Tech Tip
Contivity Secure IP Services Gateway

Configuring Branch Office Tunnel between a Contivity and a BayRS router

Contents

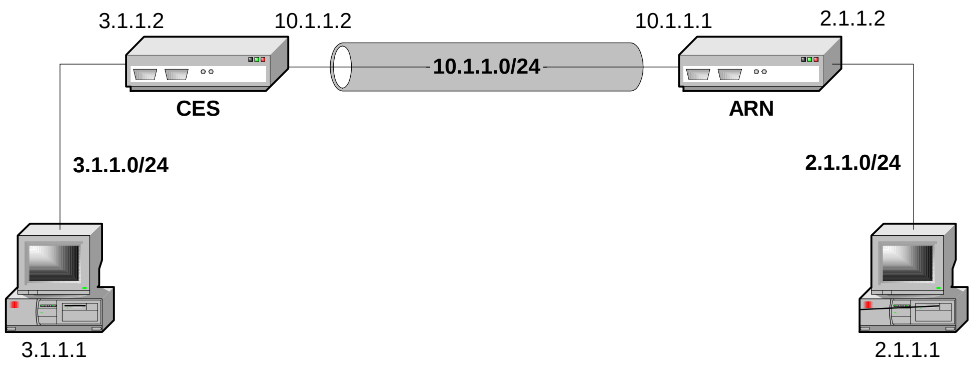
Overview

This technical tip illustrates a sample branch office tunnel configuration between Contivity Secure IP Services Gateway and BayRS router.

Sample Configuration

Setup

In this sample configuration, a Contivity 1010 running V04_85.160 code and an ARN running 15.5.0.0 code were used in the following configuration:

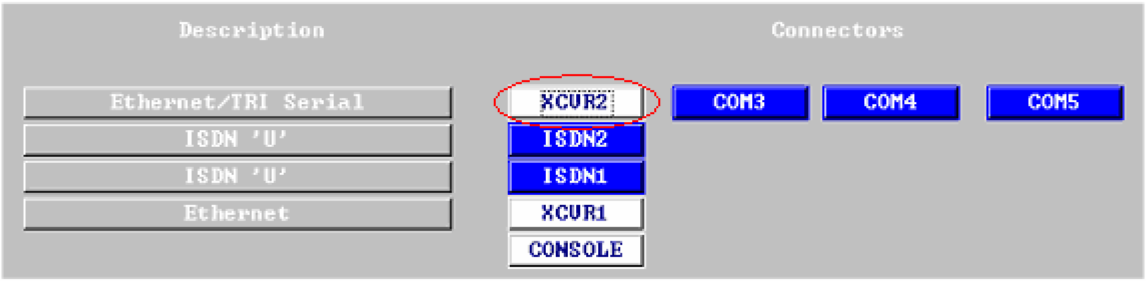


CES – code version V04_85.160, Private IP 3.1.1.2, Mgmt IP 3.1.1.254, Public IP 10.1.1.2
ARN – code version V15.5.0.0, Private IP 2.1.1.2, Public IP 10.1.1.1

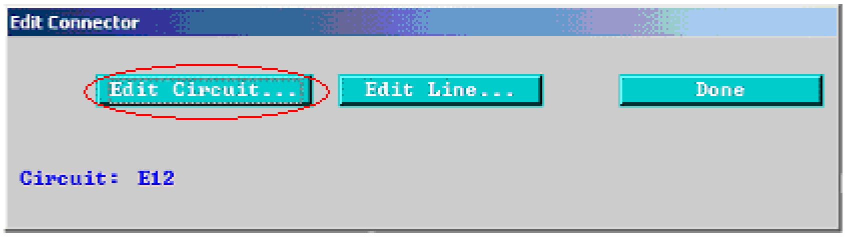
Configuring Branch Office Tunnel between a Contivity and a BayRS router

Configuring ARN

1. First, both IPSec and IKE must be loaded on the public side Ethernet interface of the ARN. Click on corresponding Ethernet connector:



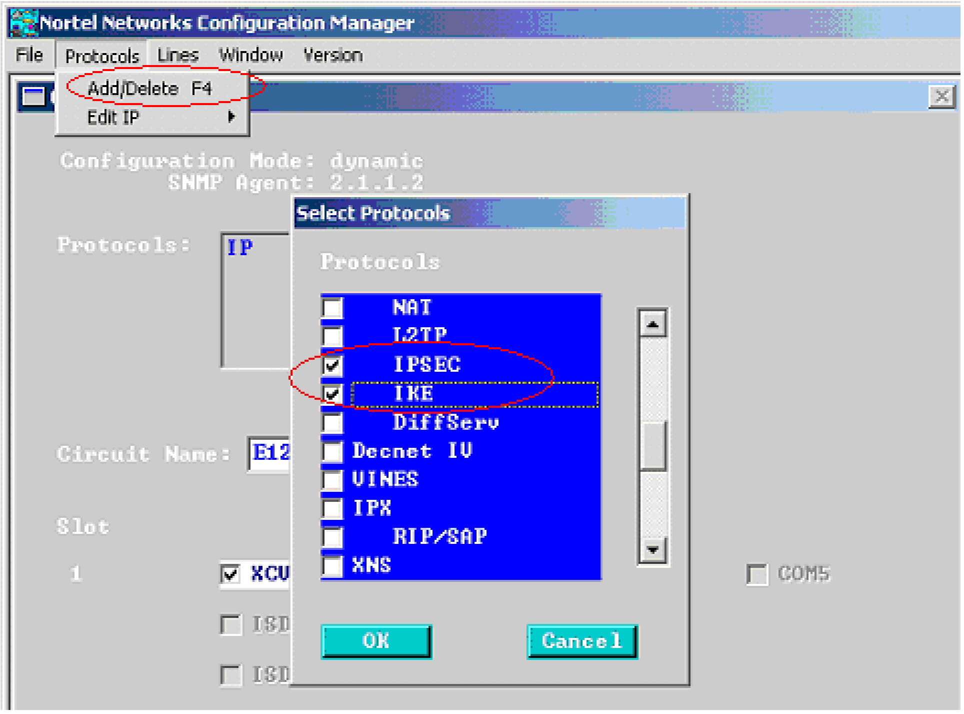
2. Click on **Edit Circuit** in the window that pops up:



Circuit: E12

Configuring Branch Office Tunnel between a Contivity and a BayRS router

3. In the **Protocols** drop down menu, select **Add/Delete**. Check the boxes next to **IPSEC** and **IKE** on the **Select Protocols** window that appears and then click **OK**:



Configuration Mode: dynamic
SNMP Agent: 2.1.1.2

Protocols: IP

Circuit Name: E12

Slot

1 ☑ XCU

□ ISD

□ ISD

□ COM5

□ NAT
□ L2TP
☑ IPSEC
☑ IKE
□ DiffServ
□ Decnet IV
□ VINES
□ IPX
□ RIP/SAP
□ XNS

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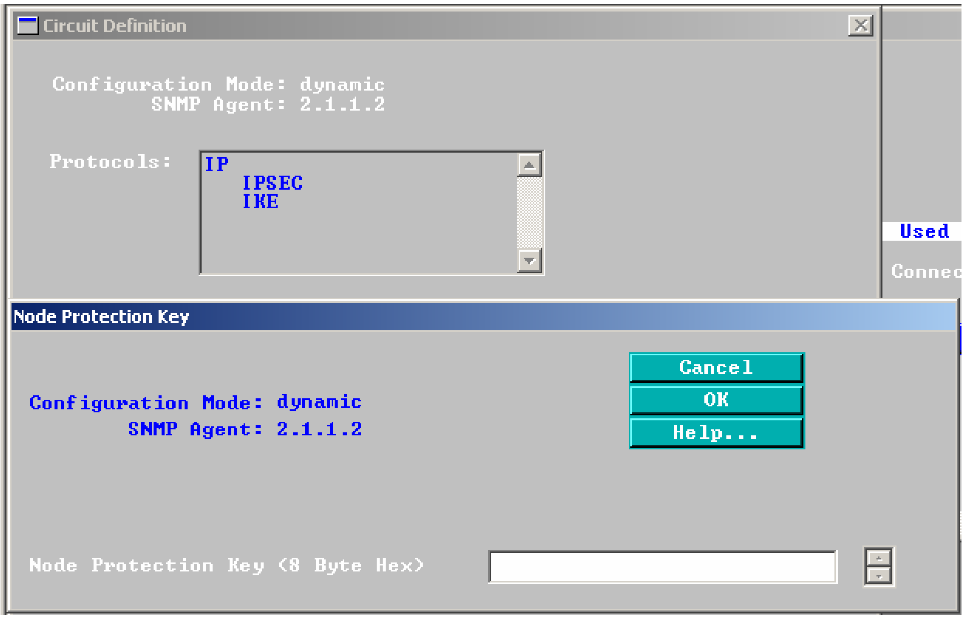
4. Click **Done** to exit out of the next screen that appears. Next, from the drop down menus go to **Protocols | Edit IP | IKE**. Enter the **Node Protection Key** (NPK) configured on the router and click **OK**. **Note**: The NPK is configured from the secure shell in the console.



