

## Cisco 10000 Series Performance Routing Engine 3

The Cisco® 10000 Series Performance Routing Engine 3 (PRE-3) (Figure 1) increases the performance, feature set, and scalability of the Cisco 10000 Series Router.

### 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.

Service providers require scalable networks to profitably meet their customers' requirements for better performance, more services, and higher reliability. Edge routers, such as the Cisco 10000 Series, will be needed to manage higher-bandwidth requirements, more subscribers, and multiple service levels ranging from best-effort consumer Internet data services to high-priority business applications, voice, and video.

**Figure 1.** Cisco 10000 Series Performance Routing Engine 3



Designed to meet new requirements from service providers for high-capacity aggregation with sophisticated IP services, the Cisco 10000 Series PRE-3 uses the latest generation of the Cisco patented Parallel Express Forwarding (PXF) technology. PXF is a parallel multiprocessor architecture that helps enable deployment of multiple IP services while maintaining peak performance throughput. The PRE-3 also introduces the Hierarchical Queuing Framework (HQF) to the Cisco 10000 Series Routers. The HQF implementation on the PRE-3 allows three levels (class, logical, and physical) of scheduling to apply queuing and shaping (see Figure 2).

### Applications

The Cisco 10000 Series PRE-3 can be used to deliver triple-play services for both ATM and Ethernet transport networks. A service provider can use the flexibility and performance of the PRE-3 to simultaneously deliver data, voice, and video to both residential and business customers.

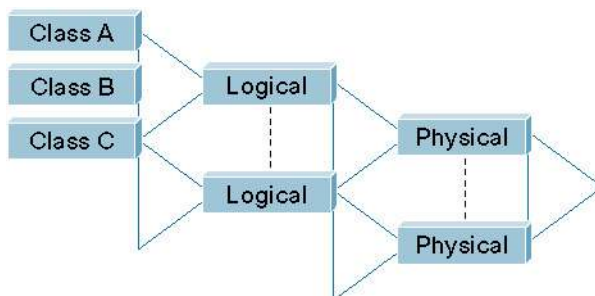
Ethernet service examples include:

- Class – Multiple packet queues for data, voice, or video
- Logical – PPP sessions grouped by Gold, Bronze, or Silver packages for bandwidth and quality of service (QoS) levels
- Physical – VLANs to separate consumer, business, and wholesale customers

ATM service examples include:

- Class – Multiple packet queues for data, voice, or video
- Logical – ATM VCs (virtual circuits) grouped by Gold, Bronze, or Silver packages for bandwidth and QoS levels
- Physical – ATM Virtual Paths (VPs) to separate consumer, business, and wholesale customers

**Figure 2.** Examples of Three-Level Scheduling with HQF and the Cisco 10000 Series PRE-3



### Key Features and Benefits

The Cisco 10000 Series PRE-3 delivers both scalability improvements and new features:

- Provides up to 9.7 million packets per second (mpps) of processing power for increased throughput
- Implements Hierarchical Queuing Framework (HQF) for up to three levels of service granularity
- Supports connection between the PRE-3 and the 51-Gbps chassis backplane
  - 3.2 Gbps transmit and receive to each full-height line card
  - 1.6 Gbps transmit and receive to each half-height line card
- Includes 800-MHz route processor with 2GB ECC protected DRAM for new features and scalability improvements
- Delivers enhanced storage options for larger and more complex configurations
  - 14 MB nonvolatile RAM (NVRAM)
  - 128 MB Compact Flash – fixed internal memory
  - 512 MB or 1GB Compact Flash – front panel removable memory
- Uses Cisco patented PXF technology to provide maximum IP service flexibility without performance impact
- Supports processor redundancy – helping enable 99.999-percent network uptime

