

IBM 8265 Nways ATM Switch

Installation Instructions

for

ATM Control Point Version 4.2.5

IISP & PNNI



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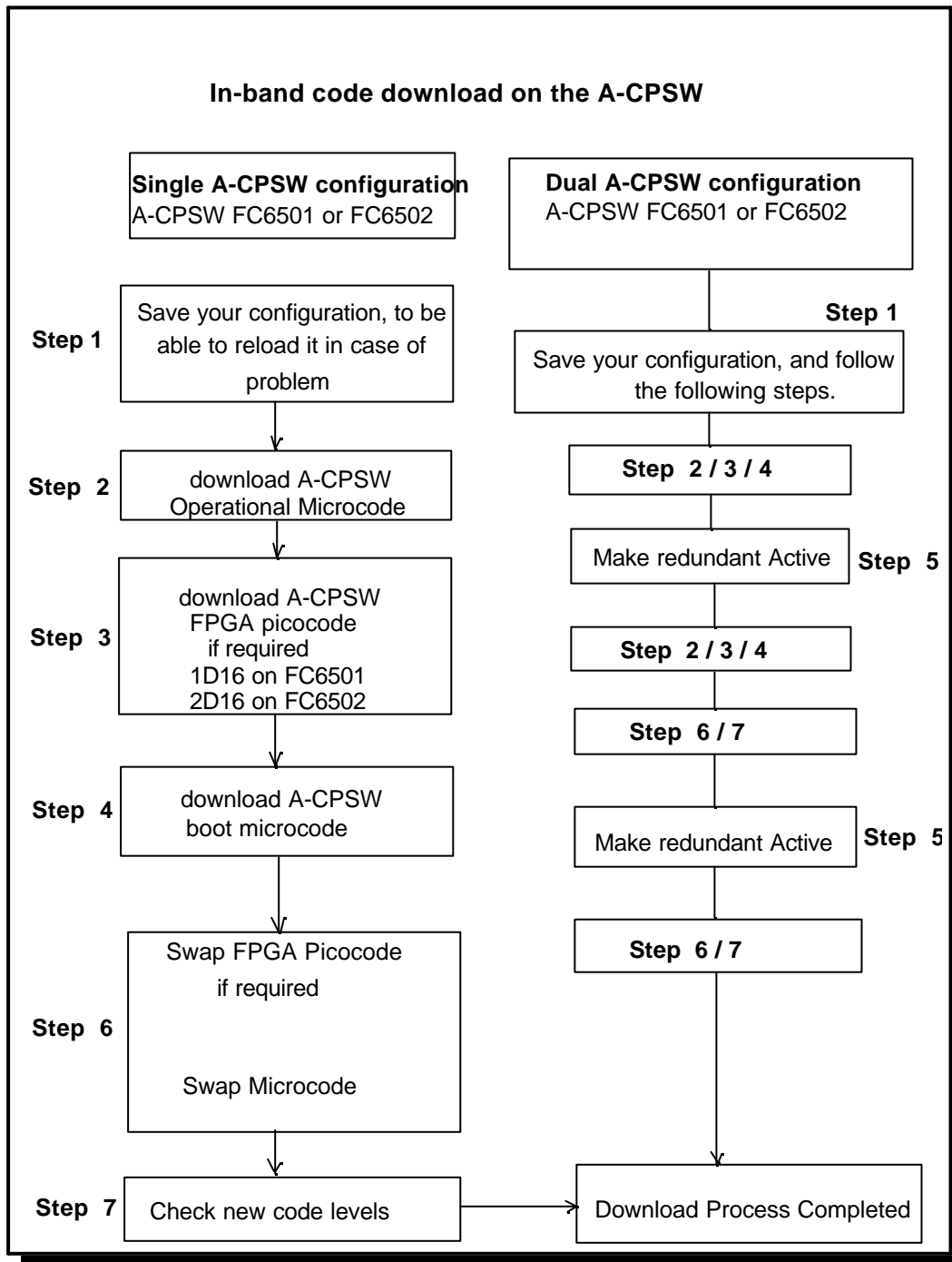
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Upgrade synopsis



Code Download Method

Download the 8265 code files on your workstation

After the download of the files, on an AIX Workstation make sure that the files can be read by all users :

Log in as "root" Set the path to the microcode files directory

Enter: `chmod a+r BOOTV425.BIN`

Enter: `chmod a+r PNNIV425.BIN` or `IISPV425.BIN`

Enter: `chmod a+r FPGA1D16.BIN (A-CPSW FC6501)` or `FPGA2D16.BIN (A-CPSW FC6502)`.

In-Band download method

You need to perform an inband download operation, using either:

- *Classical IP mode.*

Make sure that your ATM network is configured for IP Over ATM (RFC 1577). To configure your ATM network for IP over ATM:

1. Connect an ARP server to the ATM network. The ARP server will be used to map IP addresses to ATM addresses.
2. For each A-CPSW module verify that the following parameters are configured:
 - ATM address of the ARP server
 - IP address and IP mask of the A-CPSW
 - IP address of the default gateway
3. Verify the IP connectivity to the TFTP server by entering a PING command for each active A-CPSW module.

