

## Cisco 7600 Series SPA Interface Processor-400

**Note:** Refer to “Cisco Catalyst 6500 Series Switches Release Notes” for Catalyst 6500 release compatibility.

The Cisco® I-Flex design combines shared port adapters (SPAs) and SPA interface processors (SIPs), offering an extensible design that enables service prioritization for data, voice, and video services. Enterprise and service provider customers can take advantage of improved slot economics resulting from modular port adapters that are interchangeable across Cisco routing platforms. The I-Flex design maximizes connectivity options and offers superior service intelligence through programmable interface processors that deliver line-rate performance. The interface processors help accelerate service delivery and revenues and provide a rich set of quality-of-service (QoS) features for premium service delivery. The processors also lower costs by reducing the number of platforms to deploy and manage in any given network. This data sheet contains specifications for the Cisco 7600 Series SPA Interface Processor-400 (Cisco 7600 SIP-400). See Figure 1.

### Product Overview

**Figure 1.** Cisco 7600 Series SPA Interface Processor-400



The Cisco 7600 SIP-400 helps enable high-performance, intelligent wide- and metropolitan-area network (WAN/MAN) services. Enterprises and service providers can take full advantage of the increased scalability, performance, and rich features offered by the Cisco 7600 SIP-400, along with the many options for WAN aggregation and connectivity offered in the SPA/SIP portfolio. The Cisco 7600 SIP-400 accepts up to four Cisco SPAs, including ATM, packet over SONET/SDH (POS), Ethernet and Circuit Emulation over Packet (CEoP), BITS Clocking support, and WAN/MAN connectivity.

### Applications

#### WAN, MAN, and LAN Service Convergence

The Cisco 7600 SIP-400 simplifies network design and deployment by allowing consolidation of LAN, WAN, and MAN interfaces into a single, highly scalable platform – the Cisco 7600 Series. The Cisco 7600 Series supports any mix of media or traffic within a common system, software, and

chassis, thereby simplifying network configuration and installation tasks and accelerating service delivery. Converged data, voice, and video traffic can be transported transparently from end to end across an interconnected LAN, WAN, or MAN; the Cisco 7600 Series can manage thousands of simultaneous traffic flows at wire speed with granular QoS and security control.

### **WAN Aggregation**

The Cisco 7600 SIP-400 helps enable the Cisco 7600 Series to perform high-end WAN aggregation based on Ethernet, point-to-point circuits, Frame Relay, ATM, or POS. The rich QoS features and distributed processing attributes of the Cisco 7600 SIP-400 make it a cornerstone of a highly scalable WAN aggregation solution. Higher-layer applications can easily be supported on an end-to-end network to enable intelligent data, voice, video, and security services – all on the same platform – for integrated, easy-to-use application delivery and control.

### **Circuit Emulation over Packet and Channelized ATM**

With the Cisco 7600 SIP-400, the Cisco 7600 Series can perform the TDM-over-packet functions (Structure-Agnostic Transport over Packet [SAToP] and Circuit Emulation Services over Packet Switched Networks [CESoPSN]) using Circuit Emulation over Packet (CEoP) SPAs, allowing the migration of traditional TDM functions to more cost-effective and scalable packet-based architectures. In addition, the ability to perform channelized ATM functions on the CEoP SPAs greatly simplifies migration of traditional ATM infrastructure to packet-based technologies.

## **Features and Benefits**

### **Scalable Bandwidth with Intelligent Network Services for Next-Generation Applications**

The unique value provided by the Cisco 7600 Series is the convergence supported from the physical layer to a highly scalable application layer. The Cisco 7600 Series can scale from 10 Megabit Ethernet to 10 Gigabit Ethernet in the LAN, and DS-0 to OC-48/STM-16 in the WAN. Differentiated Services (DiffServ) and IP Precedence priority packet marking, along with QoS classification, policing, queuing, intelligent packet discard, and security access control on every port, help ensure that the platform can meet the demands of any network environment. The rich QoS features of the Cisco 7600 Series include the capability to guarantee bandwidth to business-critical applications; limit bandwidth to noncritical applications; drop selective, low-priority packets to avoid congestion; and mark packets to control QoS for any type of traffic flow.