## Product Specifications

**Table 1.** Product Specifications

Description	Specification
<b>Product Compatibility</b>	Compatible with the Cisco 10008 8-slot chassis
<b>Software Compatibility</b>	Compatible with Cisco IOS® Software Release 12.2(31)SB and later Cisco IOS 12.2 images supported on the Cisco 10000 Series
<b>Connectivity and Controls</b>	10/100 Ethernet port network management interface with RJ-45 connector Console serial port Auxiliary (modem) port Push button reset
<b>Features and Functions</b>	Supports 61,500 broadband subscribers Hierarchal Queuing Framework (HQF) provides up to 3 levels of QoS or shaping per packet 9.7-mpps forwarding performance through the PXF complex
<b>LEDs</b>	Alarms: Critical/Major/Minor (yellow, three per card) <ul style="list-style-type: none"> <li>• ON indicates an alarm condition</li> <li>• OFF indicates no alarm</li> </ul> Fail (yellow, one per card) <ul style="list-style-type: none"> <li>• ON indicates that a major failure has disabled the Cisco PRE-3</li> <li>• OFF indicates that the Cisco PRE-3 is operating properly</li> </ul> Status (bicolor, one per card) <ul style="list-style-type: none"> <li>• Flashing yellow indicates that the system is booting</li> <li>• Green indicates that Cisco PRE-3 is active (as a primary)</li> <li>• Flashing green indicates that Cisco PRE-3 is standby (as a secondary)</li> <li>• OFF indicates no power to Cisco PRE-3</li> </ul> Ethernet activity/link (green, two per card) <ul style="list-style-type: none"> <li>• Activity: Green indicates packets are being transmitted and received</li> <li>• Link: Green indicates carrier detected; the port is able to accept traffic</li> </ul> CF card slot 0 (green – ON indicates slot 0 is active)
<b>Memory</b>	Route processor memory: 2GB ECC protected DRAM Onboard memory: 128 MB Compact Flash, 14 MB NVRAM (7 MB primary and 7 MB backup) Removable memory: 512 MB or 1GB Compact Flash Packet memory: 256 MB ECC protected
<b>Performance</b>	PXF performance: 9.7 million packets per second RP forwarding performance: 400,000 packets per second
<b>Reliability and Availability</b>	Supports Online Insertion and Removal (OIR) Support Nonstop Forwarding (NSF) and Stateful Switch Over (SSO) Supports In-Service Software Upgrades (ISSUs)

Description	Specification
<b>MIBs</b>	A partial list of supported MIBs includes: <ul style="list-style-type: none"> <li>• SONET MIB</li> <li>• DS3 MIB</li> <li>• DS1 MIB</li> <li>• Frame Relay MIB</li> <li>• MIB II (Interfaces MIB, RFC 1213)</li> <li>• TCP MIB</li> <li>• UDP MIB</li> <li>• RS232 MIB</li> <li>• OSPF MIB</li> <li>• BGP4 MIB</li> <li>• IGMP MIB</li> <li>• IPMROUTE MIB</li> <li>• PIM MIB</li> <li>• RMON MIB</li> <li>• Cisco RTTMON MIB</li> <li>• Cisco CAR MIB</li> <li>• Cisco IP Stat MIB</li> <li>• Cisco Config Copy MIB</li> <li>• Cisco Frame Relay MIB</li> <li>• Cisco CDP MIB</li> <li>• Cisco Config Management MIB</li> <li>• Cisco Image MIB</li> <li>• Cisco IPMROUTE MIB</li> <li>• Cisco Memory Pool MIB</li> <li>• Cisco Ping MIB</li> <li>• Cisco TCP MIB</li> <li>• Cisco Entity Sensor MIB (Replaces ENVMON MIB)</li> <li>• Cisco Process MIB</li> <li>• Entity MIB (Replaces OLD-CISCO-CHASSIS-MIB)</li> <li>• Cisco Bulk File MIB</li> <li>• Cisco FTP Client MIB</li> </ul>
<b>Network Management</b>	Network management through: <ul style="list-style-type: none"> <li>• Telnet (command-line interface [CLI])</li> <li>• Console port (through the CLI)</li> <li>• Simple Network Management Protocol (SNMP)</li> </ul> RFC 2665
<b>Physical Dimensions</b>	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: 8.9 lb (4.04 kg)
<b>Power</b>	200W

