

Cisco 10000 Series Performance Routing Engine PRE-1

The Cisco 10000 Series PRE-1 is a centralized processing engine that provides up to 2.6 million packets per second (MPPS) performance. PRE-1 enables service providers to deploy a wide range of revenue-generating IP services while offering consistent, high-performance throughput.

Figure 1
Cisco 10000 Series Performance Routing Engine PRE-1



Designed to address Internet service provider (ISP) requirements for high-capacity, leased-line aggregation with sophisticated IP services, the PRE-1 utilizes the Cisco-patented Parallel express Forwarding (PXF) technology. PXF is a multiple-processor architecture that enables deployment of multiple IP services while maintaining peak performance throughput.

Benefits of PRE-1 include:

- Provides up to 2.6 MPPS of centralized processing in the Cisco 10000 Series.
- Uses Cisco-patented PXF technology to provide maximum IP services performance.
- Supports processor redundancy—for enabling 99.999% network uptime.

Features	Benefits
Provides up to 2.6 MPPS of centralized processing in the Cisco 10000 Series.	Customers aggregating leased line, ATM, Frame Relay, and Broadband aggregation traffic require line-rate performance with a wide variety of features enabled. The Cisco 10000 Series with PRE-1 provides the IP services performance 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 IP services 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 up-sell 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 saving customers time and money.
Supports processor redundancy—for enabling 99.999% network uptime.	Each Cisco 10000 chassis supports up to two PRE-1s for redundancy. Coupled with an unparalleled set of high availability features and functionality, the Cisco 10000 Series is Cisco's premier carrier-class edge aggregation platform.

Product Specifications: Components

Hardware Features

- Hot-swappable (with redundant PRE-1 modules)
- 262-MHz PMC RM7000 MIPS processor with integrated 16 KB data and 16 KB instruction Level 1 caches and integrated 256 KB Level 2 cache
- 2 MB Level 3 cache
- Two PCMCIA slots
 - Either PCMCIA slot can be a memory or I/O device
 - One slot can support Type I and II cards only, the other slot can support Type I, II, or III cards
- 32 MB of FLASH memory
- 128-MB packet buffer
- 512 KB of NVRAM
- 512 MB of DRAM
- Route Processor Main Memory Error Correction Code (ECC)
- One Ethernet 10/100 Mbps network management interface with an RJ-45 connector
- Serial console port
- Auxiliary (modem) port
- Push button reset

PXF Hardware Features

- Two PXF Network Processors (containing a total of 32 individual processors)
- Each processor set has two independent 32-MB SDRAM control memories
- 128 MB of PXF Configuration Memory (per column)
- 1 GB of PXF Configuration Memory (total)
- PXF Column Memory Error Correction Code (ECC)

- PXF Packet Buffer Memory Error Correction Code (ECC)
- Backplane interconnect 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, PRE-1 separates control plane functionality from data plane functionality. A general-purpose RISC processor (262-300 MHz MIPS RISCMark RM7000) supports control plane functions of packet-switching, administration, and configuration. Multiple PXF Network Processors support data plane functionality—including high-performance Layer 3 forwarding. The combination of a general purpose RISC processor with advanced programmable PXF Network Processors provide maximum flexibility while maintaining maximum throughput of essential IP services such as quality of service (QoS), multi-protocol label switching (MPLS), and access policy filtering. For a detailed list of software features supported on PRE-1, refer to:

http://www.cisco.com/go/cis/products/10000s/10k_SW_rchpxf

Product Specifications: Environmental Conditions

- 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% relative humidity (RH)
- Operating humidity, nominal: 5% to 85% RH
- Operating humidity, short term: 5% to 90% RH
- Operating altitude: -60 m to 4000 m

Product Specifications: Physical Specifications

- Height: 16.0" (40.64 cm)

- Width: 1.91" (4.84 cm)
- Depth: 9.97" (25.32 cm)
- Weight: 7.5 lbs (3.41 kg)

LEDs

- Alarm: Yellow LED indicates that an alarm condition exists when it is lit
- Fail: Yellow LED indicates PRE-1 failure when lit
- Status: Bi-color LED will blink yellow while a PRE-1 is booting up, on a working PRE-1, it will be steady green if the PRE-1 is the primary, or blinking green if the PRE-1 is the redundant backup; blinking is done in software Network Management Ethernet (NME) and Backplane
- Ethernet (BPE) link status: These are "virtual" LED status bits that show the state of the NME and BPE links