### **Lower Cost of Ownership**

A major benefit of LAN, WAN, and MAN consolidation on the Cisco 7600 Series is the reduction in the number of platforms to deploy and manage in any given network. This service convergence not only simplifies network design and configuration, but it also decreases rack space, power requirements, and the training and administrative burden associated with managing many different platforms. Such integration eases the support needs of maintenance staff; spare parts for multiple platforms do not need to be stocked or managed.

These benefits directly reduce capital expenditures (CapEx) and ongoing operational costs of network management, such as training, element management, and inventory and configuration management. In addition to requiring fewer platforms, a converged solution from Cisco means that all LAN, WAN, and MAN functions can be managed with the same network management tool set, reducing the number of management platforms required.

Table 1 summarizes the features and benefits of the Cisco 7600 SIP-400.

**Table 1.** Features and Benefits of Cisco 7600 SIP-400

Feature	Description	Benefit
Functionality	A feature-rich WAN services card for QoS and bandwidth optimization	Eliminates the need for multiple service modules; reduces costs
Modularity	Up to 4 SPAs per module	Provides high-density aggregation, with a combination of interface types and the capability to invest as business needs grow
Investment protection	SPA support across many midrange and high-end routers	Allows SPAs to be reused across the Cisco carrier router portfolio
CPU	High-performance network processors	Ability to run 4 GE line rate for 64-byte packets, and OC-48 line rate for 48-byte packets for POS, HDLC, etc. with select services
Queues	32,000 ingress and egress	Allows deep queuing and sophisticated QoS for multiservice applications
Memory default	1 GB per Cisco 7600 SIP-400	Enables support of large routing tables, rich QoS features, and increased scalability
Switch fabric connectivity	Yes	Enables the use of the Cisco 7600 Series Route Switch Processor (RSP) 720, 3C/3CXL and Supervisor Engine 720-3B/3BXL – 720-Gbps integrated switch fabric for data forwarding
Online insertion and removal (OIR) of module	SIP and SPA OIR are supported	Increases availability and provides operational ease of use

The Cisco SPA/SIP portfolio offers the following additional advantages:

- Boosts service performance with modular, flexible, intelligent interface processors
  - Superior flexibility, providing mix-and-match of interface types on the same interface processor for consistent services, independent of access technology
  - Pioneering programmable interface processors that provide flexibility for the service diversity required in next-generation networks
  - Innovative design that provides intelligent delivery of services without compromising on performance
- Increases speed to service revenue
  - The scalable and programmable Cisco architecture extended to 10 Gbps dramatically improves customer density, increasing potential revenue per platform.
  - Interface breadth (copper, channelized, POS, ATM, and Ethernet) on a modular interface processor allows service providers to more quickly roll out new services, so customers of all business sizes receive consistent, secure, and guaranteed services.
  - High-density SFP interfaces are featured for high-port-count applications with reach flexibility. Future optical technology improvements can be adopted using existing SPAs.
- Dramatically improves the financials of your routing purchase
  - Improved slot economics and increased density reduce CapEx.
  - The ability to easily add new interfaces as they are needed enables a “pay-as-you-grow” business model while still offering a high-density solution.
  - SPAs are shared across multiple platforms, and can be easily moved from one to another, providing consistent feature support, accelerated product delivery, and a significant reduction in operating expenses (OpEx) through common sparing as service needs change.

## Product Specifications

Table 2 provides the product specifications of the Cisco 7600 SIP-400.

