

Cisco 7600 Series Route Switch Processor 720 with 10 Gigabit Ethernet Uplinks

Product Overview

The Cisco® 7600 Series Route Switch Processor 720 with 10 Gigabit Ethernet uplinks (RSP720-10GE) is designed to deliver the high scalability, performance, and fast convergence required for today and tomorrow's demanding voice, video, data, and mobility (quadruple-play) services. The Cisco 7600 Series RSP720-10GE (Figure 1) offers Carrier Ethernet service providers tremendous flexibility, scalability, and performance at the access or aggregation edge while deploying advanced IP video and triple-play (voice, video, and data) system applications in both the residential and business services markets. In essence, it gives service providers and enterprises true service convergence with the ability to manage a wide variety of applications over a range of access media using a single platform, the Cisco 7600 Series Routers.

Figure 1. The Cisco 7600 Route Switch Processor 720 with 10 Gigabit Ethernet Uplinks



The Cisco 7600 Series RSP720-10GE includes the following:

- Two X2-based 10 Gigabit Ethernet ports (with line rate forwarding)
- Two Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports and one 10/100/1000 gigabit port for additional flexibility: This port-level flexibility allows you to position the Cisco 7600 Series at the access edge connecting with a 10 Gigabit Ethernet port uplink and a Gigabit Ethernet port uplink. The two 10 Gigabit Ethernet uplink ports help save a slot that you can use for an additional high-density Ethernet module, shared port adapter (SPA), or SPA interface processor (SIP).
- Crossbar switch fabric: The Cisco 7600 Series RSP720-10GE has a new and enhanced 720-Gbps crossbar switch fabric and the same new application-specific integrated circuit (ASIC)-based forwarding engine that is used by the Cisco RSP720. This single module delivers 40 Gbps of switching fabric capacity per slot, supporting 4-port 10 Gigabit Ethernet and 48-port 10/100/1000 density line cards.
- Standby as an independent forwarding line card: In a redundant configuration, the Cisco 7600 Series RSP720-10GE introduces the unique capability of the standby processor being able to operate as an independent distributed forwarding line card.

With hardware-enabled forwarding for IPv4, IPv6 Unicast and Multicast, and Multiprotocol Label Switching (MPLS), the Cisco 7600 Series RSP720-10GE can provide high-speed central forwarding with rich packet-processing features such as access control lists (ACLs), quality of service (QoS), MPLS VPNs, and more. The Cisco 7600 Series RSP720-10GE delivers a rich set of IP features in hardware for applications such as subscriber aggregation, IP Forwarding, Layer 2 and Layer 3 MPLS VPNs, and Ethernet over MPLS (EoMPLS) with QoS and security features.

The Cisco 7600 Series RSP720-10GE comes integrated with two new daughter cards:

- Cisco 7600 Policy Feature Card (PFC-3C or PFC-3CXL): Performs Layer 2 and Layer 3 forwarding in hardware with consistent performance, even with intensive features enabled such as ACLs, QoS, generic routing encapsulation (GRE), or Network Address Translation (NAT). The card executes the following functions:
 - Performs Layer 2 and Layer 3 forwarding
 - Enforces ACL functions
 - Performs QoS policing and marking
 - Collects NetFlow statistics
 - Offers Control Plane Policing (CoPP)
- Cisco 7600 Multilayer Switch Feature Card (MSFC4): Runs Layer 2 and Layer 3 protocols and performs all the control-plane functions.

High-Level Hardware and Software Support Specifications

Table 1. Support Specifications

Description	Specification
Software compatibility	<ul style="list-style-type: none"> • The Cisco 7600 Series RSP720-10GE is generally available from the Cisco IOS® Software 12.2(33)SRE release train. • Support for the RSP720-10GE is only available on a limited basis for Cisco IOS Software 12.2(33)SRC, 12.2(33)SRD release trains.
Supported chassis and line cards	<p>Cisco 7603-S, 7604, 7606-S, 7609, 7609-S, and 7613* models</p> <p>* The Cisco 7613 is only supported from Software Release 12.2(33)SRE2 onwards. The RSP720-10GE will not support 7613 chassis with earlier IOS release.</p> <p>The Cisco 7606 is not supported in any version with the RSP720-10GE</p> <p>All of the Ethernet Services Plus modules (Cisco 7600 Series ES+) are supported</p> <p>SIPs and SPAs:</p> <ul style="list-style-type: none"> • Cisco 7600 Series SPA Interface Processor-600 (Cisco 7600 SIP 600) • Cisco 7600 Series SPA Interface Processor-400 (Cisco 7600 SIP 400) • Cisco 7600 Series SPA Interface Processor-200 (Cisco 7600 SIP 200) <p>Cisco 7600 Series/Catalyst® 6500 Series Enhanced FlexWAN Module</p> <p>All of the Cisco 7600 Series Ethernet services modules are supported</p> <p>High-density Ethernet cards (part numbers):</p> <ul style="list-style-type: none"> • WS-X67xx (WS-X6704-10GE and WS-X6708-10GE are both supported) • WS-X65xx • WS-X64xx • WS-X61xx <p>Distributed forwarding cards (part numbers)**:</p> <ul style="list-style-type: none"> • DFC3C • DFC3CXL • DFC3B • DFC3BXL <p>** Note that the rule of the least common denominator applies in a Cisco 7600 Series chassis and the lowest level of PFC or DFC dictates at which level the entire chassis operates. A DFC3B forces the Cisco 7600 Series configuration to run in 3B mode, regardless of the PFC-3C (or -3CXL) of the RSP720-10GE.</p>