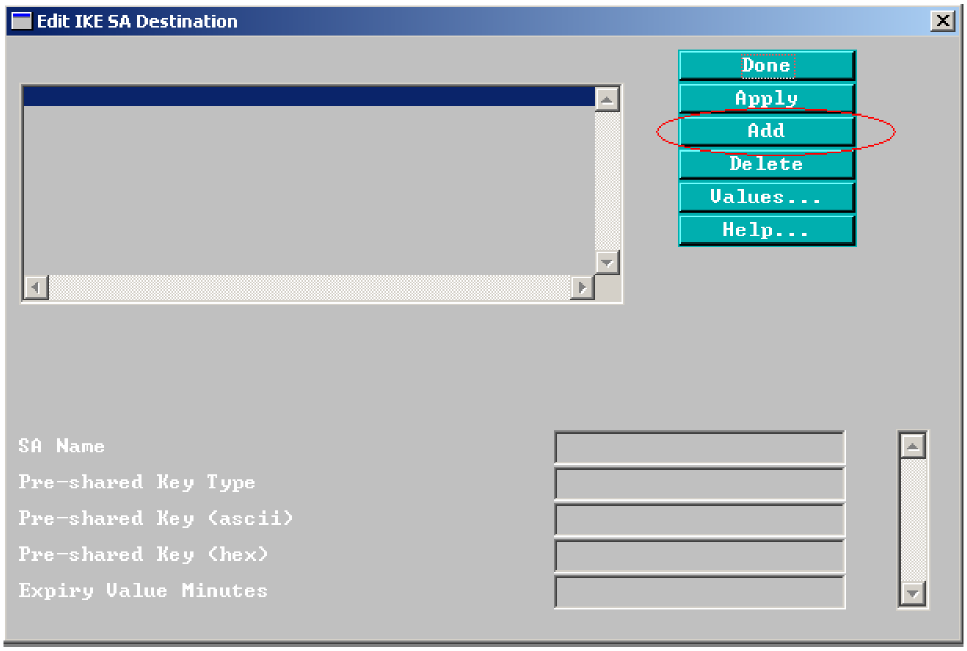
Configuration Mode: dynamic
SNMP Agent: 2.1.1.2

Protocols: IP
IPSEC
IKE

Configuration Mode: dynamic
SNMP Agent: 2.1.1.2

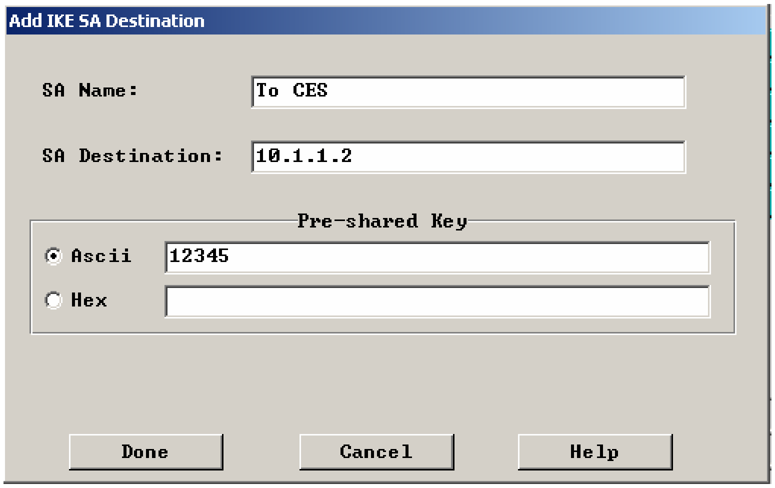
Node Protection Key (8 Byte Hex)

5. The **Edit IKE SA Destination** screen will appear. Click **Add**:



SA Name
Pre-shared Key Type
Pre-shared Key (ascii)
Pre-shared Key (hex)
Expiry Value Minutes

6. This process will define the endpoint address and pre-shared key for the Branch Office Tunnel. Configure a Name (For example, To CES), the Destination IP address of the endpoint of the tunnel (CES public IP address), and either an **Ascii** or **Hex Pre-shared Key**. This Pre-shared Key must match the key configured on the CES. When finished, click **Done**:



Add IKE SA Destination

SA Name: To CES

SA Destination: 10.1.1.2

Pre-shared Key

● Ascii 12345

○ Hex

7. Click **Done** on the **Edit IKE SA Destination** screen.

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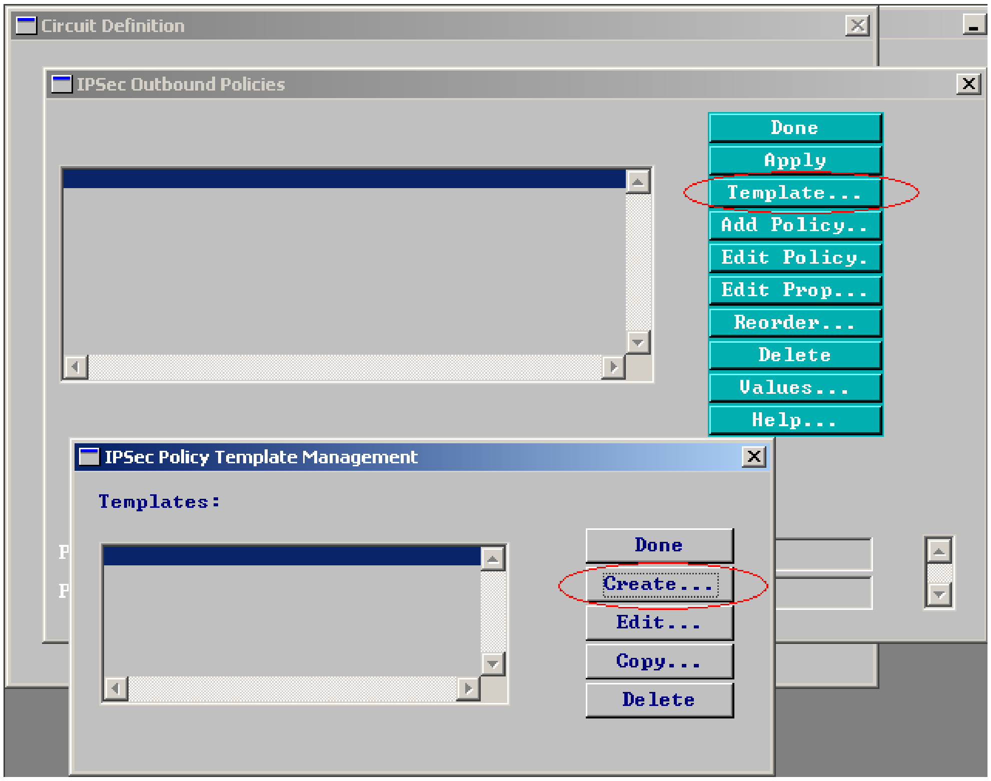
8. From the drop down menu go to **Protocols | Edit IP | IP Security | Outbound Policies**. First we need to make a template to define the IPSec policy, so click on the **Template** button, and then **Create** on the **IPSec Policy Template Management** screen:



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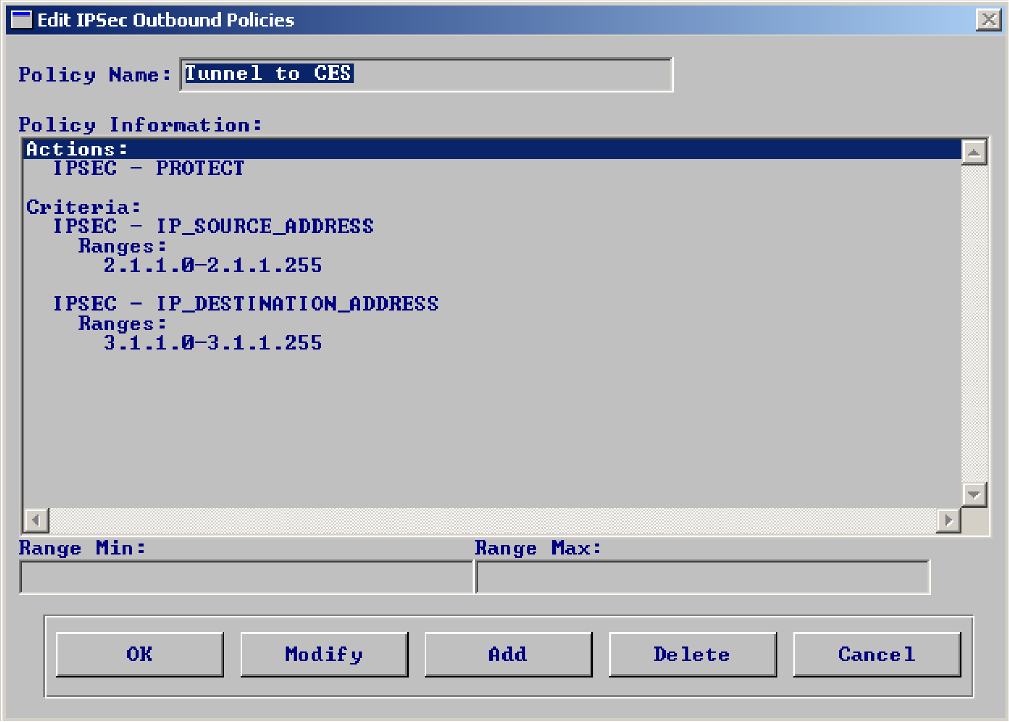
9. Using the drop-down menus, create a policy containing **Action->Protect**, and **Criteria->Source & Destination IP** address ranges corresponding to the Local (ARN local network, 2.1.1.0/24 in this case) and Remote (CES local network, 3.1.1.0/24 in this case) networks respectively. This is an example of what the template should look like when done:



Edit IPSec Outbound Policies

Policy Name: Tunnel to CES

Policy Information:

```
Actions:
  IPSEC - PROTECT

Criteria:
  IPSEC - IP_SOURCE_ADDRESS
    Ranges:
      2.1.1.0-2.1.1.255

  IPSEC - IP_DESTINATION_ADDRESS
    Ranges:
      3.1.1.0-3.1.1.255
```

Range Min:

Range Max:

**** NOTE **** It is important to include the network and broadcast addresses in the range, i.e. x.x.x.0 and x.x.x.255 for a 24 bit subnet.