Description	Specification
<b>Approvals and Compliance</b>	<p><b>Safety</b></p> <ul style="list-style-type: none"> <li>• UL60950 &amp; CAN/CSA-C22.2 No. 60950. Information technology equipment</li> <li>• AS/NZS 60950</li> <li>• IEC/EN 60950 Information technology equipment</li> <li>• 73/23/EEC</li> </ul> <p><b>Electromagnetic Emissions Certification</b></p> <ul style="list-style-type: none"> <li>• AS/NZ 3548: 1995 (including AMD I + II) Class B</li> <li>• EN55022: 1998 Class B</li> <li>• CISPR 22: 1997</li> <li>• EN55022: 1994 (including AMD I + II)</li> <li>• 47 CFR Part 15: 2000 (FCC) Class B</li> <li>• VCCI V-3/01.4 Class 2</li> <li>• CNS-13438: 1997 Class B</li> <li>• GR1089: 1997 (including Rev. 1: 1999)</li> </ul> <p><b>Immunity</b></p> <ul style="list-style-type: none"> <li>• EN300386: 2000-TNE EMC requirements; product family standard; high priority of service; central office and noncentral office locations</li> <li>• EN50082-1: 1992/1997</li> <li>• EN50082-2: 1995-Generic Immunity Standard, Heavy Industrial</li> <li>• CISPR24: 1997</li> <li>• EN55024: 1998-Generic ITE immunity standard</li> <li>• EN61000-4-2: 1995 + AMD I + II ESD, Level 4/8 kV contact, 15 kV air</li> <li>• IEC-1000-4-3: 1995 + AMD 1-Radiated Immunity, 10 V/m</li> <li>• IEC-1000-4-4: 1995-Electrical Fast Transients, Level 4/4 kV/B</li> <li>• IEC-1000-4-5: 1995 + AMD 1-DC Surge-Class 3; AC Surge-Class 4</li> <li>• EN61000-4-6: 1996 + AMD 1-RF conducted immunity, 10 Vrms</li> <li>• EN61000-4-11: 1995-Voltage Dips and Sags</li> <li>• ETS300 132-2: 1996 + corrigendum, December 1996</li> <li>• GR1089:1997 (including Rev1: 1999)</li> </ul> <p><b>Network Equipment Building Standards</b></p> <p>The module meets the following Networking Equipment Building Standards (NEBS):</p> <ul style="list-style-type: none"> <li>• GR-1089-CORE</li> <li>• GR-63-CORE</li> </ul> <p><b>European Telecommunication Standards Institute (ETSI)</b></p> <ul style="list-style-type: none"> <li>• ETSI 300 386-1 – Levels for equipment with a “high priority of service” that is installed in “locations other than telecommunication centers”</li> <li>• ETSI 300 386-2:1997 – Levels for equipment with a “high priority of service” that is installed in “locations other than telecommunication centers”</li> <li>• ETSI 300 132-2: December 1994 – Power supply interfaces at the input to telecommunications equipment Sections 4.8 and 4.9</li> </ul>
<b>Environmental</b>	<p>Storage temperature: –38 to 150°F (–40 to 70°C)</p> <p>Operating temperature, nominal: 41 to 104°F (5 to 40°C)</p> <p>Operating temperature, short term: 23 to 131°F (–5 to 55°C)</p> <p>Storage relative humidity: 5 to 95 percent relative humidity (RH)</p> <p>Operating humidity, nominal: 5 to 85 percent RH</p> <p>Operating humidity, short term: 5 to 90 percent RH</p> <p>Operating altitude: –60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)</p>

## Ordering Information

To place an order, visit the [Cisco Ordering Home Page](#). Table 2 lists the ordering information for the Cisco 10000 Series PRE-3.

**Table 2.** Ordering Information

Product Name	Part Number
Cisco 10000 Series Performance Routing Engine 3	ESR-PRE3
Cisco 10000 PRE 512 MB Compact Flash	MEM-10K-CPTFL512M
Cisco 10000 PRE 1GB Compact Flash	MEM-10K-CPTFL1G
Cisco 10000 Series eight-slot chassis, 1 PRE3, 1 AC PEM bundle	10000-1P3-1AC
Cisco 10000 Series eight-slot chassis, 2 PRE3, 2 AC PEM bundle	10000-2P3-2AC
Cisco 10000 Series eight-slot chassis, 1 PRE3, 1 DC PEM bundle	10000-1P3-1DC
Cisco 10000 Series eight-slot chassis, 2 PRE3, 2 DC PEM bundle	10000-2P3-2DC

## Service and Support

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## For More Information

For more information about the Cisco 10000 Series Routers, visit <http://www.cisco.com/en/US/products/hw/routers/ps133/index.html> or contact your local account representative.



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