Description	Specification
Optics support	<p>10 Gigabit Ethernet:</p> <ul style="list-style-type: none"> • X2-10GB-SR= • X2-10GB-CX4= • X2-10GB-LX4= • X2-10GB-LR= • X2-10GB-ER= • X2-10GB-LRM= (12.2(33)SRE and later) • X2 10GB-ZR= (12.2(33)SRE and later) • X2-DWDM (12.2(33)SRE and later) <p>Gigabit Ethernet:</p> <ul style="list-style-type: none"> • GLC-T= • GLC-SX-MM= • GLC-LH-SM= • GLC-ZX-SM= • GLC-BX-D= • GLC-BX-U= • SFP-GE-T= • SFP-GE-S= • SFP-GE-L=

Features and Benefits

Table 2 lists the features and benefits of the Cisco 7600 Series RSP720-10GE.

Table 2. Features and Benefits of Cisco 7600 Series RSP720-10GE

Feature	Benefits
Integrated 720-Gbps switch fabric	<ul style="list-style-type: none"> • Offers Layer 2 forwarding rates of up to 30 million packets per second (Mpps) (Centralized Forwarding) • Provides bandwidth capacity of 40 Gbps per slot • Allows additional slots for increased port density
Hardware-based Cisco Express Forwarding	<ul style="list-style-type: none"> • Offers Layer 3 (IP and MPLS) forwarding rates of 30 Mpps (Centralized Forwarding)
10 Gigabit Ethernet and Gigabit Ethernet port options	<ul style="list-style-type: none"> • Offers two 10 Gigabit Ethernet and three Gigabit Ethernet port options (including one 10/100/1000 RJ-45 port) on the RSP
Faster CPU and added memory	<ul style="list-style-type: none"> • Performance improvements, including: <ul style="list-style-type: none"> ◦ Faster protocol convergence times ◦ Improved Internet Group Management Protocol (IGMP) snooping times ◦ Improved router bootup times ◦ Faster rates of establishing Dynamic Host Configuration Protocol (DHCP) server and Label Distribution Protocol (LDP) ◦ IP sessions and Traffic Engineering
High-density residential subscribers aggregation	<ul style="list-style-type: none"> • Allows customers to support a combination of Layer 2 VPN (L2VPN) and L3VPN features for use in a quadruple-play network

Hardware Features of the Cisco 7600 Series RSP720-10GE

Table 3. Hardware Features of Cisco 7600 Series RSP720-10GE

Features	RSP720-3C-10GE	RSP720-3CXL-10GE
Memory (route processor/switch processor)	Up to 4 GB/Up to 2 GB	Up to 4 GB/Up to 2 GB
Compact Flash memory	512 MB/1 GB	512 MB/1 GB
Nonvolatile RAM (NVRAM)	4 MB	4 MB
File Allocation Table (FAT) 32 file system	Supported	Supported

Scalability

Table 4. Scalability for Cisco 7600 Series RSP720-10GE

Part Number	RSP720-3C-10GE	RSP720-3CXL-10GE
IPv4 Routing	In hardware: Up to 400 Mpps [*]	In hardware: Up to 400 Mpps [*]
IPv6 Routing	In hardware: Up to 200 Mpps [*]	In hardware: Up to 200 Mpps [*]
Layer 2 bridging	In hardware: Up to 400 Mpps [*]	In hardware: Up to 400 Mpps [*]
MPLS	<ul style="list-style-type: none"> MPLS in hardware to enable use of Layer 3 VPNs and EoMPLS tunneling Up to 1024 Virtual Route Forwarding (VRF) with a total of up to 256,000 routes per system 	<ul style="list-style-type: none"> MPLS in hardware to enable use of Layer 3 VPNs and EoMPLS tunneling Up to 1024 VRF with a total of up to 1,000,000 routes per system
Generic routing encapsulation (GRE)	In hardware	In hardware
NAT	Hardware assisted	Hardware assisted
Routes	256,000 (IPv4); 128,000 (IPv6)	1M (IPv4); 512K (IPv6)
NetFlow entries	128,000	256,000

^{*} With distributed forwarding cards (DFCs)

