

Cisco 6400 Node Route Processor Frequently Asked Questions

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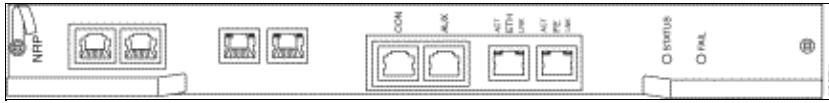
Related Information

Introduction

This document provides some frequently asked questions for the Cisco 6400 Node Route Processor.

Q. What is an NRP?

A. A Node Route Processor (NRP) is a router blade for the Cisco 6400. The NRP receives traffic from one or more Node Switch Processor (NSP) Asynchronous Transfer Mode (ATM) switch ports, re-assembles the ATM cells into packets, routes the packets, segments the routed packets, and sends them back to the ATM switch.



Q. What encapsulation does the NRP support?

A. The NRP supports RFC 1483 bridging, Point-to-Point Protocol over ATM (PPPoA), Point-to-Point Protocol over Ethernet (PPPoE), and RFC 1483 routing encapsulation.

Q. What existing hardware platform is the NRP based on?

A. The NRP1 is based on the 7200 Network Processing Engine (NPE)-200 core, but it does not use port adapters.

The NRP2 is comparable to the 7200's NPE-300.

Q. How many NRPs can be put into a Cisco 6400?

A. The maximum number of NRPs that can be put into a Cisco 6400 is eight, but the recommended maximum is six.

Q. What are the different ports available on the NRP and what are their functions?

A. The NRP1 has the following ports: standard Cisco console and auxiliary ports. It has a 10-BaseT Ethernet for network management. It has a 10/100 Fast Ethernet port for connection to external networking and data storage. It has an ATM OC-3 speed interface to the backplane, switch to switch fabric on the NSP through the backplane. It has a backplane Ethernet (BPE) to communicate with other cards on the chassis. The BPE is used to communicate with the NSP and other NRP's.

The NRP2 has only a gigabit Ethernet physical interface. A gigabit interface converter (GBIC) module and connector is required. Supported GBIC types include 1000BaseSX/LX/LH/ZX. Console access to the NRP2-SV is done through the NSP in the Cisco IOS software, refer to Methods for accessing the NRP2-SV. The NRP2-SV has a 622 Mbps ATM backplane interface. It uses the PAM mailbox which is a serial interface for internal system communication.

Q. How much main memory does the NRP have?

A. The NRP1 has 64 MB or 128 MB of DRAM. Memory is in two SIMM slots. Each slot must contain the same size memory chip.

Q. How many megabytes of fast packet memory does the NRP have?

A. The NRP1 has 4 MB of SRAM packet memory which is the fast packet memory.

Q. How many megabytes of L2 cache does the NRP have?

A. The NRP1 has 1 MB of L2 cache.

Q. How many megabytes of flash memory does the NRP have?

A. The NRP1 has 8MB or 16 MB of secondary flash memory, which stores the main Cisco IOS® image and large configurations.

The NRP2–SV has no onboard flash. All images and configuration data is stored on the NSP disks.

Q. How many megabytes of boot flash does the NRP have?

A. The NRP has 8MB or 16 MB of secondary flash memory, which stores the main Cisco IOS® image and large configurations.

The NRP2–SV has no onboard flash. All images and configuration data is stored on the NSP disks.

Q. How many megabytes of boot flash does the NRP have?

A. NRP has 4 MB of boot flash memory, which stores the Cisco IOS boot helper image.

The NRP2–SV has no onboard flash. All images and configuration data is stored on the NSP disks.

Q. What do the various LEDs in the NRP indicate?

LED	Status	Condition
Status	Steady Green	NRP is active (primary)
	Blinking Green	NRP is standby
	Steady Yellow	(secondary) Cisco IOS is not running
	Blinking Yellow	System is booting
	Off	NRP has no power
Fail	Steady Yellow	NRP failed
	Off	Normal operation
ETH	Blinking Green	Packets are being transmitted and received

	Off	No activity
ACT (Activity)	Steady	Port is operational
LNK (Link)	Green Off	No carrier is detected
FE	Blinking Green	Packets are being transmitted and received
	Off	No activity
ACT (Activity)	Steady	Port is operational
LNK (Link)	Green Off	No carrier is detected

Q. What is the processor used in the NRP1?

A. The processor used in the NRP1 is a MIPS R5K, as used in the NPE-200.

The NRP2-SV has two RM7000 RISC processors.

Q. What is the internal clock speed of the CPU?

A. The internal clock speed of the NRP1's CPU is 200 MHz.

The internal clock speed of the NRP2-SV's CPU is 270 MHz.