- *Ethernet or Token Ring LAN-Emulation mode.*

Make sure your network is configured in Ethernet or Token Ring LAN-Emulation. To configure your network in Ethernet or Token Ring LAN-Emulation :

1. You must have an Ethernet or Token Ring LAN-Emulation Server configured and ready.
You can use the local LES of the 8265.
2. You must configure the Ethernet or Token Ring LAN-Emulation Client on your 8265.
3. You must have a TFTP Server somewhere in the IP network (either on the Emulated LAN, either behind an IP Gateway), and the microcode files installed on that TFTP Server.
4. Check that you can PING the TFTP server from the 8265 LEC.

- *Serial Line IP support (SLIP) mode .*

Make sure your workstation can act as a TFTP server .

1. Set up a A-CPSW Configuration Console in SLIP Mode:
2. Then configuring the SLIP interface on the TFTP workstation will allow you to perform Inband Download between your workstation and the A-CPSW.
3. The SLIP connection will be broken after a reset of the A-CPSW and connection will revert back to normal mode.

- *A-CPSW RJ45 Ethernet Port.*

1. You must configure the RJ45 Ethernet port on your 8265.
2. You must have a TFTP Server somewhere in the IP network (either on the Ethernet LAN, either behind an IP Gateway), and the microcode files installed on that TFTP Server.
3. Check that you can PING the TFTP server from the 8265 Ethernet interface.

Out of Band Download method

- ***FPGA picocode cannot be downloaded using this method, only boot and operational.***

Once you have the code on your A-disk or hard disk, and you have connected your PC on the RS232 port, using an RS232 emulated terminal, you have to type the following commands on the command line:

MAINTAIN

DOWNLOAD OUT-OF-BAND BOOT (or OPERATIONAL)

You then have to choose the Xmodem protocol and select the path where your code is located.

Note: This method is not recommended since it takes more time than the In-Band method(15 secs versus 45mins).

Upgrading the 8265

- ***IMPORTANT : It is strongly recommended to upgrade the 8265 to Release v425 from the release v413, v414, v422 or v424 codes.***

- ***IMPORTANT***

The following steps show an example of Inband Download.

You may log into the A-CPSW console either locally using an ASCII terminal connected to the A-CPSW console port, or remotely using a TELNET session. PLEASE, READ WHAT FOLLOWS CAREFULLY :

1. If you have only one A-CPSW (no redundant) follow steps 1 to 4 then steps 6 and 7.
 2. If you have two A-CPSWs modules (one redundant A-CPSW) follow steps 1 to 5 for main A-CPSW and steps 2 to 4 then 6 and 7 for redundant A-CPSW .Then follow steps 6 and 7 on main A-CPSW (see upgrade synopsis).
- ***IMPORTANT***
It is recommended to perform the following steps with NO OPERATIONAL TRAFFIC flowing on your 8265 node. Typically, this would be scheduled as part of a maintenance period. You should save all your configuration parameters before upgrading.

Step 1: Saving Configuration before the upgrade

1. Setup the TFTP parameters by entering the following commands:

- *SET TFTP SERVER_IP_ADDRESS <ip address of the TFTP server>*
- *SET TFTP FILE_TYPE CONFIGURATION*
- *SET TFTP FILE_NAME*

Note : Provide the full path and name of the file when prompted

2. Start the upload inband procedure by entering: **UPLOAD**

Step 2: Download Inband the 8265 A-CPSW operational microcode

Upgrade the new active A-CPSW operational microcode (PCMCIA) as follows:

Configure the TFTP parameters by entering the following commands:

- *SET TFTP SERVER_IP_ADDRESS <ip address of the TFTP server>*
- *SET TFTP FILE_TYPE OPERATIONAL*
- *SET TFTP FILE_NAME*

Type the full path and name of the operational microcode file when prompted (its actual name is indicated in the Readme file).

1. Make sure you can reach the TFTP server by entering:

PING <ip address of the TFTP server>
(Stop PING by entering: Ctrl+C)

2. Start the download inband procedure by entering:

DOWNLOAD INBAND

When prompted, type "Y" to confirm.

3. Wait for successful termination of the download operation. The message *Download successful* is displayed.

This may also be checked by displaying the TFTP last transfer result through the command: **"SHOW TFTP"**.

The command **"SHOW DEVICE"** displays the downloaded operational code level as backup.

It should display : **v.4.2.5**

Step 3: Download Inband the 8265 A-CPSW FPGA picocode

This operation should be done only if your CPSW FPGA level is not uptodate, the latest level is 1D16 for A-CPSW FC6501 and 2D16 for A-CPSW FC6502.

1. Configure the TFTP parameters by entering the following commands:

- *SET TFTP SERVER_IP_ADDRESS <ip address of the TFTP server>*
- *SET TFTP FILE_TYPE FPGA*
- *SET TFTP TARGET_MODULE <n> (n=9 or 11 depending of active A-CPSW position).*

- *SET TFTP FILE_NAME* (Note : Type the full path name of the FPGA file when prompted)
- *SAVE TFTP*

2. Make sure you can reach the TFTP server by entering:

PING <ip adress of the TFTP server>
(Stop PING by entering: Ctrl+C)

3. Start the download inband procedure by entering:

DOWNLOAD

When prompted, type "Y" to confirm.

Wait for successful termination of the download operation (it may take up to 10 minutes). The message *Download successful* is displayed.

This may also be checked by displaying the TFTP last transfer result with the command: "*SHOW TFTP*".

The command *SHOW MODULE <n> VERBOSE* (n=9 or 11 depending on A-CPSW active position) displays the FPGA level in backup.

