

Cisco 6400 Node Route Processor 2 with Shaped Virtual Circuit

The Node Route Processor 2 with Shaped Virtual Circuits (NRP-2SV) Module for the Cisco 6400 carrier-class broadband aggregator performs aggregation and termination of large numbers of broadband subscribers, while providing the increased bandwidth per subscriber critical to the introduction of new services. The Cisco 6400 NRP-2SV lets operating companies and service providers achieve a cost-effective, high-bandwidth solution for their subscribers, without having to sacrifice high-touch services.

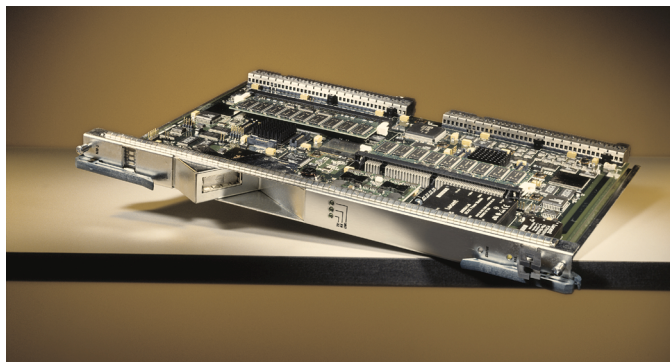
Shown in Figure 1, the Cisco 6400 NRP-2SV is the engine that runs Layer 2.5 and Layer 3 integrated high-touch services for the Cisco 6400. The Cisco 6400 NRP-2SV may receive subscribers over its Gigabit Ethernet interface or over its ATM backplane via OC-3, OC-12, or DS3 interfaces on node line cards (NLCs). The Cisco 6400 Node Switch Processor (NSP) switches incoming virtual circuits or virtual paths to the appropriate Cisco 6400 NRP-2SV. The Cisco 6400 NRP-2SV aggregates and terminates the incoming virtual circuits, offering high-performance extended services based on the Cisco IOS[®] Feature Set.

Feature Summary

Hardware

- OC-12 segmentation and reassembly (SAR) with support for 8000 virtual-circuit terminations
- Support for per-virtual circuit shaping, per-virtual circuit statistics
- Hardware support for IP+ATM functionality
- 2-MB external cache
- 2 x 256-MB Error-Correcting Code (ECC)-protected synchronous dynamic random-access memory (SDRAM), with optional upgrade to 2 x 512-MB ECC-protected SDRAM

Figure 1
Cisco 6400 NRP-2SV
Module





Packet Interface

- Modular Gigabit Ethernet packet interface
- IEEE 802.3z-compliant Gigabit Ethernet specifications
- Support for short-/medium-/long-haul gigabit interface converter (GBIC) interface modules
- Support for autonegotiation and IEEE 802.3x flow control
- Full-duplex operation
- 802.1Q and Inter-Switch Link (ISL) virtual LAN (VLAN) support
- 1500 maximum transmission unit (MTU) size

Features and Benefits

Table 1 gives the features and benefits of the Cisco 6400 NRP-2SV.

Table 1 Features and Benefits of Cisco 6400 NRP-2SV

Features	Benefits
Increased session scalability	The Cisco 6400 NRP-2SV increases the capacity of the Cisco 6400 from 14,000 to 48,000 sessions, giving service providers a dramatic reduction in cost per subscriber. Each blade is capable of supporting up to 8000 subscriber sessions.
Modular design	The modular nature of the Cisco 6400 NRP-2SV allows service providers to upgrade as their subscriber base grows. As the demand for services rises, additional Cisco 6400 NRP-2SV modules can be added to the Cisco 6400 to provide increased session and bandwidth support.
Integrated system management	Configuration storage, console traffic, and network management traffic are now controlled by the existing NSP, providing a manageable and integrated platform to the user. The NSP provides a single console port and single management Ethernet interface to configure and monitor all Cisco 6400 NRP-2SVs in the chassis.
Backward compatibility	The Cisco 6400 NRP-2SV can be deployed in a Cisco 6400 chassis with existing modules, including the NRP-1. Service providers can increase their network capacity to meet market demands without replacing the chassis.

Cisco 6400 NRP-2SV Module Features Flexible Memory Options

Depending on the bandwidth and subscriber count, sufficient buffering must be available for Layer 3 queuing and processing requirements. The Cisco 6400 NRP-2SV Module implements buffering memory with ECC-protected SDRAM modules, giving service providers the flexibility to install the requirements for their subscriber needs and to upgrade their requirements when necessary. The Cisco 6400 NRP-2SV Module provides 256- and 512-MB ECC-protected SDRAM options. Table 2 gives part numbers for the Cisco 6400 NRP-2SV modules.