10. Click **Done**, and then **Done** again on the previous screen to return to the **IPSec Outbound Policies screen**.

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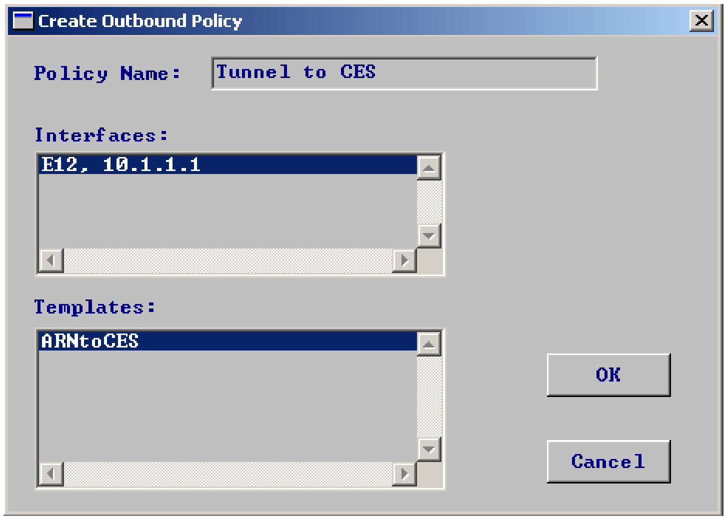
11. Click **Add Policy**. Supply the policy a name, making sure the correct interface and the template just created are highlighted, and then click **OK**:



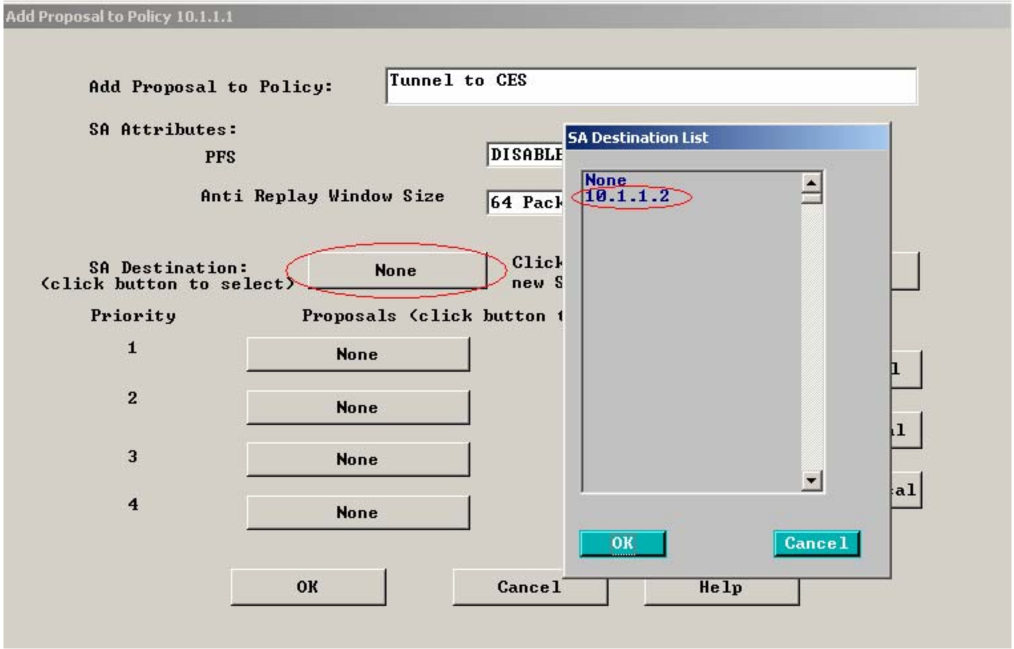
Create Outbound Policy

Policy Name: Tunnel to CES

Interfaces:
E12, 10.1.1.1

Templates:
ARNtoCES

12. On the next screen click **Automated SA**, which indicates the tunnel will use IKE for the key exchange. Click the button next to **SA Destination** and select the entry for the CES. This endpoint was defined in the IKE configuration process:



Add Proposal to Policy 10.1.1.1

Add Proposal to Policy: Tunnel to CES

SA Attributes:
PFS DISABLE
Anti Replay Window Size 64 Pack

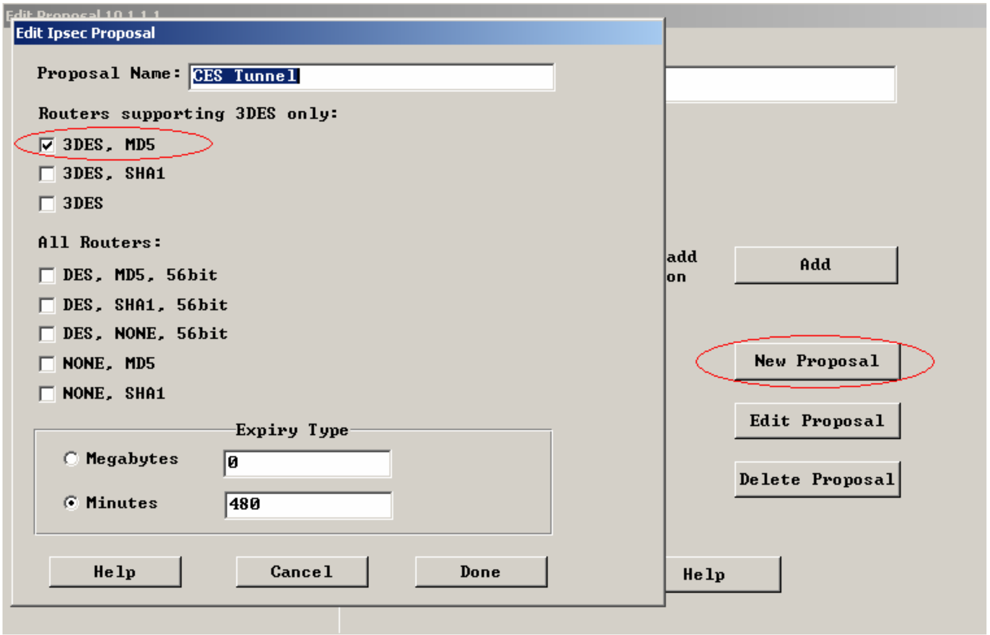
SA Destination:
(click button to select) None
Click
new S

Priority Proposals (click button t
1 None
2 None
3 None
4 None

SA Destination List
None
10.1.1.2

Configuring Branch Office Tunnel between a Contivity and a BayRS router

13. Click the **New Proposal** button to set up a proposal list defining the encryption/integrity capabilities of the CES. The CES and the ARN need to have at least one option in common in order to establish a tunnel. For simplicity, only 3DES/MD5 is selected in this example, however, as many selections can be checked as needed. Click **Done** when finished:



Edit Ipsec Proposal

Proposal Name: CES Tunnel

Routers supporting 3DES only:

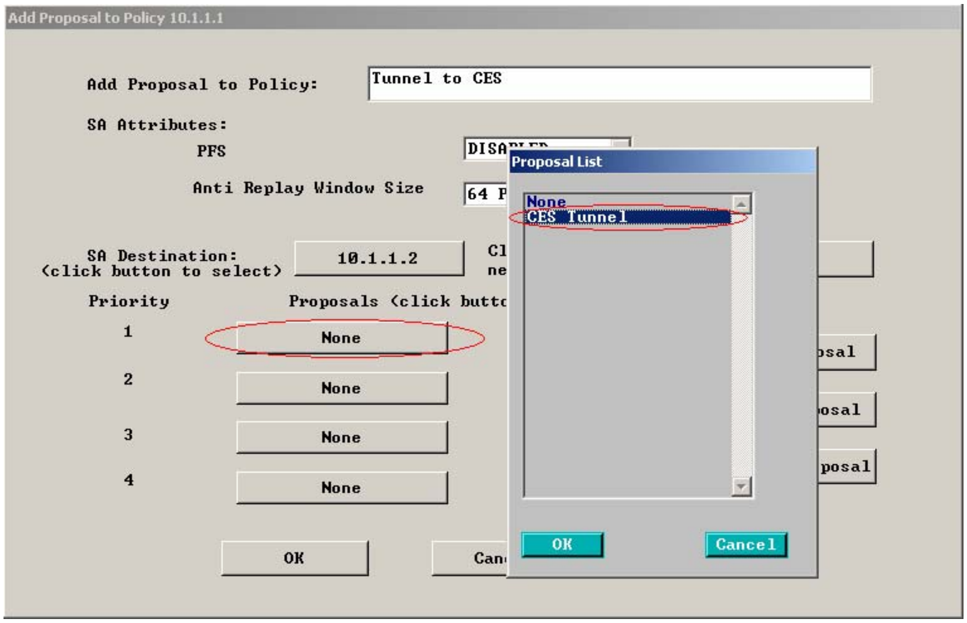
☑ 3DES, MD5
☐ 3DES, SHA1
☐ 3DES

All Routers:

☐ DES, MD5, 56bit
☐ DES, SHA1, 56bit
☐ DES, NONE, 56bit
☐ NONE, MD5
☐ NONE, SHA1

Expiry Type
○ Megabytes 0
● Minutes 480

14. Click the button labeled **None** next to **Priority 1**, select the proposal just created and click **OK**:



Add Proposal to Policy 10.1.1.1

Add Proposal to Policy: Tunnel to CES

SA Attributes:
PFS DISA
Anti Replay Window Size 64 P

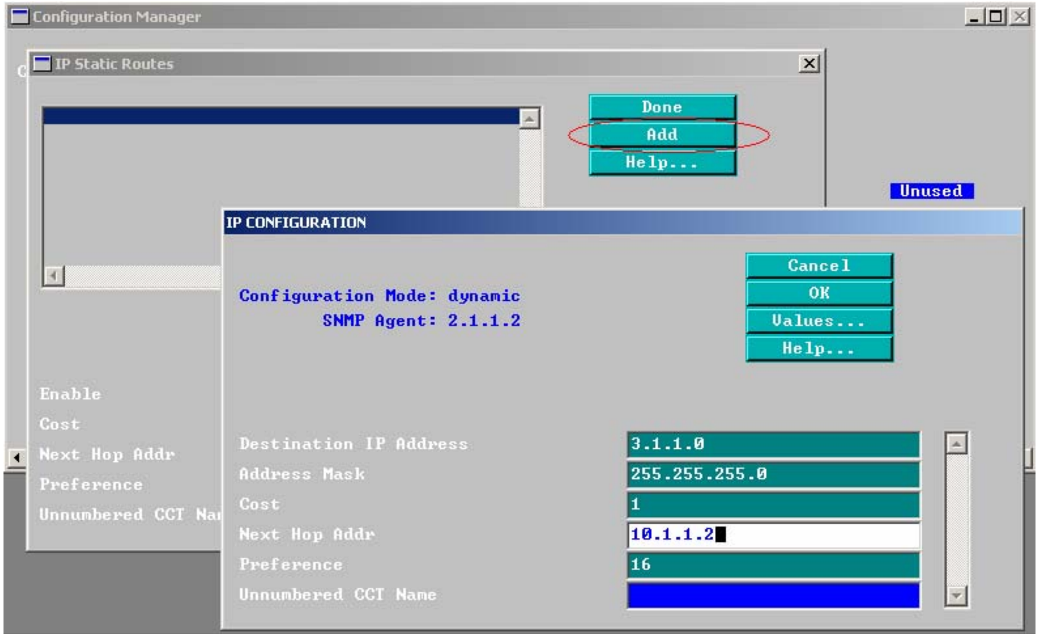
SA Destination: 10.1.1.2
(click button to select)