It should appear as **1D16** or **2D16** depending of your A-CPSW feature code, respectively FC6501 and FC6502.

Step 4: Download Inband the 8265 A-CPSW boot microcode

Upgrade the new active A-CPSW boot microcode as follows:

1. Log in as the Administrator on the A-CPSW console

2. Perform the command:

- *SET DEVICE MIGRATION NOT_ALLOWED*

3. Upgrade the A-CPSW boot microcode as follows:

- Configure the TFTP parameters by entering the following commands:

➤ *SET TFTP SERVER_IP_ADDRESS <ip address of the TFTP server>*

➤ *SET TFTP FILE_TYPE BOOT*

➤ *SET TFTP FILE_NAME*

- Make sure you can reach the TFTP server by entering:

PING <ip address of the TFTP server>
(Stop PING by entering: Ctrl+C)

- Start the download inband procedure by entering:

DOWNLOAD INBAND

When prompted, type "Y" to confirm.

- Wait for successful termination of the download operation. The message *Download successful* is displayed.

This may also be checked by displaying the TFTP last transfer result with the command: "*SHOW TFTP*".



The command "*SHOW DEVICE*" displays the new BOOT code version which will become active after an A-CPSW reset.

It should display: **v.4.2.5**.

If you have only one A-CPSW module go to step 6.

If you were upgrading your backup A-CPSW module go to step 6.

Step 5: Make the backup A-CPSW active

If you have a redundant A-CPSW make the backup one active by entering on the active A-CPSW:

- *Log in as the Administrator on the active A-CPSW console*
- *SET DEVICE ROLE SECONDARY*
- *SAVE ALL*
- *RESET ATM_SUBSYSTEM*
- *The hub will reset and the backup A-CPSW will become active. GO TO STEP 2.*



Step 6: Activate the new A-CPSW microcodes and the new FPGA picocode

DO NOT PERFORM ANY SWAP BEFORE HAVING DOWNLOADED :

- OPERATIONAL CODE
- FPGA CODE (If required)
- BOOT CODE

1. Activate the new version of A-CPSW FPGA. picocode by entering the command:

- *SAVE ALL*
- *SWAP FPGA_PICOCODE 9 (or 11).The telnet session, if any, is broken due to the A-CPSW reset.*
- *Log in as Administrator on the A-CPSW console.*

2. Activate the new version of A-CPSW microcode by entering the command:

- *SWAP MICROCODE* and confirm with *Y*. *Your remote TELNET session is broken.*
- *Log in as Administrator to the A-CPSW*

If you have only one CPSW module go to step 7.

3. If you had already swapped new FPGA picocode and microcode on both A-CPSW modules go to step 7. Check the new levels of codes .

The following table lists the microcode and FPGA versions that must be displayed at completion of the upgrade. Use the following commands

SHOW DEVICE

SHOW MODULE n VERBOSE (n could be 9 or 11)

Component	FPGA version	Flash EEPROM version	Boot EEPROM Version
A-CPSW FC6501	1D16	v4.2.5	v4.2.5
A-CPSW FC6502	2D16	v4.2.5	v4.2.5

4. Make the redundant A-CPSW secondary again as it was before the beginning of the migration :

- *SET DEVICE ROLE SECONDARY*
- *SAVE ALL*
- *RESET ATM_SUBSYSTEM*

The hub will reset and the primary A-CPSW will become active.

Perform the **step 6** again on the other A-CPSW.



Step 7: Check the new levels of codes :

1. Log in as ADMINISTRATOR on the active A-CPSW
2. The following table lists the microcode and FPGA versions that must be displayed at completion of the upgrade. Use the following commands

- *SHOW DEVICE*

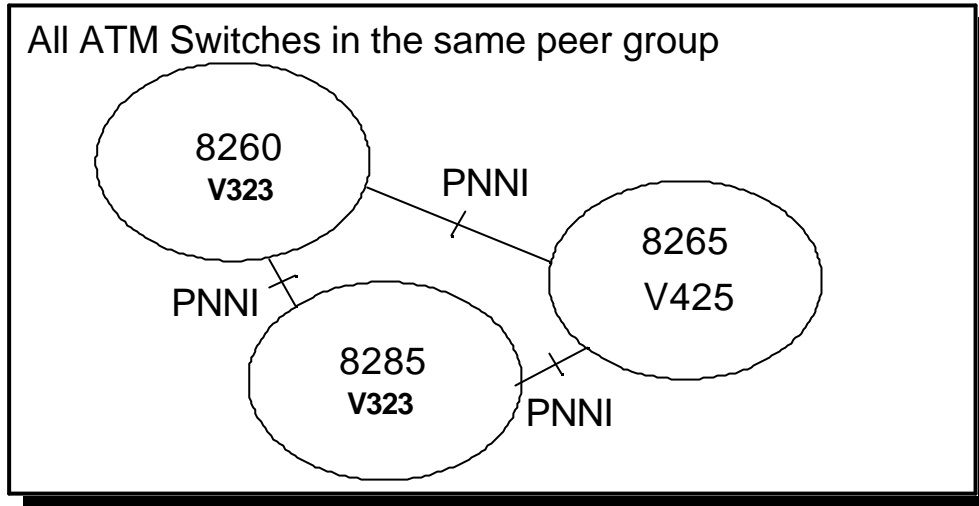
- *SHOW MODULE n VERBOSE (n could be 9 or 11)*

