsed office (remote) that consists of a single Multiservice Switch 15000 which connects a group of MG9000 gateways to a set of PNNI links to the CS2000 site. If necessary, the collapsed office can use several Multiservice Switch 15000 switches.

Figure 2
Typical deployment for Internode ESA
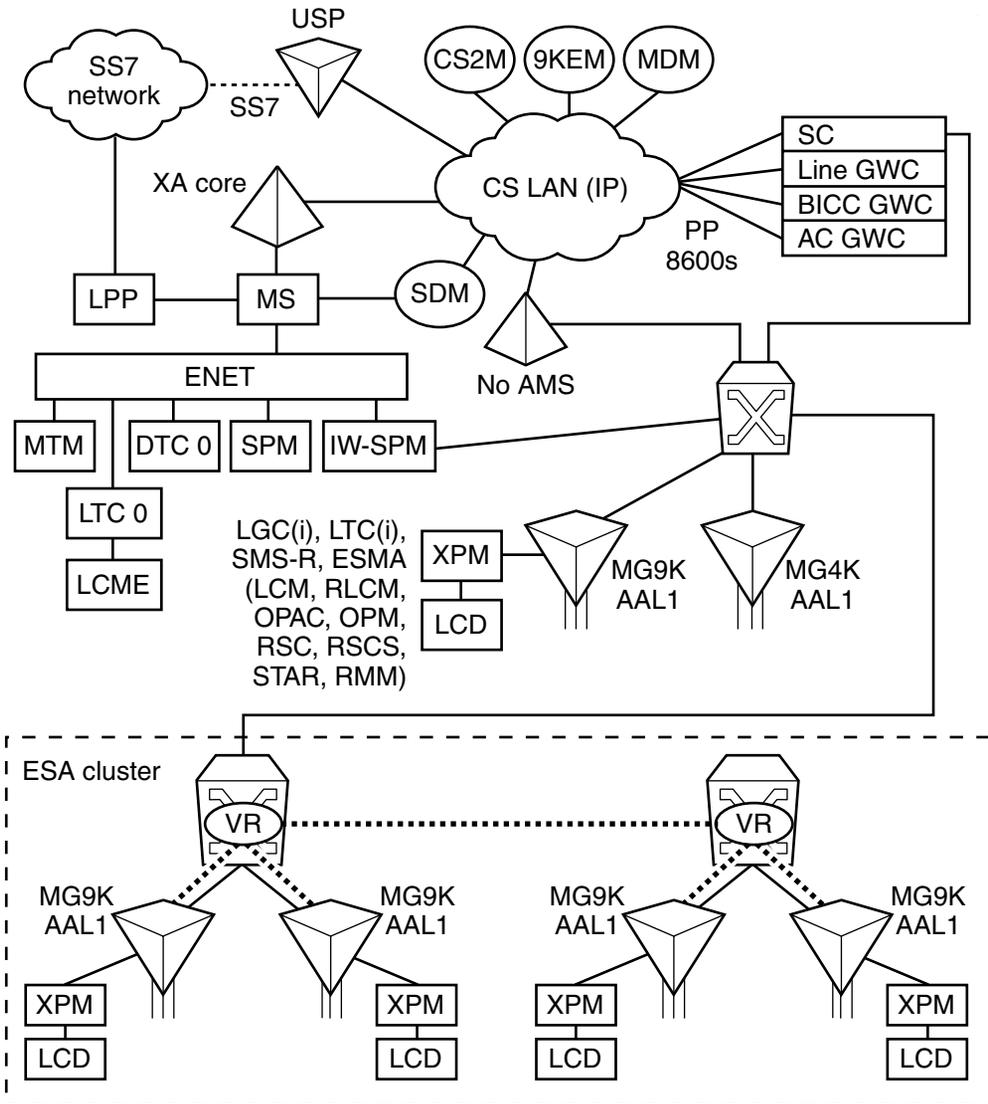
MSS 3603 005 AA

See "Internode Emergency Stand Alone for MG9000" (page 72) for more information.

time of day

The accurate tracking of time, both in the network and on each Nortel Multiservice Switch 15000 node, is essential for the proper functioning of performance data collection, accounting records, and other functions. There are three types of time to consider when configuring the time of day on Multiservice Switch 15000 nodes:

- Reference time is the date and time that is the official reference around the world. The universally accepted reference time is Coordinated Universal Time (UTC).

- Network time is the date and time to which all nodes in the network synchronize internally.

- Module time is the time on a particular node.

The time of day on a node is set through the *Time* component. For the specific values that need to be configured for the *Time* component, see NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Note: For a procedure for adjusting the time of day following the seasonal time change when switching between Standard and Daylight Saving Time, see "Time-of-day updates for seasonal time changes" (page 209).

Chapter 2
Overview of Multiservice Switch 15000 function processor configuration

This chapter discusses function processors for the Nortel Multiservice Switch 15000 nodes for the following solutions:

*   Packet Trunking - AAL1

*   Universal Access - AAL1

*   Universal Access - IP

Function processors (FPs) provide interface ports that connect network communication facilities to Multiservice Switch nodes. FPs support and execute real-time processes that enable service delivery.

There are several types of FPs and the software running on an FP determines the function of the FP.

Nortel recommends that you configure each FP with as diverse a mix of component interfaces as possible. Configure a mix of links to all the network components. In addition, distribute the links to each of the different components across as many FP card pairs as possible. A wide distribution of links prevents an FP failure from adversely affecting any component connections. For more information about how to configure links, see "Overview of Multiservice Switch 15000 interface configuration" (page 49).

For more information about link distribution and the ports to cable these links on, refer to your network plan.

This chapter includes the following topics:

Multiservice Switch 15000 function processor configuration (PT-AAL1 and UA-AAL1)

For both the Packet Trunking - AAL1 and Universal Access - AAL1 solution configurations, Nortel Multiservice Switch 15000 FPs are installed in 1+1 protected pairs. This means that you can install up to seven FP pairs on each shelf. A single Multiservice Switch 15000 shelf supports up to 112 1+1 APS protected OC-3 ATM ports, or an equivalent mix.

In the Universal Access - AAL1 solution, some FPs, such as the 12-port DS3 ATM FP, may provide multi-service data applications including DSL and are supported using single, unprotected FPs.

When installing FPs choose from the following:

- 4-port OC-3c card (single mode), to install any of the connections to the other components

  Note: Use this FP only if you require eight or fewer ports for access or trunking. If you need more than eight, use a 16-port OC-3 card

- 16-port OC-3 card, with LC connectors, to install any of the connections to the other components

- 4-port OC-12 card, to install interfaces between Multiservice Switch 15000 nodes or links to other ATM nodes

  Note: Only 4-port OC-12c/STM-4 FP, NTHW86 can be deployed.

- 12-port DS3 ATM card, supports DS3 Multiservice Switch ATM-to-Multiservice Switch ATM on 1:1 protected cards, or in unspared configurations for unprotected ATM services such as DSL, also supports a DS3 ATM interface to an MG9000

- 4-port DS3Ch Atm card, supports hot standby equipment protection and software migration for ATM services running over IMA in one-for-one equipment protected scenarios

To configure the FPs listed above, use the Nodal Provisioning tool and the following templates:

- *PT-AAL1/WUA-AAL1 FP-4pOC3SmIrAtm*

- *PT-AAL1/WUA-AAL1 FP-16pOC3SmIrAtm*

- *PT-AAL1/WUA-AAL1 FP-4pOC12SmIrAtm*

- *WUA-AAL1 FP-12pDS3Atm*

- *WUA-AAL1 FP-4pDS3ChAtm*

Multiservice Switch 15000 function processor configuration (UA-IP)

For the Universal Access - IP solution configuration, Nortel Multiservice Switch 15000 FPs are installed in 1+1 protected pairs.

A UA-IP solution supports the following FPs for Nortel Multiservice Switch 15000 nodes:

- a 4-port OC-12 FP card, for Multiservice Switch IP over ATM inter-shelf trunk interfaces, links to Communications Server LAN (CS LAN) or to other switches and routers

- a 4-port OC-3 FP card, for Multiservice Switch IP over ATM inter-shelf trunk interfaces, optical hairpins, and MG9000 interfaces

- a 12-port DS3 ATM FP card, used for Multiservice Switch 15000 nodes to MG9000 links, using DS3

- a 4-port DS3 Channelized ATM FP card, supports hot standby equipment protection and software migration for ATM services using the Multiservice Switch inverse multiplexing over ATM (IMA) feature, in one-for-one equipment protected scenarios. This is used for MG9000 links.

- a 4-port GE card, used for Gigabit Ethernet (GE) connection to a Communications Server LAN (CS LAN), or to other routers.

- a 4-port OC- 3 Channelized Single-mode (Sm) Intermediate reach (Ir) FP card (TDM), used for media gateway 15000 (MG15000) to time-division multiplexing (TDM) equipment links.

- a 2-port GE Multimode Short reach (Sr) VSP3 FP card, used to connect a Multiservice Switch 15000 nodes to a Media Gateway controller card using H.248. H.248 is the ITU-T gateway protocol.

  Note: A carrier-grade configuration does not use the GE ports. Therefore, no template is needed for these ports.

- a 2-port OC- 3 Channelized Single-mode (Sm) Intermediate reach (Ir) VSP3-o FP card, to connect a Multiservice Switch node to a Media Gateway controller card, using H.248. H.248 is the ITU-T gateway protocol.

To configure the FP cards listed above, use the Nodal Provisioning tool and the FP templates provided for a UA-IP solution. The pair of FPs must be in non-configured even/odd adjacent slots. After you apply the template, you can configure any of the interfaces on the FP card.

UA-IP supports the following FP templates for Multiservice Switch 15000 nodes:

- *UA-IP FP-4pOC12SmIrAtm*

- *UA-IP FP-4pOC3SmIrAtm*

- *UA-IP FP-12pDS3Atm*

- *UA-IP FP-4pDS3ChAtm*

- *UA-IP FP-4pGE*

- *UA-IP FP-4pOC3ChSmIr-TDM*

- *UA-IP FP-2pGeMmSrVsp3*

- *UA-IP FP-2pOC3ChSmIrVsp3-o*

Task list for Multiservice Switch 15000 function processor configuration

To configure a function processor (FP) in Nortel Multiservice Switch 15000 nodes, configure the following:

- the physical ports on each FP pair.

- the ports on the FP pair to set the clocking source.

- any customer-defined configuration for each port, if necessary.

- the engineering and control parameters for each FP pair.

- the ATM resource control connection and buffer space for each FP pair.

- the frame (IP) resource control for each FP pair.

For more information on configuring FPs, see NN10600-551 *Nortel Multiservice Switch 7400/15000/20000 FP Configuration Reference*.

Chapter 3
Overview of Multiservice Switch 15000 interface configuration

This section provides an overview of Nortel Multiservice Switch 15000 interface configuration for the following solutions.

- Packet Trunking - AAL1

- Universal Access - AAL1

- Universal Access - IP

These interfaces are installed following initial installation of the node.

This section is meant to be used with the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/ UA-AAL1/UA-IP*. The *Attribute Summary* manual contains tables of all the specific values to use for configuring Multiservice Switch 15000 nodes.

All of the descriptions of configured interfaces in this section contain cross-references to the corresponding section in the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

This section contains the following topics:

- "Overview of interface configuration between network components (PT-AAL1/UA-AAL1)" (page 50)

- "Overview of interface configuration between network components (UA-IP)" (page 55)

- "Link distribution (PT-AAL1 and UA-AAL1)" (page 61)

- "Link distribution (UA-IP)" (page 78)

- "TDM trunk distribution (UA-IP)" (page 91)

Overview of interface configuration between network components (PT-AAL1/UA-AAL1)

This section gives an overview of interface configuration between Nortel Multiservice Switch 15000 nodes and other network components in a PT-AAL1 or UA-AAL1 solution.

VoA applications

Nortel Multiservice Switch 15000 nodes provide the core packet connectivity layer for Voice over ATM (VoA) applications. VoA includes the PT-AAL1 and UA-AAL1 solutions. In addition to the VoA application, the Core Packet Network provides connectivity for a variety of Next Generation Network services including voice, multi-media and data.

User administration for centralized authentication and authorization in a VoA network is also available with the deployment of MDM Admin Servers and the Operator Client application. See "Deploying MDM Admin Servers for centralized AAA in a VoA network with the Operator Client application" (page 136) for more information.

The principal UA-AAL1 first office application is the Class 5 end office replacement program. This program is the first step towards evolving to a multiservice end-office built upon a distributed ATM network.

Available component interfaces

Nortel recommends that you configure each function processor (FP) with as diverse a mix of component interfaces as possible.

- For both PT-AAL1 and UA-AAL1 solutions, configure a mix of interfaces to the Communication Server 2000 (CS2000), Interworking Spectrum Peripheral Module (IW-SPM), and Multiservice Gateway 4000 (MG4000), as well as to other ATM network components, for example Multiservice Switch 15000 nodes.

- For a PT-AAL1 solution, also configure interfaces to the DPT-SPM component, if required.

- For a UA-AAL1 solution, also configure interfaces to the digital subscriber line (DSL), Media Gateway 9000 (MG9000), SAM21 SC, Universal Audio Server (UAS) components, and TDM core.

In addition, distribute the interfaces to each of the different components across as many FP card pairs as possible. A wide distribution of these interfaces can reduce the impact of a catastrophic dual FP failure, and prevent it from adversely affecting any component connections. For more information on distributing interfaces and the ports on which to cable these interfaces, refer to your network plan.

Architecture example for Universal Access - AAL1 (UA-AAL1)

The UA-AAL1 solution is a voice over ATM network solution that is equivalent to the DMS-100/500 switch. The solution provides End Office voice services using AAL1 for voice transmission. It is a hybrid solution that supports interworking with legacy ENET-based line and trunk services and peripherals. In addition to voice services, the UA-AAL1 solution provides DSL and DS-1 based private line services through the line gateway, using the ATM network for transport.

Figure 3
Class 5 end office (UA-AAL1 solution)

LGC	Legacy Lines
LGCi	Legacy Lines
LTC	Legacy Lines
LTCi	Legacy Lines
DTC	Legacy Trunks
DTCi	Legacy Trunks
SMS	TR-008
SMU	RCU, LDT PSAP
ESMU	RCU
SMA	AN, TR-303, ICB
ESMA	AN, TR-303, ICB
MTM	NTT, Service Circuits

MSS 3516 013 AA
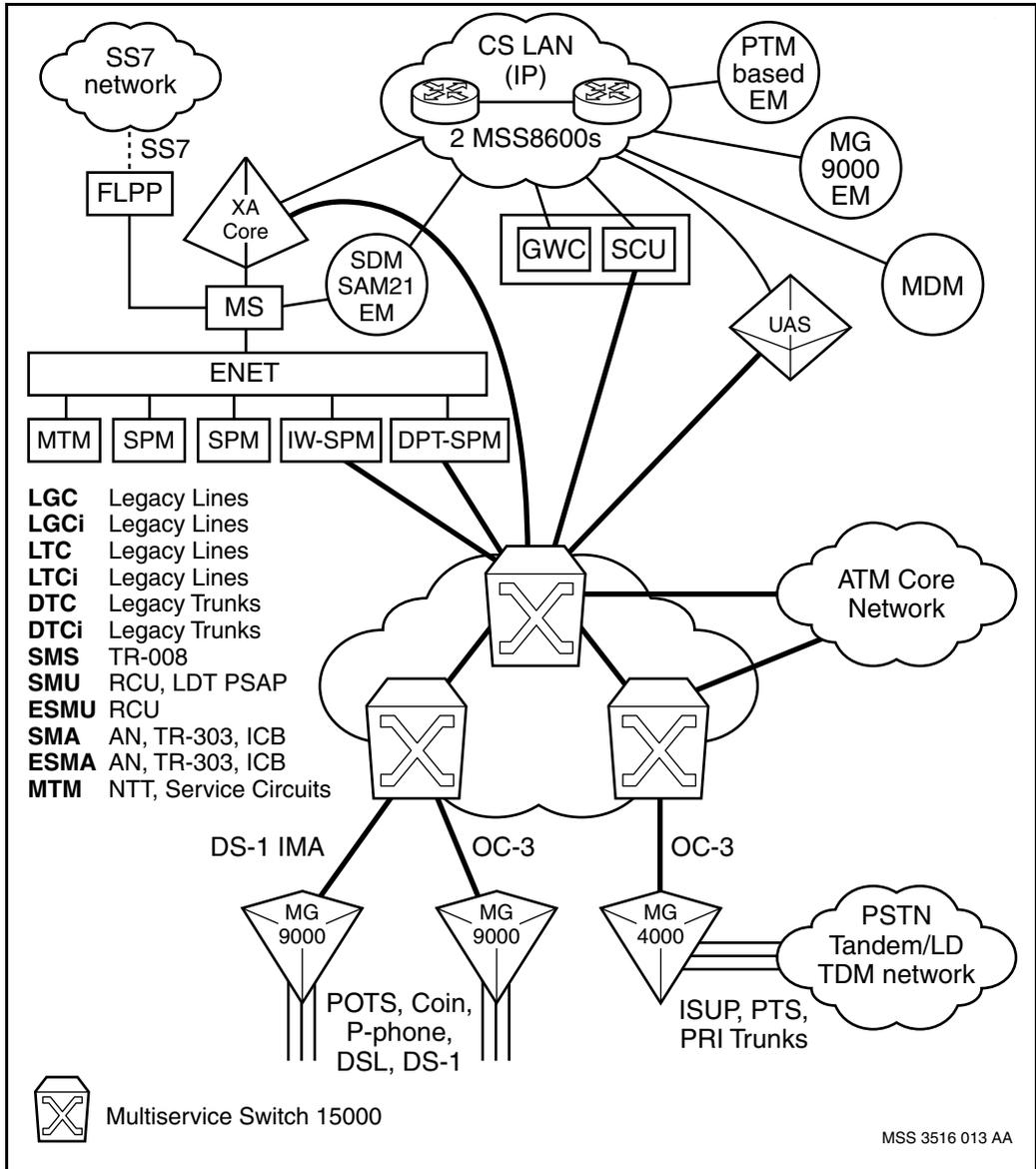
For an illustration of the evolution of a time division multiplexing (TDM) based network of class 5 and class 4 switches into a consolidated, distributed UA-AAL1 office, see Figure 4, "UA-AAL1 solution office architecture," (page 54).

Figure 4
UA-AAL1 solution office architecture
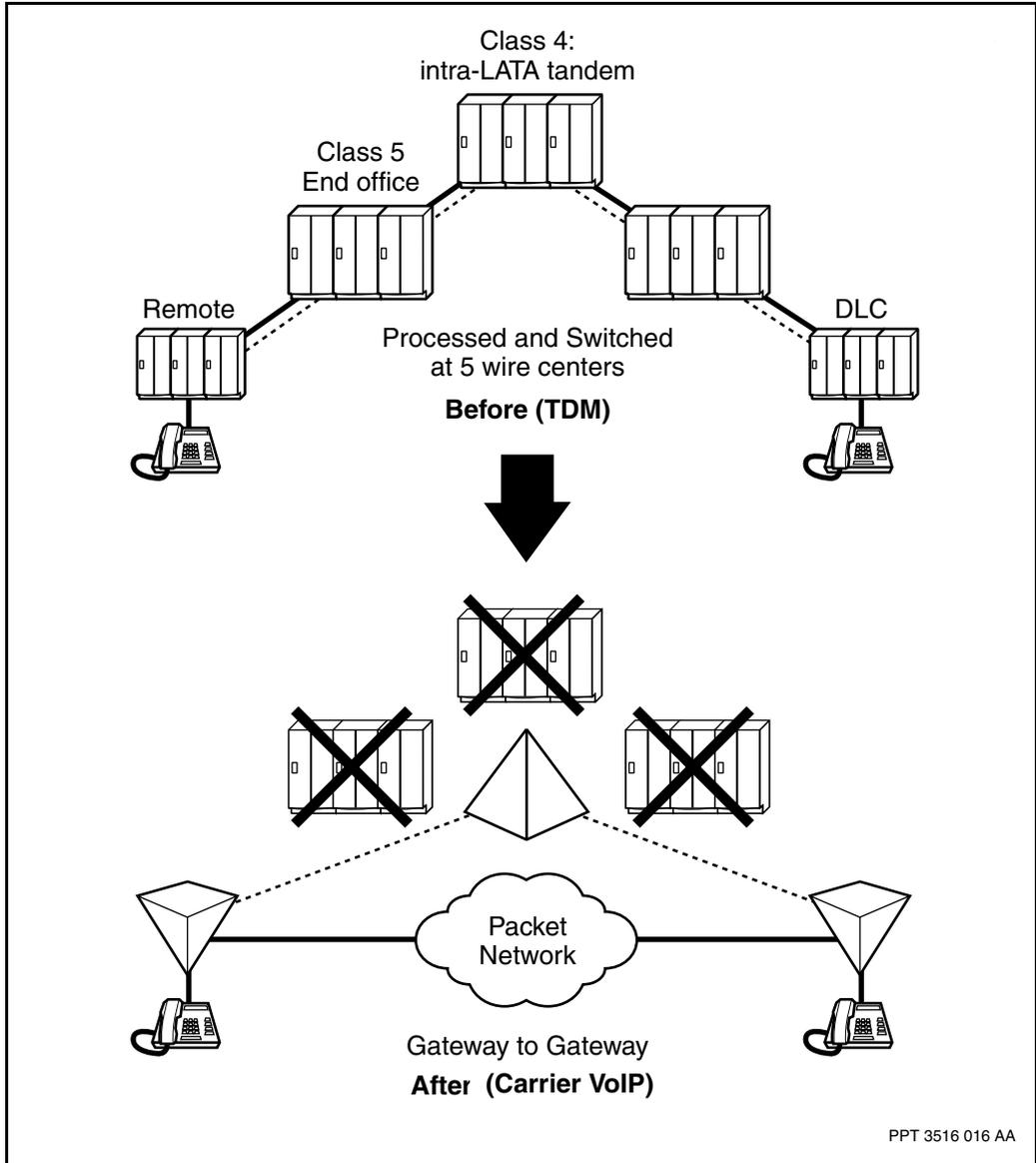
Overview of interface configuration between network components (UA-IP)

This section gives an overview of interface configuration between Nortel Multiservice Switch 15000 nodes and other network components in a UA-IP solution.

VoIP applications

The UA-IP solution is a voice over IP (VoIP) network solution that is equivalent to the DMS-100/500 switch. It provides End-Office voice services using IP for voice transmission and signaling. It is both a greenfield and a hybrid solution. In the hybrid case, this solution supports interworking with legacy ENET-based line and trunk services and peripherals. In addition to voice services, the UA-IP solution provides DSL through the MG9000 line gateway.

Available component interfaces

For a UA-IP solution, configure interfaces to other Multiservice Switch nodes, to CS-LAN, and MG9000 components, as well as for optical hairpins.

In addition, distribute the interfaces to each of the different components across as many FP card pairs as possible. A wide distribution of these interfaces can reduce the impact of a catastrophic dual FP failure, and prevent it from adversely affecting any component connections. For more information on distributing interfaces and the ports on which to cable these interfaces, refer to your network plan.

UA-IP architecture example

See Figure 5, "UA-IP architecture overview," (page 57) for an architecture overview of a UA-IP solution. In this model, a number of end-offices are replaced by remote Nortel Multiservice Switch 15000 nodes. These remote nodes aggregate IP traffic from a number of MG9000 line gateways and from primary rate interface (PRI) trunks from Media Gateway cards. Calls and signaling can go to other such offices that are also connected to either the IP Core network or the Carrier ATM Network

Figure 5
UA-IP architecture overview
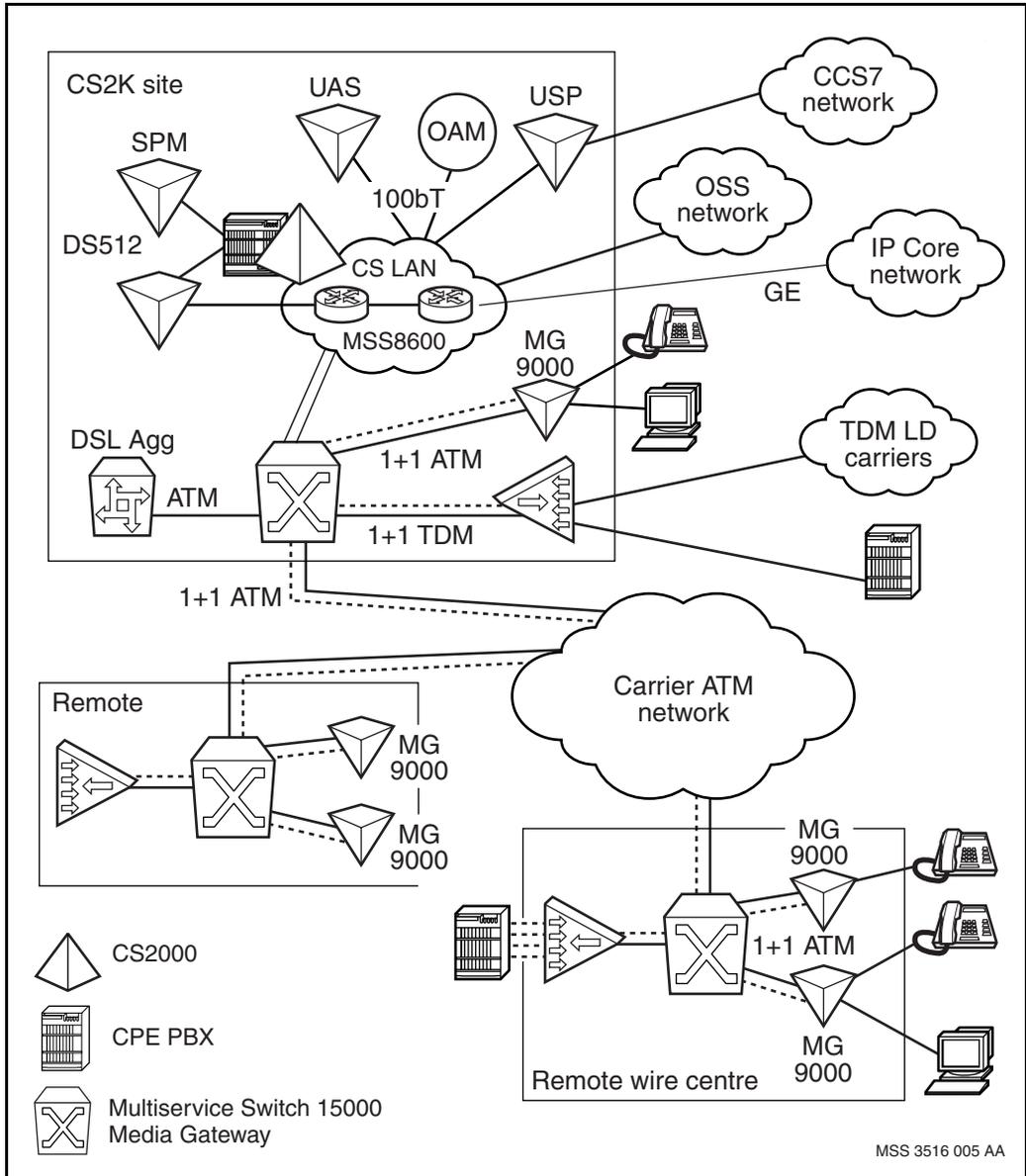
For an example of a configuration you can create using Multiservice Switch 15000 templates for Universal Access - IP, see Figure 6, "Remote wire centre (UA-IP)," (page 59) and Figure 7, "Example of remote wire centre and CS2000 site shelf configuration (UA-IP)," (page 60). This scenario is typical of a North American End-Office (EO) replacement configuration. Other configuration scenarios include:

- long-distance (LD) Tandem (in other words, a Class 4 office) replacement

- access Tandem replacement

- Carrier-Hosted Services (CHS) with Multimedia Communications Server (MCS)

Figure 6
Remote wire centre (UA-IP)
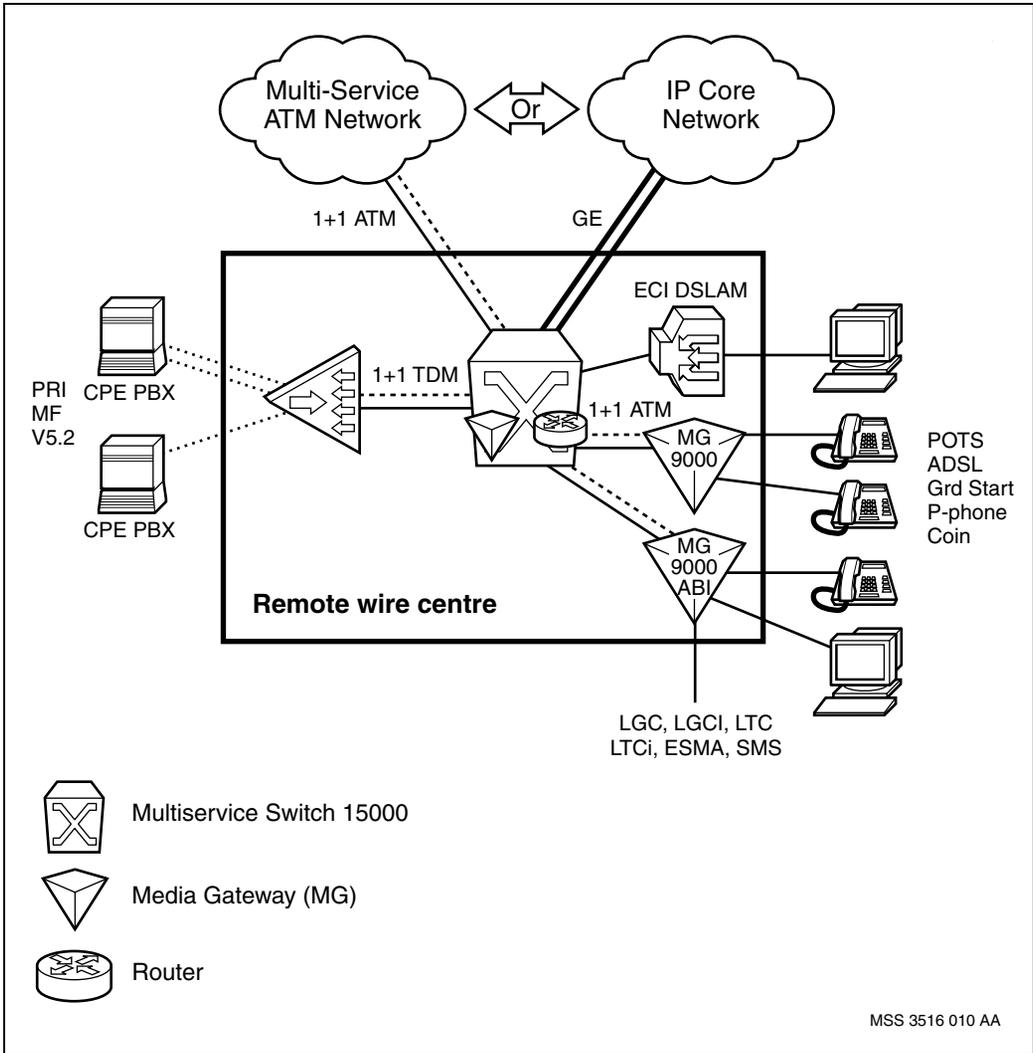
Multi-Service ATM Network

