

Cisco 10000 Series Performance Routing Engine

Service providers, particularly for the network edge, face the challenges of the ever-growing demands on scaling, performance, service availability, and operational cost reductions. The Cisco® 10000 Series Performance Routing Engine (PRE-2) is the next-generation route processor for the Cisco 10000 Series. It offers service providers the combined advantages of high performance, rich features, scalability, as well as high availability for their edge aggregation applications (Figure 1).

Figure 1

Product Overview

The Cisco 10000 Series is a service provider edge aggregation router that offers a single solution for leased-line, ATM, Frame Relay, and broadband aggregation while providing customers with high-performance IP services, maximum platform scalability, and high availability.

Designed to address

Internet-service-provider (ISP) requirements for high-capacity, leased-line aggregation, as well as broadband aggregation with sophisticated IP services, the Cisco PRE-2 uses the Cisco patented Parallel Express Forwarding (PXF) technology. PXF is a parallel multiprocessor architecture that enables deployment of multiple IP services while maintaining peak performance throughput.

Benefits of the Cisco 10000 Series PRE-2 include:

- Provides up to 6.2 mpps of processing power in the Cisco 10000 Series
- Backplane supports up to 6.4 Gbps duplex per slot
- Uses Cisco patented PXF technology to provide maximum IP services performance
- Supports processor redundancy—for enabling 99.999-percent network uptime

Features and Benefits Overview

Table 1 lists the features and benefits of the Cisco 10000 Series PRE-2.

Cisco 10000 Series
PRE-2





Table 1 Features and Benefits of Cisco 10000 Series PRE-2

Features	Benefits
Provides up to 6.2-mpps processing	Customers aggregating leased lines, ATM, Frame Relay, and broadband aggregation traffic require line-rate performance with a wide variety of features enabled. The Cisco 10000 Series with PRE-2 provides the IP services and performance that service providers require when deploying new revenue-generating services.
Uses Cisco patented PXF technology to provide maximum IP services performance	PXF technology provides the Cisco 10000 Series with performance and flexibility. Using PXF, the Cisco 10000 Series enables service providers to turn on multiple services without experiencing performance degradation. This is crucial when service providers look to upsell customers to new types of services. In addition, PXF is a software-based technology that enables the Cisco 10000 Series to implement new services without upgrading hardware—thereby providing investment protection and saving customers time and money.
Supports processor redundancy—for enabling 99.999-percent network uptime	Each Cisco 10000 chassis supports up to 2 PRE-2s for redundancy. Architected to support 99.999-percent uptime and coupled with a superior set of high-availability features and functions, the Cisco 10000 Series is the industry's leading carrier-class edge aggregation platform.

Product Specifications

Hardware Features

- Hot-swappable (with redundant PRE-2 modules)
- 500-MHz RM7000 millions-of-instructions-per-second (mips) processor with integrated 16-KB data and 16-KB instruction Level 1 caches and integrated 256-KB Level 2 cache, as well as 4-MB Level 3 cache
- Two PCMCIA card slots (compatible with PCMCIA card interface on previous PREs)
 - Either PCMCIA card slot can be a memory or input/output (I/O) device
 - Both of the PCMCIA card slots are capable of supporting Type I or II cards
- 64 MB of Flash memory
- 256-MB packet buffer
- 2 MB of nonvolatile RAM (NVRAM)
- 1 GB of DRAM
- Route processor main memory Error-Correcting Code (ECC) supported
- One Ethernet 10-/100-Mbps network management interface with an RJ-45 connector
- Serial console port
- Auxiliary (modem) port
- Alarm contacts (critical, major, minor)
- Push-button reset



PXF Hardware Features

- Four PXF network processors (containing a total of 64 individual processors)
- Two independent 32-MB SDRAM control memories on each processor set
- 128 MB of PXF configuration memory (per column)
- 1 GB of PXF configuration memory (total)
- Support for PXF column memory ECC
- Support for PXF packet buffer memory ECC
- Backplane interconnect application-specific integrated circuit (ASIC) for buffer management, flow control, management to the network processor, and interface to the Cisco 10000 Series backplane

Software Features

Through the use of PXF, the Cisco 10000 Series PRE-2 separates control-plane functions from data-plane functions. A general-purpose Reduced Instruction Set Computer (RISC) processor (500-MHz mips RM7000) supports control-plane functions of packet switching, administration, and configuration.