Component	FPGA version	Flash EEPROM version	Boot EEPROM Version
A-CPSW FC6501	1D16	v4.2.5	v4.2.5
A-CPSW FC6502	2D16	v4.2.5	v4.2.5

Microcode Level Interoperating with PNNI V4

8260/8285/8265 v3/v4 within a single peer group

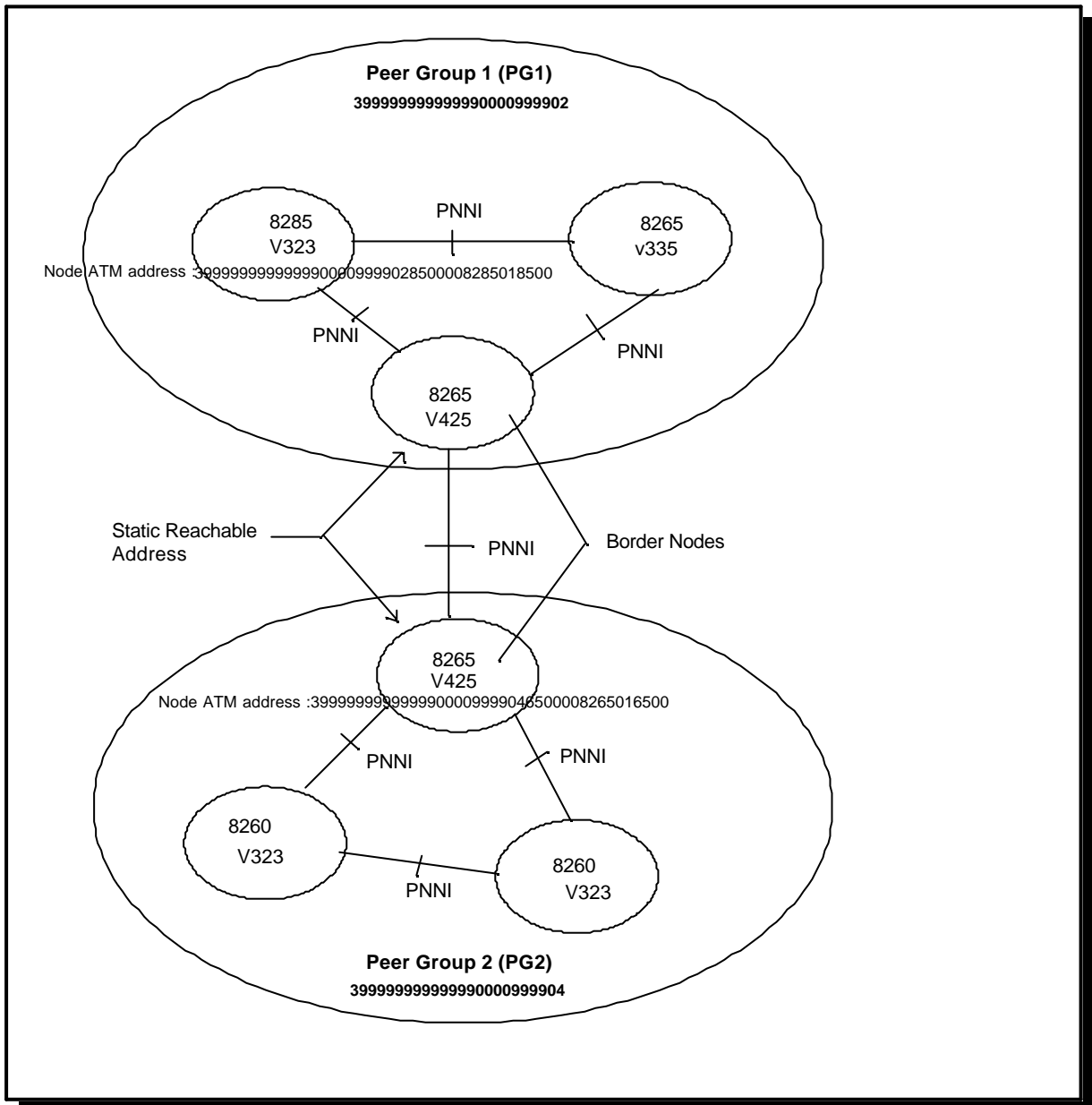
Hierarchy function is disabled, the network will be a flat PNNI Network type.



Interoperating microcode levels :

ATM Switch	V3	V4
8285	v3.2.3	not supported
8260	v3.2.3	not supported
8265	v3.3.5	up to v4.2.5

8260/8285/8265 within multiple peer groups



V3/V4 Interoperating microcode levels :

Interoperating microcode levels are the same as the one shown in previous table, v.3.2.3 for 8260, v.3.2.3 for 8285 and v.3.3.5 for 8265.

V3/V4 mandatory configuration parameter

- No V3 8260 / 8285 / 8265 ATM Switch can be Border Node in a PNNI Hierarchy Network.
- No V3 8260 / 8285 / 8265 ATM Switch can be a Peer Group Leader (PGL) in a PNNI Hierarchy Network.

Workaround to V3 Limitation :

When migrating an existing ATM network to a PNNI hierarchy environment with several peer groups, you may have to connect hierarchical devices (8265 V4) to non hierarchical devices (8285s...).