**Table 2.** Product Specifications of Cisco 7600 SIP-400

Description	Specification
<b>Compatibility</b>	Cisco Route Switch Processor 720 3C/3CXL, Cisco Supervisor Engine 720-3B/3BXL, and Cisco Supervisor Engine 32 (Sup-32) systems
<b>Minimum software compatibility</b>	Cisco IOS® Software Release 12.2(18)SXE, or later releases for Supervisor Engine 720-3B/3BXL and Supervisor Engine 32 systems in native mode Cisco IOS Software; also, 12.2(33)SRB or later releases for RSP720-GE-3CXL and RSP720-GE-3C systems
<b>Protocols</b>	<ul style="list-style-type: none"> <li>• TCP</li> <li>• User Datagram Protocol (UDP)</li> <li>• IPv4 Unicast and Multicast</li> <li>• IPv6 Unicast and Multicast</li> <li>• Multiprotocol Label Switching (MPLS)</li> <li>• SAToP and CESoPSN</li> </ul>
<b>Encapsulation</b>	<ul style="list-style-type: none"> <li>• Frame Relay</li> <li>• Point-to-Point Protocol (PPP)</li> <li>• High-Level Data Link Control (HDLC)</li> <li>• ATM permanent virtual circuit-constant bit rate (PVC-CBR), variable bit rate real-time (VBR-rt), VBR non-real-time (VBR-nrt), and unspecified bit rate (UBR)</li> <li>• ATM switched virtual circuit (SVC)-CBR, VBR-rt, VBR-nrt, UBR, UBR+</li> <li>• TDM over MPLS, ATM over MPLS, and ATM over GRE</li> <li>• L2TPv3</li> </ul>
<b>Cards, ports, and slots</b>	Four SPA bays per Cisco 7600 SIP-400

Description	Specification
<b>Features</b>	<p><b>QoS, ACLs, and Low-Speed Aggregation Features</b></p> <p>QoS</p> <ul style="list-style-type: none"> <li>• Modular QoS CLI (MQC)</li> <li>• Classification based on: <ul style="list-style-type: none"> <li>◦ IP Precedence (IPv6 and IPv4)</li> <li>◦ Diffserv code point (DSCP) (IPv6 and IPv4)</li> <li>◦ MPLS experimental values (MPLS EXP)</li> <li>◦ Extended ACL</li> <li>◦ ATM CLP</li> <li>◦ Frame Relay DE</li> <li>◦ Class of Service (CoS)</li> <li>◦ VLAN</li> </ul> </li> </ul> <p>Congestion Avoidance</p> <ul style="list-style-type: none"> <li>• Weighted Random Early Detection (WRED) based on IP Precedence, DSCP, MPLS EXP, ECN (mark IP TOS field for POS traffic)</li> </ul> <p>Queuing</p> <ul style="list-style-type: none"> <li>• Congestion management <ul style="list-style-type: none"> <li>◦ Per-virtual circuit queuing</li> <li>◦ Ingress and egress Low-Latency Queuing (LLQ)</li> <li>◦ Egress Class-Based Weighted Fair Queuing (CBWFQ)</li> </ul> </li> </ul> <p>Traffic Classification, Shaping, and Bandwidth Policing</p> <ul style="list-style-type: none"> <li>• Marking</li> <li>• Policing</li> <li>• Distributed traffic shaping (DTS)</li> <li>• Hierarchical service policies</li> </ul> <p>Security</p> <ul style="list-style-type: none"> <li>• Standard and extended ACLs</li> </ul> <p>Layer 2 and Layer 3 VPNs</p> <ul style="list-style-type: none"> <li>• Ethernet over MPLS (EoMPLS)</li> <li>• ATM over MPLS (ATM over MPLS) <ul style="list-style-type: none"> <li>◦ ATM Adaptation Layer 5 (AAL5) virtual circuit mode, single and packed cell relay virtual circuit mode</li> </ul> </li> <li>• Frame Relay over MPLS (FRoMPLS)</li> <li>• Layer 3 MPLS/VPN over GRE</li> <li>• ATM over GRE, Ethernet over GRE</li> <li>• TDM over MPLS</li> </ul> <p>High availability</p> <ul style="list-style-type: none"> <li>• IPv4 Nonstop Forwarding (NSF)</li> <li>• IPv4 Stateful Switchover (SSO)</li> <li>• Automatic Protection Switching (APS) with ATM, POS SPAs</li> <li>• OIR for both SIP and SPA</li> </ul>