Or

IP Core Network

1+1 ATM

GE

ECI DSLAM

PRI MF V5.2

CPE PBX

1+1 TDM

1+1 ATM

MG 9000

POTS ADSL Grd Start P-phone Coin

CPE PBX

MG 9000 ABI

Remote wire centre

LGC, LGCI, LTC LTCi, ESMA, SMS

Multiservice Switch 15000

Media Gateway (MG)

Router

MSS 3516 010 AA

Figure 7
Example of remote wire centre and CS2000 site shelf configuration (UA-IP)
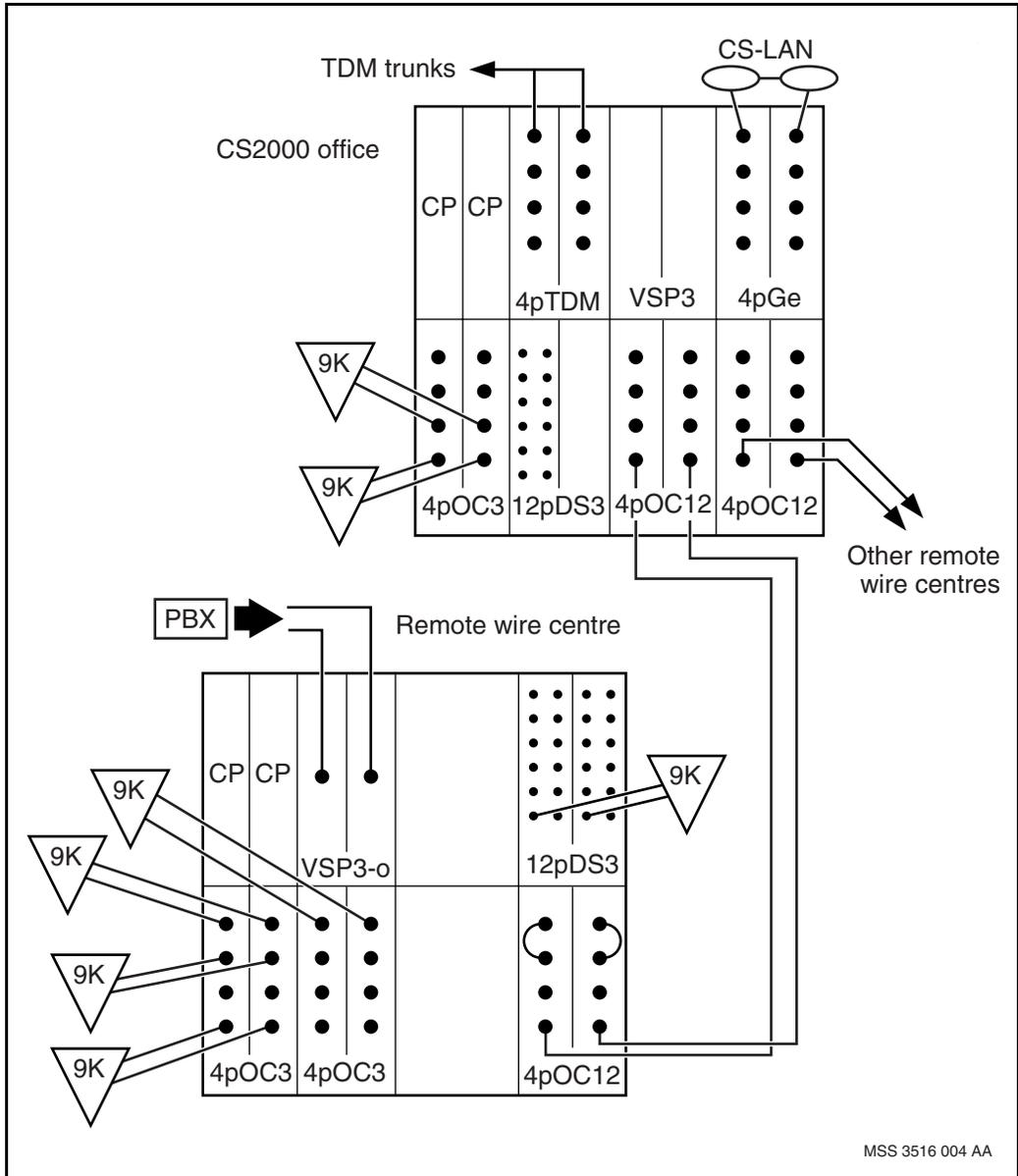
Link distribution (PT-AAL1 and UA-AAL1)

This section describes link distribution between Nortel Multiservice Switch 15000 nodes and other network components, in a PT-AAL1 or UA-AAL1 solution. It includes the topics as follows:

- "CS2000 link (PT-AAL1/UA-AAL1)" (page 61)

- "XA-Core link distribution (PT-AAL1/UA-AAL1)" (page 62)

- "SAM21 SC link distribution (UA-AAL1)" (page 64)

- "IW-SPM link distribution (PT-AAL1 and UA-AAL1)" (page 66)

- "DPT-SPM link distribution (PT-AAL1 and UA-AAL1)" (page 67)

- "MG4000 link distribution (PT-AAL1 and UA-AAL1)" (page 67)

- "MG9000 link distribution (UA-AAL1)" (page 69)

- "Internode Emergency Stand Alone for MG9000" (page 72)

- "Node-to-node ATM link distribution (PT-AAL1/UA-AAL1)" (page 73)

- "UAS link distribution (UA-AAL1)" (page 74)

- "DSL services link distribution (UA-AAL1)" (page 76)

Note 1: On Multiservice Switch 15000 shelves, the ports on the cards are numbered from the bottom to the top.

Note 2: On Multiservice Switch 15000 shelves, the two control processors (CPs) are located in slots 0 and 1 and are correspondingly numbered 0 and 1.

CS2000 link (PT-AAL1/UA-AAL1)

The Communication Server 2000 (CS2000) is comprised of a number of platforms, including the XA-Core and one or more SAM21. It processes all call requests within the network and provides centralized call control between the media gateways (MG4000 and, in the case of the UA-AAL1 solution, MG9000), as well as between the TDM-based nodes and the ATM network.

CS2000 is connected to Nortel Multiservice Switch 15000 nodes by a minimum of four unprotected OC-3 links. Since the CS2000 has a load sharing protection mechanism, the OC-3 links are not 1+1 protected by Automatic Protection Switching (APS).

XA-Core link distribution (PT-AAL1/UA-AAL1)

A sub-platform of the CS2000, the XA-Core processes all call requests within the network. It provides centralized call control between the media gateways (MG4000 and, in the case of the UA-AAL1 solution, MG9000), as well as between the TDM-based nodes and the ATM network.

XA-Core connects to a Nortel Multiservice Switch 15000 shelf through two unprotected OC-3c links. The XA-Core provides the required link protection at the application layer.

Nortel recommends that the two links between the XA-Core and the Multiservice Switch network be connected to different Multiservice Switch 15000 nodes in order to create redundancy.

When both XA-Core links are connected to the same node, the XA-Core links can be configured to support hitless software migration (HSM) using the *WUA-AAL1 BridgedCS2k-ATM Interfaces-16pOC3* template.

OC-3 ATM link pairs must be connected to the Multiservice Switch 15000 node in a specific configuration to maintain service during a software upgrade (HSM). "OC-3 ATM link pairs" (page 63) illustrates the required configuration, and the following list identifies the specifics:

- OC-3 ATM links must be connected to 16pOC3SmIrATM FP cards. (Connection to 4pOC3SmIrATM FP card is not supported.)

- The two OC-3 from XA-Core links must not be connected to the same FP card. They must be connected to two adjacent cards that have a sparing relationship, for example, to the 16pOC3SmIrATM FP cards in slots 2 and 3; port 0 on card 2, port 1 on card 3.

- The corresponding SONET port on the mated FP card must be left un-terminated. During HSM, mated FP cards upgrade one at a time, and the cell forwarding hardware behind the unterminated port is used to bring the link connected to the corresponding port on the mate card back into service during the migration.

Figure 8
OC-3 ATM link pairs

PPT 3423 001 AA
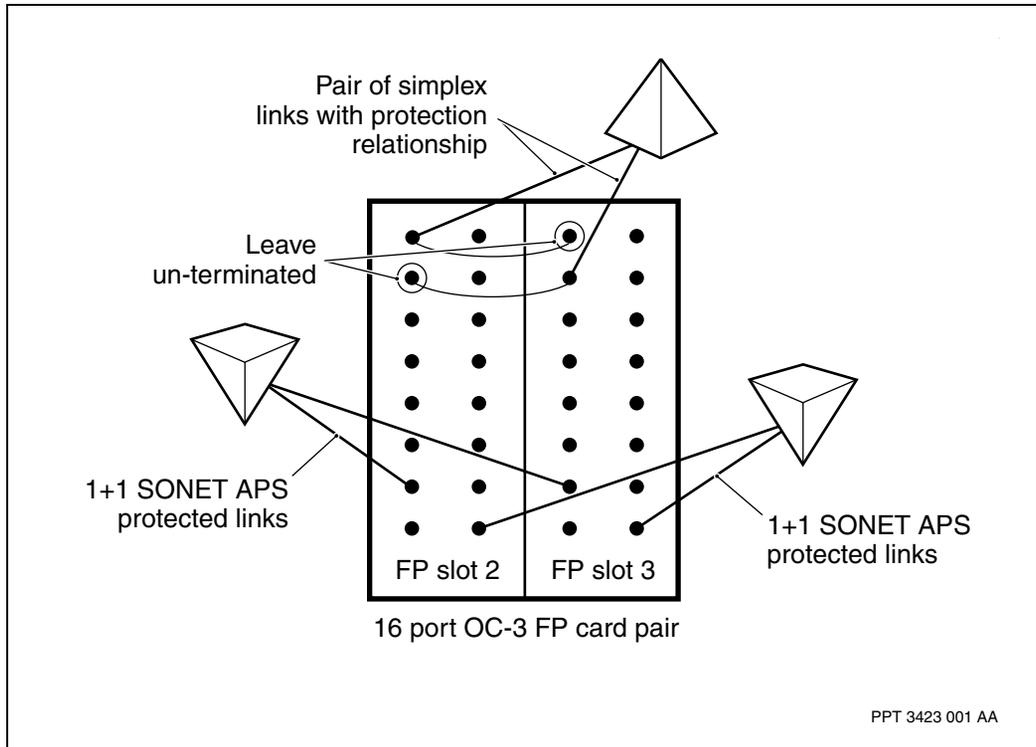
To configure the XA-Core interface, use the Nodal Provisioning tool and the following templates:

- *PT-AAL1/WUA-AAL1 CS2000 Interface 4pOC3*

- *PT-AAL1/WUA-AAL1 CS2000 Interface 16pOC3*

- *WUA-AAL1 Bridged CS2K-ATM Interfaces-16pOC3*

To configure the XA-Core interface, configure the following:

- an appropriate FP pair, if not already done

- the engineering and control parameters for each FP pair, if necessary

- the interface for XA-Core or SAM21 SC

- any customer-defined customizing for ports on the FP pair, if necessary

For the specific values that need to be configured for XA-Core interface, see the table of values for XA-Core interface configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

SAM21 SC link distribution (UA-AAL1)

A sub-platform of the CS2000 in the Universal Access - AAL1 solution, the SAM21 is a 21 slot shelf that houses the Gateway Controllers (GWC) used for MG9000s. Each SAM21 shelf has two redundant Shelf Controllers (SC) each with a connection to the ATM network.

SAM21 SC links can be configured to support hitless software migration (HSM) using the *WUA-AAL1 BridgedSam21-ATM Interfaces-16pOC3* template.

OC-3 ATM link pairs must be connected in the Nortel Multiservice Switch 15000 node to maintain service during a software upgrade (HSM) of the node. The specific configuration is described in the list below. For a graphical representation, see "OC-3 ATM link pairs" (page 63).

- The OC-3 ATM links must be connected to 16pOC3SmIrATM FP cards. (Connection to 4pOC3SmIrATM FP card is not supported.)

- The two OC-3 from a SAM21 shelf links must not be connected to the same FP card. They must be connected to two adjacent cards that have a sparing relationship, for example, to the 16pOC3SmIrATM FP cards in slots 2 and 3; port 0 on card 2, port 1 on card 3.

- The corresponding SONET port on the mate FP card must left un-terminated. During HSM, mated FP cards upgrade one at a time, and the cell forwarding hardware behind this unterminated port is used to bring the link connected to the corresponding port on the mate card back in service during the migration.

To configure the SAM21 SC interface, use the Nodal Provisioning tool and the following templates:

- *WUA-AAL1 SAM 21 SC Interface-4pOC3*

- *WUA-AAL1 SAM 21 SC Interface-16pOC3*

- *WUA-AAL1 Bridged SAM21-ATM Interfaces-16pOC3*

To configure the SAM21 SC interface, configure the following:

- an appropriate FP pair

- the ATM interfaces

- the connection admission controls for each ATM interface

- the connection map for each ATM interface for a 16 port OC-3 FP

- the user network interface (UNI)

- traffic management parameters for each UNI

For the specific values that need to be configured for the SAM21SC interface, see the table of values for the SAM21 SC interface configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

IW-SPM link distribution (PT-AAL1 and UA-AAL1)

The interworking SPM (IW-SPM) is a multi-applications high-speed platform used to provide bearer traffic interconnection between the time division multiplexing (TDM) core and the ATM fabric.

The IW-SPM acts as a bridge between the TDM core ENET using DS-512 connections and the ATM network using OC-3 links.

Each IW-SPM connects to the Nortel Multiservice Switch 15000 shelf over a protected OC-3 link. Each IW-SPM also communicates with the CS2000 over DS-512 links that run through the ENET.

To configure the IW-SPM interface, use the Nodal Provisioning tool and the following templates:

- *PT-AAL1/WUA-AAL1 IW-SPM Interfaces 4pOC3*

- *PT-AAL1/WUA-AAL1 IW-SPM Interfaces-16pOC3*

    Note: You can configure these links with the values in the templates listed above or you can refer to the appropriate section of the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP* for the values. Regardless of which method you use, have a Network Engineering Specification Book at hand as a reference when determining which values to enter into the templates.

To configure the IW-SPM interface, configure the following:

- an appropriate FP pair, if necessary

- the engineering and control parameters for each FP pair, if necessary

- the IW-SPM interface (which includes configuring any necessary customer-defined customizing for each port on the FP pair, line protection for the port, ATM interfaces, and user network interface)

For the specific values to configure for the IW-SPM interface, see the table of values for IW-SPM in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

DPT-SPM link distribution (PT-AAL1 and UA-AAL1)

The dynamic packet trunking SPM (DPT-SPM) is a class designation of the IW-SPM and is similar in all respects, including configuration.

To configure the DPT-SPM interface, use the Nodal Provisioning tool and the following templates:

- *PT-AAL1/WUA-AAL1 DPT-SPM Interfaces-4pOC3*

- *PT-AAL1/WUA-AAL1 DPT-SPM Interfaces-16pOC3*

  Note: You can configure these links with the values in the templates listed above or you can refer to the appropriate section of the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP* for the values. Regardless of which method you use, have a Network Engineering Specification Book at hand as a reference when determining the values to enter into the templates.

For the specific values that need to be configured for the DPT-SPM interface, see the table of values for DPT-SPM interface configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

MG4000 link distribution (PT-AAL1 and UA-AAL1)

The Multi-service Gateway 4000 (MG4000) is the trunk gateway between the TDM-based network and the ATM network.

The MG4000 collects TDM traffic and carries it into the ATM network through TDM-based OC-3 connections to the OC-3c interfaces in the ATM network. Two permanent virtual circuit (PVC) connections are configured between the CS2000 and the MG4000.

The MG4000s connect to the Nortel Multiservice Switch 15000 shelf over protected OC-3 links. To configure these links, first configure the ATM interfaces, and then configure two PVC connections between each MG4000 and the communication server (CS2000).

When configuring the PVCs, keep the following items in mind:

- The CS2000 has four unprotected OC-3 links into Multiservice Switch 15000 shelves. When creating the two PVC connections from one MG4000 to a CS2000, configure both of these PVC connections to go to the same pair of unprotected links, one to each of the two ports in the same FP pair. Each of the two PVC connections from one MG4000 cannot go to a different FP pair.

- Half of the PVC connections from the MG4000s must go to one of the pairs of protection group CS2000 links, while the other half must go to the other pair of protection group CS2000 links.

- The two PVC connections from each MG4000 should take the shortest route possible between the MG4000s and the CS2000. However, the two routes should also be as diverse as possible within your network topology. Each of the PVC connections should connect across different shelves, FP pairs, or physical links to decrease the common points of failure on each PVC.

- If the PVC needs to go across a link between Multiservice Switch 15000 shelves, select the link with the least number of PVC connections already running across it. Choose this link to ensure that the inter-shelf links load-share the PVC control connections.

- Define the PVC relay points as follows:

  — The relay points at the CS2000's ATM interface must be identified by the same VPI.VCI used for the CS2000's link.

  — The relay points at the MG4000's ATM interface must be identified by the same VPI.VCI used for the MG4000's link.

  — The relay points at either end of an inter-shelf link over which the PVC crosses must both be identified by the same VPI.VCI (Nortel recommends giving PVC1 a value or name equal to the SPM number plus 100 and PVC2 a value or name equal to the SPM number plus 300).

  — The other relay points on the PVC are selected using unused VPI.VCIs. You could chose to start at the top of the VCI range and progress downwards.

To configure the MG4000 interface, use the Nodal Provisioning tool and the following templates:

- *PT-AAL1/WUA-AAL1 MG4000 ATM Interfaces 4pOC3*

- *PT-AAL1/WUA-AAL1 MG4000 ATM Interfaces 16pOC3*

To configure the MG4000 interface, configure the following:

- the FP and engineer the parameters, if not already done

- a Multiservice Switch OC-3 interface for the MG4000

- the MG4000 interface for each FP type

For the specific values that need to be configured for the MG4000 interface, see the table of values for MG4000 ATM interface configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

MG9000 link distribution (UA-AAL1)

The Multi-service Gateway 9000 (MG9000) is a multi-service platform that is used with the Universal Access - AAL1 solution. It supports switched lines (for example, POTS), DS1 private line, and DSL services.

The MG9000 physically connects to the ATM network with OC-3, DS3 or DS1 IMA links. The MG9000 is connected logically to the Services Application Module 21 (SAM21) shelf controllers (SC) using four switched virtual circuits (SVC).

For the specific values to configure for the MG9000 interface, see the tables of values for MG9000 ATM interface configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

MG9000 OC-3 link distribution (UA-AAL1)

The MG9000 can connect to a Nortel Multiservice Switch 15000 node using a 1+1 LAPS-protected OC-3 interface. To configure the MG9000 OC-3 interfaces, use the Nodal Provisioning (NP) tool, and the templates as follows:

- *WUA-AAL1 MG9000 ATM Interfaces-4pOC3*

- *WUA-AAL1 MG9000 ATM Interfaces-16pOC3*

MG9000 DS1 IMA link distribution (UA-AAL1)

The MG9000 can connect to a Nortel Multiservice Switch 15000 node using a DS1 IMA interface. This interface consists of between 2 and 8 DS1s on a DS3 port of a 1:1 equipment-protected 4-port DS3 (channelized to DS1 for IMA) ATM FP.

To configure the MG9000 DS1 IMA interfaces, use the Nodal Provisioning tool, and the following templates:

- *WUA-AAL1 DS3 port-4pDS3ChAtm*

- *WUA-AAL1 MG9000 2xDS1-IMA ATM Interface-4pDS3ChAtm*

- *WUA-AAL1 1xDS1-IMA Link - 4pDS3ChAtm*

MG9000 DS3 link distribution (UA-AAL1)

The MG9000 can connect to a Nortel Multiservice Switch 15000 node using a DS3 interface, on a 1:1 equipment-protected 12-port DS3 ATM FP. To configure the MG9000 DS3 interfaces, use the Nodal Provisioning tool, and the *WUA-AAL1 MG9000 ATM Interface-12pDS3* template.

For an illustration of the MG9000 DS3 link, see Figure 9, "MG9000 DS3 to Multiservice Switch 15000 DS3 with optical transport," (page 71).

The MG9000 DS3 interface is a less costly connection than, for example, an OC-3, to an ATM backbone. However, it still meets bandwidth requirements. Additional cost savings are available when a fiber data path between the Multiservice Switch 15000 node and MG9000 is not available for connection.

Note: Even though the MG9000 DS3 interface uses a 12-port FP, it only supports the use of ports 0 through 3. Connect the 4-port DS3 sparing panel to the p0 connector on the FP faceplate for the DS3 ports. Connect it to the P3 connector on the FP faceplate for sparing panel control.

Figure 9
MG9000 DS3 to Multiservice Switch 15000 DS3 with optical transport
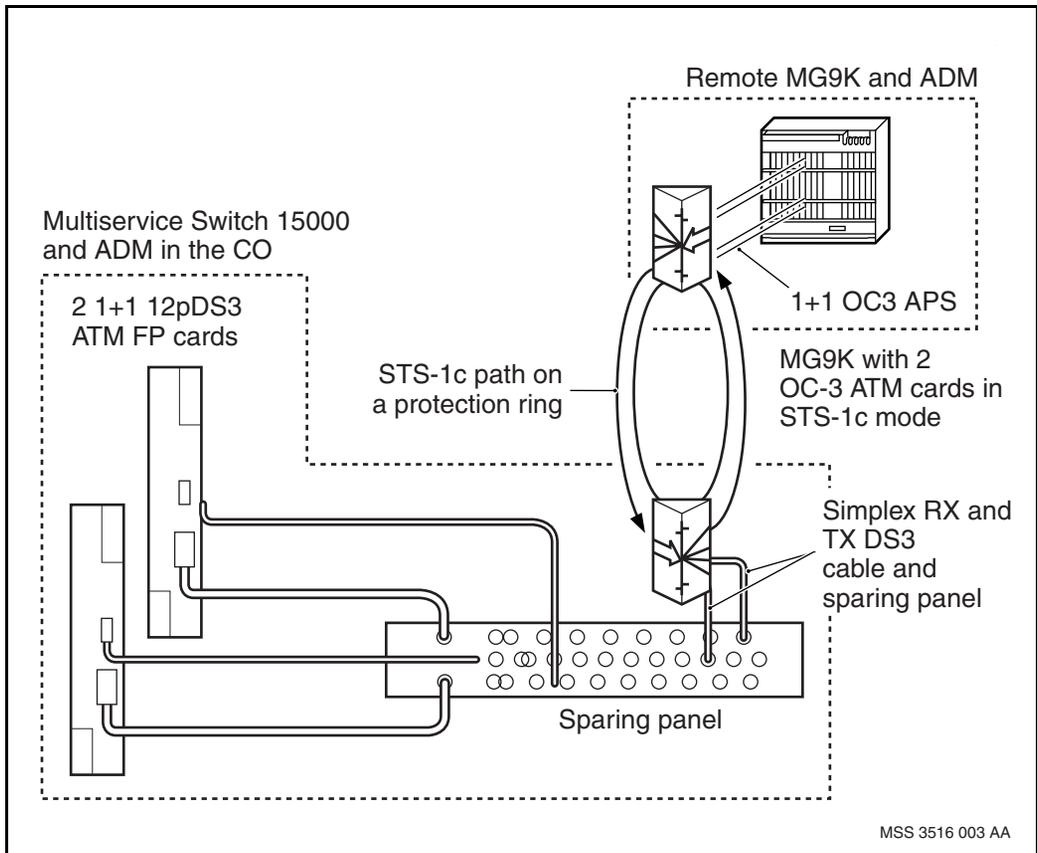
Internode Emergency Stand Alone for MG9000

To use internode emergency stand alone (ESA) in your UA-AAL1 MG9000 network, you must perform some shelf configuration on the Software (Sw) and Virtual Router (vr) components manually after the nodal provisioning template has been applied.

For detailed component configuration, refer to NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

A list of possible deployment scenarios for internode ESA are as follows:

- MG9000 connected to 4pOC3 FP card with ipRoutes > 0

- MG9000 connected to 16pOC3 FP card with ipRoutes > 0

    Note: The AtmIf Vcc Nep, AtmMpe Ac and VirtualRouter ProtocolPort components must be manually configured for MG9000 according to the configuration attributes listed in the following tables of NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*:

    — "OC-3 configuration for internode ESA"

    — "DS-3/STS-1 interface configuration to support MG9000 internode ESA"

    — "DS-1 IMA interface configuration to support MG9000 internode ESA"

- MG9000 connected to 16pOC3 FP card with ipRoute = 0; only supports a hairpin configuration

- MG9000 STS-1 connected to 12pDS3 FP cards (which do not support IP)

- MG9000 IMA connected to 4pDS3 FP cards (which do not support IP)

    — For MG9000 on these cards, an IP hairpin is required.

— PVC is needed between the MG9000 to the hairpin port.

Hairpins can be provisioned on:

- A new pair of 4pOC3 cards.

- Spare pair of 1+1 OC12 or OC3 ports on either 4pOC12 (PQC12) or 4pOC3 (assume ipRoutes > 0)

- Pair 16pOC3 with ipRoutes>0

Use the UA-IP Hairpin NP templates to configure the hairpin interfaces.

For more information about Inter-node ESA attributes, refer to NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Node-to-node ATM link distribution (PT-AAL1/UA-AAL1)

Nortel Multiservice Switch 15000 nodes support a node-to-node ATM interface, in a Universal Access - AAL1 solution. Configure these links as protected OC links on either OC-3 or OC-12 cards. When you configure this service, the ATM Interface (AtmIf) component and its subcomponents, ConnectionAdministrator (CA) and Private Network-to-Network Interface (PNNI) are always created as well.

To configure the Multiservice Switch for ATM Interface with PNNI, use the Nodal Provisioning tool and the following templates:

- PT-AAL1/WUA-AAL1 ATM PNNI Interfaces-4pOC3

- PT-AAL1/WUA-AAL1 ATM PNNI Interfaces-16pOC3

- PT-AAL1/WUA-AAL1 ATM PNNI Interfaces-4pOC12

- WUA-AAL1 ATM PNNI Interfaces-12pDS3

To configure the Multiservice Switch for ATM Interface with PNNI in the Packet Trunking - AAL1 solution, configure the following:

- an appropriate FP pair, if necessary

- the ATM PNNI interface for the appropriate FP type

- any customer-defined customizing for each port on the FP pair, if necessary

- line protection for the FP pair

- the ATM interfaces

- the PNNI interface

To configure the Multiservice Switch 15000 node for ATM Interface with PNNI in the Universal Access - AAL1 solution, configure the following:

- an appropriate FP pair

- line protection for the port

- the ATM interfaces

- the connection admission controls for each ATM interface

For a 16 port OC-3 or 4 port OC-12 FP, configure the PNNI interface for the connection map for each ATM interface.

If MG9000 interNode ESA support is required over the PNNI link, the AtmIfVcc Nep, AtmMpe Ac, and VirtualRouter ProtocolPort components need to be configured as described in the table "MSS15000 to MSS15000 configuration to support MG9000 internode ESA" in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

For the specific values that need to be configured for Multiservice Switch ATM trunks, see the table of values for ATM trunk configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

UAS link distribution (UA-AAL1)

In the Universal Access - AAL1 solution, the universal audio server (UAS) is a SAM16 shelf-based peripheral that provides services such as the following:

- conferencing

- voice mail

- announcements

Currently, the UAS is limited to providing the multi-casting capabilities necessary for local Communication Assistance for Law Enforcement Act (CALEA).

The UAS is connected to the ATM network by a OC-3 link. Call control is provided by the GWC. The CS LAN the signalling between the UAS and the GWC.

To configure the UAS interface, use the Nodal Provisioning tool and the following templates:

- *WUA-AAL1 UAS ATM Interface-4pOC3*

- *WUA-AAL1 UAS ATM Interface-16pOC3*

To configure the UAS interface, configure the following:

- an appropriate FP pair

- the ATM interfaces

- the connection admission controls for each ATM interface

- the connection map for each ATM interface for a 16 port OC-3 FP

- the user network interface (UNI)

- traffic management parameters for each UNI

For the specific values that need to be configured for the UAS interface, see the table of values for UAS ATM UNI link configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

DSL services link distribution (UA-AAL1)

In a Universal Access - AAL1 solution, you can configure Nortel Multiservice Switch 15000 nodes to support digital subscriber line (DSL) service. Each MG9000 supports DSL subscriber line access. The MG9000 then transfers the DSL connections across a Multiservice Switch ATM network using only the following virtual connections:

- permanent virtual connection (PVC)

- permanent virtual path (PVP)

- soft permanent virtual connection (SPVC)

- soft permanent virtual path (SPVP)

These DSL connections terminate at an Internet Service Provider (ISP).

There are some restrictions on the DSL service in the UA-AAL1 network. These restrictions are designed to ensure the quality and reliability of Public Switched Telephone Network (PSTN) voice traffic. The following restrictions apply to this interface:

- no signaling, routing or ILMI control channels are supported

- must be provisioned as an I.610 OAM segment boundary to prevent OAM segment cells from entering the Multiservice Switch network from the ISP network

- no connections between the ISP network and an FP that supports any device

- DSL ISP UNI interfaces require at least one ATM End System Address (AESA) to be provisioned when SPVCs and SPVPs are used to connect with the MG9000s

Connections between the Carrier VoIP network and ISP networks are left unprotected, therefore, an unprotected FP is used for all these connections or any similar connections to data-only networks.

In order to configure DSL connections across the Multiservice Switch ATM network, use Nortel Multiservice Data Manager ATM Service Provisioning tool to provision the connections. For more information on this tool, see 241-6001-600 *Nortel Multiservice Data Manager Service Provisioning for*

ATM User Guide. In conjunction with this tool, MDM has a circuit management database and circuit viewer application that allows you to track all virtual circuits (VCs) and virtual paths (VPs) that have been created in the network.