A prerequisite to make this work is that a non hierarchical node should not be a border node, i.e. a node connecting to another network. The exit border nodes have to assume some kind of gateway functions for the non hierarchical nodes.

Indeed, **these non hierachical nodes only have knowledge of their own peer group topology** and cannot compute routes (using hierarchy) to nodes outside their peer group. Therefore, the exit border nodes (as 8265) should maintain reachabilities.

How to define these non hierarchical device related reachable addresses :

Looking at the example, there are two peer groups :

The resources locally attached to the node

39.99.99.99.99.99.00.00.99.99.02.85.00.00.82.85.01.85.00 (it's a 8285) and owned by the peer group whose id = 60.39.99.99.99.99.99.00.00.99.99.02

needs to access any other station within the second peer group whose

id = 60.39.99.99.99.99.99.00.00.99.99.04.

The "show pnni node:0" from the 8265 border node of the second peer group lists :

NODE 0 CONFIG PARAMS (IN ACTIVE CONFIG REPOSITORY):

```
leadership priority: 52
level id: 96
peer group id 60.39999999999999990000999904
node id: 60.a0.3999999999999999000099990465.000082650165.00
node's atm addr: 39.9999999999999999000099990465.000082650165.00
```

NODE 0 OPERATIONAL:

is peer group leader with leadership priority 102 is a border node
peer group containing this node has 2 members (includes this node)

To define the reachable address of the other peer group non hierarchical device (ex: 8285) at the border node side :

SET REACHABLE_ADDR <slot.port> <length> <first length bits address>

where :

<slot.port> is the pnni link to the other peer group, used to reach the other border node, to eventually reach the non hierarchical device through pnni links.

<length> must be smaller than the current node:0 level (ex:96) but should be long enough to distinct the reachable address from the first <length> current peer group id bits:

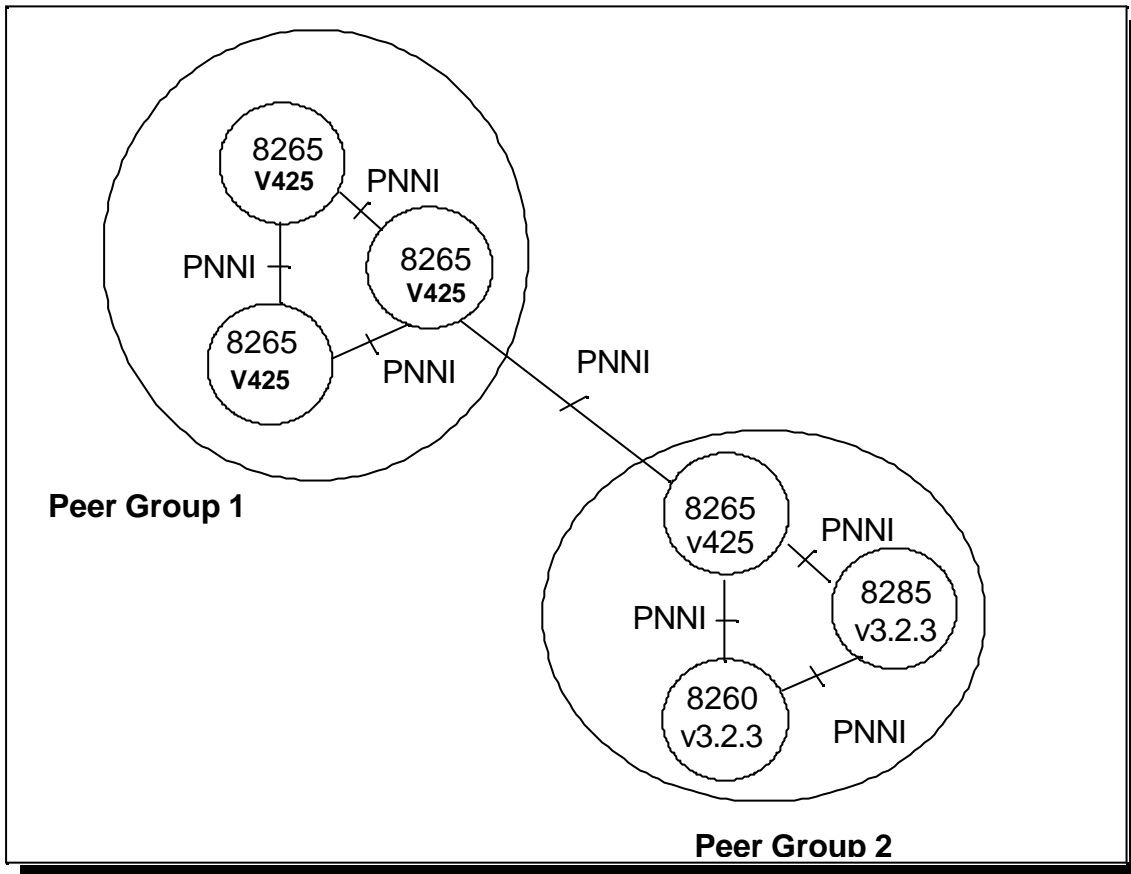
ex: the 8285 reachable address must be defined on 95 bits (**39.99.99.99.99.99.00.00.99.99.02**).

Thus, it's different from the first 95 bits of the current peer group ID

39.99.99.99.99.99.00.00.99.99.04.