Multiple PXF network processors support data-plane functions—including high-performance Layer 3 forwarding. The combination of a general-purpose RISC processor with advanced programmable PXF network processors provides maximum flexibility while maintaining maximum throughput of essential IP services such as quality of service (QoS), Multiprotocol Label Switching (MPLS), and access policy filtering. For a detailed list of software features supported on the PRE-2, see:

http://www.cisco.com/en/US/products/hw/routers/ps133/prod_bulletins_list.html

High-Availability Features

- Online insertion and removal (OIR)
- Cisco IOS[®] Software Route Processor Redundancy Plus (RPR+)

Product Specifications

Physical

- Dimensions (H x W x D): 16.0 x 1.91 x 9.97 in. (40.64 x 4.84 x 25.32 cm)
- Weight: 8.45 lb (3.84 kg)

Environmental

- Storage temperature: -38 to 150 F (-40 to 70 C)
- Operating temperature, nominal: 41 to 104 F (5 to 40 C)
- Operating temperature, short term: 23 to 131 F (-5 to 55 C)
- Storage relative humidity: 5 to 95 percent relative humidity (RH)
- Operating humidity, nominal: 5 to 85 percent RH
- Operating humidity, short term: 5 to 90 percent RH
- Operating altitude: -60 to 4000m



Regulatory Compliance

Safety

The module meets the following safety standards:

- UL 60950/CAN/CSA-C22.2 No. 60950-00, third edition, dated December 1, 2000, with no deviation considered to be less stringent than IEC 60950
- EN 60950 with Amendments 1–4, for CE Marking to the LVD directive
- IEC 60950 third edition with Amendments 1–4, including all national and group deviations
- AS/NZS 60950:2000
- AS/NZS 3260-1993 with Amendments 1–4
- ACA TS001-1997

Electromagnetic Emissions Certification

- AS/NZ 3548: 1995 (including AMD I + II) Class B
- EN55022: 1998 Class B
- CISPR 22: 1997
- EN55022: 1994 (including AMD I + II)
- 47 CFR Part 15: 2000 (FCC) Class B
- VCCI V-3/01.4 Class 2
- CNS-13438: 1997 Class B
- GR1089: 1997 (including Rev. 1: 1999)

Immunity

- EN300386: 2000-TNE EMC requirements; product family standard; high priority of service; central office and noncentral office locations
- EN50082-1:1992/1997
- EN50082-2: 1995-Generic Immunity Standard, Heavy Industrial
- CISPR24: 1997
- EN55024: 1998-Generic ITE immunity standard
- EN61000-4-2: 1995 + AMD I + II ESD, Level 4/8 kV contact, 15 kV air
- IEC-1000-4-3: 1995+AMD 1-Radiated Immunity, 10 V/m
- IEC-1000-4-4: 1995-Electrical Fast Transients, Level 4/4 kV/B
- IEC-1000-4-5: 1995+AMD 1-DC Surge-Class 3; AC Surge-Class 4
- EN61000-4-6: 1996+AMD 1-RF conducted immunity, 10 Vrms
- EN61000-4-11: 1995-Voltage Dips and Sags
- ETS300 132-2: 1996+corregendum, December 1996
- GR1089:1997 (including Rev1: 1999)



Network Equipment Building Standards

The module meets the following Networking Equipment Building Standards (NEBS):

- Level 3 compliant
- Telcordia SR-3580 Criteria Levels, issued 11/95
- GR-1089-CORE: Electromagnetic Compatibility & Electrical Safety, issued 10/02
- GR-63-CORE: Physical Protection Requirements, issued 4/02
- SBC Equipment Requirements: TP76200 MP and TP76400 MP
- Verizon Equipment Requirements: SIT.NEBS.TE.NPI.2002.010

European Telecommunication Standards Institute

- ETS 300 386-1—Levels for equipment with a “high priority of service” that is installed in “locations other than telecommunication centers”
- ETS 300 386-2:1997—Levels for equipment with a “high priority of service” that is installed in “locations other than telecommunication centers”
- ETSI 300 132-2: December 1994—Power supply interfaces at the input to telecommunications equipment Sections 4.8 and 4.9