Configure the UNI connection using the command line interface (CLI) with the NN10400-006 *Nortel Multiservice Data Manager Network Configuration* and the 241-6001-023 *Nortel Multiservice Data Manager Configuration Management Tools*. How you configure the UNI is dependent on the type of DSL aggregator being used.

To configure a subscriber's DSL service, perform the following tasks:

- Provision the Vcc endpoints into the MG9000 and the ISP DSL aggregator.

- Use the ATM Service Provisioning tool to provision the PVC or SPVC in the Multiservice Switch network from the MG9000 to the ISP.

- Alternatively, the Vcc can be carried by an existing PVP or SPVP between the MG9000 and the ISP, or a new PVP or SPVP can be added to carry the subscriber's DSL traffic.

For more information on ATM configuration, see NN10600-710 *Nortel Multiservice Switch 7400/15000/20000 ATM Configuration Management*.

Link distribution (UA-IP)

This section describes link distribution between Nortel Multiservice Switch 15000 nodes and other network components, in a UA-IP solution. It includes the topics as follows:

- "Multiservice Switch IP over ATM inter-shelf trunk interface (UA-IP)" (page 79)

- "MG9000 OC-3 interface (UA-IP)" (page 82)

- "MG9000 DS1 IMA interface (UA-IP)" (page 83)

- "MG9000 STS-1/DS3 interface (UA-IP)" (page 84)

- "CS-LAN OC-12 interface (UA-IP)" (page 85)

- "CS-LAN GE interface (UA-IP)" (page 86)

- "Hairpin ATM/IP OC-3/OC-12 interfaces (UA-IP)" (page 87)

- "TDM OC-3 interfaces on the Multiservice Switch 15000 Media Gateway 15000 (UA-IP)" (page 88)

- "Media Gateway 15000 to MGC with H.248 (VSP3) interface (UA-IP)" (page 89)

- "Media Gateway 15000 to MGC with H.248 (VSP3-o) interface (UA-IP)" (page 89)

Note 1: On a Multiservice Switch 15000 shelf, the ports on the cards are numbered starting at the bottom and working up.

Note 2: On a Multiservice Switch 15000 shelf, the two control processors (CPs) are located in slots 0 and 1 and are correspondingly numbered 0 and 1.

Note 3: The names of the templates you use to create the interfaces in a UA-IP solution include the prefix IF. This denotes a template that sets up parameters for an interface which usually (but not always) corresponds to physical facilities. This can be a single port, a pair of protected ports, a logical interface such as an ATM interface to another network element (NE, for example MG9000), or an IP interface (for example to a media gateway controller or MGC), and so on.

Note 4: There is no change to the MSS15000 configuration to support internode ESA in the UA-IP solution.

Multiservice Switch IP over ATM inter-shelf trunk interface (UA-IP)

In a UA-IP solution, you can link a remote Nortel Multiservice Switch 15000 node with IP over ATM to another Multiservice Switch 15000 node at a CS2000 site, in a UA-IP solution. This requires a Multiservice Switch IP over ATM inter-shelf trunk interface.The Multiservice Switch 15000 node is used as a packet core network element. Multiservice Switch 15000 nodes can connect either directly through fiber, or through a synchronous optical network (SONET).

Generally, in a UA-IP solution, one primary Multiservice Switch 15000 node is situated in the office with the CS-LAN. It is connected to the CS-LAN via Gigabit Ethernet (GE), or OC-12. Other Multiservice Switch 15000 nodes are at the same site, but are not necessarily connected to the CS-LAN for IP control/bearer traffic. The remaining Multiservice Switch 15000 nodes are situated in Remote Wire Centres (RWCs).

The primary Multiservice Switch 15000 node connected to the CS-LAN likely has an inter-shelf IP interface to each of the other nodes. The other nodes are not necessarily directly linked to another RWC. In most cases, an IP over ATM connection is used for bearer path IP between each RWC and every other RWC.

To configure Multiservice Switch IP over ATM inter-shelf trunk interface, use the Nodal Provisioning tool and either of the following templates:

- *UA-IP IF-MSS-IPoATM-4pOC3SmIrAtm*

- *UA-IP IF-MSS-IPoATM-4pOC12SmIrAtm*

For Multiservice Switch IP over ATM inter-shelf trunk interface in a Universal Access - IP solution, configure the following and then activate the changes:

- an appropriate FP pair

- line protection for the port

- the ATM interfaces

- apply the *UA-IP AC-RWC-Bearer* template for each RWC-to-RWC bearer path connection (See "RWC bearer VCC distribution (UA-IP)" (page 80) for more information.)

- the connection admission controls for each ATM interface

- the ATM private network-to-network interface (PNNI)

- the connection maps for each ATM interface

- manually create IP routing (for example static route) entries

Apply either of the *UA-IP IF-MSS-IPoATM-4pOC3SmIrAtm* or *UA-IP IF-MSS-IPoATM-4pOC3SmIrAtm* templates to the remote end of the link. Then apply the template to the CS2000 end of the link.

Apply the *UA-IP AC-RWC-Bearer* template to each remote Multiservice Switch 15000 node, on the new node n-1 times and one on each remote node. Also, configure the nailed-up relay points (NRPs) on the CS2000 site node.

For the specific values to configure for Multiservice Switch IP over ATM inter-shelf trunk interface, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

RWC bearer VCC distribution (UA-IP)
This section describes ATM connection distribution on Nortel Multiservice Switch 15000 nodes in a UA-IP solution. Apply this provisioning at initial commissioning of the node, or on existing node-to-node interfaces for capacity growth.

In a UA-IP solution, you can provision an asynchronous transfer mode (ATM) virtual channel connection (VCC) for IP connectivity between remote wire centres (RWCs).

To provision Multiservice Switch 15000 nodes for the RWC bearer VCC, use the Nodal Provisioning tool, and either of the following templates:

- *UA-IP AC-RWC-Bearer-4pOC12SmIrAtm*

- *UA-IP AC-RWC-Bearer-4pOC3SmIrAtm*

These templates define an ATM connection for bearer path traffic from a node at a Remote Wire Centre going to a node at another Remote Wire Centre. The ATM connection is over either an existing OC-12 IPoATM trunk or an existing OC-3 IPoATM trunk.

To configure the RWC bearer VCC on a Multiservice Switch 15000 node in a UA-IP solution, configure the following:

- an appropriate FP pair, if necessary

- Multiservice Switch IP over ATM inter-shelf trunk interface on 4pOC12SmIrAtm or 4pOC3SmIrAtm FP cards

- the LAPS STS on the above FP cards

For the specific values to configure an ATM connection - RWC bearer VCC, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

MG9000 interface (UA-IP)

The Multi-service Gateway 9000 (MG9000) is a multi-service platform that is used with the UA-IP solution.

The MG9000 physically connects to the network with OC-3, DS1 IMA, or STS-1 DS3 links.

For the specific values to configure for the MG9000 link distribution, see the tables of values for MG9000 interface configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

MG9000 OC-3 interface (UA-IP)

The MG9000 can connect to Nortel Multiservice Switch 15000 nodes using an optical link (1 + 1 OC-3).

The MG9000 carries IP traffic to the virtual router (VR) over 2 or 3 virtual channel connections (VCCs) as follows:

- MG9000 carries IP traffic over an rt-VBR Vcc that carries all voice traffic plus the H.248 control traffic. This Vcc requires a /27 subnet, because it has up to 16 IP devices connected to it, plus the Multiservice Switch 15000 node's protocol port address.

- MG9000 carries IP traffic over an nrt-VBR Vcc that carries the operations, administration, and maintenance (OAM) traffic for the MG9000. This Vcc requires a /29 subnet for three IP addresses: two IP addresses on the MG9000, plus the Multiservice Switch 15000 node's protocol port addresses.

- MG9000 carries IP traffic over an optional rt-VBR that carries other signalling (PPVM) and control traffic for MG9000 ABI cards.

To configure the MG9000 OC-3 interface, use the Nodal Provisioning tool and the *UA-IP IF-MG9000-4pOC3SmIrAtm* template

Note: In a UA-IP solution, the NP templates for the MG9000 interfaces do not configure an ABI connection, just the basic CC (bearer and H.248) and OAM Vccs. For these Vccs, the maximum traffic contract is the default. For example, by default, it assumes that 2 shelves are configured

on the MG9000 OC-3 port. It is up to the installer to change this if necessary, using the values in the Network Engineering Specification Book.

For the specific values to configure for an MG9000 OC-3 link, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

MG9000 DS1 IMA interface (UA-IP)

The MG9000 can connect to Nortel Multiservice Switch 15000 nodes using a DS1 IMA interface. This interface is an ATM interface that uses a DS1 line standard format, and inverse multiplexing for ATM (IMA).

The difference between the MG9000 DS1 IMA interfaces in a UA-IP versus a UA-AAL1 solution is that the NP template for UA-IP does not configure an ATMIf Uni Sig Vcd subcomponent. Also for UA-IP, the AtmIf component attributes have different values.

To configure the MG9000 DS1 IMA link, use the Nodal Provisioning tool and the following templates:

- *UA-IP IF-DS3port- 4pDS3ChAtm*

- *UA-IP IF-MG9000-8xDS1-4pDS3ChAtm*

The *UA-IP IF-DS3port- 4pDS3ChAtm* template creates a DS3 port on 4pDS3ChAtm FPs. This template is preparation for adding IMA-linked interfaces.

The *UA-IP IF-MG9000-8xDS1-4pDS3ChAtm* template creates an interface to an MG9000 on 4pDS3ChAtm FP cards. It provisions an IMA group of 8 DS1s with an ATMIF on the FP cards. If you require less than 8 DS1s, manually delete the extra ones.

> *Note:* The MG9000 DS1 IMA interface requires an optical hairpin. You must configure the hairpin components first, before configuring the MG9000 DS1 IMA link. For more information, see "Hairpin ATM/IP OC-3/OC-12 interfaces (UA-IP)" (page 87).

For the specific values to use for the MG9000 DS1 IMA interface configuration, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

MG9000 STS-1/DS3 interface (UA-IP)

The MG9000 can connect to Nortel Multiservice Switch 15000 nodes using a Synchronous Transport Signal level (STS-1) interface. This interface terminates on the node as a DS3 line standard format. The DS3 format is used to carry information over a T3 trunk.

To configure an MG9000 STS1/DS3 interface on Multiservice Switch 15000 nodes use the Nodal Provisioning tool and the *UA-IP IF-MG9000-12pDS3Atm* template.

The UA-IP version of the NP template, unlike the UA-AAL1 version, does not require an ATMIf Uni Sig Vcd subcomponent. Also, the values for AtmIf component attributes in the UA-IP solution are different.

> *Note:* The MG9000 STS-1 DS-3 interface requires the use of an optical hairpin. For more information, see "Hairpin ATM/IP OC-3/OC-12 interfaces (UA-IP)" (page 87).

For the specific values to configure for the STS1/DS3 interface, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

CS-LAN OC-12 interface (UA-IP)

In a UA-IP solution, you can add CS-LAN interfaces to Nortel Multiservice Switch 15000 nodes. This provides IP connectivity from the node to the CS-LAN. A CS-LAN consists of a pair of ERS 8600s.

One of the supported interfaces to the CS-LAN is via OC-12 links, unprotected, from each of two Multiservice Switch 15000 nodes. The two nodes are connected with a 1+1 protected inter-shelf link.

> *Note:* For a new customer deployment, Nortel recommends that you use a GE interface, not an OC-12 interface, to a CS-LAN.

The Multiservice Switch 15000 node connects to the CS-LAN via a synchronous optical network (SONET) port on a 4pOC12SmIrAtm FP card. The two ERS 8600s must be connected to two different Multiservice Switch 15000 nodes, via OC-12.

To configure the Multiservice Switch 15000 node for CS-LAN OC-12, use the Nodal Provisioning tool, and the *UA-IP IF-CSLAN-4pOC12SmIrAtm* template.

For the specific values to configure for a CS-LAN OC-12 link, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

CS-LAN GE interface (UA-IP)

In a UA-IP solution, you can connect Nortel Multiservice Switch 15000 nodes to a Communications Server LAN (CS-LAN), via a Gigabit Ethernet (GE) link. A CS-LAN consists of a pair of ERS 8600s.

This interface provides IP connectivity from a Multiservice Switch 15000 node to a CS-LAN. The interface is via GE links on a single Multiservice Switch 15000 node with protected routes.

Note: For a new customer deployment, Nortel recommends that you use a GE interface, not an OC-12 interface, to a CS-LAN.

To configure the Multiservice Switch 15000 node for CS-LAN GE, use the Nodal Provisioning tool, and the following templates:

- *UA-IP IF-CSLAN-noLAG-4pGE*

- *UA-IP IF-CSLAN-LAG-4pGE*

For the specific values to configure for a CS-LAN GE link, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Hairpin ATM/IP OC-3/OC-12 interfaces (UA-IP)

In a Universal Access - IP solution, you must define an optical hairpin for a Nortel Multiservice Switch 15000 link to an MG9000 that uses either DS3 or inverse multiplexing for ATM (DS1-IMA). Deploy the optical hairpin in a Multiservice Switch 15000 node on a 4-port OC-3 or OC-12 ATM FP card.

An MG9000 STS-1/DS3 link uses a 12pDS3ATM FP card. An MG9000 DS1 IMA link uses a 4pDS3ChAtm (DS1 IMA) FP card. Neither of these FP cards supports carrier grade IP, therefore, these FPs can only terminate the ATM layer. For IP forwarding, you must use an optical hairpin.

For an illustration of a hairpin IP connection see Figure 10, "Optical hairpin IP connection," (page 87).

Figure 10
Optical hairpin IP connection

MSS 3516 002 AA
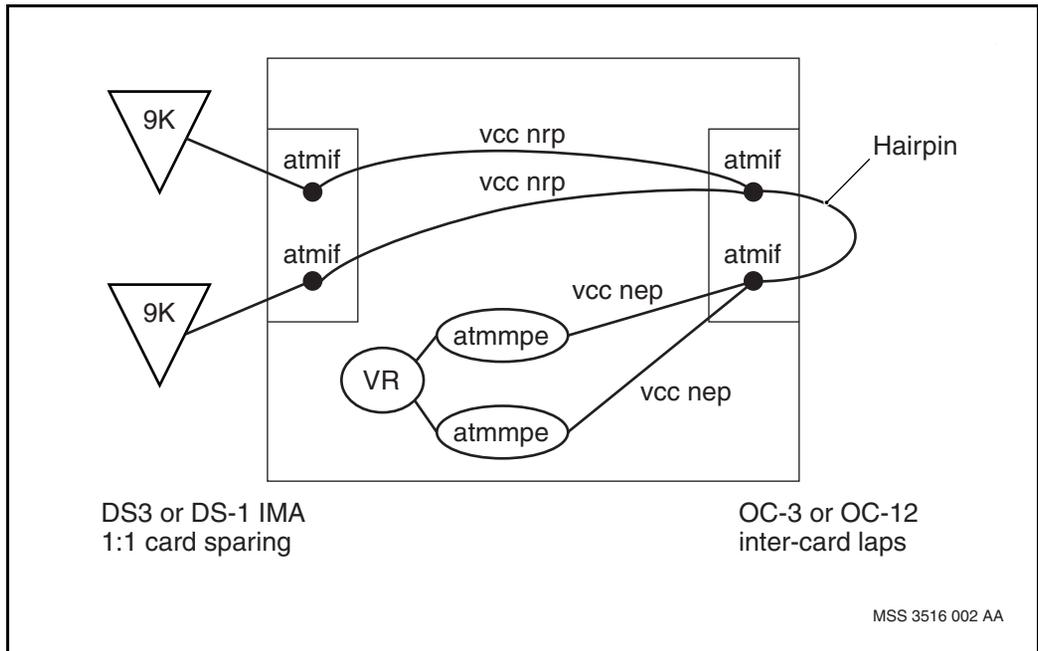
For an illustration of a hairpin IP connection used in a remote wire centre configuration, see Figure 7, "Example of remote wire centre and CS2000 site shelf configuration (UA-IP)," (page 60).

Deploy the optical hairpin on a pair of FP cards available expressly for this purpose, or else on a pair of optical cards with spare capacity.

To configure a Hairpin ATM/IP interface, use the Nodal Provisioning tool, and either of the following templates:

- *UA-IP IF-Hairpin-4pOC12SmIrAtm*

- *UA-IP IF-Hairpin-4pOC3SmIrAtm*

For the specific values to configure for a Multiservice Switch 15000 hairpin ATM/IP interface, see the section on Hairpin ATM/IP link configuration in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM OC-3 interfaces on the Multiservice Switch 15000 Media Gateway 15000 (UA-IP)

In a UA-IP solution, you can connect the Media Gateway 15000 of a Nortel Multiservice Switch 15000 node to TDM equipment, with a pair of OC-3 TDM links.

To configure the OC-3 TDM, use the Nodal Provisioning tool, and either of the following templates:

- *UA-IP IF-TDM-4pOC3ChSmIr*

- *UA-IP IF-TDM-2pOC3ChSmIrVsp3-o*

For the specific values to configure for an OC-3 TDM link, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Media Gateway 15000 to MGC with H.248 (VSP3) interface (UA-IP)

In a UA-IP solution, you can connect Nortel Multiservice Switch 15000 nodes to a Media Gateway Controller (MGC) with H.248 via a pair of VSP3 FP cards. H.248 is the ITU-T gateway control protocol, one of the control interfaces used between the MGC and the Media Gateway.

To configure the interface of the Media Gateway card of a Multiservice Switch 15000 node to MGC with H248, use the Nodal Provisioning tool, and the *UA-IP IF-MGC-H248-2pGeMmSrVsp3* template.

For the specific values to configure for this link to MGC with H.248, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Media Gateway 15000 to MGC with H.248 (VSP3-o) interface (UA-IP)

In a UA-IP solution, you can connect the Media Gateway card of a Nortel Multiservice Switch 15000 node to a Media Gateway Controller (MGC) with H.248 via a pair of 2-port VSP3-o FP cards. H.248 is the ITU-T gateway control protocol which is one of the control interfaces used between the MGC and the Media Gateway.

To configure the interface of the Media Gateway card of a Multiservice Switch 15000 node for MGC with H248, use the Nodal Provisioning tool, and the *UA-IP IF-MGC-H248-2pOC3ChSmIrVsp3-o* template.

Media Gateway 15000 to MGC with H.248 (VSP3-o) interface (UA-IP) with IPSec

If you have elected to implement IPSec security, configuration of the interface to the MGC for call control connections between a switched MG node and an MGC in a Voice over IP (VoIP) solution is done using the Nodal Provisioning tool and the *IF-MGC-IPSEC-2pOC3ChSmIrVsp3-o* template. This template provisions the Ctrl/mg SecurityPolicyDatabase (spd) component structure that is required to add IPSec protection for the control connection to MGC on 2pOC3ChSmIrVsp3 FP's. The spd component is a sub-component of the Nsta and ctrl/mg component.

You must also use the template IF-MGC-IPSEC-ping-2pOC3ChSmIrVsp3-o to configure the policy components for the Ctrl/mg component which will allow ICMP pings to be sent and recieved on 2pOC3ChSmIrVsp3 FP's.

Note: You must provision the *IF-TDM-2pOC3ChSmIrVsp3-o* template and the Nsta hierarchy before provisioning with the IPSec templates.

Refer to the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP* for more information about an MGC with an H.248 link and IPSec.

TDM trunk distribution (UA-IP)

This section describes TDM trunk distribution on a Nortel Multiservice
Switch 15000 Media Gateway node, in a UA-IP solution. It includes the
following topics:

TDM trunk preparation (LAPS STS) (UA-IP)

In a UA-IP solution, you can provision TDM trunks on VSP cards on a Media Gateway. First, you must set up the STS components for the TDM trunks. The TDM trunks must be on either 4pOC3ChSmIr (TDM) or 2pOC3ChSmIrVsp3 (VSP3-o) FP cards.

Apply this provisioning at initial commissioning of Nortel Multiservice Switch 15000 nodes or on TDM slots, that are not in use, for later capacity growth.

To prepare the node for the TDM trunks on a TDM card, use the Nodal Provisioning tool and the *UA-IP TT-LapsSts-TDM* template:

For the specific values to configure for TDM trunk preparation, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM ISUP trunk (VSP3-o) (UA-IP)

In a UA-IP solution, you can provision TDM ISUP trunks on the VSP3-o cards of Media Gateway.

Use the Nodal Provisioning tool and the *UA-IP TT-ISUPTrunk-2pOC3ChSmIrVsp3-o* template to configure the node with the TDM ISUP trunks on a VSP3-o card.

For the specific values to configure for a TDM ISUP trunk, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM ISUP trunk (VSP3) (UA-IP)

In a UA-IP solution, you can provision an ISUP trunk on the VSP3 cards of Media Gateway.

Note: On a VSP3 card, the ISUP and PRI trunk settings are common.

To provision Nortel Multiservice Switch 15000 nodes for a TDM ISUP (VSP3) trunk, use the Nodal Provisioning tool, and the *UA-IP TT-ISUPTrunk-2pGeMmSrVsp3* template.

For the specific values to configure for a TDM ISUP trunk (VSP3), see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM PRI trunk profile (VSP3-o) (UA-IP)

In a UA-IP solution, you can provision a TDM primary rate interface (PRI) trunk profile on the VSP3-o cards of Media Gateway. The PRI trunk profile is common to all PRI trunks on a VSP3-o FP card.

To provision Multiservice Switch 15000 nodes for the TDM PRI trunk profile, use the Nodal Provisioning tool, and the *UA-IP TT-PRIProfile -2pOC3ChSmIrVsp3-o* template.

For the specific values to configure for a TDM PRI trunk profile, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM PRI trunk (VSP3-o) (UA-IP)

In a UA-IP solution, you can provision a TDM primary rate interface (PRI) trunk on the VSP3-o cards of Media Gateway.

To provision Multiservice Switch 15000 nodes for the TDM PRI trunk on VSP3-o, use the Nodal Provisioning tool, and the *UA-IP TT-PRITrunk - 2pOC3ChSmIrVsp3-o* template.

For the specific values to configure for a TDM PRI trunk, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM PRI trunk profile (VSP3) (UA-IP)

In a UA-IP solution, you can provision a TDM primary rate interface (PRI) trunk profile on the VSP3 cards of a Media Gateway.

To provision Multiservice Switch 15000 nodes for the TDM PRI (VSP3) trunk profile, use the Nodal Provisioning tool, and the *UA-IP TT-PRIProfile-2pGeMmSrVsp3* template.

For the specific values to configure for a TDM PRI trunk profile (VSP3), see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM PRI trunk (VSP3) (UA-IP)

In a UA-IP solution, you can provision a PRI trunk on the VSP3 cards of Media Gateway.

Note: On a VSP3 card, the ISUP and PRI trunk settings are common, or in other words, used for both.

To provision Nortel Multiservice Switch 15000 nodes for a TDM PRI (VSP3) trunk, use the Nodal Provisioning tool, and the *UA-IP TT-PRITrunk-2pGeMmSrVsp3* template.

For the specific values to configure for a TDM PRI trunk (VSP3), see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM PTS trunk profile (VSP3-o) (UA-IP)

In a UA-IP solution, you can provision a Per-Trunk Signaling (PTS) trunk profile on the VSP3-o cards of Media Gateway. A PTS trunk profile is common to all PTS trunks using a specific profile on a VSP3-o FP card.

To provision Multiservice Switch 15000 nodes for the TDM PTS trunk profile (VSP3-o), use the Nodal Provisioning tool, and the *UA-IP TT-PTSProfile-2pOC3ChSmIrVsp-o* template.

For the specific values to configure for a TDM PTS trunk profile (VSP3-o), see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

TDM PTS trunk (VSP3-o) (UA-IP)

In a UA-IP solution, you can provision a Per-Trunk Signaling (PTS) trunk on the VSP3-o cards of Media Gateway.

To provision Multiservice Switch 15000 nodes for the TDM PTS trunk (VSP3-o), use the Nodal Provisioning tool, and the *UA-IP TT-PTSTrunk-2pOC3ChSmIrVsp3-o* template.

For the specific values to configure for a TDM PTS trunk (VSP3-o), see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Chapter 4
Overview of MDM server deployment and configuration

Nortel Multiservice Data Manager (MDM) is one of the network element management tools used in Carrier VoIP networks. It performs:

- fault management

- configuration management

- performance management

- security management

It does this for the ATM network and the IP network in the following solutions:

- Packet Trunking - AAL1 (PT-AAL1)

- Universal Access - AAL1 (UA-AAL1)

- Universal Access - IP (UA-IP)

In addition, MDM provides data feed of fault and performance information to the higher-level management system for additional processing. MDM software is installed on servers that are connected through IP connectivity to Multiservice Switch 15000 nodes.

The MDM can also be configured to host server configurations that provide centralized authentication and authorization for deployments of the Operator Client application in a VoA network. See "Deploying MDM Admin Servers for centralized AAA in a VoA network with the Operator Client application" (page 136).

In a secured VoIP network with deployments of the Operator Client application, centralized AAA is configured on the Integrated EMS. Some configuration is required on the MDM to allow Operator Client sessions to bypass the MDM and use the Integrated EMS for authentication and authorization. See NN10180-611 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Security and Administration PT-AAL1/UA-AAL1/UA-IP* for more information.

The term higher-level management system, as used in this document, refers to the application that provides additional processing of fault and performance information. In a voice over IP (VoIP), or UA-IP, solution, this is the Integrated Element Management System (integrated EMS). In a voice over ATM (VoA), or PT-AAL1 or UA-AAL1, solution, this is the SuperNode Data Manager (SDM). The higher-level management system can also be a customer operational support system (OSS), the nature of which depends on the particular customer environment.

For more information about integrated EMS, see the integrated EMS documentation suite for this release.

For more information about SDM, see the SDM documentation suite for this release.

For more information about performance data flow to a higher-level management system, see NN10158-711 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Performance PT-AAL1/UA-AAL1/UA-IP*.

The following sections contain information about MDM server deployment and configuration:

• "MDM server deployment scenarios" (page 99)

- "Overview of MDM server deployment" (page 118)

- "Deployment of servers using the dedicated network management approach" (page 120)

- "Deployment of MDM servers using the centralized network management approach" (page 124)

- "MDM server configuration for Ethernet Routing Switch 8600 fault management (PT-AAL1 and UA-AAL1)" (page 149)

- "Auto-patching for MSS/MG15000 nodes from the MDM" (page 144)

MDM server deployment scenarios

The tables in this section list Nortel Multiservice Data Manager server deployment scenarios for the management of Nortel Multiservice Switch nodes. These tables also list MDM software applications that need to be running on the servers for each of these scenarios.

For more information on the MDM server deployment scenarios, see 241-6001-310 *Nortel Multiservice Data Manager Server Reference*.

The following sections contain tables with MDM server and software application information:

- "Servers required on the various workstations" (page 99)

- "Client-set servers" (page 116)

- "MDP servers" (page 115)

- "Deploying MDM Admin Servers for centralized AAA in a VoA network with the Operator Client application" (page 136)

Servers required on the various workstations

Table 1, "Required servers on all workstations," (page 102) lists the various servers and software applications for each of the following MDM deployments:

- MDM standalone server

  MDM workstation that is configured to support the main server processes to perform surveillance, network data gathering (fault, security, and/or performance), configuration, and distribution of network

data to higher level management system in the network. This MDM deployment provides X11 access from remote and local operator desktops to the MDM Toolset user environment.

- MDM server-set

  MDM workstations configured in sets that collectively run the complete set of fault, configuration, and performance management for the network. The MDM server-set supports the main server processes for performing surveillance, network data gathering (fault, security, and/or performance), and distribution of network data to higher level management systems. Server-sets can be configured to host specific types of server processes according to network needs. The MDM client-sets that connect, through X11, to the MDM server-sets run on different workstations and provide the necessary hardware, GUI, and CLI tools for operator access.

- MDM client-set

  MDM workstations that run a small set of MDM processes for X11 desktop applications to connect to the MDM server-set. The MDM client-set uses the MDM Service Selection feature. For a large network, you may elect to run MDM client-set and server-set configurations to reduce the traffic load, caused by operator interaction with the system, on the server-sets. The client-set/server-set deployment offloads the GUIs, locally, to your operator base on the MDM desktop application from the MDM server-set. To use Service Selection feature, refer to Service Selection sections in NN10400-300 *Nortel Multiservice Data Manager Administration Tools.*

- MDM Admin Server

  MDM workstation that includes the Security Server and JAVA Web Start packages to provide centralized AAA with Operator Client desktop access in a VoA solution. The MDM Admin Server is deployed with the MDM server-set. For more information, see "Deploying MDM Admin Servers for centralized AAA in a VoA network with the Operator Client application" (page 136).

For more information about MDM deployments, refer to NN10028-111 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Product and Technology Basics PT-AAL1/UA-AAL1/UA-IP*.

For more information about the software applications appearing in the following table, refer to 241-6001-310 *Nortel Multiservice Data Manager Server Reference*. Other documents with information about specific software applications are noted in the table where applicable.