Warning : Avoid to use a 95 bit address as '39.99.99.99.99.99.00.00.99.99.03' : the 96th bit being masked out, the last byte may mean (xx1x) '02' or '03'.

With V2 IISP Link



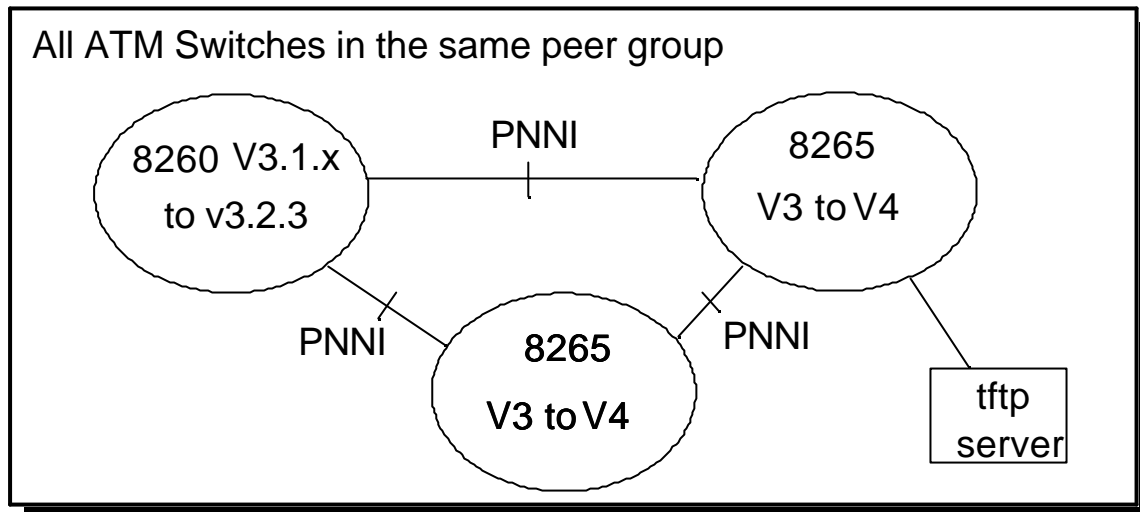
V2/V3/V4 Interoperating microcode levels :

ATM Switch	V3	V4 8265 CPSW FC6501&FC6502
8260	v3.2.3	not supported
8285	v3.2.3	not supported
8265	v3.3.5	v4.0.0 or higher

8260/8285/8265 ATM Switch Migration

Within one peer group

In this case the full PNNI Hierarchy function is disabled, the network is a flat PNNI type Network.



Migration Process

- Download and activate v3.2.3 code on the 8260 ATM Switches (working with the farthest 8260 to closest 8260 from the tftp server).
- Download and activate v4.2.5 on the 8265 ATM Switches (farthest to closest from tftp server)

This PNNI Peer Group will stay a flat PNNI Network, the hierarchy is disabled.

No PNNI setting is required (see Important Notice below)..