Priority Proposals (click butt
1 None
2 None
3 None
4 None

Proposal List
None
CES Tunnel

Configuring Branch Office Tunnel between a Contivity and a BayRS router

15. The configuration for the Branch Office Tunnel is complete at this point.
Simply click **OK** and **Done** until you are back on the front screen. The last step is to configure a static route directing traffic for the Remote network (3.1.1.0/24 in this case) out the public interface. Using the drop down menus, go to **Protocols | IP | Static Routes** and click **Add**. Enter the **Destination IP Address** (remote network), **Address Mask**, and **Next Hop Address** so that this traffic will be directed out the public interface. An entry will need to be added for each remote network, or at least enough entries to cover every remote network:



Configuration Mode: dynamic
SNMP Agent: 2.1.1.2

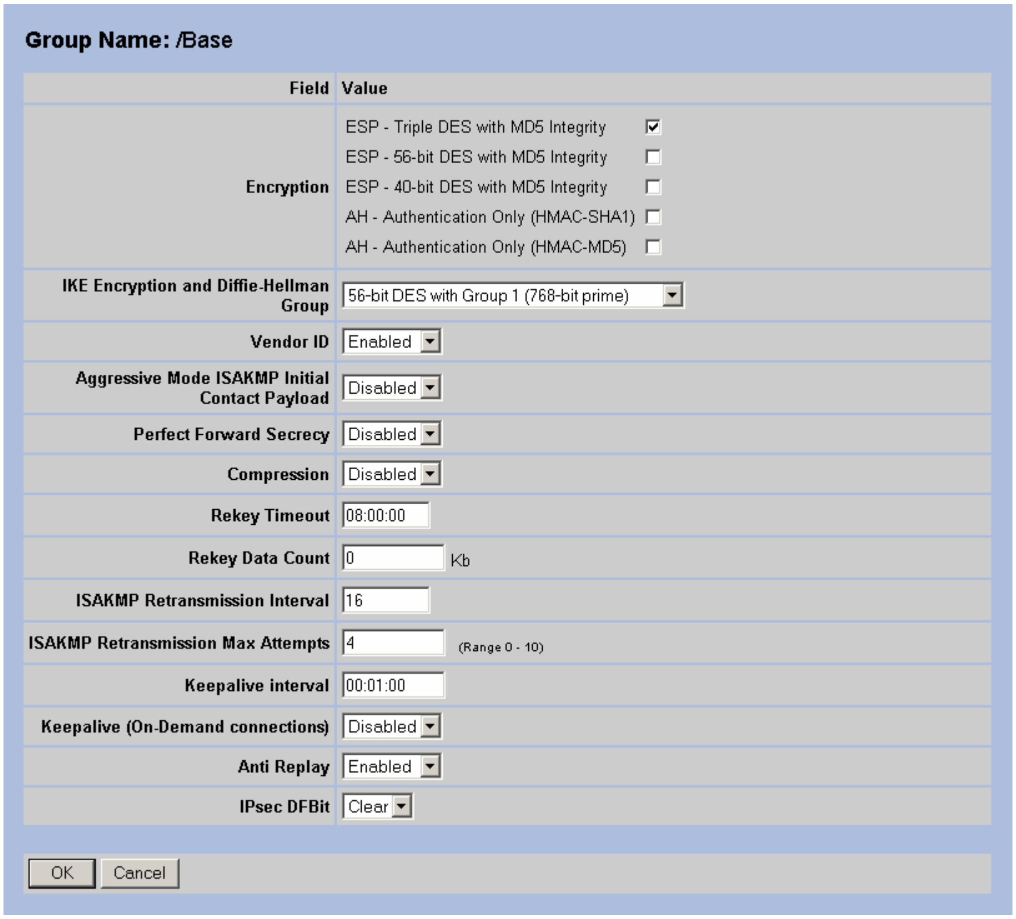
Destination IP Address	3.1.1.0
Address Mask	255.255.255.0
Cost	1
Next Hop Addr	10.1.1.2
Preference	16
Unnumbered CCT Name	

Configuring CES

Branch Office Group IPSec Settings

Configure appropriate branch office group setting. Navigate **Profiles→Branch Office**, select appropriate **Group** and click **Configure** next to it, scroll down to the **IPSec** section and click **Configure** under it.

Encryption: A compatible setting must be selected on both the CES and Router. In this case, 3DES/MD5 is checked.
Diffie-Hellman Group: The BayRS router only supports 56-bit DES with Group 1 (768 bit prime). This option must be selected.
Perfect Forward Secrecy: This must match on both the CES and the Router
Compression: This should be disabled



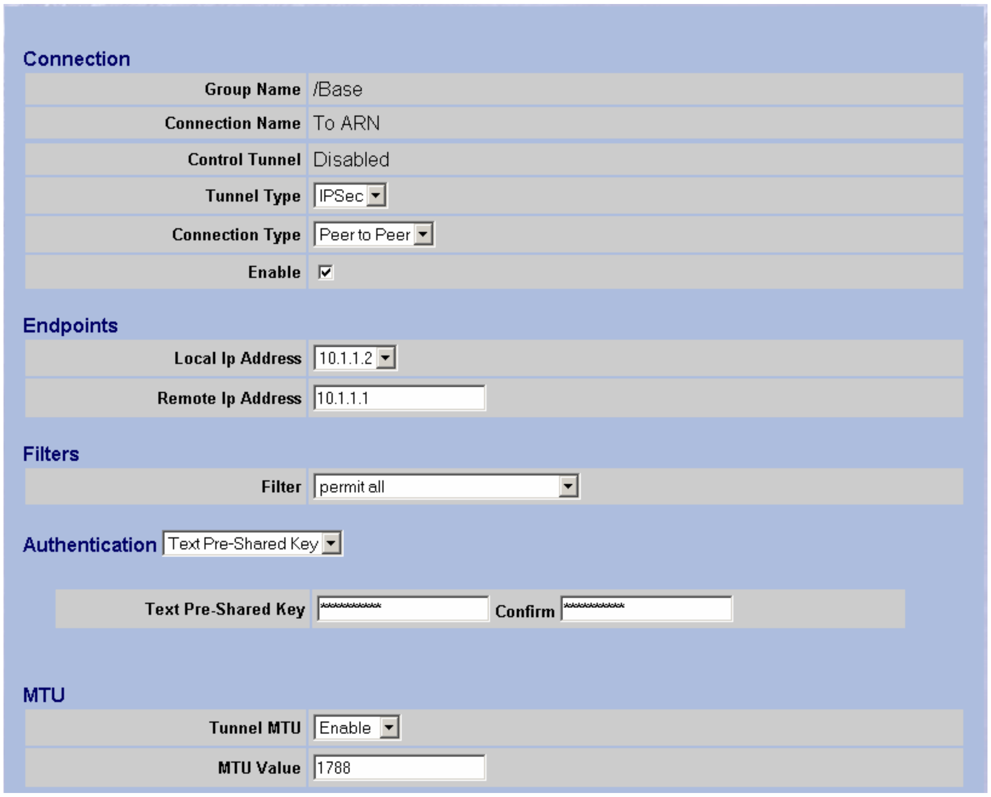
Group Name: /Base

Field	Value
Encryption	ESP - Triple DES with MD5 Integrity ☑ ESP - 56-bit DES with MD5 Integrity □ ESP - 40-bit DES with MD5 Integrity □ AH - Authentication Only (HMAC-SHA1) □ AH - Authentication Only (HMAC-MD5) □
IKE Encryption and Diffie-Hellman Group	56-bit DES with Group 1 (768-bit prime)
Vendor ID	Enabled
Aggressive Mode ISAKMP Initial Contact Payload	Disabled
Perfect Forward Secrecy	Disabled
Compression	Disabled
Rekey Timeout	08:00:00
Rekey Data Count	0 Kb
ISAKMP Retransmission Interval	16
ISAKMP Retransmission Max Attempts	4 (Range 0 - 10)
Keepalive interval	00:01:00
Keepalive (On-Demand connections)	Disabled
Anti Replay	Enabled
IPsec DFBit	Clear

Branch Office Connection Configuration

Configure branch office tunnel, navigate **Profiles→Branch Office**, select the configured in previous step **Group** and click **Add**.

Local Ip Address: This is the IP address of the CES public interface (10.1.1.2 in this case)
Remote Ip Address: This is the IP address of the ARN public interface (10.1.1.1)
Pre-Shared Key: Must match on both the CES and router. Both sides must use either **Text** (Ascii) or **Hex** and have the same Key configured.
Local & Remote Networks: Local network – CES private network (3.1.1.0/24 in this case), Remote network (ARN private network, 2.1.1.0/24 in this case).



