

Cisco 7600 Series Router

Q. What are Cisco® 7600 Series routers and where are they deployed in the network?

A. The Cisco 7600 Series is the industry's only edge router that delivers robust, high performance IP/MPLS features for a range of service provider edge and enterprise WAN/MAN applications. Coupled with the broadest set of interfaces and innovative adaptive network processing technology, the Cisco 7600 leads the industry with integrated Ethernet and private line aggregation capabilities.

The Cisco 7600 Series is a natural evolution for existing Cisco 7500 Series customers with Cisco IOS® feature parity and FlexWAN support for existing Cisco 7200/7500 Series port adapters. The Cisco 7600 also offers multi-gigabit capacity per slot, a range of form factors, and advanced Optical Service Modules (OSM) for high-performance service delivery. These unique capabilities enable carriers and enterprises alike to improve operational efficiency at the network edge while maximizing return on investment.

Cisco 7600 Series IP/MPLS Applications

- Metro Ethernet Aggregation
- Private Line Aggregation (high-speed and low-speed)
- WAN Aggregation
- Headquarters Core Routing
- Subscriber Edge Aggregation

Cisco 7600 Series Feature Highlights

- Up to 256 Gbps switch fabric capacity
- Up to 30 Mpps forwarding performance
- NEBS-compliant chassis: 3-slot, 6-slot, 9-slot, and 13-slot
- Interface breadth: DS0 to OC-48/STM-16 WAN; 10 Mbps to 10 Gigabit Ethernet
- Support for Cisco 7200/7500 Port Adapters with the FlexWAN module
- Comprehensive IP/MPLS features including: MPLS VPN, Any Transport over MPLS (AToM), Class-Based Weighted Fair Queuing/Low-Latency Queuing (CBWFQ/LLQ), Weighted Random Early Detection (WRED), and hierarchical traffic shaping

Q. What slot capacities are available for the Cisco 7600 Series?

A. There are four unique chassis available for the Cisco 7600 Series:

- 13-slot chassis with horizontal line-card slots, side-to-side airflow, 19 rack units (RU), 2 chassis per rack
- 9-slot chassis with vertical line-card slots, front-to-back airflow, 21 RU, 2 chassis per rack
- 6-slot chassis with horizontal line card slots, side-to-side airflow, 7 RU, 6 chassis per rack
- 3-slot chassis with horizontal line card slots, side-to-side airflow, 4 RU, 10 chassis per rack



Q. What kind of performance is to be expected from the Cisco 7600 Series?

A. The Cisco 7600 Series is based on high-performance application-specific integrated circuits (ASICs) along with adaptive network processors capable of forwarding traffic at up to 30 million packets per second (Mpps).

Q. What interfaces are available on the Cisco 7600 Series?

A. The Cisco 7600 Series offers one of the largest selections of WAN, MAN, and LAN interface options in the industry. These interfaces are made up of the FlexWAN module with port adapters, OSMs, and Ethernet modules. The interfaces range from DS-0 to OC-48/STM-16 WAN and 10-Mbps to 10-Gbps Ethernet.

FlexWAN Module

The FlexWAN module provides support for Cisco 7200 and 7500 series port adapters. Leveraging this wide range of WAN port adapters, the Cisco 7600 Series supports interfaces from copper and Channelized T1/E1 and T3/E3 to T1/E1, T3/E3, and OC-3/STM-1 ATM to OC-3/STM-1 POS and Channelized STM-1.

Optical Services Modules

Adding to the already wide range of interfaces are OSMs. OSMs are line cards that provide support for the following interfaces: OC-3/STM-1 POS, OC-12/STM-4 POS, OC-48/STM-16 POS, OC-48/STM-16 Dynamic Packet Transport (DPT), OC-12/STM-4 ATM, Channelized OC-12/STM-4 to DS3, Channelized OC-12/STM-4 to DS0, and Channelized T3.

Ethernet Modules

High-performance Ethernet capabilities are provided by leveraging the large breadth of Ethernet interfaces from the Cisco Catalyst® 6500 Series Switch. The Cisco 7600 Series supports 10-MB, 100-MB, 1-GB, and 10-GB Ethernet modules.