Minimum 8260/8285 code required before upgrade to v3.2.3 : **v3.1.7** or higher

Minimum 8265 code required before upgrade to v4.2.5 : **v3.3.2 or higher**

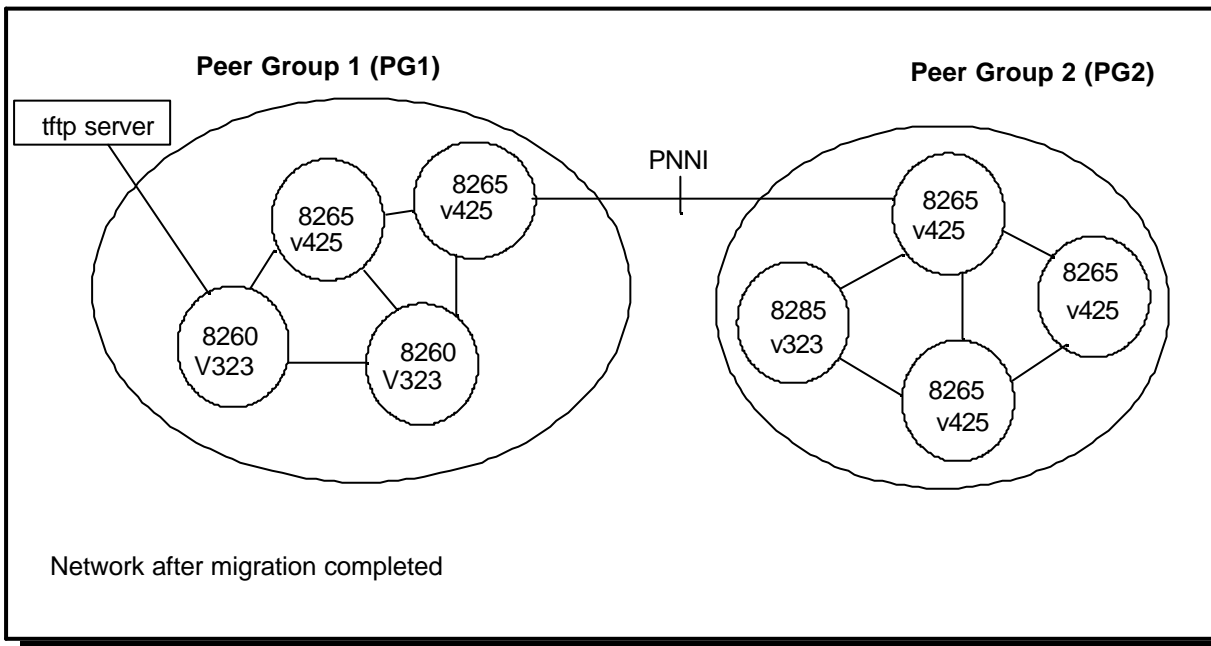
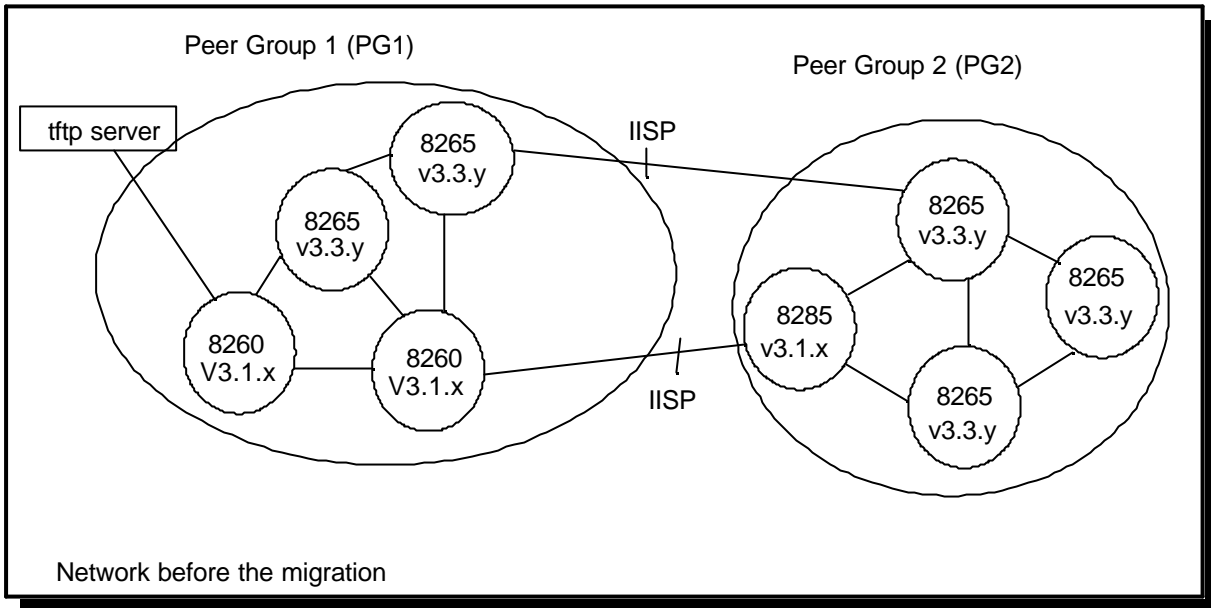
Important Notes :

- If Node:0 PNNI Level was changed to a level higher than 96 (e.g 88, 80,...), upon migration this higher level will stay the same, but Static Reachable addresses are by default migrated to UNI V4 organizational level 1 that maps to PNNI scoping level 96. These static reachable addresses will not be advertised outside of the switch. (Their scoping level is lower than the Node level).

To avoid this problem, before migration, set back the node:0 level to 96, or, after migration, set the static reachable address scoping to a higher organizational level (to a level at least equal to the node:0 one).

- At migration time from V3 to V4, any **PUBLIC UNI** links will turn to **VOID** links.

Within multiple peer group



Migration Process & Minimum PNNI settings

I/ Pre-Requisite V3 code Installation and Activation on 8260/8285 and 8265

- Download and Activate v3.2.3 code from the farthest to closest 8260/8285 ATM Switch.

II/ V4 code Installation and Activation on 8265

- Download and Activate v4 code from the farthest to closest 8265 ATM Switch

Minimum PNNI Hierarchy Settings :

Set Leadership priority at least on 2 nodes per Peer Group. One for the active and one as Backup Peer Group Leader.

Command : SET PNNI NODE:0 LEADER_PRIORITY N

N could be :

0=> Node can not be Peer Group Leader

1-205 => Priority level

III/ Enable PNNI Hierarchy

- In case two IISP links linked the two peer groups, you can remotely via telnet session, Disable the 8265(V4) IISP Port and re-enable it as PNNI Port on both ATM Switches.

IMPORTANT NOTE

- In case only one IISP link exists between the two peer groups, after the IISP port is disabled it will be impossible to join the remote 8265 via a telnet session. The disabled Port must be re-enabled locally as a PNNI Port with a local console.

IV/ Verify the old static Reachable addresses length, they should be shorter than 96 bits

- Address scoping for Static Reachable addresses
 - Defaultly Static Reachable addresses are migrated with scoping level "96" or UNI V4 scope 1-3 .
 - If you change node :0 level to higher value (eg:88), Static Reachable addresses won't be advertized outside the node.
 - To make the node advertized Static Reachable addresses increase their scope to (at least) node:0 level :
use the command : *SET REACHABLE_ADDRESS <slot.port> 88*
39.99999999999900009999
scope organizational : 4
 - Scope organizational : 4 maps Peer Group level 80.
 - Note that there is no other means of entering scope in V4.

