Cisco 10000 Series Performance Routing Engine 4

The Cisco® 10000 Series Performance Routing Engine 4 (PRE4) (Figure 1) addresses the demand for increased performance, scalability, and hierarchical quality of service (HQoS) to support diverse network-edge requirements for residential and business services markets.

Product Overview

The Cisco 10000 Series is a Service Provider edge aggregation router that offers a single solution for the diverse requirements of broadband aggregation, leased-line, Ethernet, ATM, and Frame Relay services. The Cisco 10000 Series provides customers with superior price/performance, industry-leading 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, are 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 4

Designed to meet new requirements from service providers for high-capacity aggregation with sophisticated IP services, the Cisco 10000 Series PRE4 uses the latest generation of 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. The PRE4 also supports the flexible Hierarchal Queuing Framework (HQF) available on the Cisco 10000 Series Routers. The HQF implementation on the PRE4 allows three levels (class, logical, and physical) of scheduling to apply queuing and shaping (see Figure 2).

Applications

The Cisco 10000 Series PRE4 can be used to deliver triple-play services for both Ethernet and ATM transport networks. A service provider can use the flexibility and performance of the PRE4 to simultaneously deliver data, voice, and video to both residential and business customers.

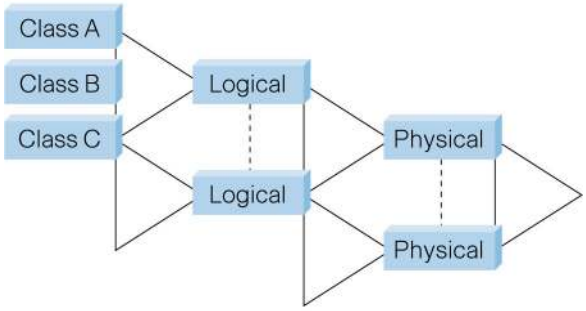
Ethernet service examples include:

- Class – Multiple packet queues for data, voice, or video
- Logical – PPP or IP sessions grouped by Gold, Bronze, or Silver packages for bandwidth and QoS levels
- Physical – QinQ or dot1Q VLANs to separate consumer, business, and wholesale customers

ATM service examples include:

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

Figure 2. Examples of Three-Level Scheduling with HQF and the Cisco 10000 Series PRE4



Key Features and Benefits

The Cisco 10000 Series PRE4 delivers both scalability improvements and new features:

- Provides up to 10 million packets per second (mpps) of processing power for increased throughput
- Delivers Hierarchal Queuing Framework (HQF) for up to three levels of service granularity
- Supports increased bandwidth through link bonding connections between the PRE4 and Cisco 10000 Series SPA Interface Processor (SIP)-600
  - 11.2 Gbps transmit and receive (full duplex) to any SIP (total bandwidth distributed across installed shared port adapters [SPAs])
  - 2.8 Gbps transmit and receive (full duplex) to each full-height line card
  - 1.4 Gbps transmit and receive (full duplex) to each half-height line card
- Includes 800-MHz route processor with 4 GB 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 1 GB 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
- Support for Building Integrated Timing Supply (BITS) interface, a component of the Cisco 10000 Series BITS architecture that enables network service synchronization

Product Specifications

Table 1. Product Specifications

Description	Specification
Product Compatibility	Compatible with the Cisco 10008 8-slot chassis
Software Compatibility	Compatible with Cisco IOS® Software Release 12.2(33)SB and later Release 12.2 images supported on the Cisco 10000 Series
Connectivity and Controls	10/100 Ethernet port network management interface with RJ-45 connector Console serial port Auxiliary (modem) port Push button reset
Features and Functions	Supports up to 61,500 broadband subscribers Hierarchal Queuing Framework (HQF) provides up to 3 levels of QoS or shaping per packet 10 mpps forwarding performance through the PXF complex
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 Cisco PRE4 • OFF indicates that the Cisco PRE3 is operating properly Status (bicolor, one per card) • Flashing yellow indicates that the system is booting • Green indicates that Cisco PRE4 is active (as a primary) • Flashing green indicates that Cisco PRE4 is standby (as a secondary) • OFF indicates no power to Cisco PRE4 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 accept traffic CF card slot 0 (green – ON indicates slot 0 is active) BITS • Green indicates T1/E1 BITS input is configured and working properly • Yellow indicates T1/E1 BITS input is configured and has errors • Off indicates T1/E1 BITS input is not configured
Memory	Route processor memory: 4 GB ECC protected DRAM Onboard memory: 128 MB Compact Flash, 14 MB NVRAM (7 MB primary and 7 MB backup) Removable memory: 512 MB or 1 GB Compact Flash Packet memory: 512 MB ECC protected
Performance	PXF performance: 10 million packets per second RP forwarding performance: 400,000 packets per second
Reliability and Availability	Supports Online Insertion and Removal (OIR) Supports Nonstop Forwarding (NSF) and Stateful Switchover (SSO) Supports In-Service Software Upgrades (ISSUs)

Description	Specification
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
Network Management	Network management through: • Telnet (command-line interface [CLI]) • Console port (through the CLI) • Simple Network Management Protocol (SNMP) RFC 2665
Physical Dimensions	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: 9.0 lb (4.09 kg)
Power	210W

Description	Specification
Approvals and Compliance	Safety • UL60950 & CAN/CSA-C22.2 No. 60950. Information technology equipment • AS/NZS 60950 • IEC/EN 60950 Information technology equipment • 73/23/EEC 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): • GR-1089-CORE • GR-63-CORE European Telecommunication Standards Institute (ETSI) • ETSI 300 386-1 – Levels for equipment with a "high priority of service" that is installed in "locations other than telecommunication centers" • ETSI 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
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 (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)

Ordering Information

To place an order, visit the Cisco Ordering Home Page. Table 2 lists the ordering information for the Cisco 10000 Series PRE4.

Table 2. Ordering Information

Product Name	Part Number
Cisco 10000 Series Performance Routing Engine 4	ESR-PRE4(=)
Cisco 10000 Series PRE Compact Flash Memory 512 MB	ESR-PRE-CF-512MB(=)
Cisco 10000 Series PRE Compact Flash Memory 1 GB	ESR-PRE-CF-1GB(=)
Cisco 10000 Series 8-slot chassis, 1 PRE4, 1 AC PEM bundle	10000-1P4-1AC
Cisco 10000 Series 8-slot chassis, 2 PRE4, 2 AC PEM bundle	10000-2P4-2AC
Cisco 10000 Series 8-slot chassis, 1 PRE4, 1 DC PEM bundle	10000-1P4-1DC
Cisco 10000 Series 8-slot chassis, 2 PRE4, 2 DC PEM bundle	10000-2P4-2DC

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you to protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, see Cisco Technical Support Services or Cisco Advanced Services.

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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