Description	Specification
<b>Memory</b>	1 GB default Double Data Rate (DDR) synchronous dynamic RAM (SDRAM) per Cisco 7600 SIP-400
<b>Supported SPAs</b>	<p>Ethernet</p> <ul style="list-style-type: none"> <li>• 2-port 1 GE SPA (V1 and V2)</li> <li>• 5 port 1 GE SPA (V2 only)</li> <li>• 1-port 10GbE SPA LAN PHY (V2 only)</li> </ul> <p>ATM</p> <ul style="list-style-type: none"> <li>• Cisco 2-Port OC-3c/STM-1c ATM SPA</li> <li>• Cisco 4-Port OC-3c/STM-1c ATM SPA</li> <li>• Cisco 1-Port OC-12c/STM-4c ATM SPA</li> <li>• Cisco 1-port OC48/STM16 ATM SPA</li> </ul> <p>POS</p> <ul style="list-style-type: none"> <li>• Cisco 2-Port OC-3c/STM-1c POS SPA</li> <li>• Cisco 4-Port OC-3c/STM-1c POS SPA</li> <li>• Cisco 1-Port OC-12c/STM-4c POS SPA</li> <li>• Cisco 1-Port OC-48/STM16-c POS/RPR SPA (POS mode only)</li> </ul> <p>Serial/Channelized</p> <ul style="list-style-type: none"> <li>• Cisco 8-port Channelized T1/E1 SPA</li> <li>• Cisco 2-port Channelized T3 to DS0 SPA</li> <li>• Cisco 4-port Channelized T3 to DS0 SPA</li> <li>• Cisco 2-port T3/E3 Serial SPA</li> <li>• Cisco 4-port T3/E3 Serial SPA</li> <li>• Cisco 1-port Channelized STM1/OC3 to DS0 SPA</li> </ul> <p>CEoP/Channelized ATM SPA</p> <ul style="list-style-type: none"> <li>• Cisco 24-port T1/E1 Circuit Emulation over Packet SPA (CEoP)</li> <li>• Cisco 1-port OC-3/STM-1 Circuit Emulation over Packet SPA</li> <li>• Cisco 2 port channelized T3 Circuit Emulation and channelized ATM SPA<sup>1</sup></li> </ul>
<b>Environmental conditions</b>	<ul style="list-style-type: none"> <li>• Operating temperature: 32 to 104°F (0 to 40°C)</li> <li>• Storage temperature: –40 to 167°F (–40 to 75°C)</li> <li>• Relative humidity: 10 to 90 percent, noncondensing</li> <li>• Operating altitude: –60 to 2000m</li> </ul>
<b>MIBs</b>	<ul style="list-style-type: none"> <li>• Cisco Entity MIB (CISCO-ENTITY-MIB)</li> <li>• Cisco Entity Asset MIB</li> <li>• Cisco Entity Field-Replaceable Unit (FRU) Control MIB</li> <li>• Cisco Entity Alarm MIB</li> <li>• Interface IF MIB (RFC 2233)</li> <li>• Frame Relay MIB (RFC 1315)</li> <li>• Cisco Frame Relay MIB</li> <li>• ATM MIB (RFC 1695)</li> <li>• Definitions of Managed Objects for Bridges (RFC 1493)</li> <li>• Evolution of Interfaces Group of MIB-II (RFC 1573)</li> <li>• SNMP MIB II (RFC 1213)</li> <li>• Remote Monitoring (RMON) MIB (RFC 1757)</li> <li>• Switch Monitoring (SMON) MIB</li> </ul>
<b>Network management</b>	Supported with CiscoWorks CiscoView CiscoWorks Resource Manager Essentials (RME) Cisco IP Solution Center (ISC)
<b>Physical specifications</b>	<ul style="list-style-type: none"> <li>• Occupies one slot in a Cisco 7600 Series router</li> <li>• Supports up to 12 Cisco 7600 SIP-400s in a 13-slot chassis</li> <li>• Requires Supervisor Engine 720-3B or 720-3BXL</li> <li>• Dimensions (H x W x D): 1.75 x 15.375 x 16 in.</li> <li>• Weight: 16 lbs not including the packaging</li> </ul>
<b>Power</b>	185W power consumption per Cisco 7600 SIP-400 265W maximum power consumption with 4 SPAs
<b>Indicators</b>	Cisco 7600 SIP-400 status: green (operational); orange (faulty)