Q. What is the external clock speed?

A. The external clock speed for NRP1 is 50 MHz.

Q. Does the NRP support Online Insertion and Removal (OIR)?

A. Yes, the NRP1 and NRP2-SV support OIR.

Q. What are some of the level 2 and level 3 features present in NRP1 Cisco IOS?

1. L2F and L2TP. These are some of the virtual private dial-up network (VPDN) tunneling features used by ISPs.
2. Internet Engineering Task Force (IETF) compliant PPP over ATM. This includes support for 1000 subscribers.
3. Subscriber bridging.
4. Web cache control protocol (WCCP) . This allows the router to divert HTTP packets, received in the data stream to a locally attached Web cache engine.
5. Unspecified Bit Rate (UBR) service.
6. ATM VC output shaping through TI1585.
7. IOS level 3 QOS features like Committed Access Rate (CAR), weighted fair queuing (WFQ), Random Early Detection (RED), Weighted Random Early Detection (WRED).

Q. Can two NRPs be configured for redundancy?

A. Yes, two NRPs can be configured for redundancy as long as they are in adjacent slots. Either NRP can be configured as primary, with the other in redundant fail-over mode. To configure redundancy between two NRP's, they must be in adjacent odd/even slots. In other words, you can configure redundancy across NRP's in slots 1 and 2 or 3 and 4, but not 2 and 3 or 1 and 4.

Cisco IOS Software Release 12.0(3)DC added support for EHSA 1+1 redundancy for the Cisco 6400 Node Route Processor (NRP-1) card. Cisco IOS Software Release 12.2(13)T adds EHSA 1+1 redundancy support for the Node Route Processor 2 with Shaped Virtual Circuits (NRP-2SV).

Q. How do you configure redundancy in an NRP?

A. To configure full-height adjacent slots for redundant operation, perform the following tasks:

Step	Command	Task
1	Configure [terminal]	At the privileged EXEC prompt, enter configuration mode from the terminal.
2	redundancy	Select the redundancy configuration submode.
3	associate slot [slot]	Configure the two cards installed in the specified slots as a redundant pair. You need only specify the first member of the redundant pair; the second member is assumed to be the device installed in the adjacent slot.
3	prefer slot [slot]	Define which of the two redundant devices acts as the preferred device.

The following example shows how to configure two NRPs installed in slots 7 and 8 for redundant operation, where the device installed in slot 8 is the primary device:

```
Switch# config term
Switch(config)# redundancy
Switch(config-r)# associate slot 7
Switch(config-r-mc)# prefer 8
Switch(config-r-mc)# end
Switch#
```

Q. How do you ensure that the configuration is consistent between a pair of redundant NRPs?

A. To ensure that the configuration is consistent between redundant NSPs or NRPs, you can configure automatic synchronization between the two devices. You have the option of synchronizing just the startup configuration, the boot variables, the configuration register, or

all three configurations. After the configuration is complete, you can disable auto-configuration using the no command. The default setting for individual synchronizable options is no auto-sync. However, the default for the auto-sync command is auto-sync standard. To set automatic configuration synchronization between redundant NSPs or NRPs, use the following command in redundancy configuration mode:

Command	Task
auto-sync [startup-config bootvar config-register standard]	Synchronize the configuration between redundant NSPs/NRPs.

Q. What are the three major steps in the configuration of PPP over ATM for the Cisco 6400?

A. The three major steps in configuring PPP over ATM are:

1. Configuring ATM
2. Configuring PPP
3. Configuring the router to use AAA

Q. What are the steps involved in configuring ATM?

A. You can configure the ATM permanent virtual circuit (PVC) by using any of the following methods:

1. Directly in the virtual circuit (VC) configuration
2. Using VC-class inheritance
3. PVC discovery mechanism

Q. Give an example of configuring ATM directly in the VC configuration.

A. The following example shows a typical direct VC configuration for the Cisco 6400 NRP:

```
router(config-if)#pvc 0/40
router(config-if-atm-vc)#encapsulation aal5mux ppp
  virtual-Template 1
router(config-if-atm-vc)#ubr 384
router(config-if)#exit
```

Q. Give an example of configuring ATM using VC-class inheritance.

A. The following example shows a typical VC class configuration for the Cisco 6400 NRP:

```
router(config)#vc-class atm ppp-atm
router(config-vc-class)#encapsulation aal5mux ppp
  virtual-Template 1
router(config-vc-class)#ubr 384
router(config-vc-class)#exit
router(config)#interface atm 0/0/0
router(config-if)#class ppp-atm
router(config-if)#pvc 0/40
router(config-if)#exit
router(config-if)#pvc 0/41
router(config-if)#exit
```