For more information about attributes and configured values, refer to NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Table 1
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Fault Management				
Data Management Agent (dma)	Yes	Yes	Yes	dma is used for global alarm clear.
FMDR	Yes	Yes	Yes	FMDR provides surveillance connections between MDM and Multiservice Switch 15000 nodes.
GMDR	Yes	Yes	Yes	GMDR is part of the fault surveillance stack that merges all the data flow from OAMCs and FMDRs, on both the local and redundant workstation.
IP Discovery Server (ipdsvr)	Yes	Yes	Yes	If IP Discovery is used for ERS 8600 enrolment, ipdsvr is required.
Network Data Access Mediator (NDAM)	Yes	Yes	Yes	NDAM provides fault management data to high-level applications, IEMS and SDM.
(Sheet 1 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Network Model co-ordinator	Yes	Yes	Yes	Network Model software applications are part of the Network Model support system. See 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.
Network Model edit server (EDSERVER)	Yes	Yes	Yes	EDSERVER lets you edit network models using the Network Viewer tool. To use Network Viewer in edit mode, both the EDSERVER and NMSERVER must be running. Security must also be configured, and there are multiple levels of security possibilities.
(Sheet 2 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Network Model server	Yes	Yes	Yes	The server responsible for handling API requests from the Network Model Provider utility. It provides information from the Network Model utility to the fault tools. and gives access to information about the active surveillance network model. NMSERVER communicates with Network Model Provider through the IPI interface, which is an IPC version of API protocol
(Sheet 3 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Network Model Surveillance updater (SURNUP)	Yes	Yes	Yes	SURNUP server is the MDM server responsible for keeping the active network model up-to-date with current component state information. It receives component state information from a GMDR server that maps states, component status, and alarms from the network into a raw component state.
psvagent	Yes	Yes	Yes	For the MSS Shelf View tool to work, the psvagent (with no parameter) is required. PSVAGENT gathers information about devices and passes it to the Shelf View application.
(Sheet 4 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
RTAC	Yes	Yes	Yes	RTAC collects all the alarms received by MDM servers that originate on Multiservice Switch nodes, and stores them in a file. The operator can access this file to perform historical searches.
SMDR	Yes	Yes	Yes	If MDM manages the Ethernet Routing Switch 8600, SMDR provides surveillance connections between MDM servers and ERS 8600 nodes.
TSVR	Yes	Yes	Yes	If MDM manages the Ethernet Routing Switch 8600, TSVR receives traps from ERS 8600 nodes.
(Sheet 5 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
System/base				
Communication Manager (FTDM)	Yes	Yes	Yes	Communication Manager manages all the Multiservice Switch connections.
Context server	Yes	Yes	Yes	Context server allows the sharing of information between applications to reduce keystrokes.
Host Group Directory Server (HGDS)	Yes	Yes	Yes	HGDS defines groupings of Multiservice Switch nodes into offices. This application is used by FMDR, PMSP, and the Command Console.
MNSD agent	Yes	Yes	Yes	MNSD agent exchanges service names between applications so that socket numbers do not need to be configured elsewhere.
(Sheet 6 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
MNSD level 2	No	Yes	Yes	MNSD level 2 provides the respective port of the MDM server process in the selected host to the remote client applications. This allows an application to connect to the server process automatically.
NTP	Yes	Yes	Yes	NTP synchronizes the MDM time with a central time server and supports MSS nodes that request time synchronization.
(Sheet 7 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
OAMC (Log Collector)	Yes	Yes	Yes	OAMC injects alarms into the workstation for servers when SVM has a server failure. The OAM log collector collects security audit logs (SAL's) from the local platform and displays them on the System Log Display tool for use in debugging MDM applications. For OAMC to function correctly, it must connect to GMDR.
SALCserver	Yes	Yes	Yes	The SALCserver can be paired with an FMDR and does not need to connect to GMDR.
(Sheet 8 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Workstation surveillance	Yes	Yes	Yes	Workstation surveillance monitors disk, CPU, memory utilization and Ethernet utilization on the local system and monitors connectivity to other MDM systems.
Configuration Management				
Backup controller	Yes	Yes	Yes	The Backup Controller and PP Backup Provider must be started as a pair. The Backup Controller receives requests from the MSS/MG15000s and SNMP Backup tools (GUI and CLI) and connects to the PP Backup Provider.
Data Synchronization Server	Yes	Yes	Yes	
MSS Command Access Server (PPAccessServer)	Yes	Yes	Yes	
(Sheet 9 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
MSS Config Model Server (pcms)	Yes	Yes	Yes	Config Model server controls shared memory for Multiservice Switch nodal provisioning applications.
NP configuration manager	Yes	Yes	Yes	NP Config server and NP Config Manager support the Multiservice Switch nodal provisioning applications.
NP configuration server	Yes	Yes	Yes	
PP Backup provider	Yes	Yes	Yes	See Backup Controller.
PP Restore provider	Yes	Yes	Yes	See Restore Controller.
(Sheet 10 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Pserver	Yes	Yes	No	Pserver connects an MDM API (Network Model, Alarms and Status) to a specific IP socket on the MDM workstation. For more information, see 241-6001-201 *Nortel Multiservice Data Manager Network Model API Reference*. This application communicates alarms to the higher-level management system.
Restore controller	Yes	Yes	Yes	The Restore Controller and PP Restore Provider must be started as a pair. The Restore Controller receives requests from the MSS/MG15000s and SNMP Backup tools (GUI and CLI) and connects to the PP Restore Provider.
Performance Management				
(Sheet 11 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Data Viewer Agent (PMAGENT)	Yes	Yes	Yes	Data Viewer tool lets you collect and display real-time performance information for the MSS, Multiservice Provider Edge (MPE), and SNMP devices in the network.
PMSP Server	Yes	Yes	No	PMSP server is used in Carrier VoIP networks to collect and convert PM statistics from MSS processors, cards, IP interfaces, VSP processors, and ATM interfaces.
Security and Centralized AAA				
GMDRAGENT	No	No	Yes	If you have elected to use Operator Client in your network, this agent is required on the MDM for fault and operator console.
(Sheet 12 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Network Model Agent (NMAGENT)	No	No	Yes	If you have elected to use Operator Client in your network, this agent is required on the MDM for fault and operator console.
RADIUS Interface (RADIUS Proxy)	No	No	Yes	Used for authentication of the MSS/ MG15000.
RTACAGENT	No	No	Yes	If you have elected to use Operator Client in your network, this agent is required on the MDM for fault and operator console.
secureFTPD	Yes	Yes	Yes	The secure FTP daemon between MDM servers and Multiservice Switch nodes that encrypts the FTP transmissions.
(Sheet 13 of 14)				

Table 1 (Continued)
Required servers on all workstations

Names in MDM Server Administration tool	Standalone server	Server-set or PM server	MDM Admin Server	Notes
Sun One IS	No	No	Yes	Used to direct authentication and authorization requests in networks that use the Operator Client application and Central AAA.
Sun One DS	No	No	Yes	The central database where each userID and its associated password are stored and maintained when Central AAA is used.
(Sheet 14 of 14)				

MDP servers

To manage the Management Data Provider (MDP) servers, use the Server Administration tool. See the table "MDP servers" (page 116) for information about the Server Administration tool options.

For more information about using the Server Administration tool to manage MDP servers, see 241-6001-309 *MDM Management Data Provider User Guide*. Also, in the table "MDP servers" (page 116), see the Comments column for names of other useful reference documents, where available.

For more information, see NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Table 2
MDP servers

Server Administration tool option	Standalone server	Server-set or PM server	MDM Admin Server	Comment
MDP Data Model Manager (mdpdmm)	Yes	Yes	Yes	This server manages the MDP Data Model Manager.
MDP Disk Manager (mdpdiskmgr)	Yes	Yes	Yes	This server manages the disk utilization of MDP files on MDM servers.
MDP File Mover Manager (mdpfmmgr)	Optional	Optional	Optional	This server manages the MDP File Mover.
MDP MSS File Manager (mdpppmgr)	Yes	Yes	Yes	This server manages the node file manager used by MDP.
MDP MSS Prober Manager (mdpfpmgr)	Yes	Yes	Yes	This server manages the collection of spooled node data.
MDP Statistics Retrieval System (MDPSRS)	Yes	Yes	Yes	MDPSRS polls nodes for non-spooled real-time statistical information. Statistic records are converted to bulk data format (BDF) and transferred to a performance or billing host for down-stream processing.

Client-set servers

This MDM server is used to reduce the load caused by operator use on the MDM server-set workstations. Any workstation with MDM software can run an MDM client-set and connect to the MDM server-set using the MDM Service Selection feature. The table below lists the MDM configuration required on a MDM client-set.

For more information about the software applications appearing in the following table, refer to 241-6001-310 *Nortel Multiservice Data Manager Server Reference*. For more information about attributes and configured values, refer to NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

Table 3
Configuration servers

Software application	Comments
Context server	This server allows the sharing of information between applications to reduce keystrokes
GMDR	MDM server-set GMDR connects as lower-level GMDR to this client-set GMDR. You can select to connect to all or some of the GMDR in a server-set depending on your choice to view the entire network or part of it.
Log Collector (OAMC)	Log Collector (OAMC) injects alarms into the workstation for servers when SVM has a server failure. The OAM log collector collects security audit logs (SAL's) from the local platform and displays them on the System Log Display tool for use in debugging MDM applications. For OAMC to function correctly, it must connect to GMDR.
MNSD level 2	MNSD level 2 communicates with the remote MDM hosts to track the service name and socket number of their MDM server processes. It feeds the information to MNSD agent and allows an application to connect to the server remotely and automatically. Do not include MDM client-set host in the command parameter.
MNSD agent	MNSD agent exchanges service names between applications so that socket numbers do not need to be configured elsewhere.
Workstation surveillance	Workstation surveillance monitors disk, CPU, memory utilization and Ethernet utilization on the local system and monitors connectivity to other MDM systems.

Overview of MDM server deployment

Nortel Multiservice Data Manager (MDM) servers are deployed using either the dedicated or centralized network management approach during the initial installation. In the dedicated network management approach, each office requires a pair of MDM servers while in the centralized network management approach, a single pair of MDM servers can manage the MSS15000/MG15000 nodes in several offices.

MDM servers can be migrated from the dedicated to the centralized network management approach while in-service if you want only one pair of MDM servers to manage the MSS15000/MG15000 nodes in several offices.

In-service migrations of MDM servers from the dedicated to centralized network management approach follow one of two methods. The choice of method to follow depends on whether you want to use the higher-level management system as an aggregator. See "Deployment of servers" (page 118).

Deployment of servers

This section shows you the sequence of tasks involved in deploying Nortel MDM servers in either the dedicated or centralized network management approach during an initial installation or as part of an in-service migration. To link to any procedure, go to "Methods for deploying servers" (page 120).

Figure 11
Deployment of servers
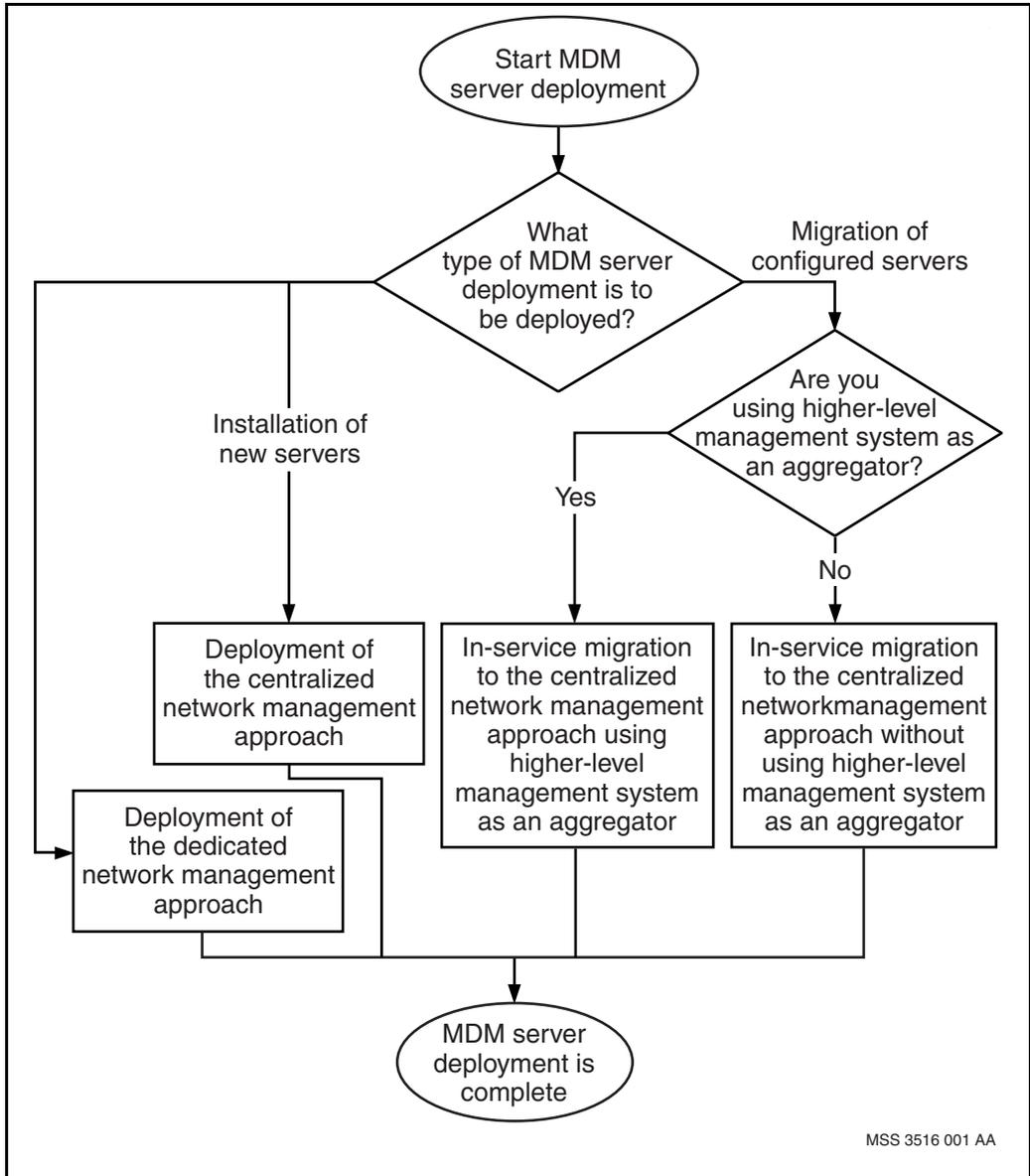
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Prerequisites for deploying servers using the dedicated network management approach

See the requisite information in the Installation Method document that describes Nortel MDM software loading and configuration.

Methods for deploying servers

- "Deployment of servers using the dedicated network management approach" (page 120)

- "Deployment of MDM servers using the centralized network management approach" (page 124)

- "In-service migration of MDM servers to the centralized network management approach without using the higher-level management system as an aggregator" (page 130)

- "In-service migration of MDM servers to the centralized network management approach using the higher-level management system as an aggregator" (page 132)

Deployment of servers using the dedicated network management approach

In the dedicated network management approach, each office requires a pair of Nortel Multiservice Data Manager servers to manage the MSS15000/ MG15000 nodes in that office. See the figure "Servers deployed using the dedicated network management approach" (page 121).

- "Prerequisites for deploying servers using the dedicated network management approach" (page 120)

- "Deploying servers using the dedicated network management approach task" (page 121)

Note: The deployment of MDM servers is performed by representatives from Nortel GNPS as part of the initial installation.

Figure 12
Servers deployed using the dedicated network management approach
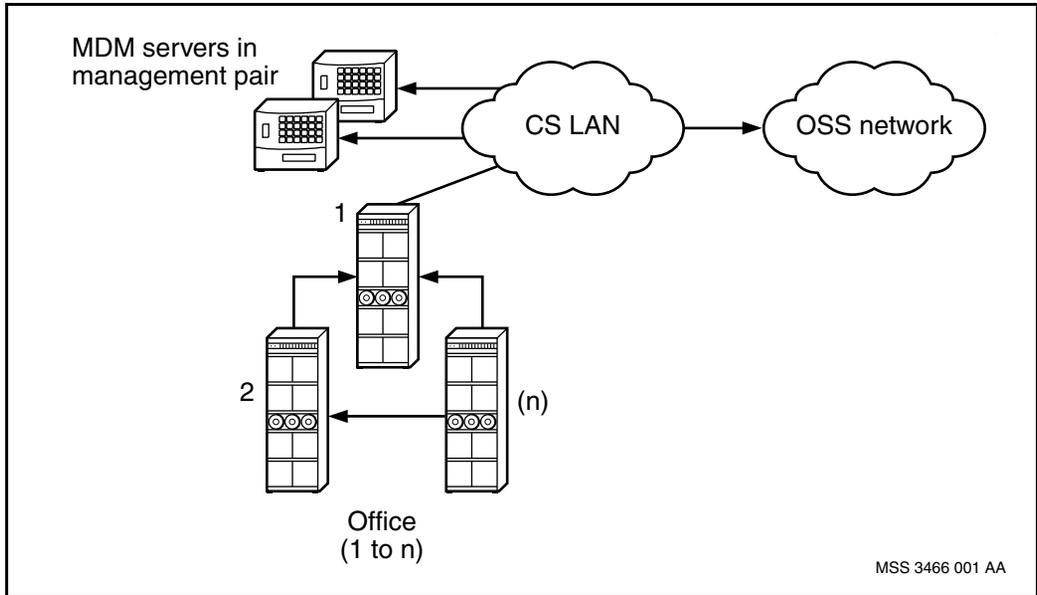
Prerequisites for deploying servers using the dedicated network management approach

See the requisite information in the Installation Method document that describes Nortel Multiservice Data Manager software loading and configuration.

Deploying servers using the dedicated network management approach task

The "Deployment of servers using the dedicated network management approach task flow" (page 123) shows you the sequence of tasks performed to deploy Nortel MDM servers using the dedicated network management approach for the following solutions:

- Packet Trunking - AAL1

- Universal Access - AAL1

- Universal Access - IP

For additional information on the tasks, go to "Task flow references" (page 124).

Figure 13
Deployment of servers using the dedicated network management approach task flow

Start initial installation of the MDM servers using the dedicated network management approach

Install MDM software using the Install Anywhere and QuickStart tools

Install Solaris 9

Configure and customize MDM software to establish network connections using MDM administration GUIs

Configure the MDM Network Model with the Multiservice Switch nodes and the connections to their gateways

Are you using higher-level management system as an aggregator?

No

Yes

Edit the configuration of the OM log collector on the higher-level management system to point to the correct IP socket in the MDM

Update the Multiservice Switch log stream configuration files on the higher-level management systems to allow these servers to receive fault data from Multiservice Switch switches

Repeat all the preceding tasks on the redundant MDM server in the pair

Initial installation of the MDM servers using the dedicated network management approach is complete

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Prerequisites to deploying servers using the centralized network management approach

See the requisite information in the Installation Method document that describes MDM software loading and configuration.

Task flow references

- Loading MDM software. See 241-6001-100 *Nortel Multiservice Data Manager Software Installation and Initial Configuration*.

- Installing Solaris. See NN10185-461 *Upgrading Nortel Multiservice Data Manager in Carrier Voice over IP Networks*.

- Configuring server software with the QuickStart tool. See 241-6001-100 *Nortel Multiservice Data Manager Software Installation and Initial Configuration*. Configuring servers for Nortel Multiservice Switch nodes. See 241-6001-303 *Nortel Multiservice Data Manager Customization and Administration*. Configuration. See 241-6001-309 *MDM Management Data Provider User Guide*.

- Using Network Viewer to build a Network Model. See 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

- Installing and configuring the log delivery application. For voice over ATM (VoA) (UA-AAL1 and PT-AAL1), see Configuration Management in the SDM documentation suite for this release. Log delivery application overview. See Product Overview in the SDM documentation suite for this release. For voice over IP (VoIP) (UA-IP), see the integrated EMS documentation suite.

Deployment of MDM servers using the centralized network management approach

In the centralized network management approach for deploying Nortel MDM servers a single pair of servers can manage the Nortel Multiservice Switch nodes in several offices. The reduction of the number of pairs of servers needed to manage the offices in a network results in a cost reduction for the customer.

See the figure "Deployment of servers using the centralized network management approach task flow" (page 128). This figure displays the centralized OAM for a network consisting of one office. A second office could be connected to the pair of servers pictured in the figure.

- "Prerequisites to deploying servers using the centralized network management approach" (page 124)

- "Deploying servers using the centralized network management approach task" (page 127)

    Note: The deployment of MDM servers is performed by representatives from Nortel GNPS as part of the initial installation.

Figure 14
Servers deployed using the centralized network management approach
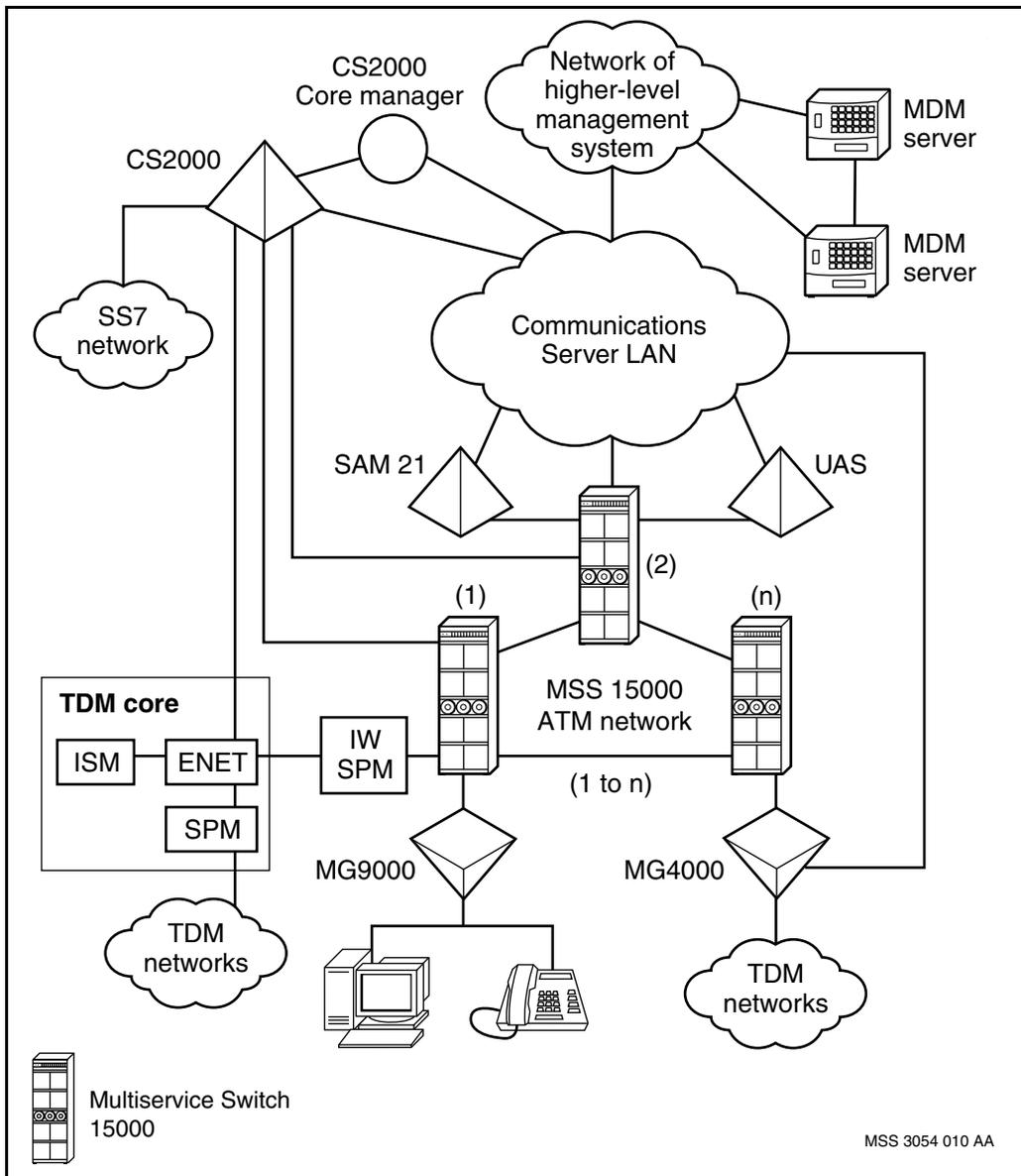
Prerequisites to deploying servers using the centralized network management approach

See the requisite information in the Installation Method document that describes MDM software loading and configuration.
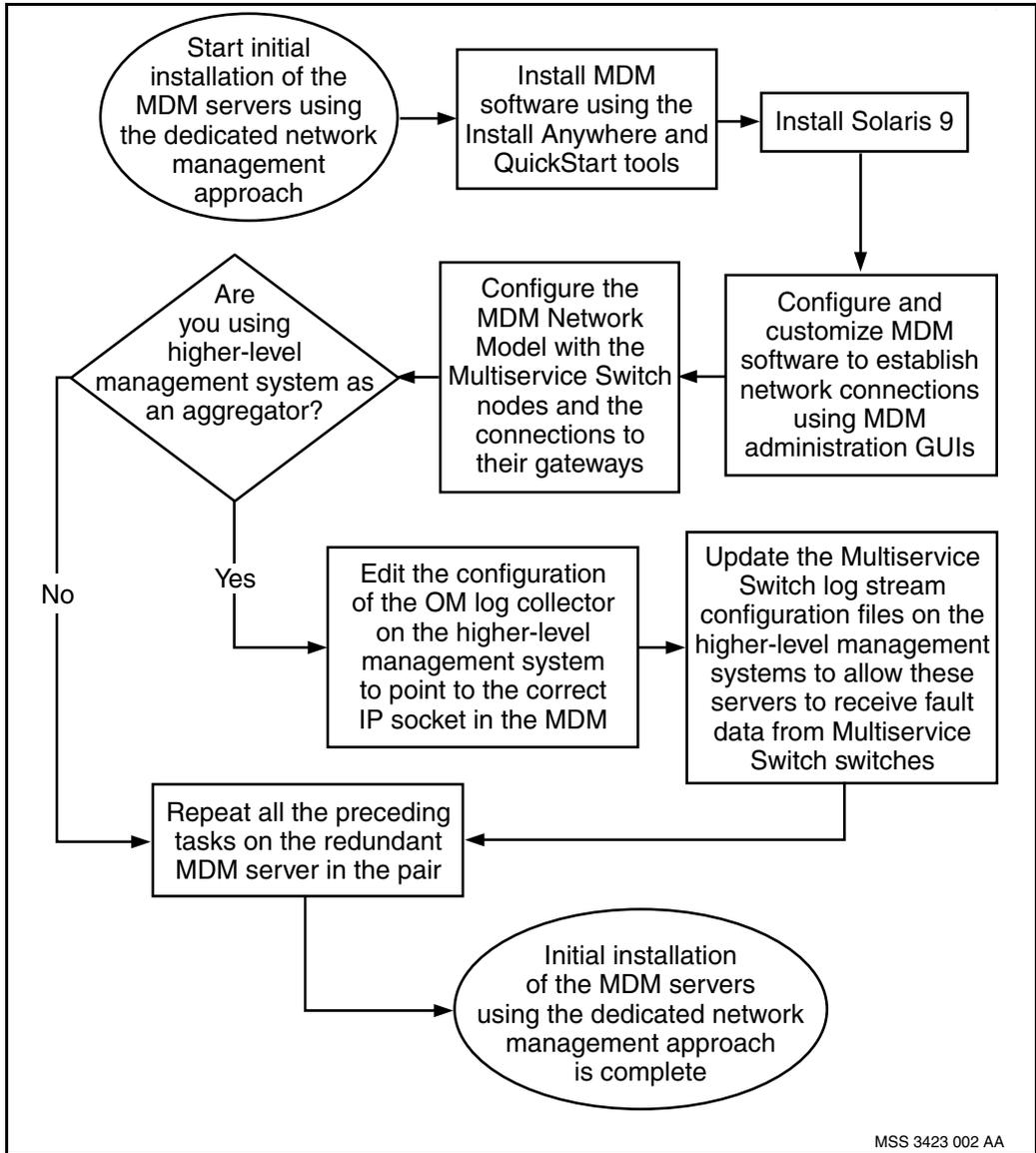
Deploying servers using the centralized network management approach task

The "Deployment of servers using the centralized network management approach task flow" (page 128) shows you the sequence of tasks performed to deploy Nortel MDM servers using the centralized network management approach for the Packet Trunking - AAL1, Universal Access - AAL1, or Universal Access - IP solutions. For additional information on the tasks, go to "Task flow references" (page 129).

Note: The centralized network management approach for deploying MDM servers can be used with the Packet Trunking - AAL1 solution which employs higher-level management system aggregation. This approach can also be used with the Universal Access - AAL1 and Universal Access - IP solutions, in which the server is directly connected to the OSS network.

Figure 15
Deployment of servers using the centralized network management approach task flow
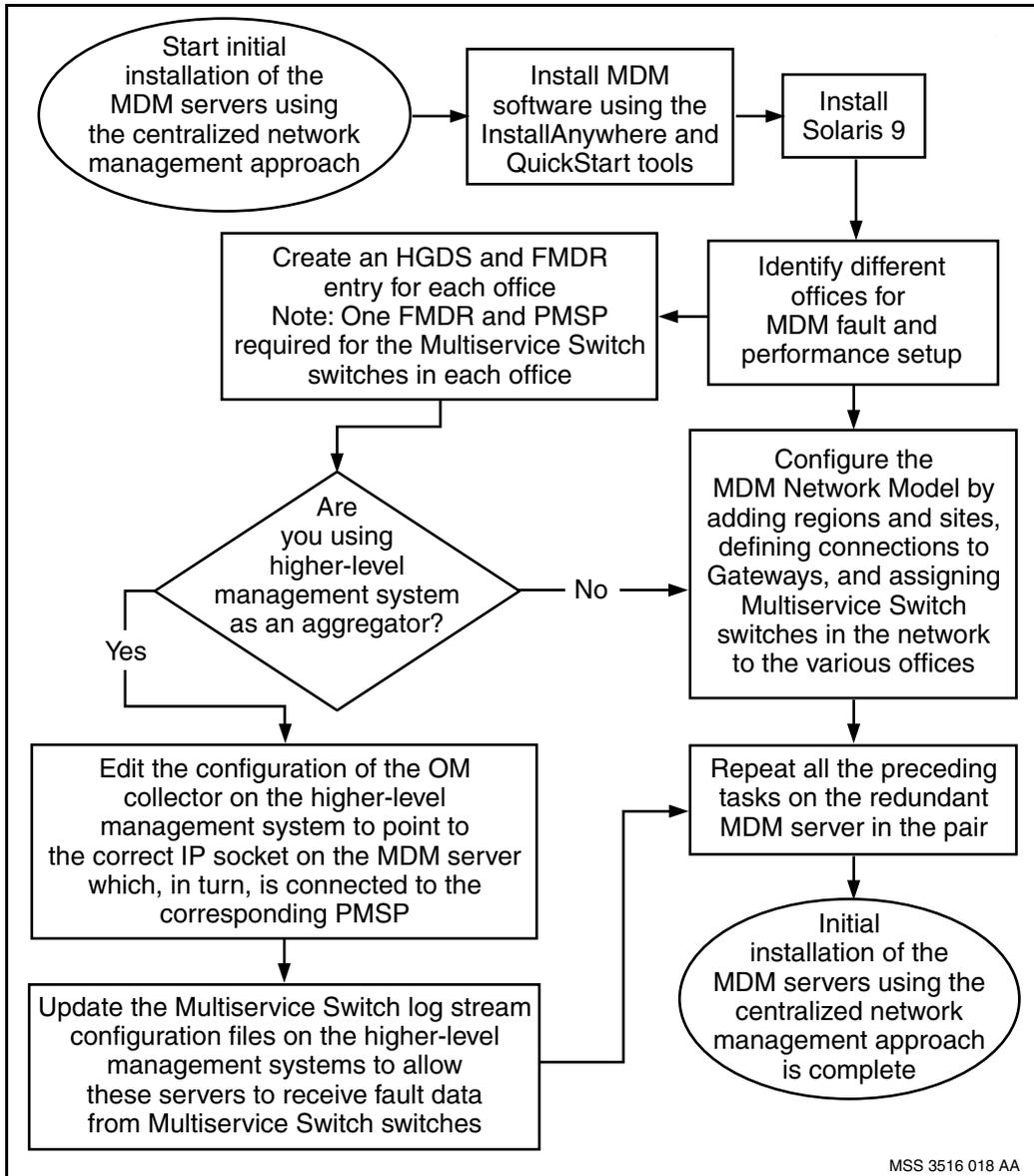
MSS 3516 018 AA

Task flow references

- Loading MDM software. See 241-6001-100 *Nortel Multiservice Data Manager Software Installation and Initial Configuration*.