<sup>1</sup> Release 12.2(33) SRC supports Clear Channel T3 ATM mode. (Channelization and Circuit Emulation are not supported in this release)

Description	Specification
<b>Regulatory compliance</b> <b>Safety</b>	CE marking <ul style="list-style-type: none"> <li>• UL 60950</li> <li>• CSA C22.2 No. 60950</li> <li>• EN60950</li> <li>• TS001</li> <li>• IEC 60950</li> <li>• AS/NZS3260</li> <li>• UL60950</li> </ul> EMC <ul style="list-style-type: none"> <li>• FCC Part 15 Class A</li> <li>• ICES-003 Class A</li> <li>• VCCI Class A</li> <li>• EN55022 Class A</li> <li>• CISPR22 Class A</li> <li>• AS/NZS3548 Class A</li> <li>• EN61000-3-2</li> <li>• EN61000-3-3</li> <li>• EN61000-3-1</li> <li>• EN55024</li> <li>• EN50082-1</li> <li>• EN300 386</li> </ul>
<b>Standards</b>	Telecommunications <ul style="list-style-type: none"> <li>• ITU-T G.610</li> <li>• ITU-T G.703</li> <li>• ITU-T G.707</li> <li>• ITU-T G.783 Sections 9–10</li> <li>• ITU-T G.784</li> <li>• ITU-T G.803</li> <li>• ITU-T G.813</li> <li>• ITU-T G.825</li> <li>• ITU-T G.826</li> <li>• ITU-T G.841</li> <li>• ITU-T G.957 Table 3</li> <li>• ITU-T G.958</li> <li>• ITU-T I.361</li> <li>• ITU-T I.363</li> <li>• ITU I.432</li> <li>• ITU-T Q.2110</li> <li>• ITU-T Q.2130</li> <li>• ITU-T Q.2140</li> <li>• ITU-T Q.2931</li> <li>• ITU-T O.151</li> <li>• ITU-T O.171</li> <li>• ETSI ETS 300 417-1-1</li> <li>• ACA TS 026 (1997)</li> <li>• BAPT /TC/139 (Draft 1e)</li> </ul>

### Ordering Information

To place an order, visit the [Cisco Ordering Home Page](#), or refer to Table 3.

**Table 3.** Ordering Information

Product Name	Part Number
Cisco 7600 Series SPA Interface Processor-400	7600-SIP-400
Cisco 7600 Series SPA Interface Processor-400, spare	7600-SIP-400=

## 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 your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, refer to [Cisco Technical Support Services](#) or [Cisco Advanced Services](#).

## For More Information

For more information about Cisco 7600 Series Routers, visit <http://www.cisco.com/go/7600>.

For more information about the Cisco SPA/SIP portfolio, visit <http://www.cisco.com/go/spa> or contact your local Cisco account representative.



**Americas Headquarters**  
Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
[www.cisco.com](http://www.cisco.com)  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

**Asia Pacific Headquarters**  
Cisco Systems, Inc.  
168 Robinson Road  
#28-01 Capital Tower  
Singapore 068912  
[www.cisco.com](http://www.cisco.com)  
Tel: +65 6317 7777  
Fax: +65 6317 7799

**Europe Headquarters**  
Cisco Systems International BV  
Haarlerbergpark  
Haarlerbergweg 13-19  
1101 CH Amsterdam  
The Netherlands  
[www-europe.cisco.com](http://www-europe.cisco.com)  
Tel: +31 0 800 020 0791  
Fax: +31 0 20 357 1100

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