Q. What are Cisco 7600 Series OSMs?

A. Cisco 7600 Series OSMs are line cards for the Cisco 7600 Series that provide WAN interfaces, PXF IP services processors for high-speed IP service applications, and deep packet buffers. Each POS and ATM OSM provides an additional four ports of Gigabit Interface Converter (GBIC)-based switched Gigabit Ethernet as a complement to the high-speed WAN interfaces on the same line card. Each OSM provides an 8-Gbps full-duplex connection to the 256-Gbps Switch Fabric Module (with dual connectivity to redundant crossbar fabrics), as well as up to 6-Mpps distributed IP service application to enable high-speed throughput with IP services enabled.

The following OSMs are available now:

- 4-ports Gigabit Ethernet WAN with 2-ports Gigabit Ethernet (GBIC-based)
- 2-port OC-12c/STM-4c ATM (multimode [MM] and single mode-intermediate reach [SM-IR]) with 4-ports Gigabit Ethernet
- 4-, 8-, and 16-port OC-3c/STM-1c POS (MM, SM-IR, and single mode-long reach [SM-LR]) with 4-ports Gigabit Ethernet
- 2- and 4-port OC-12c/STM-4c POS (MM, SM-IR, and SM-LR) with 4-ports Gigabit Ethernet
- 1-port OC-48c/STM-16c POS (single mode-short reach [SM-SR], SM-IR, and SM-LR) with 4-ports Gigabit Ethernet
- 2-port OC-48c/STM-16c POS/DPT (MM, SM-IR, and SM-LR) with 4-ports Gigabit Ethernet
- 1-port Channelized OC-12/STM-4 POS to DS3/E3 (SM-IR) with 4-ports Gigabit Ethernet



- 1-port Channelized OC-12/STM-4 POS to DS0 (SM-IR) with 4-ports Gigabit Ethernet
- 12-port Channelized T3 to DS0

Q. What are Enhanced OSMs supported on the Cisco 7600 Series?

A. The Enhanced OSMs represent a complete family of optical-speed network interfaces, including POS, DPT, ATM, and Channelized interfaces, which constitute the next generation of optical-service modules for the Cisco 7600 Series. The Enhanced OSMs offer all the benefits of the original OSMs with the following incremental benefits:

- Increased MPLS/VPN Virtual Route Forwarding (VRF) support to a minimum of 511 and up to 1023 per system for MPLS Layer 3 configurations.
- Enhancement to existing QoS features with the addition of support for WRED.
- Support for a greater number of traffic-shaping queues, with deeper queue buffers. The Enhanced OSMs support a minimum of 8000 QoS queues per PXF network processor.
- Future support for Layer 2 AToM network-aggregation features to support traditional Layer 2 services such as Frame Relay and ATM over an MPLS core network with simultaneous support for Layer 3 services using RFC 2547-compliant MPLS VPNs.

Q. What is a Channelized OSM for the Cisco 7600 Series?

A. The Channelized OSMs give service providers and large enterprises a mechanism to consolidate high-speed leased lines onto a single optical or copper link. These OSMs enable users to channelize an OC-12/STM-4 circuit down to DS3 or DS0, depending on the OSM. In addition, a Channelized T3 OSM provides copper T3 channelization down to DS0. Cisco offers three options for high-speed channelized optical connectivity for the Cisco 7600 Series: Channelized OC-12/STM-4 to DS3, Channelized OC-12/STM-4 to DS0, and Channelized T3 to DS0.

Q. Which port adapters are currently supported by the Cisco 7600 Series FlexWAN Module?

A. The following port adapters can be used with the Cisco 7600 Series FlexWAN Module:

T1/E1: PA-4T+, PA-8T-V35, PA-8T-232, PA-8T-X21, PA-MC-4T1, PA-MC-8T1, PA-MC-8E1/120

T3/E3 and STM-1: PA-T3, PA-T3+, PA-E3, PA-2T3, PA-2T3+, PA-2E3, PA-MC-T3, PA-MC-E3, PA-MC-2T3+, PA-MC-STM-1

HSSI: PA-H, PA-2H

ATM: PA-A3-T3, PA-A3-E3, PA-A3-OC3MM, PA-A3-OC3SMI, PA-A3-OC3SML, PA-A3-8E1IMA, PA-A3-8T1IMA

Packet over SONET: PA-POS-OC3MM, PA-POS-OC3SMI, PA-POS-OC3SML

Q. What is PXF on the OSM for the Cisco 7600 Series?

A. PXF stands for Parallel eXpress Forwarding and is the term used to describe the adaptive network processors used on each OSM (up to two per line card). These processors provide IP service application at up to 6 Mpps.