Q. Give an example of configuring ATM using PVC discovery mechanism.

A. The following example shows a typical PVC discovery configuration for the Cisco 6400 NRP:

```
router(config)#vc-class atm ppp-atm
router(config-vc-class)#encapsulation aal5mux ppp
    virtual-Template 1
router(config-vc-class)#exit
router(config)#interface atm 0/0/0
router(config-if)#class ppp-atm
router(config-if)#atm ilmi-enable
router(config-if)#atm ilmi-pvc-discovery
router(config-if)#exit
```

Q. What are the steps involved in configuring PPP?

1. The first step in per-user configuration occurs when a virtual access interface is cloned from the virtual template. A virtual template is a configuration that is applied to each user as the user logs in. This virtual access inherits all the configuration specified in the virtual template and, when the virtual template is changed, the changes are automatically propagated to all virtual accesses cloned from that particular virtual template.
2. The second step in per-user configuration occurs when the user is identified. At that point, user-specific information, such as IP address authorization and user-specific route-maps, is downloaded from the authentication, authorization, and accounting (AAA) server and applied to the virtual access belonging to the user.

Q. Give an example of configuring Virtual templates with local pool.

A. The following example shows a typical virtual template configuration for the Cisco 6400 NRP:

```
router(config)#interface Virtual-Template 1
router(config-if)#ip unnumbered ethernet 0/0/0
router(config-if)#peer default ip address pool telecommuters
router(config-if)#ppp authentication chap

router(config)#ip local pool telecommuters 10.36.1.1 10.36.1.254
```

In the configuration above, it is assumed that all PPP over ATM VCs (users) cloned from virtual template 1 will use Challenge Handshake Authentication Protocol (CHAP) authentication and will be allocated an IP address from the pool named "telecommuters" configured on the router. In addition, the local end of the PPP over ATM connection is running without an IP address (recommended). Instead, the IP address of the e1/0 interface is used for addressability.

Q. Give an example of configuring Virtual templates with DHCP server.

A. The following example shows a typical different-class configuration for a virtual template where addresses are allocated from a DHCP server.

```
router(config)#ip dhcp-server
router(config)#interface Virtual-Template 2
router(config-if)#ip unnumbered ethernet 0/0/0
```

```
router(config-if)#peer default ip address dhcp
router(config-if)#ppp authentication pap
```

Q. How many virtual templates can be configured?

A. Up to 25 virtual templates can be configured.

Q. What are the steps involved in configuring AAA?

A. The following example shows a typical AAA for PPP configuration for the Cisco 6400 NRP:

```
router(config)#aaa new-model
router(config)#aaa authentication ppp [name][method]
```

The name option here refers to the name of this particular method list (or default, if it is the default list), and the method option is a list of methods, for our purposes either radius or tacacs+. For example, to configure virtual template 1 to use TACACS+ before RADIUS, and virtual template 2 to use RADIUS before TACACS+, you need to issue the following configuration commands:

```
router(config)#aaa new-model
router(config)#aaa authentication ppp list1 tacacs+ radius
router(config)#aaa authentication ppp list2 radius tacacs+
```

```
router(config)#interface Virtual-Template 1
router(config-if)#ip unnumbered ethernet 0/0/0
router(config-if)#ppp authentication chap list1
```

```
router(config)#interface Virtual-Template 2
router(config-if)#ip unnumbered ethernet 0/0/0
router(config-if)#ppp authentication chap list2
```

Occasionally, it is useful to keep a local database of user names and passwords, in which case the router should be configured to check the local database first before checking the AAA servers. The command to enable this is:

```
router(config)#aaa authentication local-override
```

For either TACACS+ or RADIUS, the router must be configured with the name or IP address of the server:

```
router(config)#radius-server host [server-name-or-ip] auth-port 1645
acct-port 1646
router(config)#radius-server key <radius-password>
```

Q. Give an example of configuring IRB on the NRP.

A. An example of configuring IRB on the NRP:

```
bridge irb
!
interface ATM2/0
no ip address
no ip directed-broadcast
no ip route-cache
```

```
no ip mroute-cache
!
interface ATM2/0.10032 point-to-point
no ip directed-broadcast
no ip route-cache
no ip mroute-cache
atm pvc 32 1 32 aal5snap
bridge-group 1
!
interface ATM2/0.10033 point-to-point
no ip directed-broadcast
no ip route-cache
no ip mroute-cache
atm pvc 33 1 33 aal5snap
bridge-group 1
!
interface BVI1
ip address 10.1.1.1 255.255.255.0
ip directed-broadcast

bridge 1 protocol ieee
bridge 1 route ip
bridge 1 aging-time 3602
```

Related Information

- [NRP2–SV Data Sheet](#)
- [Aggregation/DSLAM \(DSL Access Multiplexer\)](#)
- [Technical Support – Cisco Systems](#)

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