- Installing Solaris. See NN10185-461 *Upgrading Nortel Multiservice Data Manager in Carrier Voice over IP Networks*.

- Configuring MDM software with the QuickStart tool. See 241-6001-100 *Nortel Multiservice Data Manager Software Installation and Initial Configuration*. Configuring servers for Nortel Multiservice Switch nodes and FMDR server redundancy for surveillance access. See 241-6001-303 *Nortel Multiservice Data Manager Customization and Administration*. Configuration. See 241-6001-309 *MDM Management Data Provider User Guide*.

- Using Network Viewer to build a Network Model. See 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

- Edit the configuration of the OM log collector. See the SDM documentation.

- Installing and configuring the log delivery application. See Configuration Management in the SDM documentation suite for this release. Log delivery application overview. See Product Overview in the SDM documentation suite for this release. For voice over IP (VoIP) (UA-IP), see the integrated EMS documentation suite.

- Select if MDM alarms are sent to every SDM server in the network or only one. See the SDM documentation.

In-service migration of MDM servers to the centralized network management approach without using the higher-level management system as an aggregator

Migrate Nortel Multiservice Data Manager servers in your network from the dedicated to the centralized network management approach while in-service if you want one pair of servers to manage the Nortel Multiservice Switch nodes in several offices. Follow this method if your network does not use the higher-level management system as an aggregator.

Note: An in-service migration of MDM servers to the centralized network management approach is not a hitless software migration. While the migration has no effect on network service and causes no service outage, it may result in the interruption of the operator's view of the Multiservice Switch network.

- "Prerequisites for an in-service migration to the centralized network management approach without using the higher-level management system as an aggregator" (page 130)

- "In-service migration to the centralized server network management approach without using the higher-level management system as an aggregator task flow" (page 130)

Prerequisites for an in-service migration to the centralized network management approach without using the higher-level management system as an aggregator

See the prerequisite information in NN10185-461 *Upgrading Nortel Multiservice Data Manager in Carrier Voice over IP Networks*.

In-service migration to the centralized server network management approach without using the higher-level management system as an aggregator task flow

The "In-service migration to the centralized network management approach without using the higher-level management system as an aggregator task flow" (page 131) shows you the sequence of tasks needed to perform an in-service migration of Nortel MDM servers from the dedicated to the

centralized network management approach in a network without using the higher-level management system as an aggregator. For additional information on the tasks, go to "Task flow references" (page 131).

Figure 16
In-service migration to the centralized network management approach without using the higher-level management system as an aggregator task flow
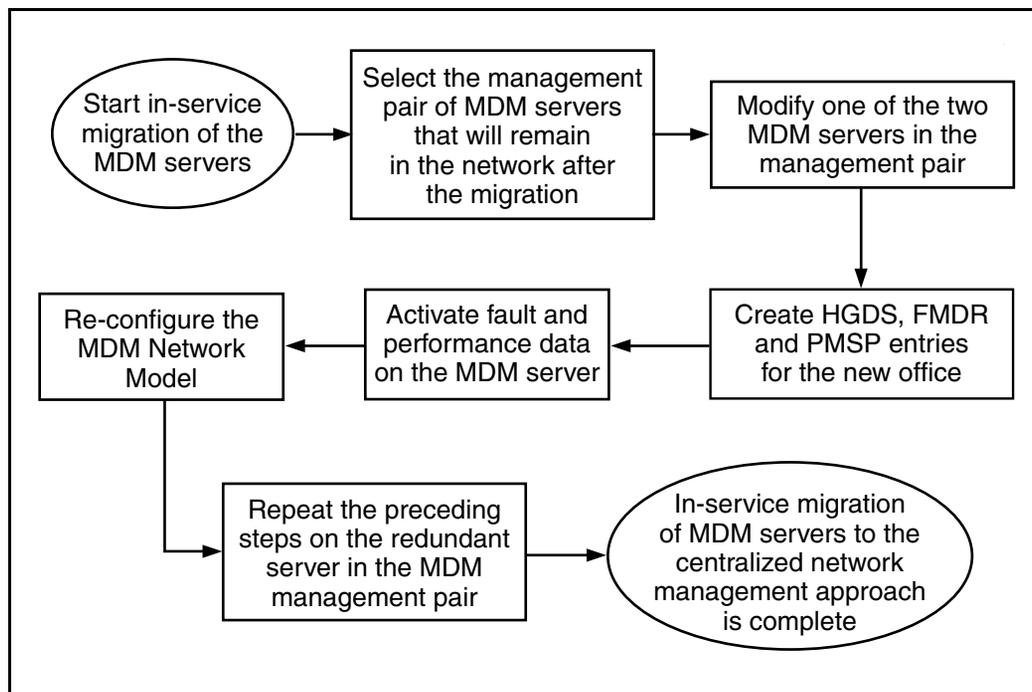
The pair of servers not selected to remain in the network following the in-service migration are now available for redeployment.

Task flow references
- Deploying Regionalized Models and Using Network Viewer to build a Network Model. See 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

- Performance Measurement Stream Processor (PMSP) and FMIP Management Data Router. 241-6001-310 *Nortel Multiservice Data Manager Server Reference*. Configuring MDM servers for Nortel

Multiservice Switch nodes and FMDR redundancy for surveillance access. See 241-6001-303 *Nortel Multiservice Data Manager Customization and Administration*.

- Using Network Viewer to build a Network Model. See 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

In-service migration of MDM servers to the centralized network management approach using the higher-level management system as an aggregator

Migrate Nortel MDM servers in your network from the dedicated to the centralized network management approach if you want one pair of servers to manage the Nortel Multiservice Switch nodes in several offices. Follow this method if your network uses the higher-level management system as an aggregator.

Note: An in-service migration of MDM servers to the centralized network management approach is not a hitless software migration. While the migration has no effect on network service and causes no service outage, it can interrupt the operator's view of the Multiservice Switch network.

- See "Prerequisites for an in-service migration to the centralized network management approach using the higher-level management system as an aggregator" (page 133)

- See "In-service migration to the centralized server network management approach using the higher-level management system as an aggregator task flow" (page 133)

Prerequisites for an in-service migration to the centralized network management approach using the higher-level management system as an aggregator

See the prerequisite information in NN10185-461 *Upgrading Nortel Multiservice Data Manager in Carrier Voice over IP Networks*.

In-service migration to the centralized server network management approach using the higher-level management system as an aggregator task flow

The "In-service migration to the centralized network management approach using the higher-level management system as an aggregator task flow" (page 134) shows you the sequence of tasks needed to perform an in-service migration of Nortel MDM servers from the dedicated to the centralized network management approach in a network using the higher-level management system as an aggregator. For additional information on the tasks, go to "Task flow references" (page 131).

Figure 17
**In-service migration to the centralized network management approach using the higher-level management system as an aggregator task flow**
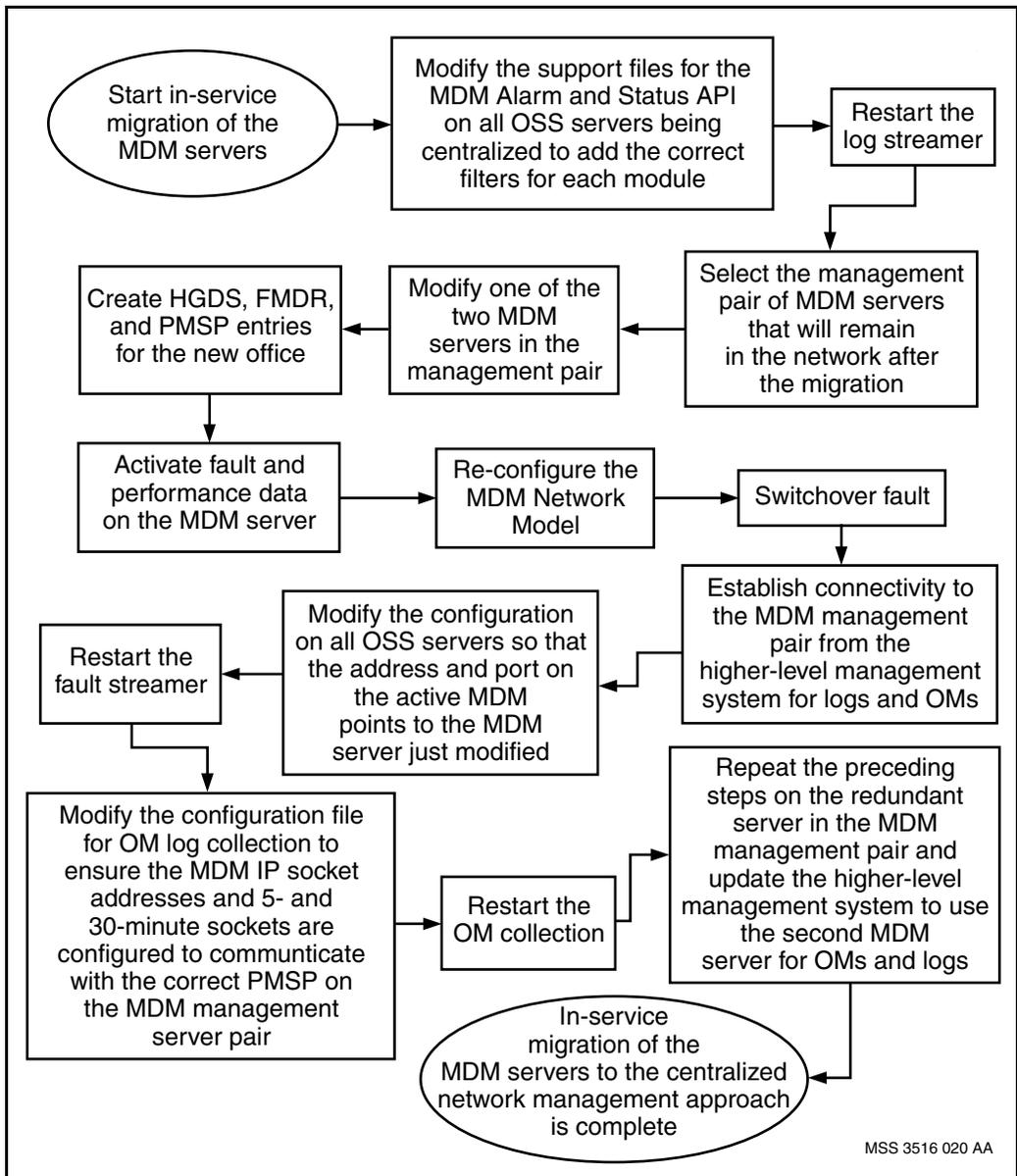
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The pair of servers not selected to remain in the network following the in-service migration are now available for redeployment.

Task flow references

For the documentation references for the tasks as follows, see the table "Reference documentation for task flow" (page 136).

- See the SDM documentation. [If you are using SDM as an aggregator, modify the *RegMsg.API*, *CreateMsg.API*, *GetMsg.API* log streamer files on both SDM servers to have the correct filters for the modules that are specific to them.]

- Install and configure higher-level management system application.

- Deploying Regionalized Models and Using Network Viewer to build a Network Model. See 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

- Activate higher-level management system application.

- See the SDM documentation. [Establish the connection to the management MDM server pair from the SDM server.

  — If you are using SDM as an aggregator, modify the log streamer *plslog.cfg* file so that the address and port on the currently in use MDM server point to the primary MDM server of the management pair that will remain in the network following the migration.

  — Restart the fault streamer as specified in the SDM documentation.]

- Performance Measurement Stream Processor (PMSP) and FMIP Management Data Router. See 241-6001-310 *Nortel Multiservice Data Manager Server Reference*. Configuring MDM servers for Multiservice Switch nodes and FMDR redundancy for surveillance access. See 241-6001-303 *Nortel Multiservice Data Manager Customization and Administration*.

- Using Network Viewer to build a Network Model. See 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

Table 4
Reference documentation for task flow

Task	SDM reference (VoA)	integrated EMS reference (VoIP)
Install and configure the log delivery application	See Configuration Management in the SDM documentation suite for this Carrier VoIP release.	See the integrated EMS documentation suite for this release.
Log delivery application overview	See Product Overview in the SDM documentation suite for this Carrier VoIP release.	See the integrated EMS documentation suite for this release.
Activate log delivery application	See Upgrades in the SDM documentation suite for this Carrier VoIP release.	See the integrated EMS documentation suite for this release.

Deploying MDM Admin Servers for centralized AAA in a VoA network with the Operator Client application

If you deploy Operator Client in your VoA network, client-sets can be re-deployed as MDM Admin Servers. MDM Admin Servers support user administration and mediate access to the administrative X11 based tools of the MDM Toolset. The MDM Admin Servers host the full set of MDM servers found on the MDM server-set as well as those servers that make up the user administration server for the Operator Client application and centralized AAA. The MDM Admin Server hosts all the servers required to provide centralized AAA and it provides base network information for the GUI tools on the Operator Client desktops. The servers that enable centralized AAA and Operator Client functionality are installed with the traditional MDM servers.

See the "Typical deployment of MDM Admin Servers with the Operator Client application in a VoA network" (page 137) for a high-level view of MDM Admin Server deployment in a VoA network.

Figure 18
Typical deployment of MDM Admin Servers with the Operator Client application in a VoA network
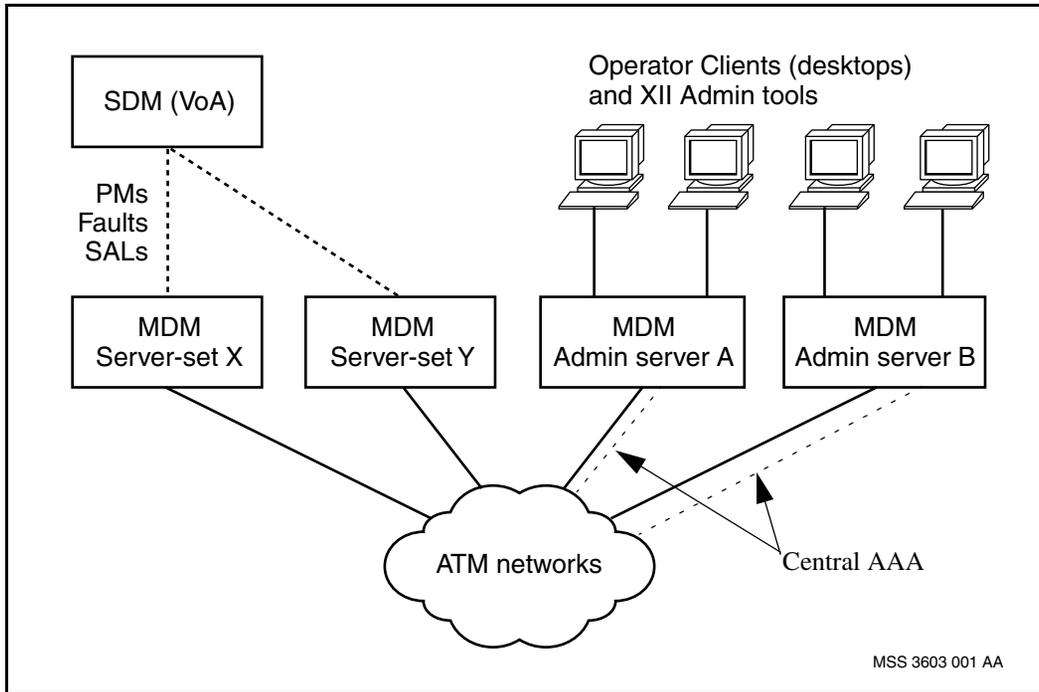
The MDM Admin Servers host the following new servers that support user administration for centralized AAA in an Operator Client environment:

- Sun ONE Identity Server (IS) - used for authentication and authorization of users on Operator Client desktops

- Sun ONE Directory Server (DS) - central database where each userID and its associated password are stored and maintained

- RADIUS proxy- Nortel NEs are authenticated through the MDM RADIUS interface

The following diagram shows how user access is managed through the Sun ONE Identity Server (IS) for centralized authentication and authorization in an Operator Client environment. The full set of MDM servers available on the MDM Admin Server is equivalent to a standalone or server-set MDM without

the PMSP server and pserver. See "MDM Admin Server for centralized user administration of the Operator Client application in a VoA network" (page 138).

Figure 19
MDM Admin Server for centralized user administration of the Operator Client application in a VoA network

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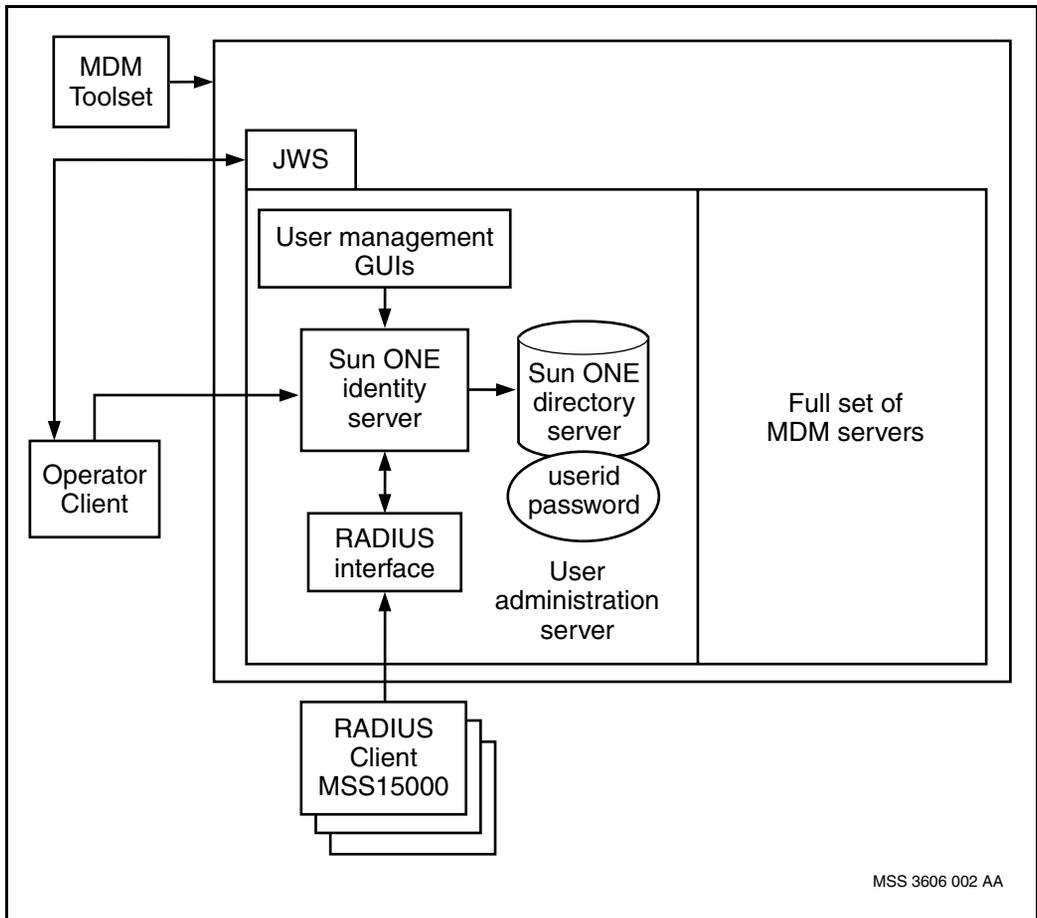
To re-deploy the MDM client-sets as MDM Admin Servers that enable Operator Client, you require the software package *MDM Operator Client and User Administration*. When this package is launched, Security server and

Java Web Start server are pre-selected in the installation panel, by default. However, it is recommended that when you install this package for a VoA solution, ensure that the Security server and Java Web Start server options are selected in the installation panel. Refer to "Installing MDM software" in NN10185-461 *Upgrading Nortel Multiservice Data Manager in Carrier Voice over IP Networks*.

RADIUS configuration for centralized authentication

The RADIUS interface can be used to provide centralized authentication for the MSS/MG15000 instead of the local authentication available on-switch. That is, the MSS/MG15000 node can be configured to authenticate with the RADIUS interface on the MDM Admin Server. The RADIUS interface on the MDM Admin Server, redirects RADIUS authentication requests to the Sun ONE IS server.

Task flow references for RADIUS configuration

The configuration of RADIUS to support centralized authentication for MSS/MG15000 includes the following:

- configuration of RADIUS interface on the MDM (RADIUS interface)

- configuration of the RADIUS secret

- configuration of RADIUS on MSS/MG15000 (RADIUS client, which authenticates using the MDM RADIUS interface)

Configuration of the RADIUS interface on the MDM

Configure the RADIUS interface on the MDM according to the procedures in the RADIUS interface configuration chapter of NN10600-606 *Nortel Multiservice Data Manager Network Security: User Access Configuration*.

Configuration of the RADIUS shared secret

The RADIUS shared secret must have the same value and must be configured on both the MDM and the MSS/MG15000 nodes. The same secret must be used for both the RADIUS proxy (the MDM RADIUS interface) and the RADIUS client (the Multiservice Switch). It is recommended that you perform the "Configuring Multiservice Switch nodes for RADIUS" procedure at the same time so that you can enter the shared secret in both locations and avoid errors. Refer to "Configuring shared secrets" in the "RADIUS Interface configuration" chapter of NN10600-606 *Nortel Multiservice Data Manager Network Security: User Access Configuration*.

Configuration of the RADIUS client on the MSS/MG15000 node

Configure the RADIUS clients on each of the MSS/MG15000 nodes to pass authentication requests through the RADIUS interface to the Sun ONE IS server. Ensure that you have added OAMradius in the featurelist of the Cp (that is, `set sw lpt/cp fl oamradius`).

	CAUTION
⚠	**Risk of surveillance data loss**
	Do not remove local user IDs from the MSS that are used by the MDP, FMDR, and PMSP surveillance servers. If you remove these user IDs and the central AAA server goes down, surveillance data may be lost. Ensure you retain the local user IDs for MDP, FMDR, and PMSP in addition to a debug level user ID.

It is necessary to remove local users from the MSS/MG15000 nodes if they are to be centrally authenticated using the MDM Admin Server. However, it is recommended that you maintain user IDs for the MDP, PMSP, and GMDR surveillance servers, as well as, at least one user with an impact of Debug on the MSS/MG15000 nodes.

Refer to "Configuring Multiservice Switch nodes for RADIUS" in the Centralized authentication configuration chapter of NN10600-601 *Nortel Multiservice Switch 7400/15000/20000 Security Management*.

JAVA Web Start technology

Java Web Start (JWS) technology is used to automatically download the applications available through Operator Client directly to the operator's desktop or PC. The JWS automatic download of applications decreases the load on the servers that is derived from operator use which helps preserve server reliability. When the JWS files have been downloaded, and if the files on your desktop are current, you will get the Operator Client window and a login screen. Enter your user ID and password and they will be authenticated at the MDM Admin Server. After authentication, the applications that the user is entitled to use are enabled.

MDM Admin Server redundancy

To ensure reliability and redundancy of user parameters and access, the MDM Admin servers should be configured in a redundant manner. One MDM Admin server is configured as the primary server and the other as the secondary or redundant server. Refer to the section "Setting up redundant Directory Servers" in the Configuring the User Administration system chapter in NN10600-606 *Nortel Multiservice Data Manager Network Security: User Access Configuration*.

Workflow for centralized AAA on an MDM Admin Server in a VoA network with the Operator Client application

Operator Client requires installation and server configuration to enable user administration and centralized AAA. See the "Workflow to use the MDM Admin Server for centralized AAA" (page 142). See also, "For information about" (page 143) for more information about MDM Admin Server configuration for centralized AAA in a VoA network reference.

Figure 20
Workflow to use the MDM Admin Server for centralized AAA


```
┌─────────────────────────────────┐
│        Install software         │
│   according to MDM software     │
│        upgrade procedure        │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│        Configure the MDM        │
│    Admin Servers to provide     │
│   centralized AAA for the OC    │
│        application users        │
└─────────────────────────────────┘
```

Configure the RADIUS interface to pass authentication requests to the Sun ONE IS → Configure the RADIUS shared secret → Configure the RADIUS client on the MSS/MG 15000 nodes for central authentication

Configure the secondary MDM Admin server

Configure and administer policies for roles and users

Configure each PC workstation to run Operator Client

Log in to Operator Client from each workstation

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Table 5
MDM Admin Server configuration for centralized AAA in a VoA network references

For information about	Refer to
Upgrading the MDM server to be an MDM Admin Server for User Administration of Operator Client desktops	NN10185-461 *Upgrading Nortel Multiservice Data Manager in Carrier Voice over IP Networks*, see the procedure Installing MDM software.
Operator Client architecture	241-6001-101 *Nortel Multiservice Data Manager Engineering Overview*
Operator Client Port configuration	NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/ UA-IP*
	NN10600-607 *Nortel Multiservice Data Manager Network Security: Secure Communications Configuration*
Configuring User authentication	NN10600-606 *Nortel Multiservice Data Manager Network Security: User Access Configuration*
RADIUS centralized authentication	NN10600-605 *Nortel Multiservice Data Manager Network Security Fundamentals*
	NN10600-601 *Nortel Multiservice Switch 7400/ 15000/20000 Security Management*
User administration	NN10600-606 *Nortel Multiservice Data Manager Network Security: User Access Configuration*
	NN10180-611 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Security and Administration PT-AAL1/UA-AAL1/UA-IP*
	NN10028-111 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Product and Technology Basics PT-AAL1/UA-AAL1/UA-IP*

Auto-patching for MSS/MG15000 nodes from the MDM

Auto-Patch is a scheduled process that automatically downloads and applies Released MSS/MG15000 non-disruptive patches to your switches with a single script that is activated and run from a Nortel Multiservice Data Manager. Activation of the auto-patch process includes configuring the cron utility and the *ppautopatch* script to schedule the download and application of non-disruptive patches to the nodes you have identified in the script.

You must download the Patch Av from the Nortel patch distribution site to the MDM that is configured to be the SDS. At the scheduled time, the script is activated, and the MDM issues on-switch commands that trigger the following sequence of activities:

1   Verification to see if the SDS has a later version of the Patch Av than those in the active node.

2   Download of the Patch Av when -download option is specified in the script.

3   Calculation of the necessary Sw patchlist by comparison with the active node configuration which is followed by application of only the required patches and commitment of the view when the -apply option is specified in the script.

You will configure your MDMs to run the auto-patch process as a redundant pair and configure the *ppautopatch* script to run on a regular basis. You configure the frequency and timing of the downloads and applications from the cron utility or any similar scheduling method that you use in your network. See "Scheduling the MDMs" (page 144).

When necessary, as in the case of performing an HSM or time-of-day (tod) change, you can inhibit the script from running. For the procedure that prevents the auto-patch script from running, see "Controlling the auto-patch process" (page 146).

Scheduling the MDMs

You can schedule and configure auto-patching from the crontab on any Multiservice Data Manager (MDM). To set up the cron entries on the MDM that is the SDS, use the <Patch distribution completion> information as the

start time for the "ppautopatch" script. That is, the day-of-week and/or time-of-day that your patch distribution has completed putting new patch updates (if any) onto the SDS sites. (This would be T_0.)

On the mate MDM, calculate the start time by adding <max duration> to <Patch distribution completion> information
(<max duration> + <Patch distribution completion> = T_1).

It is assumed that <Patch distribution completion> coincides with regular maintenance windows during which patch download and application are acceptable. If this is not the case, adjust the script start times accordingly.

Note: The script can be run concurrently on different groups of nodes.

As an example, you can configure and schedule redundant MDM hosts to perform in the following manner:

- At time T_0, the MDM configured to be the SDS can be scheduled to download all the patches available on the SDS to the nodes and apply those patches that are eligible for auto-patching to the MSS/ MG15000's it manages. Maximum time allotment of 1 hour.

- At time T_1, which equals T_0 + 1 hour, the mate MDM can be scheduled to download all the patches to the nodes and apply those patches that are eligible for auto-patching to the MSS/ MG15000's it manages. For any patches that were successfully processed by the first MDM, the auto-patching script from the mate MDM will skip the download and apply tasks after checking the active node conditions. The maximum time allotments for both the MDMs must match.

The recommended script command line options are as follows:

```
ppautopatch

-nodes <Group name>

-nuser <Node user> <Node password>

-download

-host <SDS address>

-huser <SDS user> <SDS password>

-apply
```

```
-max_duration <Max duration>
```

Note: There is no specific order required as to how the command attributes are entered, however, the order shown above is recommended. Sometimes, the "ps -ef" command truncates the returned parameters shown. Use the recommended order and the "-nodes" parameter value will be sure to appear.

Refer to NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP* for the complete set of command line attributes.

Controlling the auto-patch process

It is recommended that you prevent the auto-patching script from running on both MDMs before you perform an HSM and on the days that you have time-of-day (tod) changes scheduled.

Before doing an HSM or before tod changes are scheduled to be made, ensure that no auto-patch script ("ppautopatch") is running and that it does not run during the HSM or tod change. Issue the following commands on both MDM servers where a "ppautopatch" script could be configured to run for the node being upgraded:

1   Issue:

   touch /opt/MagellanNMS/cfg/private/noppautopatchrun

2   Issue:

   ps -ef | grep ppautopatch

   If the second command returns only one response, such as the following, it is ok to go ahead with the HSM:

   ```
   ps -ef | grep ppautopatch
   root 6453 29431 0 09:10:53 pts/11 0:00 grep ppautopatch
   ```

If the second command returns one or more additional responses, such as the following, then the script "ppautopatch" is running.

```
ps -ef | grep ppautopatch

root 2112 282 0 Dec 03 ? 13:50 ppautopatch -download -
host 47.1.2.3 -huser pp15ksw pp15ksw -apply -nodes
OFFICE1 -nuser config config -max_duration 1 h

root 6453 29431 0 09:10:53 pts/11 0:00 grep ppautopatch
```

Note 1: The script does not typically take a long time to run so, generally, it is recommended to wait until all "ppautopatch" scripts are finished and then start the HSM.