Connection

Group Name	/Base
Connection Name	To ARN
Control Tunnel	Disabled
Tunnel Type	IPSec
Connection Type	Peer to Peer
Enable	☑

Endpoints

Local Ip Address	10.1.1.2
Remote Ip Address	10.1.1.1

Filters

Filter	permit all

Authentication Text Pre-Shared Key

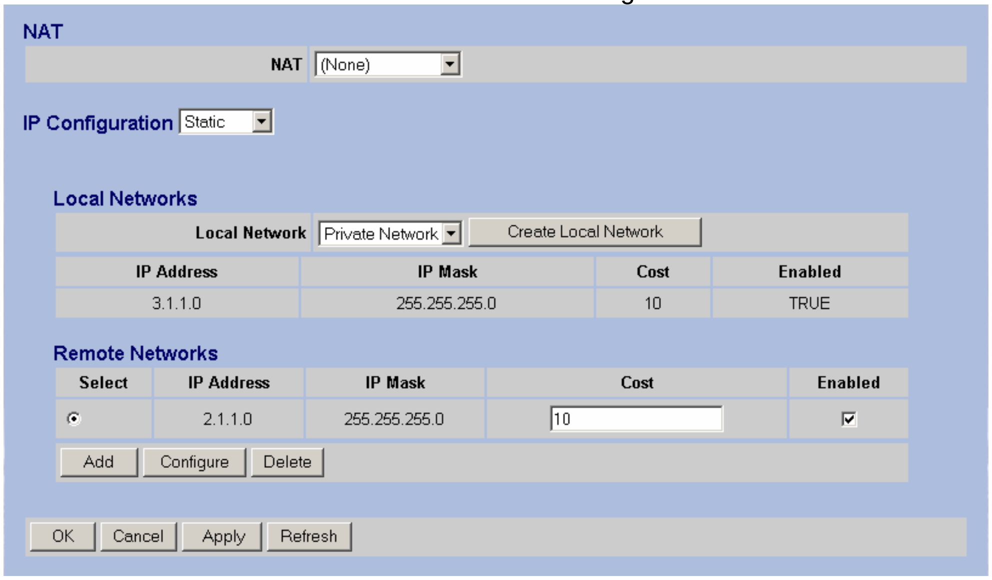
Text Pre-Shared Key	**********	Confirm	**********

MTU

Tunnel MTU	Enable
MTU Value	1788

Configuring Branch Office Tunnel between a Contivity and a BayRS router

Continuation of the Branch Tunnel Connection Configuration screen:



NAT

NAT	(None)

IP Configuration Static

Local Networks

Local Network	Private Network

IP Address	IP Mask	Cost	Enabled
3.1.1.0	255.255.255.0	10	TRUE

Remote Networks

Select	IP Address	IP Mask	Cost	Enabled
●	2.1.1.0	255.255.255.0	10	☑

Reviewing the BayRS Router event log

The log of the tunnel establishment on the ARN can be viewed from the TI (command line of console or telnet) by using "**log –ffwdit –eIKE –eIPSEC**". This is the log of a successful tunnel establishment when ARN initiates the connection:

```
#    1: 09/13/2004 15:51:21.257  TRACE    SLOT  1  IKE       Code:  35
IKE SA not found for IKE peer 10.1.1.2, interface 10.1.1.1,
beginning negotiation for new IKE SA

#    2: 09/13/2004 15:51:21.258  INFO     SLOT  1  IKE       Code:  20
Establishing IKE SA from 10.1.1.1 to 10.1.1.2,
using initiator role.

#    3: 09/13/2004 15:51:23.632  INFO     SLOT  1  IKE       Code: 115
Notification received: Source 10.1.1.2, Dest 10.1.1.1,
Message ID 0x0, SPI length: 16, SPI: 0,
Initial Contact

#    4: 09/13/2004 15:51:23.642  INFO     SLOT  1  IKE       Code:  21
IKE SA from 10.1.1.1 to 10.1.1.2 is up.
Cipher: 3DES, Hash: SHA1, Life Type: Minutes, Life Time: 480

#    5: 09/13/2004 15:51:23.643  INFO     SLOT  1  IKE       Code:  27
Establishing IPsec SA from 10.1.1.1 to 10.1.1.2 for policy 1
using initiator role, without perfect forward secrecy. Quick Mode ID
0x820be868.

#    6: 09/13/2004 15:51:23.818  INFO     SLOT  1  IKE       Code:  28
Quick Mode exchange, ID 0x820be868, from 10.1.1.1 to 10.1.1.2 is up.
Sending negotiated SA information for policy 1 to IPsec.
```

Below is the log of a successful tunnel establishment when the ARN responds to the connection:

```
#    1: 09/13/2004 15:59:16.715  INFO     SLOT  1  IKE        Code:  20
Establishing IKE SA from 10.1.1.1 to 10.1.1.2,
using responder role.

#    2: 09/13/2004 15:59:16.733  INFO     SLOT  1  IKE        Code: 117
Invalid Payload Type: Source 10.1.1.2, Dest 10.1.1.1,
Message ID 0x0, SPI length: 0, SPI: 0

#    3: 09/13/2004 15:59:16.735  INFO     SLOT  1  IKE        Code:  22
IKE SA not established from 10.1.1.1 to 10.1.1.2

#    4: 09/13/2004 15:59:16.739  INFO     SLOT  1  IKE        Code:  20
Establishing IKE SA from 10.1.1.1 to 10.1.1.2,
using responder role.

#    5: 09/13/2004 15:59:17.873  INFO     SLOT  1  IKE        Code: 115
```

```
Notification received: Source 10.1.1.2, Dest 10.1.1.1,
Message ID 0x0, SPI length: 16, SPI: 0,
Initial Contact

#    6: 09/13/2004 15:59:17.907  INFO     SLOT  1  IKE       Code:  21
IKE SA from 10.1.1.1 to 10.1.1.2 is up.
Cipher: DES, Hash: SHA1, Life Type: Minutes, Life Time: 480

#    7: 09/13/2004 15:59:18.021  INFO     SLOT  1  IKE       Code:  27
Establishing IPsec SA from 10.1.1.1 to 10.1.1.2
using responder role, without perfect forward secrecy. Quick Mode ID
0x3f4a938e.

#    8: 09/13/2004 15:59:18.170  INFO     SLOT  1  IKE       Code:  28
Quick Mode exchange, ID 0x3f4a938e, from 10.1.1.1 to 10.1.1.2 is up.
Sending negotiated SA information for policy 1 to IPsec.
```

Reviewing the Contivity event log

The log of the Contivity can be viewed from the GUI through **Status → Event Log**.

Below is a log of a successful tunnel establishment when the Contivity initiates the tunnel:

```
09/16/2004 14:48:48 0 Branch Office [01] IPSEC branch office connection
initiated to rem[2.1.1.0-255.255.255.0]@[10.1.1.1] loc[3.1.1.0-
255.255.255.0]
09/16/2004 14:48:48 0 Security [11] Session: IPSEC[10.1.1.1] attempting
login
09/16/2004 14:48:48 0 Security [01] Session: IPSEC[10.1.1.1] has no
active sessions
09/16/2004 14:48:48 0 Security [01] Session: IPSEC[10.1.1.1] To ARN has
no active accounts
09/16/2004 14:48:49 0 Security [01] Session: IPSEC[10.1.1.1]:13 SHARED-
SECRET authenticate attempt...
09/16/2004 14:48:49 0 Security [01] Session: IPSEC[10.1.1.1]:13
attempting authentication using LOCAL
09/16/2004 14:48:49 0 Security [11] Session: IPSEC[10.1.1.1]:13
authenticated using LOCAL
09/16/2004 14:48:49 0 Security [11] Session: IPSEC[10.1.1.1]:13 bound to
group /Base/To ARN
09/16/2004 14:48:49 0 Security [01] Session: IPSEC[10.1.1.1]:13 Building
group filter permit all
09/16/2004 14:48:49 0 Security [01] Session: IPSEC[10.1.1.1]:13 Applying
group filter permit all
09/16/2004 14:48:49 0 Security [11] Session: IPSEC[10.1.1.1]:13
authorized
09/16/2004 14:48:49 0 Security [11] Session: network IPSEC[2.1.1.0-
255.255.255.0] attempting login
09/16/2004 14:48:49 0 Security [11] Session: network IPSEC[2.1.1.0-
255.255.255.0] logged in from gateway [10.1.1.1]
09/16/2004 14:48:49 0 ISAKMP [02] ISAKMP SA established with 10.1.1.1
09/16/2004 14:48:49 0 Security [12] Session: IPSEC[10.1.1.1]:13 physical
addresses: remote 10.1.1.1 local 10.1.1.2
```

```
09/16/2004 14:48:49 0 Security [12] Session: IPSEC[-]:14 physical
addresses: remote 10.1.1.1 local 10.1.1.2
09/16/2004 14:48:49 0 Outbound ESP from 10.1.1.2 to 10.1.1.1 SPI
0xc0523930 [03] ESP encap session SPI 0x303952c0 bound to s/w on cpu 0
09/16/2004 14:48:49 0 Inbound ESP from 10.1.1.1 to 10.1.1.2 SPI
0x00140fa3 [03] ESP decap session SPI 0xa30f1400 bound to s/w on cpu 0
09/16/2004 14:48:49 0 Branch Office [00] 4f5eb08
BranchOfficeCtxtCls::RegisterTunnel: rem[2.1.1.0-
255.255.255.0]@[10.1.1.1] loc[3.1.1.0-255.255.255.0] overwriting tunnel
context [ffffffff] with [6ea7a30]
09/16/2004 14:48:49 0 ISAKMP [03] Established IPsec SAs with 10.1.1.1:
09/16/2004 14:48:49 0 ISAKMP [03] ESP 56-bit DES-CBC-HMAC-MD5 outbound
SPI 0xc0523930
09/16/2004 14:48:49 0 ISAKMP [03] ESP 56-bit DES-CBC-HMAC-MD5 inbound
SPI 0x140fa3
```