Table 2 Part Numbers for Cisco 6400 NRP-2SV Modules

Part Number	Description
MEM-NRP2-256M	Default 256-/256-MB (2 x 256 MB)



Table 2 Part Numbers for Cisco 6400 NRP-2SV Modules

Part Number	Description
MEM-NRP2-512M	Option upgrade 512-/512-MB (2 x 512 MB)

Cisco 6400 NRP-2SV Module Gigabit Ethernet Interface Options

The Cisco 6400 NRP-2SV Module supports GBIC modular technology to ensure that customers have maximum flexibility in configuring physical network interfaces in their Gigabit Ethernet networks. GBICs are changeable without powering down the card or the chassis (“hot swap”), and they provide an easy method of changing physical interfaces. Cisco currently supports two GBICs on the Cisco 6400 NRP-2SV (1000BASE-SX and 1000BASE-LX/LH GBIC), supporting connectivity of up to 10 kilometers (over premium single-mode fiber or dispersion-shifted single-mode fiber). Table 3 lists the Gigabit Ethernet interface options.

Table 3 Gigabit Ethernet Interface Options

Gigabit Ethernet Interface Options	
C6400-GBIC-SX	1000BASE-SX GBIC—Cisco standardized multimode up to 500m
C6400-GBIC-LHLX	1000BASE-LH GBIC—Cisco standardized single mode up to 10 km

Specifications

Physical

- Occupies a single slot
- Height: 16.0 in. (40.6 cm)
- Depth: 10.0 in. (25.4 cm)

Environmental

- Operating temperature: 32° to 104°F (0° to 40°C)
- Storage temperature: –40° to 158°F (–40° to 70°C)
- Relative humidity: 5 to 95%, noncondensing
- Altitude: 10,000 ft (3048m)

Regulatory Compliance

- UL 1950, Third Edition
- CSA C22.2, No. 950-95, Third Edition
- EN 60950

Electromagnetic Emissions Certification

- FCC Class A (Part 15)
- EN 55022 Class B
- CE Mark



- VCCI Class II
- Network Equipment Building Standards (NEBS) Level 3
- European Telecommunication Standards Institute (ETSI)

Mean Time Between Failure

- 1.5 x 10⁵ hours (17 years) mean time between failure (MTBF)

LEDs

- Alphanumeric display
- Link
- Transmission activity
- Receive activity
- Status
- Fail

Connectors

- 1000BASE GBIC modular packet interface
- Support for SX and LH/LX modules

Management

- Cisco Service Connection Manager (SCM)
- Cisco Element Management Framework (EMF)

System Feature

- Hot-swap without system interruption

Optical Power Budgets

Table 4 gives power information for the Cisco 6400 NRP-2SV Module.

Table 4 Power Information for Cisco 6400 NRP-2SV Module

Parameter	Unit
1000BASE-SX GBIC (multimode)	• Power budget: 7.5 dB
	• Transmit power: 9.5 to 0 dBm
	• Receive power: 17 to 0 dBm
1000BASE-LH/LX GBIC (single mode)	• Power budget: 8 dB
	• Transmit power: 11 to -3 dBm
	• Receive power: 19 to -3 dBm



Ordering and Availability

The Cisco 6400 NRP-2SV Module is orderable today. The Cisco 6400 NRP-2SV Module requires Cisco IOS Software Release 12.2(2)B6 or higher.

Table 5 gives descriptions and part numbers for components of the Cisco 6400 NRP-2SV Module.

Table 5 Descriptions and Part Numbers for Components of Cisco 6400 NRP-2SV Module

Part Number	Part Description
C6400-NRP-2SV(=)	Cisco 6400 NRP-2SV Module with default 2 x 256-MB SDRAM
Cisco IOS Software options	
S64J31-12202B	Cisco 6400 Cisco IOS Software for NRP: Base, label switch controller (LSC), or Multiprotocol Label Switching virtual private network (MPLS VPN)
S64J51-12202B	Cisco 6400 Cisco IOS Software for NRP with Multidomain
S64J61-12202B	Cisco 6400 Cisco IOS Software for NRP with WebSelection
Memory options	
MEM-NRP2-256M	Default 256-/256-MB (2 x 256 MB)
MEM-NRP2-512M	Optional upgrade 512-/512-MB (2 x 512 MB)
Gigabit Ethernet interface options	
C6400-GBIC-SX	1000BASE-SX GBIC—Cisco standardized multimode up to 500m
C6400-GBIC-LHLX	1000BASE-LH GBIC—Cisco standardized single mode up to 10 km

Special Notes

To enable support for the Cisco 6400 NRP-2SV, you must use Cisco IOS Software Release 12.2(2)B6 or higher on the NSP module in the Cisco 6400 chassis.

For more information, contact the Cisco 6400 marketing team at ask-6400-pm@cisco.com



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