Note 2: On an MDM that manages nodes in more than one office, a running script may not necessarily include the node to be upgraded (refer to the -nodes parameter value for the "ppautopatch" script). If you are sure that none of the running scripts pertain to the node being upgraded, you can proceed with the HSM.

Note 3: The "noppautopatchrun" file should be deleted on both MDM servers after the HSM is completed. If performing HSM on a series of nodes from the same MDM, it is recommended not to remove the file until after all the HSM's have been performed.

When the auto-patch script fails to download or apply a patch

The script downloads and applies any non-disruptive patch that has a Released GEN status. When issues that prevent the potential download and/or application of an eligible patch to an MSS/MG15000 node are encountered, the script generates alarms. These SET alarms provide notification that the auto-patch attempt did not complete as expected. The alarm details and ppautopatch log file provide details about successes and failures each time the script runs. Generally, an alarm raised (SET) against a component on one MDM must be cleared (CLR) by the same MDM.

Alarms with error paths that are specific to an MSS/MG15000 node that the MDM is trying to reach are handled differently from alarms raised against an MDM component by a specific MDM. If the script runs on the first MDM and fails because it is not able to access a specific node, a SET alarm is issued. The SET alarm is cleared when the mate MDM runs the script successfully at its scheduled time.

The successful execution of a script that runs on one platform (the mate MDM) can clear the SET alarm that was issued by the script running on the other platform (the first MDM). That is, when the mate MDM runs the script and successfully processes the MSS/MG15000 node at the later time, a CLR alarm is issued that clears the original SET that was generated on the first MDM.

> *Note:* Remember that the script runs on both MDM's in a server pair, offset from each other in time, and the standard configuration has the MDM surveillance server processes cross-connected to feed alarms between a mated pair of server platforms.

If both the SDS MDM and the mate MDM have run the script on what appears to be an eligible patch and the patch is not auto-applied by the script, there may be a problem with the patch itself. Contact Nortel GNTS and provide them with information about the patch, such as the date it was downloaded from Nortel, patch name, and type.

For more information about auto-patching, see the following table:

For more information about	refer to
The auto-patch process including process control, disk management, and error logs	"Configuring the auto-patch process" in NN10400-300 *Nortel Multiservice Data Manager Administration Tools*
Activating the auto-patch script	Activating the auto-patch script" in NN10185-461 *Upgrading Nortel Multiservice Data Manager in Carrier Voice over IP Networks*
Auto-patch log cleanup	NN10180-611 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Security and Administration PT-AAL1/UA-AAL1/UA-IP*

For more information about	refer to
Attributes available for the auto-patch feature	NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/ UA-IP*
Alarms that occur during the auto-patch process	NN10092-911 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Fault Management Overview PT-AAL1/UA-AAL1/UA-IP*

MDM server configuration for Ethernet Routing Switch 8600 fault management (PT-AAL1 and UA-AAL1)

This section describes fault management when using the higher-level management system in a voice over ATM (VoA) solution only. VoA refers to Packet Trunking - AAL1 (PT-AAL1) or Universal Access - AAL1 (UA-AAL1) only.

In voice over IP solution (VoIP), the Integrated Element Management System (Integrated EMS) handles Ethernet Routing Switch 8600 (ERS 8600) faults directly, without involving MDM servers. It does not handle Nortel Multiservice Switch 15000 or Media Gateway faults directly. For those faults, Integrated EMS uses the MDM. For more information about fault management for VoIP, refer to the Integrated EMS documentation suite for this release.

Customers with MDM servers in a network have the option of configuring the servers to receive SNMPv2c traps from a set of ERS 8600 nodes that are performing as the CS LAN in a office. These traps are merged into the same stream of alarms, originating from Multiservice Switch 15000 nodes and MDM servers, that is being forwarded to the higher-level management system where they are converted into the SCC2 format.

> *Note:* Fault collection is the only aspect of ERS 8600 network management that is integrated into MDM in the solution. All other aspects of ERS 8600 network management continue to be supported as before. For the details on OAM tasks and access for managing Multiservice Switch nodes, see NN10028-111 *Nortel Multiservice*

Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Product and Technology Basics PT-AAL1/UA-AAL1/UA-IP.

- "Downloading the ERS 8600 DCD cartridge from the ESD web site" (page 150)

- "Configuring MDM for ERS 8600 fault management" (page 153)

- "Verifying MDM configuration for ERS 8600 fault management" (page 156)

Downloading the ERS 8600 DCD cartridge from the ESD web site

After verifying that the MDM server has sufficient disk space, you can begin to download the ERS 8600 cartridge and accompanying documentation from Nortel ESD web site. When you download the software, a copy of the software is placed in the directory you specify.

- "Prerequisites" (page 150)

- "Procedure steps" (page 151)

- "Variable values" (page 152)

Prerequisites
- Ensure that there is enough disk space on the MDM server.

- You need to have root access to login to the MDM servers.

- You need a Nortel Web access account with a user ID and password to enter into the appropriate fields when prompted to log in. Contact your Nortel customer representative for more information on accessing the web site.

- Refer to the software downloads area of the Nortel web site (www.nortelnetworks.com) to determine the software load that you must install to manage ERS 8600 nodes.

- The software you need to download may be composed of more than one file. Ensure that you download all software files that belong to the release you require.

Procedure steps

1   Login to the MDM server as the root user.

2   Open an xterm session.

3   Start Netscape and go to *www.nortelnetworks.com*.

4   In the Technical Support section of the window, click *Software Downloads*.

The Technical Support window opens.

5   In the *Select from* section of the Technical Support window, select *Product Families* and *Preside* from the items contained in the list boxes.

The *... choose a product ...* list box fills with item names.

6   In the *... choose a product ...* section, select *Multiservice Data Manager Device Integration Cartridges* from the items contained in the list box.

The *... and get the content* list box fills with item names.

7   In the *... and get the content* section, select *Software* from the items contained in the list box and click *Go*.

The Multiservice Data Manager Device Integration Cartridges window opens.

8   In the Multiservice Data Manager Device Integration Cartridges window, click on *MDM ERS 8600 Cartridge V3.4.0.*

Note 1: If version 3.4.0 of the software does not appear in the window, contact your Nortel account prime.

Note 2: The software you want to download may be composed of more than one file. Ensure that you download all software files that belong to the release you require.

The Software: Software Detail Information window opens.

9   Click on the load name listed beside the File Download heading.

A File Download dialog opens.

10   In the File Download dialog, select the Save this file to disk option.

A Save As dialog opens.

11   Specify a folder in the home directory of the userID of the MDM user to indicate where you want the software placed. This is typically:

`/tmp/pp8600DCDSW`

12 Click *Save*.

13 Repeat step 5 to step 12 except download 241-6003-100 *Preside Generic Device Integration Installation Guide* by selecting *Documentation* rather than *Software* in step 7 and specify the /tmp/pp8600DCDdoc rather than /tmp/pp8600DCDSW folder in step 11.

14 On the MDM server, use the xterm window to change directories to the directory containing the software. (This is the same directory you specified in step 11.):

```
cd /tmp/pp8600DCDSW
```

15 Untar the software:

```
tar -xvf <load_name>.tar
```

16 Repeat step 1 through step 15 on the other MDM server to download the software.

Variable values

Variable	Value
<load_name>	The name of the software load file that you want to download.

Configuring MDM for ERS 8600 fault management

After downloading and untarring the software for the node's DCD cartridge, configure Nortel MDM servers to receive SNMPv2c traps from ERS 8600 nodes.

- "Prerequisites" (page 153)

- "Procedure steps" (page 153)

- "Variable values" (page 155)

Prerequisites
- Install the ERS 8600 DCD cartridge on the MDM servers. For details, see "Downloading the ERS 8600 DCD cartridge from the ESD web site" (page 150).

- The DCD cartridge needs to support the version of the software that is running on the ERS 8600 nodes.

- Prior to configuring MDM servers, use the Release Update GUI to delete the release version number (SNxx). To delete it, leave the Carrier VoIP Release blank. The GUI modifies the */opt/MagellanNMS/system/info/ release.name* file. If you do not delete the release information, the *packageadd* process fails and an error message is produced.

- You need to have root access to login to MDM servers.

- You need a list of the nodes that you are going to manage with MDM servers. Include the device name and IP address for each node on that list as well.

- You need to know the SNMP community string for each node that you are going to manage with MDM.

- You need to know the host name or IP address of the MDM servers when establishing cross-connectivity between the servers.

Procedure steps
1   Login to the server as the root user.

2   Open an xterm session.

3   In the xterm window, change directory to the newly untarred directory containing the software file you downloaded in step 14 of "Downloading

the ERS 8600 DCD cartridge from the ESD web site" (page 150). Generally, the newly untarred file is in the `./Passport8600` directory.

4 Add the DCD cartridge to the SVMList by executing the following command:

`pkgadd -d . <filename>`

5 Add the SMDR and TVSR fault servers to the Server Administration configuration using the GUI of the Server Administration tool.

For details on using the Server Administration tool, see 241-6001-303 *Nortel Multiservice Data Manager Customization and Administration*.

6 Add the SMDR fault server to your General Management Data Router server configuration using the GUI of the GMDR Administration tool.

For details on using the GMDR Administration tool, see 241-6001-303 *Nortel Multiservice Data Manager Customization and Administration*.

7 Add the following line to the `/opt/MagellanNMS/cfg/smdr.svr` file:

`:<host>:idi_PP8600dcd:0:0:`

8 Re-enter the Carrier VoIP release version number in the */opt/ MagellanNMS/system/info/release.name* file.

Use the Carrier VoIP MDM Software Migration GUI to set Carrier VoIP Release. Use the format: SNxx.y. For example, SN06.2 or SN07. The release number is the same one that you deleted prior to beginning this procedure.

9 Repeat step 1 to step 8 on the other MDM server.

10 Establish server cross-connectivity between the two servers using the GUI of the GMDR Administration tool.

For details, see the procedure for configuring GMDR to access surveillance data servers in 241-6001-303 *Nortel Multiservice Data Manager Customization and Administration*.

Note: When you enter the server name of the other server in the Server Name field of the GMDR Add Server dialog, use the SMDR suffix.

11 Repeat step 10 on the other server.

12 From the Fault menu in the main MDM dialog, select *IP Discovery* in order to use the IP discovery application to find the nodes.

The IP Device Discovery dialog opens.

For details on using the IP Discovery application, see 241-6001-011 *Nortel Multiservice Data Manager Fault Management Tools*.

13 In the IP Device Discovery window, select the *Network Settings* tab and specify the IP address, community string, port, device type, and SNMP version information in the provided fields.

14 From the Device menu in the IP Device Discovery dialog, select the *Discover ...* option.

The Discovery dialog opens.

15 Enter the IP address of the node you wish to find in the IP Address field.

16 Select both the Register to Receive Traps check box and ERS 8600 option from the Discover As drop-down menu in the Options area of the Discovery window.

Note: You may need to expand the Options area of the Discovery window in order to see the Register to Receive Traps check box and Discover As drop-down menu.

17 Click *Start*.

When the Discovery process is finished, click *Close*.

18 Exit the IP Discovery tool by closing all the windows and returning to the MDM main window.

19 Repeat step 12 to step 18 on the other server.

20 Configure a trap receiver for each MDM server on each node.

For details on configuring a trap receiver, see the Configuring SNMP settings in ERS 8600 NTP 315545-B *Managing Platform Operations and Using Diagnostic Tools.*

Note: The new configuration can be de-activated by stopping the *idi_PP8600DCD* process.

Variable values

Variable	Value
`<filename>`	The <filename> is the name of the file containing the DCD cartridge software.
`<host>`	The <host> is the name of the server on which the MDM application is currently running.

Verifying MDM configuration for ERS 8600 fault management

After completing the procedures for downloading the ERS 8600 DCD cartridge and configuring Nortel MDM servers to receive SNMPv2c traps from the nodes, verify that the servers are set up properly for fault management by using the MDM Network Model.

- "Prerequisites" (page 156)

- "Procedure steps" (page 156)

Prerequisites
- You need to know a password to enable the Network Model Editing feature.

Procedure steps
1 From the MDM Fault menu, select *Network Viewer*.

   Verify that the icon for the node appears in the display of the Network Model.

2 From the Network Model Edit menu, select *Enable Network Model Editing*.

   An Enable Editing dialog opens and prompts you for a password.

3 Enter the password at the prompt to enable Network Model editing.

4 From the Network Model Edit menu, select *Show Excluded Modules ...* to list the unassigned network elements.

   The unassigned network elements appear in the Excluded Modules window in the Component List dialog.

5 Assign the new nodes to the appropriate site using drag and drop in the Network Viewer display.

6 Position the node icons in the network using the Network Viewer display.

7 From the File menu, select *Save View* to save the Network Model.

8 From the File menu, select *Exit* to close the Network Viewer display.

9 Repeat step 1 to step 8 on the other MDM server.

10 New router - green (on) & grey (no connectivity).

Chapter 5
Overview of the EdgeLink 100 multiplexor to Multiservice Switch 15000 interface configuration

The EdgeLink 100 multiplexor (MUX) is a Telco Systems broadband multiplexor. For more general information about the EdgeLink 100 MUX, see NN10028-111 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Product and Technology Basics PT-AAL1/UA-AAL1/UA-IP*. For information on connecting a Nortel Multiservice Switch 15000 node to an EdgeLink 100 MUX, see NN10600-130 *Nortel Multiservice Switch 15000/20000 Hardware Installation, Maintenance, and Upgrade*.

For diagrams depicting a logical view of the connection between the EdgeLink 100 MUX and a pair of 4-port DS3Ch ATM FPs and DS3 sparing panel on a Multiservice Switch 15000 node, see the following figures:

• "Connection between one EdgeLink 100 MUX and a Multiservice Switch 15000 node" (page 158)

• "Connection between four EdgeLink 100 MUXs and a Multiservice Switch 15000 node" (page 159)

Note: You can also support two or three EdgeLink 100 MUXs from the same pair of 4-port DS3Ch ATM FPs and DS3 sparing panel.

Figure 21
Connection between one EdgeLink 100 MUX and a Multiservice Switch 15000 node
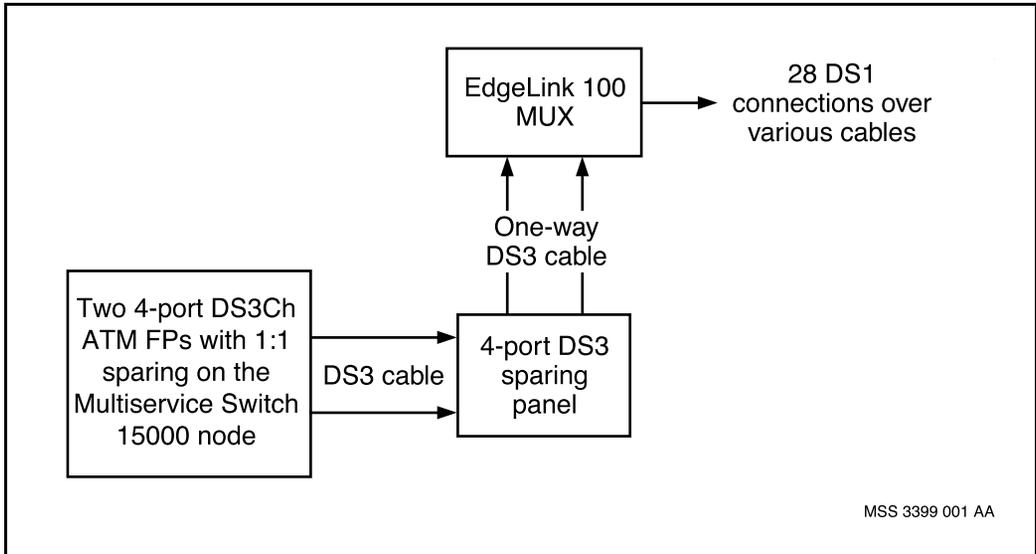
Figure 22
Connection between four EdgeLink 100 MUXs and a Multiservice Switch 15000 node
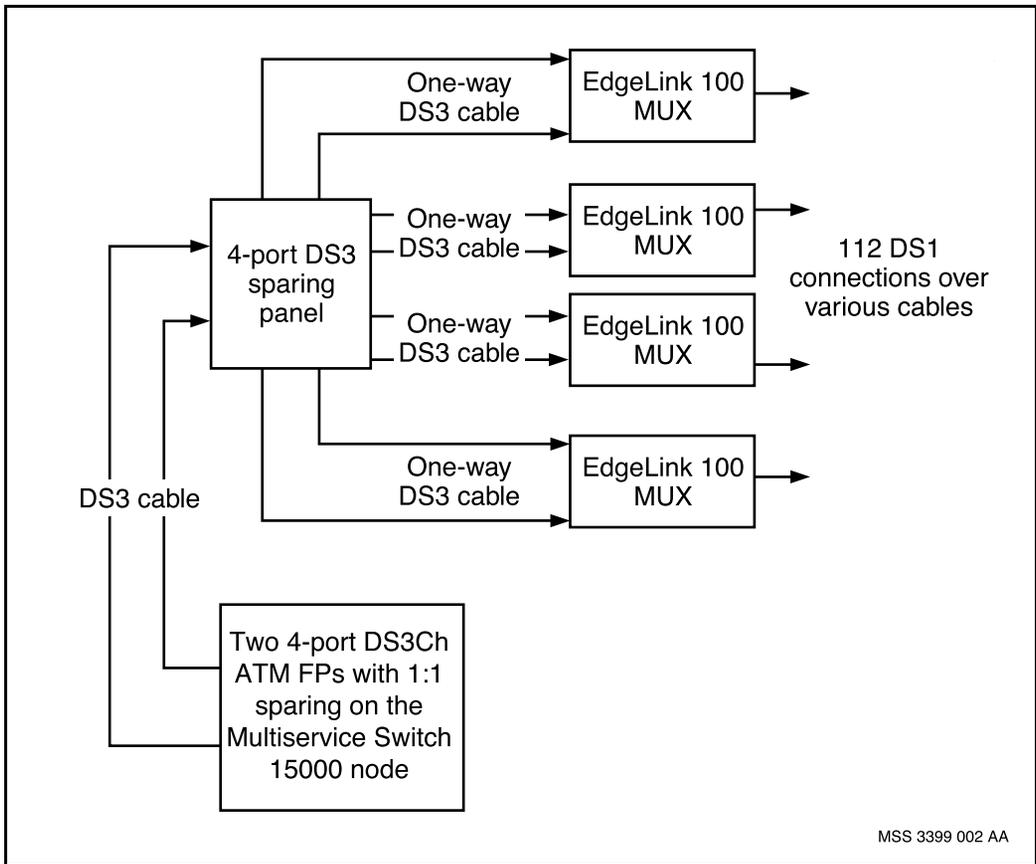
To configure the EdgeLink 100 MUX to interface with a Multiservice
Switch 15000 node, refer to the following tables:

- "DS1 provisioning parameters" (page 160)

- "DS3 provisioning parameters" (page 160)

Table 6
DS1 provisioning parameters

DS1 interface status	Options
channel name = default	none
line code = B8ZS	ami or B8ZS
line buildout = 0-133 feet	0-133 feet, 133-266 feet, 266-399 feet, 399-533 feet, or 533-655 feet
loopback = none	none
service mode = in-service	in-service or out-of-service
equipped state = equipped	equipped, unequipped, or disabled
input activity = activity present	cannot be set because it is operational or out-of-service
mask state = monitoring	cannot be set because it is operational

Table 7
DS3 provisioning parameters

DS3 interface status	Options
operation mode = c-bit parity mode (data link disabled)	c-bit parity mode (data link enabled), c-bit parity mode (data link disabled), or M13 mode
line code = B3ZS	cannot be set
line buildout = 0-100 feet	0-100 feet, 100-200 feet, or 200-450 feet
transmit timing = local	local or loop
BER threshold = 10^{-9}	10^{-9}, 10^{-8}, 10^{-7}, or 10^{-6}
BER value = 7.5E - 11	none
loopback = none	none
service mode = in-service	in-service or out-of-service

Chapter 6
Use cases for Network incremental growth

This section presents use cases for Network incremental growth. It gives a high-level overview of the steps for adding new components to an existing network solution as follows:

- Packet Trunking - AAL1 (PT-AAL1)

- Universal Access - AAL1 (UA-AAL1)

- Universal Access - IP (UA-IP)

This chapter includes the following sections:

- "Use cases for incremental growth of a network (PT-AAL1/UA-AAL1)" (page 162)

- "Use cases for incremental growth of a UA-IP network" (page 183)

Use cases for incremental growth of a network (PT-AAL1/UA-AAL1)

This section presents use cases for incremental growth of an existing Packet Trunking - AAL1 (PT-AAL1) or Universal Access - AAL1 (UA-AAL1) solution. It gives a high-level overview for the addition of new components to a network.

This section includes the topics as follows:

- "Addition of new FP pair (PT-AAL1/UA-AAL1)" (page 163)

- "Addition of new node-to-node ATM interface (PT-AAL1/UA-AAL1)" (page 165)

- "Addition of new MG4000 to network (PT-AAL1/UA-AAL1)" (page 167)

- "Addition of new MG9000 with OC-3 to network (UA-AAL1)" (page 170)

- "Addition of new MG9000 with DS1 IMA to network (UA-AAL1)" (page 172)

- "Addition of new MG9000 with DS3 ATM (UA-AAL1)" (page 175)

- "Addition of new IW-SPM (PT-AAL1/UA-AAL1)" (page 177)

- "Addition of new DPT-SPM (PT-AAL1/UA-AAL1)" (page 180)

Note: The installation, configuration, and connectivity of the component hardware is beyond the scope of this chapter.

Addition of new FP pair (PT-AAL1/UA-AAL1)

Nortel assumes that the new FP pair is being added to a Nortel Multiservice Switch 15000 node configured as part of an existing PT-AAL1 or UA-AAL1 network.

*   "Prerequisites to adding a new FP pair" (page 163)

*   "Adding a new FP pair to a node" (page 164)

*   "Considerations for adding a new FP pair to a node" (page 164)

Prerequisites to adding a new FP pair

*   Prior to starting to add the new FP pair, consult your completed network and site plans. Network planning is usually performed by the customer with assistance from representatives from the Nortel network engineering group. Record the type and version of the FPs that are being installed as well as the slot numbers in the site plan. For more information on choosing FP slots, see NN10600-130 *Nortel Multiservice Switch 15000/20000 Hardware Installation, Maintenance, and Upgrade*.

*   You will need to refer to some customer-specific values that are found in the Network Engineering Specification Book. This book is the product of co-operation between the customer and Nortel network engineering group.

*   You will need to refer to some specific values that are found in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

*   Information on using Nortel Multiservice Data Manager Nodal Provisioning templates to configure the new FP pair is contained in the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

Adding a new FP pair to a node
Procedure steps

1   Identify the available slots for a new pair of FPs. Once you have installed the new FP pair, continue this task.

2   Using the MDM Nodal Provisioning tool, configure the new FPs on the Multiservice Switch 15000 node by applying any of the templates as follows:

   a.   *PT-AAL1/WUA-AAL1 FP-4pOC3SmIrAtm*

   b.   *PT-AAL1/WUA-AAL1 FP-4pOC12SmIrAtm*

   c.   *WUA-AAL1 FP-4pDS3ChAtm*

   d.   *PT-AAL1/WUA-AAL1 FP-16pOC3SmIrAtm*

   e.   *WUA-AAL1 FP-12pDS3Atm*

3   Perform any necessary additional network-specific configuration using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

4   If you are adding more than one new FP pair, repeat step 1 to step 3 for each new pair of FPs added to the node.

5   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the service data changes.

6   Using the MDM Network Model tool, regenerate the Network Model for the modified nodes and save the new model.

Considerations for adding a new FP pair to a node
The following considerations were kept in mind by Nortel network engineering group when adding a new FP pair to a node:

• At initial installation of the node, FP pairs can be put through the full suite of available card or port tests. However, when adding an FP pair to an existing shelf that is currently providing service, the set of recommended card or port tests should be limited to those that are guaranteed not to effect other parts of the system.

• Adding a 16-port OC3 ATM FP pair with in-band connections over an ATM PNNI link requires different configuration procedures than those used when adding any other FP pair.

- Both types of 4-port OC-12c/STM-4 FP, NTHW11 and NTHW86, can be deployed in a mixed pair of redundant FPs. The *ipRoutesPoolCapacity* attribute for the FP needs to be configured with a value of zero before the NTHW11 FP is installed as a replacement FP. For more details on the required configuration for this deployment, see NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

  Note: The NTHW11 version of the 4-port OC-12 FP cannot be deployed in Carrier VoIP Network configurations employing in-band OAM.

Addition of new node-to-node ATM interface (PT-AAL1/UA-AAL1)

This section is a high-level overview of the steps involved in adding a new node-to-node ATM link to an existing PT-AAL1 or UA-AAL1 network.

- "Prerequisites to adding a new Multiservice Switch ATM PNNI" (page 165)

- "Adding a new Multiservice Switch ATM PNNI" (page 166)

- "Considerations for adding a new Multiservice Switch ATM PNNI" (page 166)

Prerequisites to adding a new Multiservice Switch ATM PNNI
- Prior to starting to add a new Nortel Multiservice Switch ATM PNNI, consult your completed network and site plans. Network planning is usually performed by the customer with assistance from representatives from the Nortel network engineering group.

- You will need to refer to some customer-specific values that are found in the Network Engineering Specification Book. This book is the product of co-operation between the customer and Nortel network engineering group.

- You will need to refer to some specific values that are found in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- Information on using Nortel MDM Nodal Provisioning templates to configure new FPs is contained in the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

Adding a new Multiservice Switch ATM PNNI
Procedure steps

1   Identify the available ports on a pair of 4-port or 16-port OC-3, 4-port OC-12 or 12-port DS3 FPs. If you are unable to identify any available ports, see "Addition of new FP pair (PT-AAL1/UA-AAL1)" (page 163). Once you have installed and configured the new FP pair, continue this task.

2   Using the MDM Nodal Provisioning tool, configure the new interfaces on the Multiservice Switch 15000 node by applying any of the templates for ATM PNNI interfaces, as follows:

   a.   *PT-AAL1/WUA-AAL1 ATM PNNI Interface-4pOC3*

   b.   *PT-AAL1/WUA*-AAL1 *ATM PNNI Interface-16pOC3*

   c.   *WUA-AAL1 ATM PNNI Interface-12pDS3*

3   Perform any necessary additional network-specific configuration using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

4   If you are adding more than one new ATM PNNI, repeat step 1 to step 3 for each new ATM PNNI.

5   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the service data changes.

6   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

Considerations for adding a new Multiservice Switch ATM PNNI

The following considerations were kept in mind by the Nortel network engineering group when adding a new Nortel Multiservice Switch ATM PNNI:

- If you are using in-band management over the PNNI link, additional configuration is required.

- You may wish engineer bandwidth pools rather than accept the default values.

- Engineer the virtual path connection (VPC) space if you are running digital subscriber line (DSL) virtual paths (VPs).

- Adding a 16-port OC3 ATM FP pair with in-band connections over an ATM PNNI link requires different configuration procedures than those used when adding any other FP pair.

- The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "EM/<remoteNodeName> ATMIF/ <remote AtmIfinstance>", where <remoteNodeName> and <remote AtmIfinstance> are customer-defined.

Addition of new MG4000 to network (PT-AAL1/UA-AAL1)

Nortel assumes that the new MG4000 is being added to an existing network that includes a Nortel Multiservice Switch 15000 node already loaded with either a 4-port OC-3 or 16-port OC-3 function processor (FP) pair with an available pair of protected ports.

- "Prerequisites to adding a new MG4000" (page 167)

- "Adding a new MG4000" (page 168)

- "Considerations for adding a new MG4000" (page 169)

Prerequisites to adding a new MG4000
- Prior to starting to add the new MG4000, you need to have completed your network planning. Network planning is usually performed by the customer with assistance from representatives from the Nortel network engineering group.

- You will need to refer to some customer-specific values that are found in the Network Engineering Specification Book. This book is the product of co-operation between the customer and Nortel network engineering group.

- You will need to refer to some specific values that are found in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- Information on using Nortel MDM Nodal Provisioning templates to configure the new MG4000 is contained in the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- Connectivity between MDM servers and Multiservice Switch 15000 nodes is assumed to have been established before the new MG4000 is added to the network.

- Before a new MG4000 is added to the network both the MDM servers and Multiservice Switch 15000 nodes are assumed to be running compatible software loads. For more information, see Nortel GIS Installation Methods documents.

- MDM servers need to have downloaded the most recent patches for the software release running on the server.

Adding a new MG4000
Procedure steps

1 Identify the available ports on a pair of 4-port or 16-port OC-3 FPs. If you are unable to identify any available ports, see "Addition of new FP pair (PT-AAL1/UA-AAL1)" (page 163). Once you have installed and configured the new FP pair, continue this task.

2 Using the MDM Nodal Provisioning tool, configure the interface between the MG4000 and the Multiservice Switch 15000 node by applying either the *PT-AAL1/WUA-AAL1 MG4000 ATM Interfaces 4pOC3* or *PT-AAL1/WUA-AAL1 MG4000 ATM Interfaces 16pOC3* template.

3 Perform any necessary additional network-specific configuration using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

4 Repeat step 1 to step 3 for each new MG4000 ATM Interface added to the Multiservice Switch 15000 node.

5 Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

6 Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG4000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG4000 while GEN supports multiple links. For more information on creating and editing links

in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

7   Link the newly created MG4000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

8   Using the MDM Network Model tool, create an entry or icon for the new MG4000 and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

9   Regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

10   Using the MDM Nodal Provisioning tool, create two control PVCs connecting the Multiservice Switch 15000 node and the CS2000. Perform any necessary modifications to the Multiservice Switch 15000 nodes in the network after creating these PVCs.

11   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the service data changes.

Considerations for adding a new MG4000
The following considerations were kept in mind by the Nortel network engineering group when adding a new MG4000:

• The signaling PVCs connected to the MG4000 need to be routed as diversely as possible.

• On 16-port OC3 FP pairs with in-band connections, MG4000 connection space must be engineered to remain within the connection space capacity for this FP.