Below is a log of a successful tunnel establishment when the ARN initiates the connection:

```
09/16/2004 14:45:35 0 Security [11] Session: IPSEC[10.1.1.1] attempting
login
09/16/2004 14:45:35 0 Security [01] Session: IPSEC[10.1.1.1] has no
active sessions
09/16/2004 14:45:35 0 Security [01] Session: IPSEC[10.1.1.1] To ARN has
no active accounts
09/16/2004 14:45:35 0 ISAKMP [02] Oakley Main Mode proposal accepted
from 10.1.1.1
09/16/2004 14:45:37 0 Security [01] Session: IPSEC[10.1.1.1]:11 SHARED-
SECRET authenticate attempt...
09/16/2004 14:45:37 0 Security [01] Session: IPSEC[10.1.1.1]:11
attempting authentication using LOCAL
09/16/2004 14:45:37 0 Security [11] Session: IPSEC[10.1.1.1]:11
authenticated using LOCAL
09/16/2004 14:45:37 0 Security [11] Session: IPSEC[10.1.1.1]:11 bound to
group /Base/To ARN
09/16/2004 14:45:37 0 Security [01] Session: IPSEC[10.1.1.1]:11 Building
group filter permit all
09/16/2004 14:45:37 0 Security [01] Session: IPSEC[10.1.1.1]:11 Applying
group filter permit all
09/16/2004 14:45:37 0 Security [11] Session: IPSEC[10.1.1.1]:11
authorized
09/16/2004 14:45:37 0 ISAKMP [02] ISAKMP SA established with 10.1.1.1
09/16/2004 14:45:37 0 Security [11] Session: network IPSEC[2.1.1.0-
255.255.255.0] attempting login
09/16/2004 14:45:37 0 Security [11] Session: network IPSEC[2.1.1.0-
255.255.255.0] logged in from gateway [10.1.1.1]
09/16/2004 14:45:37 0 Security [12] Session: IPSEC[10.1.1.1]:11 physical
addresses: remote 10.1.1.1 local 10.1.1.2
09/16/2004 14:45:37 0 Security [12] Session: IPSEC[-]:12 physical
addresses: remote 10.1.1.1 local 10.1.1.2
09/16/2004 14:45:37 0 Outbound ESP from 10.1.1.2 to 10.1.1.1 SPI
0x57fa39fd [03] ESP encap session SPI 0xfd39fa57 bound to s/w on cpu 0
09/16/2004 14:45:37 0 Inbound ESP from 10.1.1.1 to 10.1.1.2 SPI
0x00206994 [03] ESP decap session SPI 0x94692000 bound to s/w on cpu 0
09/16/2004 14:45:37 0 Branch Office [00] 4f5eb08
BranchOfficeCtxtCls::RegisterTunnel: rem[2.1.1.0-
255.255.255.0]@[10.1.1.1] loc[3.1.1.0-255.255.255.0] overwriting tunnel
context [0] with [4f51290]
```

```
09/16/2004 14:45:37 0 ISAKMP [03] Established IPsec SAs with 10.1.1.1:
09/16/2004 14:45:37 0 ISAKMP [03] ESP 56-bit DES-CBC-HMAC-MD5 outbound
SPI 0x57fa39fd
09/16/2004 14:45:37 0 ISAKMP [03] ESP 56-bit DES-CBC-HMAC-MD5 inbound
SPI 0x206994
```

Router Troubleshooting Tips

Router Scripts

Load the **`show.bat`** and **`ipsec.bat`** script files on to the router flash card for quick troubleshooting and configuration information. The following are some useful troubleshooting commands for the Router

The **show ipsec esp sa** command**–** gives a listing of IPSec tunnels that have been established. For example,

```
$ show ipsec esp sa

IPSEC ESP SA Table Information
---------------------------
                              Cipher  Integrity
State   Src        Dest       SPI          Alg     Alg       Mode
------  ---------  ---------  ----------   ----    -------   -----

No Manual SAs established.

Up      10.1.1.1   10.1.1.2       369140  3DES    HMAC MD5    Tunnel
Up      10.1.1.2   10.1.1.1   2015837327  3DES    HMAC MD5    Tunnel

2 Automated SA(s) established.
```

The **show ipsec policy** command – gives a listing of all IPSec policies, and proposals configured within each. For example,

```
$ show ipsec policy


IPSEC Policy Table Information
------------------------------

Policy Proposal Transform      Cipher Integrity
Number Number   Number    Type Alg    Alg
------ -------- --------- ---- ------ ---------
1      1        1         ESP  3DES   MD5
```

The **show ipsec selectors out** command– gives a list of all interfaces and the policies configured on each.

```
$ show ipsec selectors out


IPSEC Outbound Selector Table Information
-----------------------------------------

                                                Pol Policy
Cct.   Interface       Mode     State   Matches Num Name
------ --------------- -------- ------- ------- --- ---------------
2      10.1.1.1        Enabled  Up           23   1 Tunnel to CES
```

Interpreting Log Messages on the Router

```
#    9: 09/14/2004 08:17:57.900  INFO     SLOT  1  IPSEC      Code: 124
IPSec received inbound SA request. No proposal/attribute chosen.
Last validation mismatch : Received mismatching cipher algorithm.
Policy number: 1
Rcv proposal: 1, Our proposal: 1.
Rcv transform: 1, Our transform: 1.
```

This message generally indicates that there is no compatible encryption setting configured between the Router and the IPSec peer. The proposal list containing the encryption capabilities for the SA was defined in step 11 of the “Configuring ARN” section of this guide. Verify both ends have compatible settings configured, otherwise they won’t be able to negotiate the SA.

```
#    4: 09/14/2004 08:27:19.287  WARNING  SLOT  1  IKE       Code:   9
Cookies did not match properly for IKE peer 10.1.1.2,
interface 10.1.1.1
```

This message generally indicates an incompatibility in the Diffie-Hellman settings. The BayRS router uses Diffie-Hellman Group: 56-bit DES with Group 1 (768-bit prime) and there is no way to change it. Check the IPSec peer and verify that the SA is configured for Diffie-Hellman Group 1.

```
#    3: 09/14/2004 08:53:17.549  INFO     SLOT  1  IKE        Code: 124
Invalid Flags: Source 10.1.1.2, Dest 10.1.1.1
Message ID 0x0, SPI length: 0, SPI: 0

#    2: 09/14/2004 08:54:22.108  INFO     SLOT  1  IKE        Code: 117
Invalid Payload Type: Source 10.1.1.2, Dest 10.1.1.1,
Message ID 0x0, SPI length: 0, SPI: 0
```

Both these messages are generally an indication of a mismatch of the Pre-Shared Key on both sides of the connection. Depending on whether the ARN was the initiator or the responder of this particular SA, the message will be different. The Pre-Shared Key for the ARN was configured in step 6 of the “Configuring ARN” section of this guide, and in the Profiles →Branch Office →Connections section of the Contivity GUI.

```
#   16: 09/14/2004 08:58:31.927  INFO     SLOT  1  IKE           Code:
99
Notification received: Source 10.1.1.2, Dest 10.1.1.1,
Message ID 0x3c441a39, SPI length: 4, SPI: 3240933836,
Invalid ID Information

#    2: 09/14/2004 08:59:59.469  INFO     SLOT  1  IPSEC      Code: 122
IPSec received inbound SA request. Start/end destination address
does not match descriptor start/end source address.
Policy number: 1.
ID payload start/end dest address: 2.1.1.0-2.1.1.255
Descriptor start/end source address: 2.1.1.0-2.1.1.20
```

These messages generally indicate a mismatch in the Local/Remote network pairs on both sides of the connection. The Local/Remote network pairs for the ARN were configured as a Template/Policy in steps 7, 8, and 9 of the “Configuring ARN” section of this guide, and in the Profiles →Branch Office →Connections section of the Contivity GUI.

```
#    3: 09/14/2004 08:59:59.485  INFO     SLOT  1  IKE        Code: 130
No Proposal Chosen: Source 10.1.1.2, Dest 10.1.1.1
Message ID 0xd962094b, SPI length: 4, SPI: 12600
```

The No Proposal Chosen message is a generic message that usually directly follows one of the log messages noted above. Sometimes though, usually when the router initiates a connection and it fails, only this message will appear in the log. It generally indicates some type of configuration mismatch, so you may have to just double-check everything. An alternative troubleshooting tactic would be to do a test initiating the SA from the other end, which generally results in more descriptive messages in the log.

```
#    1: 09/15/2004 15:53:47.662  WARNING  SLOT  1  IPSEC     Code:  10
No Cryptographic API (capi.exe) in this image. IPSec cannot proceed.
interface: 10.1.1.1, circuit: 2, code: 1

#    2: 09/15/2004 15:53:49.267  WARNING  SLOT  1  IKE        Code:   4
No Cryptographic API (capi.exe) in this image. IKE cannot proceed,
code: 15
```

In order to run IPSec a valid capi.exe must be installed in the image. Both these messages indicates that the file is not installed. Refer to Appendix B for instructions on how to install the capi.exe file.

```
#    5: 09/13/2004 11:56:22.437  WARNING  SLOT  1  IPSEC      Code:  17
All IPsec traffic on slot 1 will be dropped since validation of the NPK
hash has failed. Please synchronize config with NPK and enable/disable
IPSEC on affected interfaces
```

This message indicates that the NPK on the router does not match the NPK of the config. This will occasionally happen when booting from a different configuration, changing your NPK, or starting from scratch. In order to correct this problem, you need to get into the secure shell through the console. Follow these steps:

1. Enter the Secure Shell with the ksession command

```
$ ksession
Please enter password:
Entering Secure Shell Session.
```

2. Use the **ktranslate** command followed by the NPK, save the config, and then exit the Secure Shell

```
SSHELL> ktranslate 0x1234567812345678
SSHELL> save config config
SSHELL> kexit
Exiting Secure Shell session.
```

3. Bounce IPSec with the follow commands

```
$ s wfIpsecBase.2.0 2;commit
$ s wfIpsecBase.2.0 1;commit
$
```

Contivity troubleshooting tips

Interpreting Log Messages on the Contivity

```
09/16/2004 15:09:40 0 ISAKMP [13] Diffie-Hellman group mismatch for
10.1.1.1 - terminating connection attempt
```

This message indicates a mismatch in the Diffie-Hellman configuration. The Diffie-Hellman Group is configurable on the Contivity through the GUI under **Profiles→Branch Office →IPSec Group Configuration**.

```
09/16/2004 15:22:58 0 tIsakmp [34] Failed Remote Network Login:
Username=: Date/Time=09/16/2004 15:22:58
```

This message generally indicates a mismatch in the Local/Remote network pairs between the Contivity and the Router. These are configurable through **Profiles→Branch Office→Connections**

```
09/16/2004 15:17:39 0 tIsakmp [34] Failed Login Attempt:
Username=10.1.1.1: Date/Time=09/16/2004 15:17:39
```

The “Failed Login Attempt” message generally indicates a mismatch in the Pre-Shared Key or possibly a mismatch in the Local/Remote network pairs. The Pre-Shared Key and the Local/Remote networks are configurable on the Contivity through the GUI under **Profiles→Branch Office→Connections.**

```
09/16/2004 15:12:49 0 ISAKMP [13] Error notification (No proposal
chosen) received from 10.1.1.1
09/16/2004 15:02:21 0 ISAKMP [13] No proposal chosen in message from
10.1.1.1
```

These “No proposal chosen” messages are generic and usually precede or follow one of the more descriptive log messages noted above. It generally indicates IPSec configuration mismatch such as Encryption level and Diffie-Hellman group, so you may have to just double-check IPSec settings. An alternative troubleshooting tactic would be to do a test initiating the SA from the Router, which generally results in more descriptive messages in the log.