LEDs

- Alarms Critical/Major/Minor (yellow, three per card)
 - ON indicates an alarm condition
 - OFF indicates no alarm
- Fail (yellow, one per card)
 - ON indicates that a major failure has disabled the PRE-2
 - OFF indicates that the PRE-2 is operating properly
- Status (bicolor, one per card)
 - Flashing yellow indicates that the system is booting
 - Green indicates that PRE-2 is active (as a primary)
 - Flashing green indicates that PRE-2 is standby (as a secondary)
 - OFF indicates no power to PRE-2
- Ethernet Activity/Link (green, two per card)
 - Activity—Green indicates packets are being transmitted and received
 - Link—Green indicates carrier detected; the port is able to port traffic
- PC card slot 0 (green—ON indicates slot 0 is active)
- PC card slot 1 (green—ON indicates slot 1 is active)

Network Management

- Network Management through
 - Telnet (command-line interface [CLI])
 - Console port (through the CLI)
 - Simple Network Management Protocol (SNMP)



- RFC 2665
- Management Information Bases (MIBs); a partial list of supported MIBs includes:
 - SONET MIB
 - DS3 MIB
 - DS1 MIB
 - Frame Relay MIB
 - MIB II (Interfaces MIB, RFC 1213)
 - TCP MIB
 - UDP MIB
 - RS232 MIB
 - OSPF MIB
 - BGP4 MIB
 - IGMP MIB
 - IPMROUTE MIB
 - PIM MIB
 - RMON MIB
 - Cisco RTTMON MIB
 - Cisco CAR MIB
 - Cisco IP Stat MIB
 - Cisco Config Copy MIB
 - Cisco Frame Relay MIB
 - Cisco CDP MIB
 - Cisco Config Management MIB
 - Cisco Image MIB
 - Cisco IPMROUTE MIB
 - Cisco Memory Pool MIB
 - Cisco Ping MIB
 - Cisco TCP MIB
 - Cisco Entity Sensor MIB (Replaces ENVMON MIB)
 - Cisco Process MIB
 - Entity MIB (Replaces OLD-CISCO-CHASSIS-MIB)
 - Cisco Bulk File MIB
 - Cisco FTP Client MIB

Power Budget

Unit power: 200W



Product System Requirements and Compatibility

Hardware Requirements

- The PRE-2 is supported in the Cisco 10008 chassis.
- The PRE-2 is supported in all line cards currently shipping on the Cisco 10000 Series in the software trains in which PRE-2 is available.

Software Requirements

The PRE-2 is supported in Cisco IOS Software Release 12.2(15)BX and later releases. For information about releases that support the PRE-2, refer to:

http://www.cisco.com/en/US/products/hw/routers/ps133/prod_bulletins_list.html

Product Ordering Details

Visit:

http://www.cisco.com/public/ordering_info.shtml

to place an order.

Product Ordering Details: Product Part Number

Table 2 gives part numbers for ordering the Cisco 10000 Series PRE-2.

Table 2 Part Numbers for Cisco 10000 Series PRE-2

Product Number	Product Description
10000-PRE2	Cisco 10000 Series PRE, 1-GB DRAM and 64-MB Flash
10000-PRE2=	Cisco 10000 Series PRE, 1-GB DRAM and 64-MB Flash, spare
10000-PREMEMFD64	Cisco 10000 Series PRE 64-MB Flash Disk (default on PRE-2)
10000-PREMEMFD64=	Cisco 10000 Series PRE 64-MB Flash Disk (default), spare
ESR-PRE-MEM-FD128	Cisco 10000 Series PRE 128-MB Flash disk
ESR-PRE-MEM-FD128=	Cisco 10000 Series PRE 128-MB Flash disk, spare

Product Ordering Details: Migration Program

A Cisco Technology Migration Plan (TMP) has been established for this product. The TMP is a sales program that allows customers to trade in Cisco products to receive a trade-in credit toward the purchase of any new Cisco product. The program underscores Cisco's commitment to the customer in terms of end-to-end product solutions as well as emphasizing the company's commitment to provide effective migration options for ever-changing network requirements.

More specifics about this program are available at:

<http://www.cisco.com/go/tradein>.

Service and Support

Cisco Systems® offers a wide range of service and support options for its customers. More information about Cisco service and support programs and benefits can be found at:

<http://www.cisco.com/en/US/support/index.html>



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