• The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "GEN/MG4K-<SPMID> -<CLLI>", where <SPMID> and <CLLI> are customer-defined.

Addition of new MG9000 with OC-3 to network (UA-AAL1)

Nortel assumes that the new MG9000 is being added to an existing Carrier VoIP UA-AAL1 solution that includes a Nortel Multiservice Switch 15000 node already loaded with either a 4-port OC-3 or 16-port OC-3 function processor (FP) pair with an available pair of protected ports.

*   "Prerequisites to adding a new MG9000 with OC-3" (page 170)

*   "Adding a new MG9000 with OC-3" (page 171)

*   "Considerations for adding a new MG9000 with OC-3" (page 172)

Prerequisites to adding a new MG9000 with OC-3

*   Prior to starting to add the new MG9000, you need to have completed your network planning. Network planning is usually performed by the customer with assistance from representatives from the Nortel network engineering group.

*   You will need to refer to some customer-specific values that are found in the Network Engineering Specification Book. This book is the product of co-operation between the customer and Nortel network engineering group.

*   You will need to refer to some specific values that are found in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

*   Information on using Nortel MDM Nodal Provisioning templates to configure the new MG9000 is contained in the Nortel GIS Installation Methods documents and the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

*   Connectivity between MDM servers and Multiservice Switch 15000 nodes is assumed to have been established before the new MG9000 is added to the network.

*   Before a new MG9000 is added to the network both the MDM servers and Multiservice Switch 15000 nodes are assumed to be running compatible software loads.

*   MDM servers need to have downloaded the most recent patches for the software release running on the server.

Adding a new MG9000 with OC-3
Procedure steps

1   Identify the available ports on a pair of 4-port OC-3 or 16-port OC-3 FPs. If you are unable to identify any available ports, see "Addition of new FP pair (PT-AAL1/UA-AAL1)" (page 163). After you have installed and configured the new FP pair, continue this task.

2   Using the MDM Nodal Provisioning tool, configure the interface between the MG9000 and the Multiservice Switch 15000 node by applying either the *WUA-AAL1 MG9000 ATM Interfaces-4pOC3* or *WUA-AAL1 MG9000 ATM Interfaces-16pOC3* template.

3   Perform any necessary additional network-specific configuration using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. Consult the table with values for MG9000 non-IMA interfaces.

4   Repeat step 1 to step 3 for each new MG9000 ATM interface added to the Multiservice Switch 15000 node.

5   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

6   Using the MDM Network Model tool, create an entry or icon for the new MG9000 and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

7   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

8   Using the MDM Network Model Editor tool, choose either the FDMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

9   Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the service data changes.

Considerations for adding a new MG9000 with OC-3

The following considerations were kept in mind by the Nortel network engineering group when adding a new MG9000:

- The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "GEN/MG9K-<SPMID>-<CLLI>", where <SPMID> and <CLLI> are customer-defined.

- Internode ESA must be defined for each MG9000, if required.

Addition of new MG9000 with DS1 IMA to network (UA-AAL1)

Nortel assumes that the new MG9000 with inverse multiplexing for ATM (IMA) is being added to an existing UA-AAL1 solution that includes a Nortel Multiservice Switch 15000 node already loaded with 4-port DS3ChAtm FPs and available DS3 ports.

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Prerequisites to adding a new MG9000 with DS1 IMA

- Prior to starting to add the new MG9000, you need to have completed your network planning. Network planning is usually performed by the customer with assistance from representatives from the Nortel network engineering group.

- You will need to refer to some customer-specific values that are found in the Network Engineering Specification Book. This book is the product of co-operation between the customer and Nortel network engineering group.

- You will need to refer to some specific values that are found in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- Information on using Nortel MDM Nodal Provisioning templates to configure the new MG9000 is contained in the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- Connectivity between the MDM servers and the Nortel Multiservice Switch 15000 nodes is assumed to have been established before the new MG9000 is added to the network.

- Before a new MG9000 is added to the network both the MDM servers and Multiservice Switch 15000 nodes are assumed to be running compatible software loads.

- MDM servers need to have downloaded the most recent patches for the software release running on the server.

Adding a new MG9000 with DS1 IMA
Procedure steps

1   Identify the available ports on a pair of 4-port DS3ChAtm FPs. If you are unable to identify any available ports, see "Addition of new FP pair (PT-AAL1/UA-AAL1)" (page 163). Once you have installed and configured the new FP pair, continue this task.

2   Using the MDM Nodal Provisioning tool, configure the required DS3 ports on the 4-port DS3ChAtm FP. You need to configure the DS3 port first using the *WUA-AAL1 DS3 port - 4pDS3ChAtm* template and values from the Network Engineering Specification Book before configuring the IMA interface. Repeat this step for each DS3 port that needs to be configured.

3   Using the MDM Nodal Provisioning tool, configure the interface between the MG9000 and the Multiservice Switch 15000 node by applying the *WUA-AAL1 MG9000 2xDS1 - IMA ATM Interface - 4pDS3ChAtm* template once and the *WUA-AAL1 1xDS1- IMA Link - 4pDS3ChAtm* template for each additional interface.

   Note: The *WUA-AAL1 MG9000 2xDS1 - IMA ATM Interface* template configures a 2xDS1 IMA MG9000 link to another Multiservice Switch 15000 node using a DS3 port on a 4-port DS3ChAtm FP. The *WUA-AAL1 1xDS1-IMA Link - 4pDS3ChAtm* template provisions a DS1-IMA link on the IMA virtual port of a DS3 port of a 4-port DS3ChAtm FP.

4   Perform any necessary additional network-specific configuration using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. Consult the table with values for MG9000 ATM IMA interfaces.

5   Repeat step 1 to step 4 for each new MG9000 ATM IMA interface added to the Multiservice Switch 15000 node.

6   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

7   Using the MDM Network Model tool, create an entry or icon for the new MG9000 and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

8   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

9   Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10 Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

11 Using the Command Console, activate and commit the service data changes.

Considerations for adding a new MG9000 with DS1 IMA
The following considerations were kept in mind by Nortel network engineering group when adding a new MG9000 with ATM IMA:

•   The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "GEN/MG9K-<SPMID> -<CLLI>", where <SPMID> and <CLLI> are customer-defined.

•   Internode ESA must be defined for each MG9000, if required.

Addition of new MG9000 with DS3 ATM (UA-AAL1)

This section gives an overview of the steps for adding a new MG9000 with a 12pDS3 user-to-network interface (UNI) interface to an existing UA-AAL1 network.

The network must include a Nortel Multiservice Switch 15000 node already loaded with 12-port DS3 ATM type FP cards, with an available pair of DS3 ports.

- "Prerequisites to adding a new MG9000 with DS3 ATM" (page 175)

- "Adding a new MG9000 with DS3 ATM" (page 176)

- "Considerations for adding a new MG9000 with DS3 ATM" (page 177)

Prerequisites to adding a new MG9000 with DS3 ATM

- Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

- For customer-specific values, see the Network Engineering Specification Book.The customer and Nortels' network engineering group produce this book jointly.

- For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- For information on using the Nodal Provisioning application of Nortel Multiservice Data Manager, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- Connectivity must exist between MDM servers and the Multiservice Switch 15000 nodes.

- MDM servers and Multiservice Switch 15000 nodes must be running compatible software loads.

- You must download the most recent patches for the software release running on the MDM servers.

Adding a new MG9000 with DS3 ATM
Procedure steps

1 Identify the available ports on a pair of 12-port DS3 Atm FPs. If you are unable to identify any available ports, see "Addition of new FP pair (PT-AAL1/UA-AAL1)" (page 163). Install and configure the new FP pair, then continue to the next step.

2 Using the MDM Nodal Provisioning tool, configure the interface between the MG9000 and the Multiservice Switch 15000 node. Do this by applying the *WUA-AAL1 MG9000 DS3 ATM Interface-12pDS3Atm* template.

3 Configure the network, as required, using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. In the *Attribute Summary*, consult the table that contains values for MG9000 DS3 ATM interfaces.

4 Repeat step 1 to step 3 for each new MG9000 DS3 ATM interface you add to the Multiservice Switch 15000 node.

5 Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

6 Using the MDM Network Model tool, create an entry or icon for the new MG9000 and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

7 Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

8 Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

9 Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10 Using the Command Console, activate and commit the service data changes.

Considerations for adding a new MG9000 with DS3 ATM

Nortel network engineering group considers the following when adding a new MG9000 with DS3 ATM:

- This interface requires use of a 4pDS3 sparing panel (code NTHR79xx-xx). Use only ports 0 through 3, and connect a single panel to P0 (data), and P3 (control). Therefore, one FP is deployed with one NTHR79 4-port 1:1 sparing panel.

- Unlike the DS3 private network-to-network (PNNI) interface between Nortel Multiservice Switch 15000 nodes, with this interface only one channel can exist between the MG9000 and the Multiservice Switch 15000 node. If that channel is lost, the MG9000 is in ESA until the channel is returned to service.

- You can use deployed 12pDS3 cards on which PNNI interfaces are already provisioned to provision new MG9000 interfaces.

- The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "GEN/MG9K-<SPMID> -<CLLI>", where <SPMID> and <CLLI> are customer-defined.

- Internode ESA must be defined for each MG9000, if required.

Addition of new IW-SPM (PT-AAL1/UA-AAL1)

Nortel assumes that you are adding the new Interworking-Spectrum Peripheral Module (IW-SPM) to an existing Carrier VoIP solution.

The network must include a Nortel Multiservice Switch 15000 node already loaded with an 4-port OC-3 or 16-port OC-3 function processor (FP) pair, with an available pair of protected ports.

Prerequisites to adding a new IW-SPM

- Prior to starting to add the new IW-SPM, you need to have completed your network planning. Network planning is usually performed by the customer with assistance from representatives from Nortel network engineering group.

- You will need to refer to some customer-specific values that are found in the Network Engineering Specification Book. This book is the product of co-operation between the customer and Nortel network engineering group.

- You will need to refer to some specific values that are found in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- Information on using Nortel MDM Nodal Provisioning templates to configure the new IW-SPM is contained in the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- Connectivity between MDM servers and Multiservice Switch 15000 nodes is assumed to have been established before the new IW-SPM is added to the network.

- Before a new IW-SPM is added to the network both the MDM servers and Multiservice Switch 15000 nodes are assumed to be running compatible software loads.

- MDM servers need to have downloaded the most recent patches for the software release running on the server.

Adding a new IW-SPM
Procedure steps

1 Identify the available ports on a pair of 4-port OC-3 or 16-port OC-3 FPs. If you are unable to identify any available ports, see "Addition of new FP pair (PT-AAL1/UA-AAL1)" (page 163). Once you have installed and configured the new FP pair, continue this task.

2 Using the MDM Nodal Provisioning tool, configure the interface between the IW-SPM and the Multiservice Switch 15000 node by applying either the *PT-AAL1/WUA-AA*L1 *IW-SPM Interface 4pOC3* or *PT-AAL1/WUA-AAL1 IW-SPM Interface 16pOC3* template.

3 Perform any necessary additional network-specific configuration using values from the Network Engineering Specification Book and

NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

4   Repeat step 1 to step 3 for each new IW-SPM Interface added to the Multiservice Switch 15000 node.

5   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

6   Using the MDM Network Model tool, create an entry or icon for the new IW-SPM and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

7   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

8   Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new IW-SPM in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the IW-SPM while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

9   Link the newly created IW-SPM icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

Considerations for adding a new IW-SPM
The following considerations were kept in mind by Nortel network engineering group when adding a new IW-SPM:

•   The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "GEN/IW-SPM-<SPMID> -<CLLI>", where <SPMID> and <CLLI> are customer-defined.

Addition of new DPT-SPM (PT-AAL1/UA-AAL1)

Nortel assumes that the new Dynamic Packet Trunking-Spectrum Peripheral Module (DPT-SPM) is being added to an existing solution that includes a Nortel Multiservice Switch 15000 node already loaded with either a 4-port OC-3 or 16-port OC-3 function processor (FP) pair with an available pair of protected ports.

Prerequisites to adding a new DPT-SPM

- Prior to starting to add the new DPT-SPM, you need to have completed your network planning. Network planning is usually performed by the customer with assistance from representatives from Nortel network engineering group.

- You will need to refer to some customer-specific values that are found in the Network Engineering Specification Book. This book is the product of co-operation between the customer and Nortel network engineering group.

- You will need to refer to some specific values that are found in NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- Information on using Nortel MDM Nodal Provisioning templates to configure the new DPT-SPM is contained in the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- Connectivity between MDM servers and Nortel Multiservice Switch 15000 nodes is assumed to have been established before the new DPT-SPM is added to the network.

- Before a new DPT-SPM is added to the network both the MDM servers and Multiservice Switch 15000 nodes are assumed to be running compatible software loads.

- MDM servers need to have downloaded the most recent patches for the software release running on the server.

Adding a new DPT-SPM
Procedure steps

1   Identify the available ports on a pair of 4-port OC-3 or 16-port OC-3 FPs. If you are unable to identify any available ports, see "Addition of new FP pair (PT-AAL1/UA-AAL1)" (page 163). Once you have installed and configured the new FP pair, continue this task.

2   Using the MDM Nodal Provisioning tool, configure the interface between the DPT-SPM and the Multiservice Switch 15000 node by applying either the *PT-AAL1/WUA-AAL1 DPT-SPM Interfaces-4pOC3* or *PT-AAL1/WUA-AAL1 DPT-SPM Interfaces-16pOC3* template.

3   Perform any necessary additional network-specific configuration using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

4   Repeat step 1 to step 3 for each new DPT-SPM interface added to the Multiservice Switch 15000 node.

5   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

6   Using the MDM Network Model tool, create an entry or icon for the new DPT-SPM and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

7   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

8   Using the MDM Network Model Editor tool, choose either the FNmode or Gen icon to represent the new DPT-SPM in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

9   Link the newly created DPT-SPM icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the service data changes.

Considerations for adding a new DPT-SPM

The following considerations were kept in mind by Nortel network engineering group when adding a new DPT-SPM:

*   The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "GEN/DPT-SPM-<SPMID> -<CLLI>", where <SPMID> and <CLLI> are customer-defined.

Use cases for incremental growth of a UA-IP network

This section presents use cases for incremental growth of an existing Universal Access - IP (UA-IP) solution. It gives an overview of the steps for adding new components to a network.

This section includes the topics as follows:

Note: The installation, configuration, and connectivity of the component hardware is beyond the scope of this chapter.

Addition of new FP pair (UA-IP)

This section is an overview of the steps for adding a new FP pair to a Nortel Multiservice Switch 15000 node in an existing UA-IP network.

This section includes the topics as follows:

*   "Prerequisites to adding a new FP pair" (page 163)

*   "Adding a new FP pair to a node" (page 164)

*   "Considerations for adding a new FP pair to a node" (page 164)

Prerequisites for adding a new FP pair to a node

*   Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

*   Consult your completed network and site plans. Record the type and version of the FPs that you are installing, as well as the slot numbers in the site plan. For more information on choosing FP slots, see NN10600-130 *Nortel Multiservice Switch 15000/20000 Hardware Installation, Maintenance, and Upgrade*.

*   For customer-specific values, see the Network Engineering Specification Book. The customer and Nortel network engineering group produce this book jointly.

*   For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

*   For information on using the Nodal Provisioning application of Nortel MDM, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

Adding a new FP pair to a node
Procedure steps

1   Identify the available slots for a new pair of FPs. Install the new FP pair, then continue to the next step.

2   Using the MDM Nodal Provisioning tool, configure the new FPs on the Multiservice Switch 15000 node. Apply any of the templates as follows:

   a.   *UA-IP FP-4pOC3SmIrAtm*

   b.   *UA-IP FP-4pOC12SmIrAtm*

   c.   UA-IP *FP-12pDS3Atm*

   d.   UA-IP FP-4pDS3ChAtm

   e.   *UA-IP FP-4pGE*

   f.   UA-IP *FP-4pOC3ChSmIr-TDM*

   g.   UA-IP *FP-2pGeMmSrVsp3*

   h.   *UA-IP FP-2pOC3ChSmIrVsp3*-o

3   Configure the network, as required. Use values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

4   To add more than one new FP pair to the node, repeat step 1 through step 3 for each new pair of FPs added.

5   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the service data changes.

6   Using the MDM Network Model tool, regenerate the Network Model for the modified nodes and save the new model.

Considerations for adding a new FP pair to a node

The network engineering group at Nortel considers the following when adding a new FP pair to a Nortel Multiservice Switch 15000 node:

• At initial installation of the Multiservice Switch shelf, FP pairs can be put through the full suite of available card or port tests. However, when adding an FP pair to an existing shelf that is currently providing service, limit the set of recommended card or port tests to those that are guaranteed not to affect other parts of the system.

Addition of new MG9000 with OC-3 (UA-IP)

This section is an overview of the steps for adding a new MG9000, with an OC-3 interface, to an existing UA-IP network.

The network must include a Nortel Multiservice Switch 15000 node already loaded with a 4-port OC-3 function processor (FP) pair, with an available pair of protected ports.

In UA-IP, the MG9000 is supported on the same interfaces as in PT-AAL1 and UA-AAL1. However, the 12pDS3Atm and 4pDS3ChAtm FP cards do not support IP. Therefore, when configuring interfaces to the MG9000 on these cards, you must set up an optical hairpin. The optical hairpin terminates the IP from the MG9000.

> *Note:* This procedure creates two host entries only, one for MG9000 OAM, and another for MG9000 Call Control. You must create the other 16 entries manually.

This section includes the topics as follows:

- "Prerequisites to adding a new MG9000 with OC-3" (page 186)

- "Adding a new MG9000 with OC-3" (page 187)

- "Considerations for adding a new MG9000 with OC-3" (page 188)

Prerequisites to adding a new MG9000 with OC-3
- Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

- For customer-specific values, see the Network Engineering Specification Book. The customer and Nortel network engineering group produce this book jointly.

- For specific values, see NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/ UA-IP*.

- For information on using the Nodal Provisioning application of Nortel MDM, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- There must be connectivity between MDM servers and the Multiservice Switch 15000 nodes.

- MDM servers and Multiservice Switch 15000 nodes must be running compatible software loads.

- You must download the most recent patches for the software release running on the MDM servers.

Adding a new MG9000 with OC-3
Procedure steps

1   Identify the available ports on a pair of 4-port OC-3 FPs. If you are unable to identify any available ports, see "Addition of new FP pair (UA-IP)" (page 184). Install and configure the new FP pair. Then continue to the next step.

2   Using the MDM Nodal Provisioning tool, configure the interface between the MG9000 and the Multiservice Switch 15000 node. Do this by applying the *UA-IP IF-MG9000-4pOC3SmIrAtm* template.

3   Configure the network, as required. Use values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. In the Attribute Summary, consult the table that contains values for MG9000 OC-3 interfaces.

4   For each new MG9000 OC-3 interface you add to the Multiservice Switch 15000 node, repeat step 1 to step 3.

5   Manually create the remaining address resolution protocol (ARP) Host entries.

6   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

7   Using the MDM Network Model tool, create an entry or icon for the new MG9000 and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

8   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

9   Using the MDM Network Model Editor tool, choose either the FDMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The

FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10 Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

Considerations for adding a new MG9000 with OC-3

The network engineering group at Nortel considers the following when adding a new MG9000 with OC-3:

• The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. For the MG9000, Nortel recommends a name format of "GEN/MG9K_<id>", where <id> is customer-defined. For the optical hairpin, Nortel recommends a name format of "EM/<remoteNodeName> atmif/<remote AtmIf instance>", where <remoteNodeName> and <remote AtmIf instance> are customer-defined.

Addition of new MG9000 with STS-1/DS3 (UA-IP)

This section is an overview of the steps for adding a new MG9000 with STS-1/DS3 interface to an existing UA-IP network.

The network must include a Nortel Multiservice Switch 15000 node already loaded with 12-port DS3 ChAtm FPs and available DS3 ports.

This section includes the topics as follows:

• "Prerequisites to adding a new MG9000 with STS-1/DS3" (page 188)

• "Adding a new MG9000 with STS-1/DS3" (page 189)

• "Considerations for adding a new MG9000 with STS-1/DS3" (page 190)

Prerequisites to adding a new MG9000 with STS-1/DS3

• Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

- For customer-specific values, see the Network Engineering Specification Book. The customer and Nortel's network engineering group produce this book jointly.

- For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- For information on using the Nodal Provisioning application of the Nortel MDM, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- There must be connectivity between MDM servers and the Multiservice Switch 15000 nodes.

- Both the MDM servers and Multiservice Switch 15000 nodes must be running compatible software loads.

- You must download the most recent patches for the software release running on the MDM servers.

Adding a new MG9000 with STS-1/DS3
Procedure steps

1   Identify the available ports on a pair of 12-port DS3Atm FPs. If you are unable to identify any available ports, see "Addition of new FP pair (UA-IP)" (page 184). Install and configure the new FP pair, then continue to the next step.

2   If required by the Network Engineering Specification Book only, add a new hairpin interface. To configure a new hairpin interface, use the MDM Nodal Provisioning tool. If the optical hairpin is on a 4pOC3 FP, apply the *UA-IP IF-Hairpin-4pOC3SmIrAtm* template. If the optical hairpin is on a 4pOC12 FP, apply the *UA-IP IF-Hairpin-4pOC12SmIrAtm* template.

3   Using the MDM Nodal Provisioning tool, configure the interface between the MG9000 and the Multiservice Switch 15000 node. Do this by applying the *UA-IP IF-MG9000-12pDS3Atm* template. Apply it for each of the MG9000 DS3 interfaces in the Network Engineering Specification Book.

  Note: The *UA-IP IF-MG9000-12pDS3Atm* template creates an interface to an MG9000 on 12psDS3Atm FPs. It provisions DS3s with an ATMIF on 12pDS3Atm FPs. The DS3s, ATMIF, and so on must not be configured previously.

4   Configure the network, as required, using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. In the *Attribute Summary*, consult the tables that contain values for Hairpin ATM/IP interfaces, and for MG9000 STS-3/DS1 interfaces.

5   Repeat step 1 to step 5 for each new MG9000 STS-1/DS3 interface you add to the Multiservice Switch 15000 node.

6   Manually create the remaining address resolution protocol (ARP) Host entries.

7   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

8   Using the MDM Network Model tool, create an entry or icon for the new MG9000 and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

9   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

10 Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

11 Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

12 Using the Command Console, activate and commit the service data changes.

Considerations for adding a new MG9000 with STS-1/DS3

The network engineering group at Nortel considers the following when adding a new MG9000 with STS-1/DS3:

* The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at

your company. MDM surveillance also uses this field. For the MG9000, Nortel recommends a name format of "GEN/MG9K_<id>", where <id> is customer-defined. For the optical hairpin, Nortel recommends a name format of "EM/<remoteNodeName> atmif/<remote AtmIf instance>", where <remoteNodeName> and <remote AtmIf instance> are customer-defined.

Addition of new MG9000 with DS1 IMA (UA-IP)

This section is an overview of the steps for adding a new MG9000 with DS1 IMA to an existing Carrier VoIP UA-IP network.

The network must include a Nortel Multiservice Switch 15000 node already loaded with 4-port DS3 ChAtm FPs and available DS3 ports, with at least 8xDS1 available within the DS3 port.

This section includes the following topics:

- "Prerequisites to adding a new MG9000 with DS1 IMA" (page 192)

- "Adding a new MG9000 with DS1 IMA" (page 193)

- "Considerations for adding a new MG9000 with DS1 IMA" (page 194)

Prerequisites to adding a new MG9000 with DS1 IMA

- Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

- For customer-specific values, see the Network Engineering Specification Book. The customer and Nortel network engineering group produce this book jointly.

- For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- For information on using the Nodal Provisioning application of the MDM, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- There must be connectivity between the MDM servers and the Multiservice Switch 15000 nodes.

- MDM servers and Multiservice Switch 15000 nodes must be running compatible software loads.

- You must download the most recent patches for the software release running on the MDM servers.

Adding a new MG9000 with DS1 IMA
Procedure steps

1 Identify the available ports on a pair of 4-port DS3ChAtm FPs. If you are unable to identify any available ports, see "Addition of new FP pair (UA-IP)" (page 184). Install and configure the new FP pair, then continue to the next step.

2 If required by the Network Engineering Specification Book only, add a new hairpin interface. Use the MDM Nodal Provisioning tool to configure the new hairpin. If the hairpin is on a 4pOC3 FP, apply the *UA-IP IF-Hairpin-4pOC3SmIrAtm* template. If the hairpin is on a 4pOC12 FP, apply the *UA-IP IF-Hairpin-4pOC12SmIrAtm* template,

3 Using the MDM Nodal Provisioning tool, configure the required DS3 ports on the 4-port DS3ChAtm FP. Configure the DS3 port first using the *UA-IP IF-DS3port- 4pDs3ChAtm* template and values from the Network Engineering Specification Book. Click Multiple creations to create all required DS3 ports, as per the Network Engineering Specification Book.

4 Using the MDM Nodal Provisioning tool, configure the interface between the MG9000 and the Multiservice Switch 15000 node. Do this by applying the *UA-IP IF-MG9000-8xDS1-4pDS3ChAtm* template. Apply it for each of the MG9000 DS1 IMA interfaces in the Network Engineering Specification Book.

5 Configure the network, as required, using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. In the *Attribute Summary*, consult the table that contains values for MG9000 DS1 IMA interfaces.

6 Repeat step 1 to step 5 for each new MG9000 DS1 IMA interface you add to the Multiservice Switch 15000 node.

7 Manually create remaining address resolution protocol (ARP) Host entries.

8 Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

9 Using the MDM Network Model tool, create an entry or icon for the new MG9000 and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10 Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 node and save the new model.

11 Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

12 Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

Considerations for adding a new MG9000 with DS1 IMA

The network engineering group at Nortel considers the following when adding a new MG9000 with DS1 IMA:

- The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "GEN/MG9K_<id>", where <id> is customer-defined.

Addition of new Multiservice Switch inter-shelf IP interface to Carrier VoIP network (UA-IP)

This section gives an overview of the steps for adding a new remote Nortel Multiservice Switch 15000 node, linked with IP over ATM to another Multiservice Switch 15000 node at the CS2000 site, in a UA-IP solution. This is known as a Multiservice Switch IP over ATM inter-shelf trunk interface.

Generally, in a UA-IP solution, one primary Multiservice Switch 15000 node is situated in the office with the CS-LAN. It is connected to the CS-LAN via Gigabit Ethernet (GE), or OC-12. Other Multiservice Switch 15000 nodes can also be in the CS-LAN site, but are not necessarily connected to the CS-LAN for IP control/bearer traffic. The remaining Multiservice Switch 15000 nodes are situated in Remote Wire Centres (RWCs).

The primary Multiservice Switch 15000 node connected to the CS-LAN likely has an inter-shelf IP interface to each of the other Multiservice Switch 15000 nodes. Each of the other nodes is not necessarily directly linked to another RWC. However, in most cases, an IP over ATM connection exists that is used for bearer path IP between each RWC and every other RWC.

This section includes the topics as follows:

- "Prerequisites to adding a new Multiservice Switch IP over ATM inter-shelf trunk interface" (page 195)

- "Adding a new Multiservice Switch IP over ATM inter-shelf trunk interface" (page 195)

- "Considerations for adding a new Multiservice Switch IP over ATM inter-shelf trunk interface" (page 196)

Prerequisites to adding a new Multiservice Switch IP over ATM inter-shelf trunk interface

- Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel. Consult the completed network and site plans.

- For customer-specific values, see the Network Engineering Specification Book.The customer and Nortel network engineering group produce this book jointly.

- For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- For information on using the Nodal Provisioning application of the Nortel MDM, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

Adding a new Multiservice Switch IP over ATM inter-shelf trunk interface
Procedure steps

1   Identify the available ports on a pair of 4-port OC-3 or 4-port OC-12 FPs. If you are unable to identify any available ports, see "Addition of new FP pair (UA-IP)" (page 184). Install and configure the new FP pair, then continue to the next step.

2   Add the interface to the CS2000 site end of the new link. Use the MDM Nodal Provisioning tool to configure the new interfaces on the Multiservice Switch 15000 node. Configure each of the inter-shelf Multiservice Switch IP over ATM interfaces in your Network Engineering Specification Book. If the interface is on a 4pOC3 FP, apply the *UA-IP IF-MSS-IPoATM-4pOC3SmIrAtm* template. If the interface is on a 4pOC12 FP, apply the *UA-IP IF-MSS-IPoATM-4pOC12SmIrAtm* template.

3   Add the interface to the remote site end of the new link, using the same templates as in step 2.

4   Using the MDM Nodal Provisioning tool, configure the *UA-IP AC-RWC-Bearer -4pOC3SmIrAtm* template for each of the RWC-to-RWC bearer path connections in your Network Engineering Specification Book.

     Alternatively, apply the *UA-IP AC-RWC-Bearer-4pOC12SmIrAtm* template if the inter-shelf link is on a 4pOC12 FP.

5   Manually create the nailed-up relay points (NRPs) on the CS2000-site Multiservice Switch 15000 shelf.

6   Manually create the IP routing (for example, static route) entries on the CS2000-site Multiservice Switch shelf, as specified in the Network Engineering Specification Book.

7   Perform additional network configuration, as required. Use values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

8   To add more than one new Multiservice Switch IP over ATM inter-shelf trunk interface, repeat step 1 to step 6 for each new interface.

9   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the service data changes.

10   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

Considerations for adding a new Multiservice Switch IP over ATM inter-shelf trunk interface

The network engineering group at Nortel considers the following when adding a new Multiservice Switch IP over ATM inter-shelf trunk interface:

- If you are using in-band management over the private network-to-network interface (PNNI) link, additional configuration is required.

- You can engineer bandwidth pools rather than accept the default values.

- Engineer the virtual path connection (VPC) space if you are running digital subscriber line (DSL) virtual paths (VPs).

- The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "EM/<remoteNodeName> ATMIF/ <remote AtmIf instance>", where <remoteNodeName> and <remote AtmIf instance> are customer-defined.

Addition of new CS-LAN with GE (LAG and no LAG) (UA-IP)

This section is an overview of the steps for adding a new CS-LAN with Gigabit Ethernet (GE), to an existing UA-IP network. The interface can either use, or not use, a Link Aggregation Group (LAG).

The purpose of this procedure is to provide IP connectivity from a Nortel Multiservice Switch 15000 node to the CS-LAN. A CS-LAN consists of a pair of Passport 8600 nodes, connected to a Multiservice Switch 15000 node.