Q. Which features are accelerated through hardware on the Cisco 7600 Series?

A. The Cisco 7600 Series supports a wide array of features in one of two acceleration paths. The first path is in the Policy Feature Card (PFC) complex. The PFC supports IPv4 Unicast and Multicast traffic along with features such as policing, marking, classification, and access control lists (ACLs) at 30 Mpps.



The second hardware-accelerated forwarding path is the PFX processing complex located on each line card. Each PFX complex is capable of forwarding traffic at up to 6 Mpps. Depending on the interface of the specific card, there may be up to two PFX processors on any single line card.

Features supported by this complex include Layer 2 virtual private networks (VPNs), more commonly known as Any Transport over MPLS (AToM), Layer 3 Multiprotocol Label Switching (MPLS) VPNs (RFC 2547-compliant) as well as quality of service (QoS) features like Class-Based Weighted Fair Queuing (CBWFQ), Low Latency Queuing (LLQ), Weighted Random Early Detection (WRED), and Traffic Shaping.

Q. Is a DPT or resilient packet ring (RPR) solution available on the Cisco 7600 Series?

A. An OC-48/STM-16 POS/DPT OSM is available. The OSM provides either two ports of OC-48/STM-16 POS or a single OC-48/STM-16 DPT node on the same card, along with four ports of Gigabit Ethernet. In addition, POS- or DPT-mode configurations are software-selectable.

Q. Does the Cisco 7600 Series have feature parity with the Cisco 7500 Series?

A. Today, the Cisco 7600 Series supports the majority of critical features found on the Cisco 7500 Series, including support for Cisco 7500 Series port adapters. More advanced QoS and high-availability features will be supported in upcoming hardware and software enhancements.

Q. What MPLS functions are available on the Cisco 7600 Series?

A. The Cisco 7600 Series supports Ethernet over MPLS, Basic MPLS (with Label Edge Router [LER] and Label Switch Router [LSR] capabilities), and MPLS VPNs. MPLS features require OSMs and/or FlexWAN modules until the next-generation forwarding engine is available in the 2003 calendar year. At that time MPLS will be supported natively in the hardware forwarding ASICs and will not require interface restrictions, thereby making the Cisco 7600 Series an even more cost-effective solution.

Q. What is Ethernet over MPLS (EoMPLS) on the Cisco 7600 Series?

A. Ethernet over MPLS is Layer 2 transport of Ethernet frames across an MPLS core. This is an implementation of the IETF “draft-martini-l2circuit-trans-mpls-10” for the transport of Ethernet frames.

This capability is a subset of a complete suite of Layer 2 transport mechanisms often referred to as “Any Transport over MPLS” (AToM). Currently, both VLAN mode and port mode (VC types 4 and 5) are supported on the Cisco 7600 Series.

The following URL details the capabilities of this feature:

<http://www.ietf.org/internet-drafts/draft-martini-l2circuit-trans-mpls.txt>

Q. Is IPv6 supported on the Cisco 7600 Series?

A. The Cisco 7600 Series will support hardware-accelerated IPv6 in calendar year 2003 with the introduction of the next-generation forwarding engine for the Cisco 7600 Series.

Q. Is automatic protection switching (APS) supported on the POS OSMs for the Cisco 7600 Series?

A. Yes, SONET 1+1 APS is supported on all POS OSMs, including OC-3/STM-1, OC-12/STM-4, and OC-48/STM-16. Supported configurations include APS between ports on a single line card, between ports on different line cards in the same chassis, and between ports in different chassis. APS is not yet supported on the OC-12 ATM line card.

Q. Does the Cisco 7600 Series support Network-Based Application Recognition (NBAR)?

A. Yes, NBAR is supported on the FlexWAN modules. It has been supported as of Cisco IOS Software Release 12.1(8a)E.

Q. How many simultaneous routes are supported by the Cisco 7600 Series?

A. 256,000 simultaneous IP routes without unicast Reverse Path Forwarding (RPF) check enabled.

Q. What management capabilities are offered for the Cisco 7600 Series to support service provisioning and service-level monitoring?

A. As primarily an IP-services WAN-edge aggregation platform, the Cisco 7600 Series provides appropriate provisioning and monitoring tools. To that end, the Cisco 7600 Series has been tested with the Cisco Element Management Framework (CEMF), Cisco VPN Solution Center, and CiscoWorks Service Management Solution for subscriber-provisioning tools to automate and simplify service provisioning.



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