Appendix A – Setting the NPK on the BayRS router

Firstly, if it hasn't been done already, a password for the Secure Shell must be created. If you don't have one configured and you try to enter the Secure Shell, you will receive an error message as such:

```
$ ksession
Must set secure shell password
```

To change the Secure Shell password use the **kpassword** command and follow the instructions, as such:

```
$ kpassword
Changing password for Secure Shell
Old password:
New Password: ********
Retype new password: ********
Secure Shell password changed.
```

Once the password is established, enter the Secure Shell using the **ksession** command.

```
$ ksession

Please enter password:
Entering Secure Shell Session.
SSHELL>
```

Firstly, you need to create a random number seed. Use the **kseed** command and follow the instructions, as follows.

```
SSHELL> kseed

To initialize the seed for the cryptographic random number generator,
please now enter a series of characters which you would consider to be
'random.'  As you enter them,
dots '.' will be displayed to indicate progress.  If your string is not
'random' enough, questions '?' will be displayed.  In that case, modify
the pattern you are entering.  When enough data is input, you will be
prompted to stop (near 3 lines of input)...

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

All done, thank you!
SSHELL>
```

Now, you can set the NPK using the **kset npk** command, as follows. The NPK is a 16 digit hexadecimal number.

```
SSHELL> kset npk 0x1234567812345678
SSHELL> kexit
```

Now, save the configuration and exit the Secure Shell using **kexit**

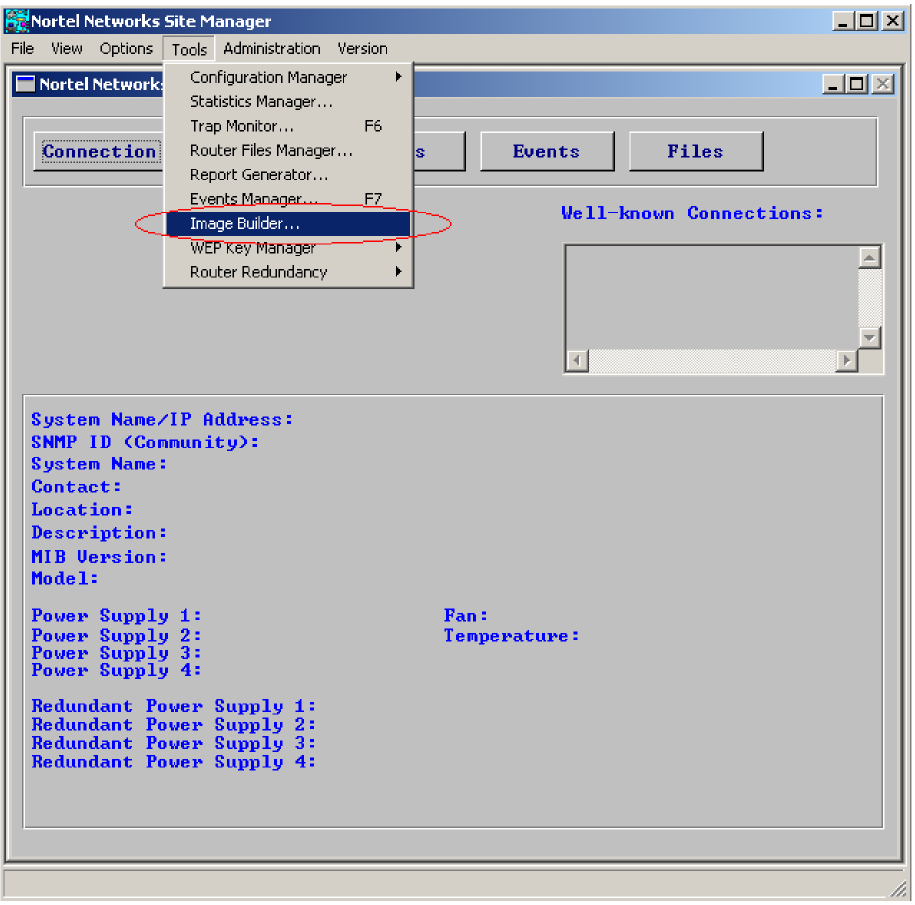
```
SSHELL> save config config
SSHELL> kexit

Exiting Secure Shell session.
```

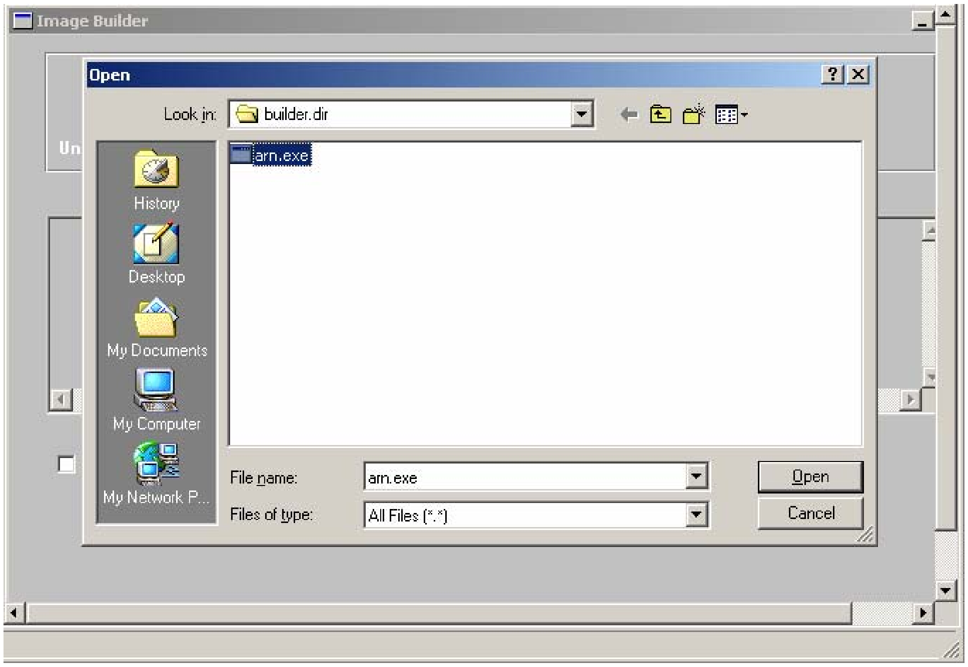
Appendix B – Adding the capi.exe file to the router image

By default, the router image (i.e. arn.exe, asn.exe, bn.exe, etc.) do not come installed with the modules necessary to run IPSec. These modules must be purchased separately and installed in the image using a **Site Manager** utility called "**Image Builder**". The module needed is the capi.exe (Cryptographic API). Once this module is obtained, use the following process to add it into the image.

1. Launch **Site Manager** and then open **Image Builder** through the **Tools** drop-down menu.



2. Once **Image Builder** is opened for the first time, it will create a '**builder.dir'** subdirectory within your **Site Manager** directory. Move the image file (arn.exe, bn.exe, etc.) to this directory. When the **Image Builder** application opens up, go to **File | Open** and locate the image file. Click **Open** to open up the selected image.



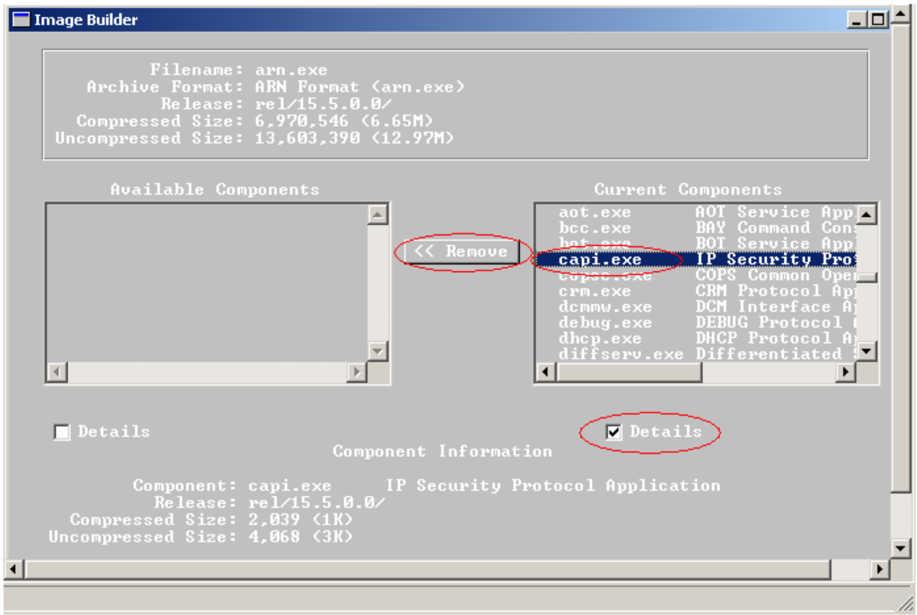
Look in: builder.dir

File name: arn.exe

Files of type: All Files (*.*)

Configuring Branch Office Tunnel between a Contivity and a BayRS router

3. Check the **Details** button on the right-hand column, find the capi.exe file, highlight it, and click **<< Remove**. Note that the size of the capi.exe is very small (2039 bytes, in this case).