Multiservice Switch 15000 nodes support GE links to a CS-LAN, using either of the configurations as follows:

- Single GE links on separate 4pGE FP cards, on a single Multiservice Switch 15000 node, using Protected Routes.

- Pairs of GE links in a Link Aggregation Group (LAG), with each pair on separate 4pGE cards, on a single Multiservice Switch 15000 node, using Protected Routes.

The existing network must include a Multiservice Switch 15000 node already loaded with 4-port GE FPs and available GE ports.

Generally, in the UA-IP solution, one primary Multiservice Switch 15000 node is situated in the office with the CS-LAN. It is connected to the CS-LAN via GE or OC-12. Other Multiservice Switch 15000 nodes are also in the CS-LAN site. However, they are not necessarily connected to the CS-LAN for IP control/bearer traffic. The remaining nodes are in Remote Wire Centres (RWCs).

This section includes the topics as follows:

- "Prerequisites to adding a new CS-LAN GE interface" (page 198)

  Note: This section does not discuss how to convert from single GE links without LAG, to two or more GE links in a LAG.

Prerequisites to adding a new CS-LAN GE interface

- Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

- For customer-specific values, see the Network Engineering Specification Book. The customer and Nortel network engineering group produce this book jointly.

- For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- For information on using the Nodal Provisioning application of Nortel MDM, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- There must be connectivity between MDM servers and the Multiservice Switch 15000 nodes.

- MDM servers and Multiservice Switch 15000 nodes must be running compatible software loads.

- You must download the most recent patches for the software release running on the MDM servers.

Adding a new CS-LAN GE interface
Procedure steps

1   Identify the available ports on a pair of 4-port GE FPs. If you are unable to identify any available ports, see "Addition of new FP pair (UA-IP)" (page 184). Install and configure the new FP pair, then continue to the next step.

2   For GE links without LAG, using the MDM Nodal Provisioning tool, configure the interface to the CS-LAN on the Multiservice Switch 15000 node. Do this by applying the *UA-IP IF-CSLAN-noLAG-4pGE* template for each of the CS-LAN GE interfaces in the Network Engineering Specification Book.

3 For pairs of GE links in a LAG, using the MDM Nodal Provisioning tool, configure the interface to the CS-LAN on the Multiservice Switch 15000 node. Do this by applying the *UA-IP IF-CSLAN-LAG-4pGE* template for each of the CS-LAN GE with LAG interfaces in the Network Engineering Specification Book. If you require a third GE link in the LAG, add it manually.

4 Manually create IP routing (for example, static route) entries specified in the Network Engineering Specification Book.

5 Manually create OSPF including export rules for advertising local address and static routes to the CS-LAN.

6 Configure the network, as required, using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. In the *Attribute Summary*, consult the table that contains values for CS-LAN GE interfaces, with or without LAG.

7 Repeat step 1 to step 6 for each new CS-LAN GE interface you add to the Multiservice Switch 15000 node.

8 Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

9 Using the MDM Network Model tool, create an entry or icon for the new CS-LAN and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10 Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

11 Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

12 Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

Addition of new CS-LAN with OC-12 (UA-IP)

This section is an overview of the steps for adding a new CS-LAN with an OC-12 link, to an existing UA-IP network. A CS-LAN consists of a pair of ERS 8600 nodes.

The existing network must include a Nortel Multiservice Switch 15000 node already loaded with 4-port OC-12 FPs and available OC-12 ports.

Multiservice Switch 15000 nodes support an OC-12 link to a CS-LAN. The interface consists of single OC-12 links, unprotected, from each of two Multiservice Switch 15000 nodes. The nodes are connected with a 1+1 protected IP over ATM inter-shelf link.

Generally, in the UA-IP solution, one primary Multiservice Switch 15000 node is situated in the office with the CS-LAN. It is connected to the CS-LAN via GE or OC-12. Other Multiservice Switch 15000 nodes are also in the CS-LAN site. However, they are not necessarily connected to the CS-LAN for IP control/bearer traffic. The remaining nodes are in Remote Wire Centres (RWCs).

> *Note:* For OC-12 CS-LAN links, the *UA-IP FP-4pOC12SmIrAtm* template configures a pair of OC-12 cards with default connectionPoolCapacity settings. You must override these settings to create the unprotected VCCs required by the CS-LAN interface. If you apply the FP template initially without overriding these settings, and then change those parameters manually, an outage of both OC-12 cards occurs. If the manual override is required during incremental commissioning, coordinate the change to minimize or eliminate traffic outages on any interfaces currently in use on the OC-12 cards.

This section includes the topics as follows:

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Prerequisites to adding a new CS-LAN with OC-12
- Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

- For customer-specific values, see the Network Engineering Specification Book. The customer and Nortel network engineering group produce this book jointly.

- For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- For information on using Nortel MDM Nodal Provisioning templates to configure the new CS-LAN with optical link, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- There must be connectivity between MDM servers and the Multiservice Switch 15000 nodes.

- MDM servers and Multiservice Switch 15000 nodes must be running compatible software loads.

- You must download the most recent patches for the software release running on the MDM servers.

Adding a new CS-LAN with OC-12 link
Procedure steps

1   Identify the available ports on a pair of 4-port OC-12 FPs. If you are unable to identify any available ports, see "Addition of new FP pair (UA-IP)" (page 184). Install and configure the new FP pair, then continue to the next step.

   Note: In this case, a pair of 4pOC12 FPs must have other ports with LAPS-protected interfaces, in order for the HSM and EP switchovers to meet carrier-grade standards.

1   Using the MDM Nodal Provisioning tool, configure the interface to the CS-LAN on the Multiservice Switch 15000 node. Apply the *UA-IP IF-CSLAN-4pOC12SmIrAtm* template.

2   Configure the network, as required, using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. In the *Attribute Summary*, consult the table that includes values for CS-LAN OC-12 interfaces.

3   Repeat step 1 to step 4 for each new CS-LAN OC-12 interface you add to the Multiservice Switch 15000 node.

4   Manually create IP routing (for example, static route) entries specified in the Network Engineering Specification Book.

5   Manually create OSPF including export rules for advertising local address and static routes to the CS-LAN.

6   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

7   Using the MDM Network Model tool, create an entry or icon for the new CS-LAN and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

8   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

9   Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

10 Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

Considerations for adding a new CS-LAN with OC-12 link

The network engineering group at Nortel considers the following when adding a new CS-LAN with OC-12 link:

- The reporting for the REMOTEATMIFLABEL NTM statistic field is only useful if you give the *remoteAtmInterfaceLabel* attribute a meaningful name that is consistent with the naming conventions used at your company. MDM surveillance also uses this field. Nortel recommends a name format of "GEN/8600_<ID>", where <ID> is customer-defined.

Addition of new VSP and TDM physical interface (UA-IP)

This section is an overview of the steps for adding new voice services processor (VSP) or time division multiplexing (TDM) physical interfaces, to an existing UA-IP network.

The purpose of adding VSP and TDM physical interfaces is to create the component infrastructure for a VSP pair, including its packet interfaces to the media gateway controller (MGC). This procedure also creates physical interfaces for later adding the TDM trunks. For information about adding TDM trunks, see "Addition of new TDM trunk interface (UA-IP)" (page 205).

For VSP3 FP cards, the TDM interfaces must be on 4pOC3 TDM cards.

For VSP3-o FP cards, the TDM interface must be on VSP3-o FP cards, using port 0 only.

This section includes the topics as follows:

- "Prerequisites to adding a new VSP or TDM physical interface" (page 203)

- "Adding a new VSP or TDM physical interface" (page 204)

Prerequisites to adding a new VSP or TDM physical interface
- Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

- For customer-specific values, see the Network Engineering Specification Book. The customer and Nortel network engineering group produce this book jointly.

- For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- For information on using the Nodal Provisioning application of Nortel MDM, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- There must be connectivity between MDM servers and the Multiservice Switch 15000 nodes.

- MDM servers and Multiservice Switch 15000 nodes must be running compatible software loads.

- The network must use H.248 as the protocol between the MGC and the Media Gateway 15000, and virtual router access point (VRAP) as the connectivity scheme.

- You must download the most recent patches for the software release running on MDM servers.

Adding a new VSP or TDM physical interface
Procedure steps

1 For a new TDM FP OC-3 interface, identify the available ports on a pair of 4-port OC3ChSmIr FPs. If you are unable to identify any available ports, see "Addition of new FP pair (UA-IP)" (page 184). Install and configure the new FP pair, then continue to the next step.

2 For each of the TDM interfaces in the Network Engineering Specification Book, use the MDM Nodal Provisioning tool to configure the required OC-3 ports on the 4-port OC-3 TDM FPs. To do this, use the *UA-IP IF-TDM-4pOC3ChSmIr* template along with values from the Network Engineering Specification Book. Repeat this step for each OC-3 TDM port to configure.

3 For each of the VSP3-o interfaces in the Network Engineering Specification Book, use the MDM Nodal Provisioning tool to configure the required OC-3 ports on the 2-port OC-3 Vsp3-o FP cards. To do this, apply the UA-IP IF-TDM-2pOC3ChSmIrVsp3-o template along with values from the Network Engineering Specification Book. Repeat this step for each VSP3-o port to configure.

4 Configure the network, as required, using values from the Network Engineering Specification Book and NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*. In the *Attribute Summary*, consult the table that includes values for VSP and TDM interfaces.

5 Repeat step 1 to step 5 for each new TDM interface you add to the Multiservice Switch 15000 node.

6 Manually create the associated IP routing (for example, static route) entries specified in the Network Engineering Specification Book.

7   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

8   Using the MDM Network Model tool, create an entry or icon for the new VSP or TDM physical interface and links to the specific pair of ports selected on the Multiservice Switch 15000 node. For more information on creating and editing links in the MDM Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

9   Using the MDM Network Model tool, regenerate the Network Model for the modified Multiservice Switch 15000 nodes and save the new model.

10   Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

11   Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

Addition of new TDM trunk interface (UA-IP)

This section is an overview of the steps for adding a new time division multiplexing (TDM) trunk interface, to an existing UA-IP network. The purpose of adding new TDM trunk interfaces is to create individual profiles and DS1-based TDM trunks. You must add the trunks one at a time.

For some trunk types, you must add profiles before adding the associated trunks. After that, you can add the trunks in order, as specified by the Network Engineering Specification Book.

This section includes the topics as follows:

- "Prerequisites to adding a new TDM trunk interface" (page 205)

- "Adding a new TDM trunk interface" (page 206)

Prerequisites to adding a new TDM trunk interface
- Complete your network planning. For assistance, contact your representatives from the network engineering group at Nortel.

- For customer-specific values, see the Network Engineering Specification Book. The customer and Nortel network engineering group produce this book jointly.

- For specific values, see the NN10225-512 *Nortel Multiservice Switch 15000, Media Gateway 15000 and Multiservice Data Manager in Carrier Voice over IP Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

- For information on using the Nodal Provisioning application of Nortel MDM, see the 241-6001-610 *Nortel Multiservice Data Manager Nodal Provisioning User Guide*.

- There must be connectivity between MDM servers and the Nortel Multiservice Switch 15000 nodes.

- MDM servers and Multiservice Switch 15000 nodes must be running compatible software loads.

- The network must use H.248 as the protocol between the MGC and the Media Gateway 15000 (MG15000), and virtual router access point (VRAP) as the connectivity scheme.

- You must download the most recent patches for the software release running on the MDM servers.

- The VSP and TDM physical interfaces must be already applied and activated. For more information, see "Addition of new VSP and TDM physical interface (UA-IP)" (page 203).

Adding a new TDM trunk interface
Procedure steps
1   For a new PRI trunk on a VSP3 FP, first create a PRI trunk profile. Apply the *TT-PRIProfile-2pGeMmSrVsp3* template for each of the VSP3s that contain PRI trunks, as specified in the Network Engineering Specification Book.

2   For a new PRI trunk on a new VSP3-o FP, first create a PRI trunk profile. Apply the *TT-PRIProfile-2pOC3ChSmIrVsp3-o* template for each of the VSP3s that contain PRI trunks, as specified in the Network Engineering Specification Book.

3   For a new PTS trunk on a VSP3-o FP, first create a PTS trunk profile. Apply the *TT-PTSProfile-2pOC3ChSmIrVsp3-o* template for each of the

VSP3-os that contain PTS trunks, as specified in the Network Engineering Specification Book.

4   Activate the changes.

5   For a new TDM port, first configure the LAPS STS component. Apply the *TT-LapsSts-TDM* template for each of the TDM ports (4pOC3TDM or VSP3-o) as specified in the Network Engineering Specification Book. You can click Multiple creations to create all the STS components under the LAPS for a port pair.

   Note: You cannot activate the changes until you add at least one Trunk under each STS you create.

6   For each ISUP trunk on VSP3, apply the *TT-ISUPTrunk-2pGeMmSrVsp3* template. Repeat this step for each ISUP trunk on VSP3, as specified in the Network Engineering Specification Book.

7   For each PRI trunk on VSP3, apply the *TT-PRITrunk-2pGeMmSrVsp3* template. Repeat this step for each PRI trunk on VSP3, as specified in the Network Engineering Specification Book.

8   For each ISUP trunk on VSP3-o, apply the *TT-ISUPTrunk-2pOC3ChSmIrVsp3-o* template. Repeat this step for each ISUP trunk on VSP3-o, as specified in the Network Engineering Specification Book.

9   For each PRI trunk on VSP3-o, apply the *TT-PRITrunk-2pOC3ChSmIrVsp3-o* template. Repeat this step for each PRI trunk on VSP3-o, as specified in the Network Engineering Specification Book.

10   For each PTS trunk on VSP3-o, apply the *TT-PTSTrunk-2pOC3ChSmIrVsp3-o* template. Repeat this step for each PTS trunk on VSP3-o, as specified in the Network Engineering Specification Book.

11   Using the MDM Nodal Provisioning tool or Command Console, activate and commit the new service data.

12   Using the MDM Network Model Editor tool, choose either the FNMOD or GEN icon to represent the new MG9000 in the network and link it to the specific pair of ports selected on the Multiservice Switch 15000 node. The FNMOD supports one link that terminates on the MG9000 while GEN supports multiple links. For more information on creating and editing links in the Network Model, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

13   Link the newly created MG9000 icon to the Multiservice Switch 15000 node in the Network Model. For more information, see 241-6001-015 *Nortel Multiservice Data Manager Network Model Administration*.

Appendix A
Time-of-day updates for seasonal time changes

Seasonal time changes, such as the change from Standard Time to Daylight Saving Time (DST) or back again, require that the time kept by the Nortel Multiservice Switch ATM Core and Packet Core networks be updated using the procedure documented here. Typically in North America, seasonal time changes occur at approximately 2:00 AM on a Sunday in the spring and fall.

- "Prerequisites to updating the time of day for seasonal time changes" (page 210)

- "Updating the time of day for seasonal time changes task flow" (page 211)

- "Updating the time of day for seasonal time changes" (page 212)
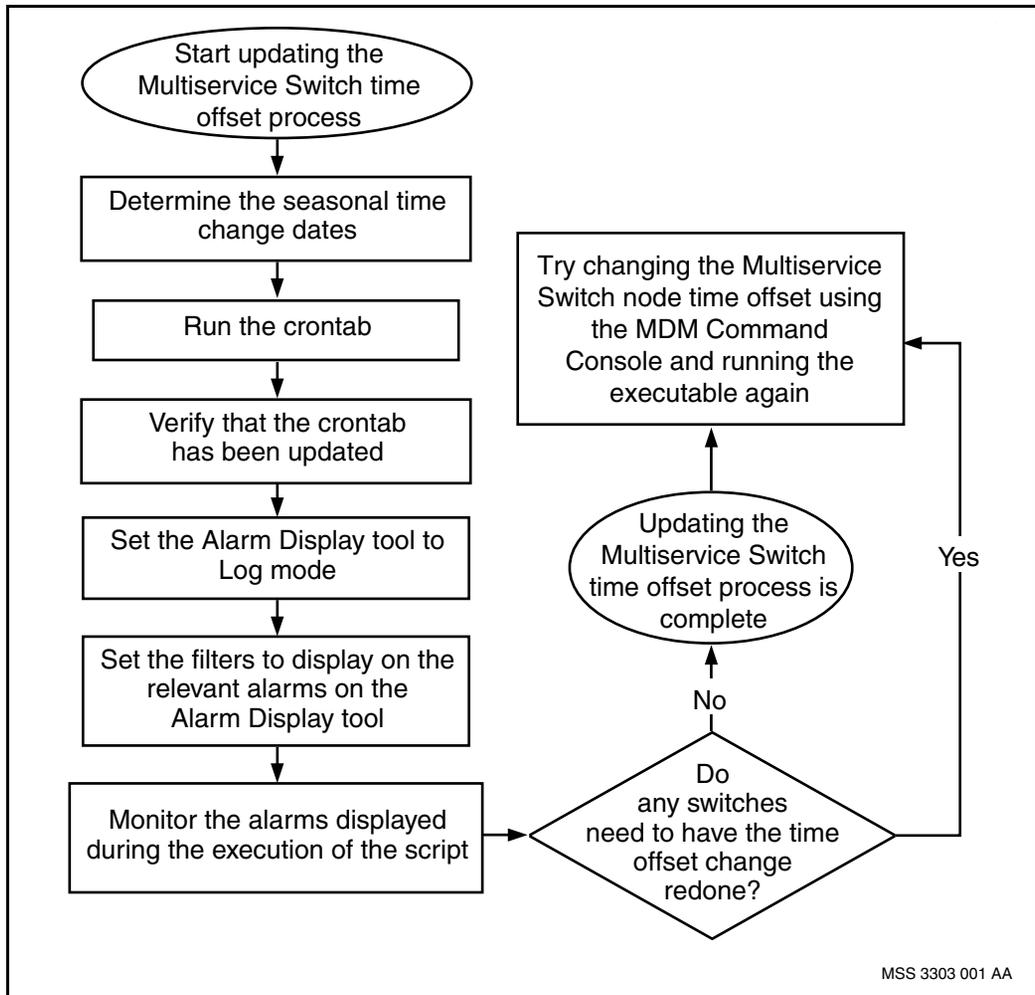
- "Monitoring the script" (page 217)

Prerequisites to updating the time of day for seasonal time changes

- Nortel Multiservice Switch ATM Core network needs to use a supported version of the Network Time Protocol (NTP) to synchronize the network time of day.

- Ensure that the ppautopatch script is not currently running and that you have inhibited the ppautopatch script from running at its scheduled time if it has been scheduled to run during the time planned for tod changes. See "Controlling the auto-patch process" (page 146).

- All Nortel MDM servers and Multiservice Switch nodes must be configured according to the standard configuration and recommendations specified in the documentation.

- MDM servers need to be configured with a valid time zone that has an enabled seasonal time changeover capability. Such a configuration ensures that the server's local time will handle the time change automatically, using the standard Solaris-based mechanism.

- All MDM servers and Multiservice Switch nodes within a region need to belong to the same time zone.

- The script needs to be installed on both MDM servers. Installing the script on both servers provides redundancy in case one of the servers is unavailable while the script is executing. If you are installing the script on more than one server, Nortel recommends leaving an interval of one minute before running the script on each server. The exception to this rule is MDM servers running as client-servers. MDM client-servers do not require the script to be installed.

- During the execution of the script, no configuration or operational tasks can run on the Multiservice Switch nodes or MDM servers. For example, there should not be a software migration nor disk cleanup running while the script is executing.

- This procedure needs to be repeated on a regional-basis in order to ensure all the MDM servers and Multiservice Switch nodes are updated.

Updating the time of day for seasonal time changes task flow

This task flow displays the sequence of tasks you need to perform to update the time-of-day on Nortel Multiservice Switch nodes for seasonal time changes. To link to any task, go to "Task flow navigation" (page 212).

Figure 23
Updating the time of day for seasonal time changes task flow

Task flow navigation

Updating the time of day for seasonal time changes

Nortel recommends that a System Administrator ("root") perform the procedures that comprises this task.

Prerequisites

Prior to executing the script, perform the following recommended steps to ensure no system surveillance outage occurs:

- Start the nmstool application and configure it to be administering the session servers. If the system administrator is remotely accessing the system the correct settings for the display variables must be met. (Where would the user find the correct display variable settings?)

- Enable Log mode in the Alarm Display tool and make the alarms for all nodes in the region viewable by removing all filters.

- Verify that the seasonal time change has occurred in the region in question. Typically in North America, seasonal time changes occur at approximately 2:00 AM on a Sunday in the spring and fall.

Have the following information available before executing the script:

- The new offset value for the *todchangeover* attribute. For example, -300 is Eastern Standard Time (5 hours earlier than UTC) and -240 is Eastern Daylight saving time (4 hours earlier than UTC).

- The name of the HGDS group to be specified in the procedure. This information is only needed if you are not using the default HDGS group name.

- A valid Nortel Multiservice Switch user ID and password with an impact-level of at least service is needed for MDM group authentication.

Configuration

Configuration needs to be performed annually per server.

1   Determine the dates of the seasonal time change.

For example, during the fall of 2002, October 27th was the date of the seasonal time change and Nortel recommended running the script at 2:01 AM. During the spring of 2003, April 6th was the date of the seasonal time change and Nortel recommended running the script at 3:01 AM. On each subsequent MDM server upon which the script is run, add one minute to the time when you set it to begin running originally.

2   Run the crontab editor (crontab -e) to edit the crontab entry under your administration userid:

```
<minute hour day month> * /todchangover.script <new
offset value> -auth <Passport group> <Passport userid
for groupname> <Passport password for groupname>
```

Note: This step needs to be repeated annually. Nortel recommends that you program the time change each year on January 1st for both the spring and fall time-of-day change.

For an example of the command used in this step complete with sample values that reset the time offset for the spring and fall seasonal change, see "Example steps" (page 215).

3   Verify the crontab has been updated by listing the contents of the cron file:

```
more /var/spool/cron/crontabs/root
```

4   Log out of the MDM server.

5   Repeat step 1 through step 4 on the redundant MDM server. Configuring both servers provides redundancy in case the primary server is not available during the time changeover period specified in the command in step 2. Once you have completed these steps on the second server, configuration is complete.

Execution

Execution needs to be performed twice annually.

1   Log on to a MDM server just prior to the seasonal time changeover.

2   Select Log mode from the nmstool set menu to set the GUI of the Alarm Display tool. Use this GUI to monitor the execution of the script.

>   *Note:* For more information about enabling Log mode in the Alarm Display tool, see 241-6001-011 *Nortel Multiservice Data Manager Fault Management Tools*.

3   Set the filters for the 70150001 and 301007* series of alarm messages to display using the Alarm Display tool. You can follow the progress of the todchangeover script by viewing the node time change alarms (70150001) and todchangeover script alarms (301007* series).

4   The 70150001 alarm is the alarm you want to see because it indicates that the node's time offset has changed by more than 100 seconds. You should expect one of these alarms for each node in the group specified on the script command line (see step 2). You will not see the 70150001 alarm when the script executes on the second MDM server if the script running on the first server was successful in changing the node time offset. The 301007* alarm indicates that some sort of error occurred during the execution of the script and intervention by an operator is required to complete the time offset change.

5   Begin monitoring the alarms produced by the script just prior to the seasonal time change. For more information about monitoring the alarms generated by the script, see "Monitoring the script" (page 217).

6   Ensure that the script has successfully executed without any unexpected errors by reviewing the content of the `/tmp/tod_output` file.

>   *Note 1:* The records in this temporary file are appended to every time the script or executable is run; however, they are overwritten following a server reboot. To save your records prior to a reboot, create a new non-temporary file for storing them.

>   *Note 2:* During the time changeover period during which the server changes its time offset until the node changes its time offset (in the fall, 62 minutes from 1:59 DST to 2:01 EST and in the spring, 1 minute from 2:00 EST to 3:01 DST), Performance Management Stream Processor (PMSP) data is lost. PMSP data will be accurate again at the next 5 or 30 minute interval after the interval featuring the time changeover (in the fall, the 5-minute data from 2:10 EST and 30-minute data from 3:00 EST and in the spring, the 5-minute data from 3:10 DST and 30-minute data from 4:00 DST).

Example steps

The following steps are examples of Nortel MDM server cron entry for changing the time offset on a node as in the command appearing in step 2 of the "Updating the time of day for seasonal time changes" (page 212). The sample variable values used in these example steps are based on the seasonal time changes mentioned in step 1 of "Updating the time of day for seasonal time changes" (page 212).

1 Set the values for making the time-of-day change occurring at 2:01 AM on October 27th, 2002 for the Eastern time zone:

```
1 2 27 10 * /todchangeover.script -300 -auth ACCESS
fred samsam
```

2 Set the values for making the time-of-day change occurring at 3:01 AM on April 6th, 2003 for the Eastern time zone:

```
1 3 6 4 * /todchangeover.script -240 -auth ACCESS fred
samsam
```

Note 1: These steps are only an example. The values you use in your configuration might differ from the values shown here. Consult your network engineer to ensure the values you are using are accurate for your configuration.

Note 2: Remember that for additional MDM servers the times specified for running the script should be one minute later.

Variable values

Variable	Value
<minute hour day month>	The exact time, down to the minute, when you want to set the change of the time offset value to occur. It is not necessary to use more digits than necessary for each of these values. For example, represent April with `4` and October with `10`.
<new offset value>	The new time offset value applied to Multiservice Switch nodes. This value is the time in minutes that the node is being offset from UTC. The range of possible is -720 to 720. There is no default value.

Variable	Value
<Passport group>	The name of the HGDS group to be used to communicate with the nodes.
<Passport password for groupname>	The node password for the user ID specified in the command
<Passport userid for groupname>	The node user ID for the group specified in the command.

Monitoring the script

The script executes after the time you specified in step 2 of "Updating the time of day for seasonal time changes" (page 212) is passed. This section documents what happens when the script runs. Steps are used in order to break the information down into small units, however, the script runs automatically without input from the system operator. The script provides two types of output, one to a log file, `/tmp/tod_output`, and the other to the Alarm Display tool. For important events occurring during the execution of the script, both types of outputs are shown below in "Script process" (page 218).

- "Prerequisites" (page 217)
- "Script process" (page 218)

Prerequisites

Prior to executing the script, perform the following recommended steps to ensure there is no system surveillance outage:

- In addition to normal operations, open windows for the display of the alarms generated by the execution of the script prior to the 2:00 AM seasonal time change.

- Enable Log mode in the Alarm Display tool and set the filters for the 7015 0001 alarm and the 301007* series of alarms.

Script process

1   The script begins executing.

Figure 24
Sample log output

```
                    ... Welcome to the Time Of Day change tool. This
                    tool is used to change

                    ... Passports time offset value


                    ... Note that this tool should be run after MDM has
                    completed its time

... change to/from Daylight Savings Time.


on error

                    Thu Sep 5 15:27:27 EDT 2002

                    The UTC time offset value must be specified.
```

Figure 25
Sample Display Alarm tool output

Nothing unless an input parameter error

On error

Warning MSG 30100703 02-07-24 15:27:27 NMS/FT1400-2 APPL/TODCHANGEOVER

ID-FFFFC929 Type: environmental CAUSE:unexpectedInfo

NMS/ft1400-2 TOD script failed to execute due to bad parameters

2   The todchangeover script authenticates the node's group. In the example used here, the group is ACCESS (seen in the output below as "group ACC") as specified in the command line of step 2 of "Updating the time of day for seasonal time changes" (page 212). Successful authentication results in the display of the following messages.

Figure 26
Sample log output

```
No message if authentication successful

on error

Unable to connect to group ACC. Exiting. Operation
failed:

CM: error - APPLICATION_ERROR 1136 Fdtr - Invalid
group requested ACC
```

Figure 27
Sample Display Alarm tool output

No message if authentication is successful

On error

Warning MSG 30100700 02-07-24 15:27:27 NMS/FT1400-2 GROUP/ACC

ID-FFFFC929 Type: security CAUSE:authenticationFailure

3   The todchangeover script displays the current time offset value for each node in the group. If the script is successful, you will see the actual time offset value for each node within the log. If the script is unable to display an time offset value for a node, an alarm is sent to the alarm browser.

Figure 28
Sample log output

```
                   ... Displaying Passports with their current offset.

                   ... If a Passport is missing or showing the wrong
                   offset it will need to be manually updated or a
                   different group should be selected. Use the Command
                   Console tool and use the Passport command 'set time
                   offset nnnn' to correct.

                   CHRISPC - time offset = Unable to query the time
                   offset

                   SUCCESSION_1 - time offset = -240 minutes
```

Figure 29
Sample Display Alarm tool output

```
                   WARNING MSG 30110701 02-09-05 15:27:27 NMS/FT1400-
                   2 PP/CHRISPC

                   ID: FFFFF8A0 TYPE: communications CAUSE: congestion

                   CO: TOD script failed to get response from Passport
```

4   The todchangeover script changes the time offset value on each node. If the script is unable to set the new time offset value, an alarm is sent to the alarm browser.

Figure 30
Sample log output

```
                   ... About to change the Passport time to the new
                   offset

                   on error
```

Figure 31
Sample Display Alarm tool output

```
No message if authentication is successful

On error

                WARNING MSG 30110702 02-09-05 15:27:27 NMS/FT1400-
                2 PP/CHRISPC

                ID: FFFFF8A0 TYPE: communications CAUSE:
```

5   The todchangeover script displays the results of the setting of the new time offset value. If the time offset value has been successfully changed, you will see the actual offset value of the node within the log. If the script is unable to display an offset time value, an alarm is sent to the alarm browser.

Figure 32
Sample log output

```
                ... Displaying Passports with their current offset.

                ... If a Passport is missing or showing the wrong
                offset it will need to be manually updated or a
                different group should be selected. Use the Command
                Console tool and use the Passport command 'set time
                offset <new_offset>' to correct.

                CHRISPC - time offset = Unable to query the time
                offset

                SUCCESSION_1 - time offset = -240 minutes
```

Figure 33
Sample Display Alarm tool output

```
                WARNING MSG 30110701 02-09-05 15:27:27 NMS/FT1400-
                2 PP/CHRISPC

                ID: FFFFF8A0 TYPE: communications CAUSE: congestion

                CO: TOD script failed to get response from Passport
```

6 The script terminates. The `/tmp/tod_output` log file should be reviewed to ensure that all the nodes had their time offset value changed. The following message indicating that the process is complete is added to the log.

Figure 34
Sample log output

```
                ... Passport time offset change macro completed.
```

Nortel Multiservice Switch 15000, Media Gateway
15000 and Multiservice Data Manager in Carrier Voice
over IP Networks

Configuration Overview

PT-AAL1/UA-AAL1/UA-IP

(I)SN08 and up

NORTEL