



## **Cisco 12000 Series Internet Router Basics**

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### **Feature History**

<b>Release</b>	<b>Modification</b>
11.2GS	The Cisco 12008 and Cisco 12012 Internet Routers were introduced.
12.0(8)S	The Cisco 12016 Internet Router was introduced.
12.0(15)S	The Cisco 12416 Internet Router was introduced.
12.0(16)S	The Cisco 12410 Internet Router was introduced.
12.0(17)S	The Cisco 12406 Internet Router was introduced.
12.0(21)S	The Cisco 12404 Internet Router was introduced.

The Cisco 12000 Series Internet Routers include a number of platforms and comprise a wealth of features that have been introduced since the product was released. This document describes how to configure and troubleshoot the Cisco 12000 Series Internet Routers on a system level. It does not describe hardware installation procedures, nor does it describe protocol and routing configurations.

## **Feature Overview**

The Cisco 12000 Series Internet Routers are a class of routers that perform Internet routing and switching at up to gigabit speeds. Meeting the exponential growth in demand for Internet bandwidth, these routers bring scalability and high-performance carrier-class services to IP-based networks.

## **Benefits**

The Cisco 12000 Series Internet Routers offer a wide range of benefits, including:

- High-end routing for service provider backbone and edge applications, enabling service providers to meet the challenge of building packet networks to satisfy services demand while increasing profitability
- Up to 10 Gbps per slot systems
- Wide range of interfaces, including Packet over SONET (POS), Asynchronous Transfer Mode (ATM), Dynamic Packet Transport/Resilient Packet Ring (DPT/RPR), and Gigabit Ethernet (GbE)
- Reliability
- Rich set of service enablers

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- Low cost of ownership
- Proven investment protection, including systems that can be upgraded in the field to increase switching capacity
- IP and MPLS networks

## Supported Platforms

Table 1-1 details the platforms included in the Cisco 12000 Series, the number of slots and capacity of each platform, and supported Cisco IOS releases.

**Table 1-1 Cisco 12000 Series Internet Router Platforms**

Platform	Rack Size	Number of Slots	Switch Fabric Capacity	Number of Line Card Slots <sup>1</sup>	Number of Switch Fabric Slots
Cisco 12008	1/3	8	40 Gbps	7	3 SFC <sup>2</sup> , 2 CSC <sup>3</sup>
Cisco 12012	Full	12	60 Gbps	11	3 SFC, 2 CSC
Cisco 12016	Full	16	80 Gbps <sup>4</sup>	15	3 SFC, 2 CSC
Cisco 12404	1/8	4	80 Gbps	3	1 board <sup>5</sup>
Cisco 12406	1/4	6	120 Gbps	5	3 SFC, 2 CSC
Cisco 12410	1/2	10	200 Gbps	9	5 SFC, 2 CSC
Cisco 12416	Full	16	320 Gbps	15	3 SFC, 2 CSC

1. One slot is used by the route processor card (RP). If two RPs are present for redundancy purposes, there is one less slot available for line cards.
2. Switch fabric card
3. Clock scheduler card
4. The Cisco 12016 Internet Router can be upgraded to a Cisco 12416 Internet Router using a switch fabric upgrade kit.
5. The Cisco 12404 Internet Router contains a single board that performs the functionality of 3 SFCs and 1 CSC.

## Supported Line Cards

Cisco 12000 Series Internet Routers offer an extensive portfolio of line cards, including Packet over SONET (POS), channelized and digital signal, Asynchronous Transfer Mode (ATM), Ethernet, and Dynamic Packet Transport (DPT). These line cards deliver high performance, guaranteed priority packet delivery, and service-transparent online insertion and removal (OIR).

Each of these line cards is distinguished by its underlying engine type. Cisco 12000 Series Internet Router line cards are designed to support high-speed packet forwarding performance in the core of an IP network. Engine 3 and Engine 4+ line cards are designed for edge applications and implement enhanced IP services (such as QoS) in hardware with no performance impact.

Available line cards for the Cisco 12000 Series Internet Routers as of November 2002 are listed in Table 1-2 through Table 1-7.

**Final Review Draft October 31, 2007 - Cisco Confidential****Table 1-2 POS/SDH Line Cards**

Line Card	Engine	Chassis Supported	First Cisco IOS Release
4-Port OC-3c/STM-1c POS/SDH	0	All	12.0(5)S
1-Port OC-12c/STM-4c POS/SDH	0	All	12.0(10)S
1-Port OC-48c/STM-16c POS/SDH	2	All	12.0(10)S
4-Port OC-12c/STM-4c POS/SDH	2	All	12.0(10)S
8-Port OC-3c/STM-1c POS/SDH	2	All	12.0(10)S
16-Port OC-3c/STM-1c POS/SDH	2	All	12.0(10)S
16-Port OC-3c/STM-1c POS/SDH	3 ISE	All	12.0(21)S
4-Port OC-12c/STM-4c POS/SDH	3 ISE	All	12.0(21)S
1-Port OC-48c/STM-16c POS/SDH	3 ISE	All	12.0(21)S
4 and 8-Port OC-3c/STM-1c POS/SDH	3 ISE	All	12.0(22)S
4-Port OC-48c/STM-16c POS/SDH	4+	124xx	12.0(15)S
1-Port OC-192c/STM-64c POS/SDH	4/4+	124xx	12.0(15)S

**Table 1-3 ATM Line Cards**

Line Card	Engine	Chassis Supported	First IOS Release
4-Port OC-3c/STM-1c ATM	0	All	12.0(5)S
1-Port OC-12c/STM-4c ATM	0	All	12.0(7)S
4-Port OC-12c/STM-4c ATM	2	All	12.0(13)S
8-Port OC-3c/STM-1c ATM	2	All	12.0(22)S
4-Port OC-12c/STM-4c ATM ISE	3	All	12.0(25)S