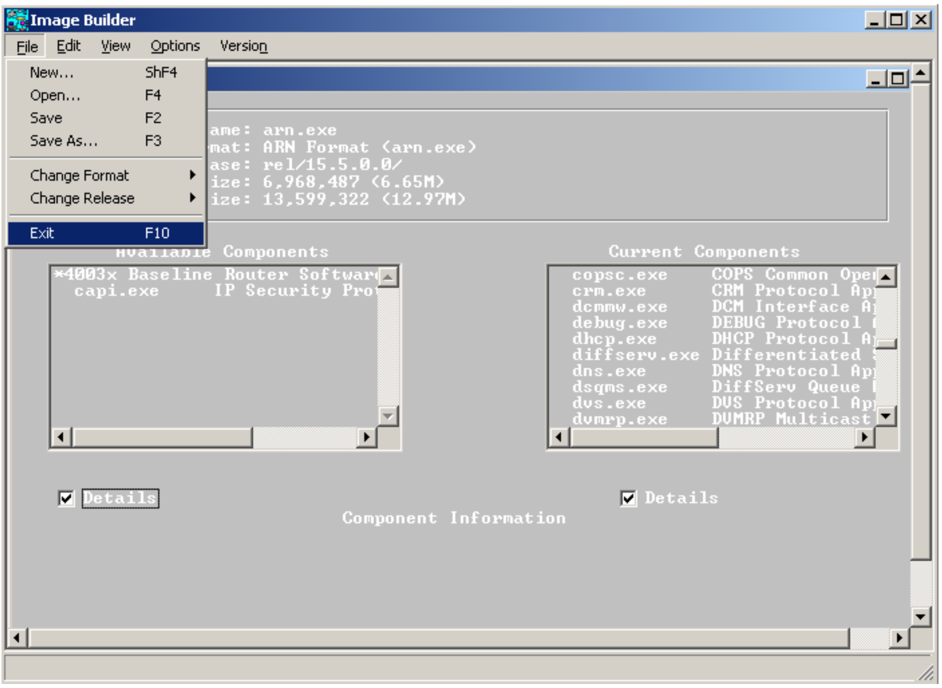
```
         Filename: arn.exe
   Archive Format: ARN Format (arn.exe)
          Release: rel/15.5.0.0/
  Compressed Size: 6,970,546 (6.65M)
Uncompressed Size: 13,603,390 (12.97M)
```

```
aot.exe       AOT Service App
bcc.exe       BAY Command Con
bot.exe       BOT Service App
capi.exe      IP Security Pro
copsc.exe     COPS Common Ope
crm.exe       CRM Protocol Ap
dcmmw.exe     DCM Interface A
debug.exe     DEBUG Protocol
dhcp.exe      DHCP Protocol A
diffserv.exe  Differentiated
```

□ Details ☑ Details

```
        Component: capi.exe      IP Security Protocol Application
          Release: rel/15.5.0.0/
  Compressed Size: 2,039 (1K)
Uncompressed Size: 4,068 (3K)
```

4. Go to **File | Save** and then **File | Exit** to close out of **Image Builder**.



```
ame: arn.exe
mat: ARN Format (arn.exe)
ase: rel/15.5.0.0/
ize: 6,968,487 (6.65M)
ize: 13,599,322 (12.97M)
```

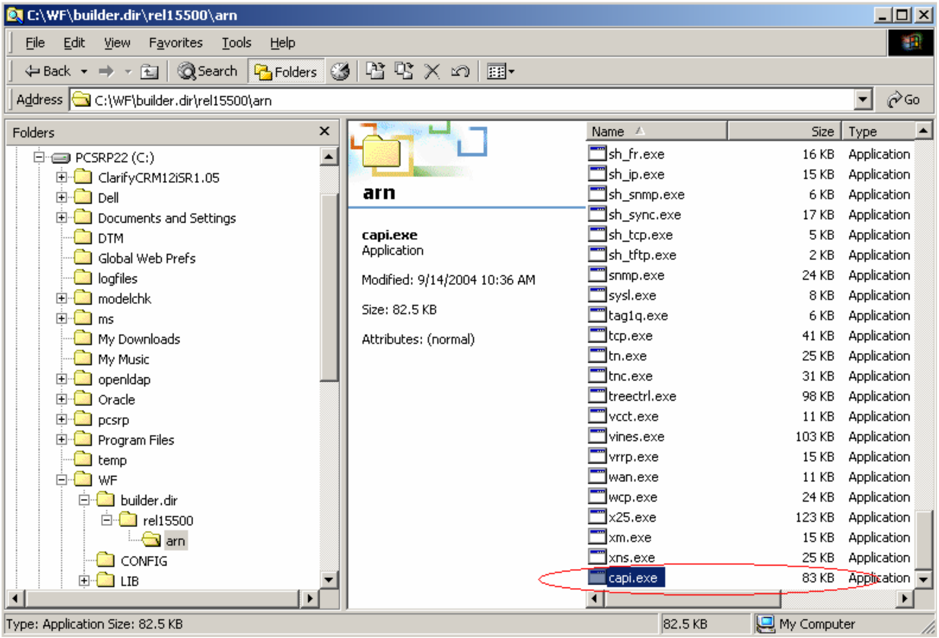
```
*4003x Baseline Router Softwar
  capi.exe      IP Security Pro
```

```
copsc.exe     COPS Common Ope
crm.exe       CRM Protocol Ap
dcmmw.exe     DCM Interface A
debug.exe     DEBUG Protocol
dhcp.exe      DHCP Protocol A
diffserv.exe  Differentiated
dns.exe       DNS Protocol Ap
dsqms.exe     DiffServ Queue
dvs.exe       DVS Protocol Ap
dvmrp.exe     DVMRP Multicast
```

☑ Details ☑ Details

Configuring Branch Office Tunnel between a Contivity and a BayRS router

5. There are now 2 addition subdirectories in the **/WF/builder.dir** directory. One for the version of your image (15.5.0.0, in this case), and one for the platform (ARN, in this case). The platform subdirectory contains all the modules found in the image. Find the "dummy" capi.exe (the one that is roughly 2000 bytes) and replace it with the real capi.exe file. The real one should be considerably larger.



Address C:\WF\builder.dir\rel15500\arn

capi.exe
Application

Modified: 9/14/2004 10:36 AM

Size: 82.5 KB

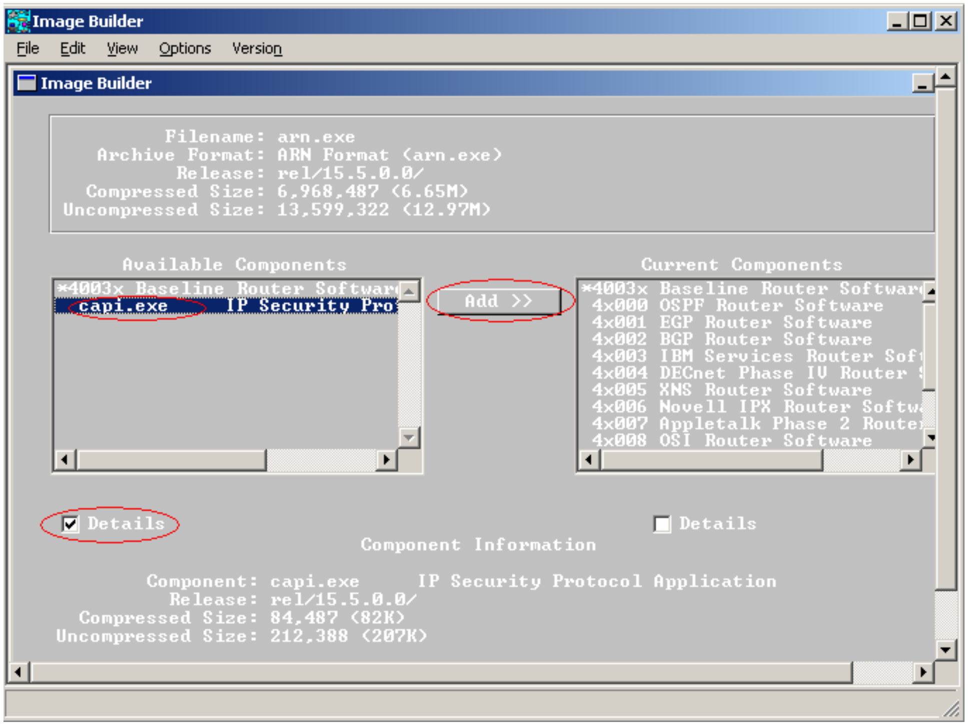
Attributes: (normal)

Name	Size	Type
sh_fr.exe	16 KB	Application
sh_ip.exe	15 KB	Application
sh_snmp.exe	6 KB	Application
sh_sync.exe	17 KB	Application
sh_tcp.exe	5 KB	Application
sh_tftp.exe	2 KB	Application
snmp.exe	24 KB	Application
sysl.exe	8 KB	Application
tag1q.exe	6 KB	Application
tcp.exe	41 KB	Application
tn.exe	25 KB	Application
tnc.exe	31 KB	Application
treectrl.exe	98 KB	Application
vcct.exe	11 KB	Application
vines.exe	103 KB	Application
vrrp.exe	15 KB	Application
wan.exe	11 KB	Application
wcp.exe	24 KB	Application
x25.exe	123 KB	Application
xm.exe	15 KB	Application
xns.exe	25 KB	Application
capi.exe	83 KB	Application

Type: Application Size: 82.5 KB 82.5 KB

Configuring Branch Office Tunnel between a Contivity and a BayRS router

6. Reenter **Image Builder** through **Tools | Image Builder** and open up the original image file in the **builder.dir** directory, the same way as in step 2. Check the **Details** button on the left-hand side of the screen, and highlight **capi.exe**. Note the size of this file is much larger than the dummy file (In this case, about 82K). Click **Add >>** to install the real capi.exe file into the image. Once done, **Save** and **Exit** image builder and retrieve the image file from the **builder.dir** directory. This image is now ready to load onto the router.



```
           Filename: arn.exe
     Archive Format: ARN Format (arn.exe)
            Release: rel/15.5.0.0/
    Compressed Size: 6,968,487 (6.65M)
  Uncompressed Size: 13,599,322 (12.97M)
```

Available Components

```
*4003x Baseline Router Softwar
  capi.exe        IP Security Pro
```

Current Components

```
*4003x Baseline Router Softwar
 4x000 OSPF Router Software
 4x001 EGP Router Software
 4x002 BGP Router Software
 4x003 IBM Services Router Sof
 4x004 DECnet Phase IV Router S
 4x005 XNS Router Software
 4x006 Novell IPX Router Softw
 4x007 Appletalk Phase 2 Route
 4x008 OSI Router Software
```

☑ Details

□ Details

```
        Component: capi.exe     IP Security Protocol Application
          Release: rel/15.5.0.0/
  Compressed Size: 84,487 (82K)
Uncompressed Size: 212,388 (207K)
```

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If after following this guide you are still having problems, please ensure you have carried out the steps exactly as in this document. If problems still persist, please contact Nortel Networks Technical Support (contact information is available online at: http://www.nortel.com/cgi-bin/comments/comments.cgi?key=techsupport_cu).

We welcome you comments and suggestions on the quality and usefulness of this document. If you would like to leave a feedback please send your comments to: CRCONT@nortel.com

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