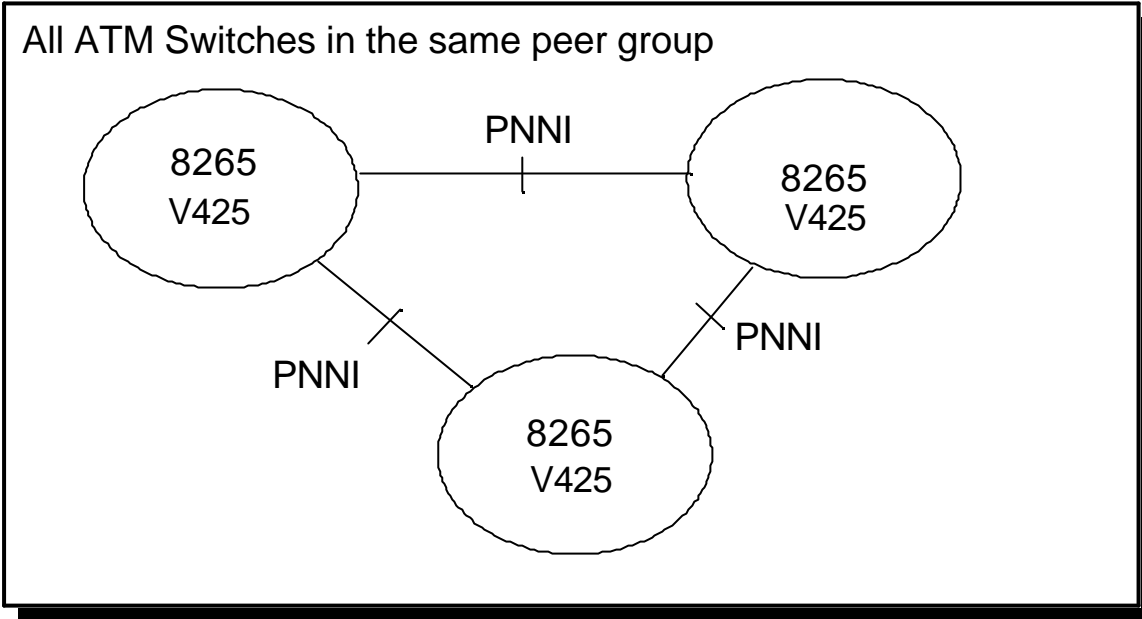


Default UNI Scope to PNNI Level Mappings

UNI scope	PNNI Routing Level Indicator
1-3	96
4-5	80
6-7	72
8-10	64
11-12	48
13-14	32
15 (global)	0

New 8265 ATM Switch V4.X Installation

Multiple 8265 V4 within a single PNNI Peer Group



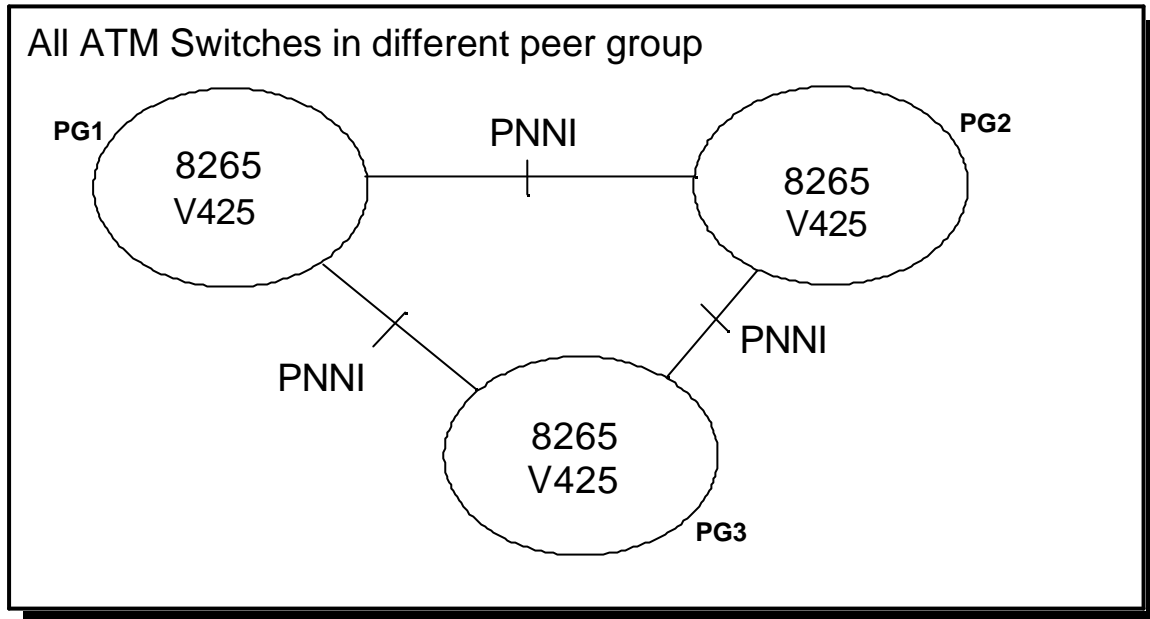
Minimum PNNI Settings

- ATM address to change on each Node (common Peer Group ID)

Note :

All other settings could be default

Multiple Peer Group



Minimum PNNI Settings

- ATM address to change in each Peer Group on each node
- Common Peer Group ID on each node in each Peer Group

Note :

All other settings could be default

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