**Table 1-4 Ethernet Line Cards**

Line Card	Engine	Chassis Supported	First IOS Release
8-Port Fast Ethernet	1	All	12.0(10)S
1-Port Gigabit Ethernet	1	All	12.0(10)S
3-Port Gigabit Ethernet	2	All	12.0(11)S
10-Port 1-Gigabit Ethernet	4	124xx	12.0(22)S
1-Port 10-Gigabit Ethernet	4	124xx	12.0(23)S
10-Port Modular Gigabit Ethernet	4	124xx	12.0(23)S
4-Port Gigabit Ethernet ISE	3	All	12.0(25)S

**Final Review Draft October 31, 2007 - Cisco Confidential****Table 1-5 Dynamic Packet Transport (DPT) Line Cards**

Line Card	Engine	Chassis Supported	First IOS Release
2-Port OC-12c/STM-4c DPT	1	All	12.0(10)S
1-Port OC-48c/STM-16c DPT	2	All	12.0(15)S
4-Port OC-48c/STM-16c DPT	4+	124xx	12.0(23)S
1-Port OC-192c/STM-64c DPT	4+	124xx	12.0(23)S
4-Port OC-12c/STM-4c DPT ISE	3	All	12.0(24)S

**Table 1-6 Channelized Line Cards**

Line Card	Engine	Chassis Supported	First IOS Release
2-Port Channelized OC-3c/STM-1c to E1/T1	0	All	12.0(17)S
1-Port Channelized OC-12c/STM-4c to DS3	0	All	12.0(5)S
1-Port Channelized OC-12c/STM-4c to OC-3c/STM-1c	0	All	12.0(5)S
6-Port Channelized T3 (T1)	0	All	12.0(14)S
4-Port Channelized OC-12c/STM-4c (DS3/E3, OC-3c/STM-1c) POS/SDH	3 ISE	All	12.0(21)S
1-Port Channelized OC-48c/STM-16c (DS3/E3, OC-3c/STM-1c, OC-12c/STM-4c) POS/SDH	3 ISE	All	12.0(21)S

**Table 1-7 Electrical Interface Line Cards**

Line Card	Engine	Chassis Supported	First IOS Release
6-Port DS3	0	All	12.0(10)S
12-Port DS3	0	All	12.0(10)S
6-Port E3	0	All	12.0(15)S
12-Port E3	0	All	12.0(15)S

**Related Documents**

For more information concerning the Cisco 12000 Series Internet Router hardware, refer to the installation and configuration guide for the specific platform, as listed following:

- [Cisco 12008 Internet Router Installation and Configuration Guide](#)
- [Cisco 12012 Internet Router Installation and Configuration Guide](#)
- [Cisco 12016 Internet Router Installation and Configuration Guide](#)
- [Cisco 12404 Internet Router Installation and Configuration Guide](#)

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- *Cisco 12406 Internet Router Installation and Configuration Guide*
- *Cisco 12410 Internet Router Installation and Configuration Guide*
- *Cisco 12416 Internet Router Installation and Configuration Guide*

For more information concerning specific line cards and their configuration, refer to the line card installation and configuration notes located at

<http://www.cisco.com/univercd/cc/td/doc/product/core/cis12000/linecard/index.htm>.

# Supported MIBs and RFCs

## **MIBs**

The following Management Information Bases (MIBs) apply:

- APS MIB
- ATM MIB
- ATM Forum MIB
- BGP4 MIB
- Cisco AAL5 MIB
- Cisco ATM Ext MIB
- Cisco Bulk File MIB
- Cisco Car MIB
- Cisco CDP MIB
- Cisco Config Copy MIB
- Cisco Config MAN MIB
- Cisco Enhanced WRED MIB
- Cisco Entity FRU Control MIB trap support
- Cisco Environmental MIB
- Cisco Frame Relay MIB
- Cisco Flash MIB
- Cisco FTP Client MIB
- Cisco IETF-ATM2-PVCTRAP-MIB
- Cisco IMAGE MIB
- Cisco IP Stat MIB
- Cisco IPMROUTE MIB
- Cisco Memory Pool MIB
- Cisco Ping MIB
- Cisco Process MIB
- Cisco Queue MIB
- Cisco RTTMON MIB
- Cisco Syslog MIB

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- Cisco TCP MIB
- Cisco VLAN IFTABLE Relationship MIB
- Community MIB
- Expression MIB
- If MIB
- IGMP MIB
- Int Serv Guaranteed MIB
- Int Serv MIB
- IP MROUTE MIB
- IPv6 MIB
- Notification Log MIB
- MQC MIB (Engines 2, 3, 4, and 4+)
- Old Cisco Chassis MIB
- Old Cisco CPU MIB
- Old Cisco Interfaces MIB
- Old Cisco IP MIB
- Old Cisco Memory MIB
- Old Cisco System MIB
- Old Cisco TCP MIB
- Old Cisco TS MIB
- Optical MIB
- PFE MIB
- PIM MIB
- RMON MIB
- RS-232 MIB
- RSVP MIB
- SNMPv2 MIB
- TCP MIB
- UDP MIB

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator, found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

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To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to [cco-locksmith@cisco.com](mailto:cco-locksmith@cisco.com). An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

### **RFCs**

The following Requests for Comments (RFCs) apply:

- RFC 1213
- RFC 1253
- RFC 1315
- RFC 1398
- RFC 1407
- RFC 1595—For RFC 1595, the Cisco 12000 Series Internet Router does not support SONET Far End Line Group, SONET Far End Path Group, SONET VT Group, and SONET Far End VT Group.

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