Power Budget

- Unit Power: 80W

Network Management

- Network Management via
 - Telnet (CLI)
 - Console port (CLI)
 - Simple Network Management Protocol (SNMP)
- RFC 2665
- Management Information Bases (MIBs). Partial list of supported MIBs include:
 - 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

Product Regulatory Approvals

- UL60950/CAN/CSA-C22.2 No. 60950-00, third edition, dated December 1, 2000 with no deviation considered to be less stringent than IEC 60950
- EN60950 with Amendments 1-4, for CE Marking to the LVD directive
- IEC 60950 third edition with Amendments 1-4 including all national/group deviations
- AS/NZS 60950:2000
- AS/NZS 3260-1993 with Amendments 1-4
- ACA TS001-1997

Product Regulatory Compliance

Product Regulatory Compliance: Electromagnetic Emissions Certification

- AS/NZ 3548:1995 [incl Amd I + II] Class B
- EN55022:1998 Class B
- CISPR 22:1997
- EN55022:1994 [incl 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 [incl Rev1: 1999]

Product Regulatory Compliance: Immunity

- EN300386:2000-TNE EMC requirements. Product family standard. High priority of Service. Central office and Non-central 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/ 8kV contact,15kV air/
- IEC-1000-4-3:1995+AMD 1-Radiated Immunity, 10V/m
- IEC-1000-4-4:1995-Electrical Fast Transients, Level 4/ 4kV/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, 10Vrms
- EN61000-4-11:1995-Voltage Dips and Sags
- ETS300 132-2:1996+corregendum, Dec 1996
- GR1089:1997 [incl Rev1: 1999]

Product Regulatory Compliance: Network Equipment Building Systems

- Level 3 compliant
- Bellcore SR-3580 Criteria Levels, issued 11/95
- GR1089-Core: Electromagnetic Compatibility & Electrical Safety, issued 12/97
- GR63-Core: Physical Protection Requirements, issued 10/95
- SBC Equipment Requirements: TP76200 MP & TP76400 MP
- Verizon Equipment Requirements: SIT.NEBS.TE.NPI.2000.004 Rev. 1

Product System Requirements and Compatibility

Hardware Requirements

- Chassis: The PRE-1 is supported in the Cisco 10008 and Cisco 10005 chassis.
- Line cards: The PRE-1 is supported with all line cards currently shipping on the Cisco 10000 Series in the software trains in which PRE-1 is available.

Software Requirements

Initial IOS Releases: PRE-1 is supported in 12.0(15)SL, 12.0(17)ST, and 12.0(22)S and later Cisco IOS® releases. For the latest PRE-1 IOS release information, refer to:

<http://www.cisco.com/go/info/Support-IMS/what/whswmatmg>

Product Ordering Details

Please visit http://www.cisco.com/public/ordering_info.shtml to place an order.

Product Ordering Details: Product Part Number

Product Number	Product Description
ESR-PRE1	Performance Routing Engine, 512 DRAM and 32M Flash
ESR-PRE1=	Performance Routing Engine, 512 DRAM and 32M Flash, SPARE
ESR-PRE-MEM-FD48	Cisco 10000 Series PRE-1 48M Flash Disk (default)
ESR-PRE-MEM-FD48=	Cisco 10000 Series PRE-1 48M Flash Disk, SPARE
ESR-PRE-MEM-FD128	Cisco 10000 Series PRE-1 128M Flash Disk option
ESR-PRE-MEM-FD128=	Cisco 10000 Series PRE-1 128M Flash Disk option, SPARE

Product Ordering Details: Ordering Information

It is recommended that customers who order spare carriers also order enough blanks to ensure there are no empty slots in a configured system.

Product Ordering Details: Migration Program

A Cisco Technology Migration Plan (CTMP) has been established for this product.

The Technology Migration Plan is a sales program that allows customers to trade in Cisco products to receive a trade-in credit towards 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 to the customer Cisco's commitment to provide effective migration options in the face of ever-changing network requirements.

More specifics about this program can be found 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 on Cisco service and support programs and benefits can be found at:

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

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