QoS Features

Table 5. QoS Features of Cisco 7600 Series RSP720-10GE

Feature	RSP720-3C-10GE	RSP720-3CXL-10GE
Aggregate rate-limiting location	Ingress port or VLAN and egress VLAN or Layer 3 port	Ingress port or VLAN and egress VLAN or Layer 3 port
Rate-limiting level types: Committed information rate (CIR) and peak information rate (PIR)	CIR and PIR	CIR and PIR
Flow-based rate-limiting method; number of rates	Per source address, destination address, or full flow; 64 rates	Per source address, destination address, or full flow; 64 rates
MAC ACLs featuring per-port and per-VLAN granularity	Yes	Yes

Security Features

Table 6. Security Features of Cisco 7600 Series RSP720-10GE

Feature	RSP720-3C-10GE	RSP720-3CXL-10GE
Port security	Yes	Yes
IEEE 802.1x and 802.1x extensions	Yes	Yes
VLAN and router ACLs and port ACLs	Yes	Yes
Reflexive ACLs	128,000	256,000
Unicast Reverse Path Forwarding (uRPF) check in hardware	Up to 6 paths	Up to 6 paths
CPU rate limiters (denial-of-service [DoS] protection)	10 special-case rate limiters plus CoPP	10 special-case rate limiters plus CoPP
Private VLANs	Yes	Yes
MAC ACLs on IP	Yes	Yes
TCP intercept hardware acceleration	Yes	Yes

MPLS Features

Table 7. MPLS Features

Feature	RSP720-3C-10GE	RSP720-3CXL-10GE
Interface support	LAN and WAN interface modules as applicable	LAN and WAN interface modules as applicable
Label imposition and disposition (MPLS provider edge) and swapping (MPLS provider core)	Yes	Yes
Label Distribution Protocol (LDP)	Yes	Yes
Tag Distribution Protocol (TDP) support	Yes	Yes
MPLS VPN	Yes	Yes
VRF Lite	Yes	Yes
QoS mechanisms using experimental (EXP) bits	Yes	Yes
MPLS with Resource Reservation Protocol Traffic Engineering (MPLS-RSVP-TE)	Yes	Yes
MPLS Differentiated Services (DiffServ)-Aware Traffic Engineering (MPLS-DS-TE)	Yes	Yes
MPLS traceroute	Yes; refer to release notes for details	Yes; refer to release notes for details
EoMPLS	Yes	Yes

Routing and MIB Support

Table 8. Routing and MIB Feature Support

Description	Specification
Protocols	Layer 3 routing protocols: <ul style="list-style-type: none"> • Border Gateway Protocol Version 4 (BGPv4) • Open Shortest Path First (OSPF) • Intermediate System-to-Intermediate System (IS-IS) • Routing Information Protocol (RIP) • Distributed Forwarding Information Base (FIB) switching • Cisco Discovery Protocol • Internet Control Message Protocol (ICMP) Multicast Forwarding <ul style="list-style-type: none"> • Protocol independent Multicast (PIM; both sparse and dense modes) • (S,G) • (*,G) • Bidirectional PIM in hardware Comprehensive MPLS support Cisco Group Management Protocol (GMP) and IGMP snooping
MIBs	MPLS LDP MIB <ul style="list-style-type: none"> • MPLS Label Switch Router (LSR) MIB • MPLS-TE MIB • MPLS VPN MIB Please refer to software release notes and check the following MIB finder for more information: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml .
Network management	CiscoWorks

Product Specifications and Compliance

Table 9. Product Specifications and Compliance

Description	Specification		
Physical specifications	(H x W x D): 1.57 x 15.35 x 17.05 in. (4 x 39 x 43.3 cm) Weight: 11.7 lb (5.336 kg)		
Power consumption	RSP720-3CXL-10GE: 375W RSP720-3C-10GE: 355W		
Environmental conditions	Operating temperature: 32 to 104°F (0 to 40°C) Storage temperature: -40 to 167°F (-40 to 75°C) Relative humidity: 10 to 90%, non-condensing Regulatory compliance		
Predicted mean time between failure (MTBF)	80,000 hr		
Compliance	<table border="0"> <tr> <td style="vertical-align: top;"> CE Markings <ul style="list-style-type: none"> • Safety • UL 60950 • EN 60950 • CSA-C22.2 No. 60950 • IEC 60950 • AS/NZS 3260 • IEC 60825-1,-2 • EN 60825 -1,-2 • 21CFR1040-10 • TS001 • EMC • FCC Part 15 (CFR 47) Class A • ICES-003 Class A • EN 55022 Class A • CISPR 22 Class A • AS/NZS 3548 Class A • VCCI Class A • EN55024 • ETS300 386 • EN50082-1 • EN61000-6-1 </td> <td style="vertical-align: top; padding-left: 20px;"> Emission <ul style="list-style-type: none"> • 47 CFR Part 15: 2005 • CISPR22: 2005 • EN300386: V1.3.3 : 2005 • EN55022: 1994 [+ amd 1 & 2] • EN55022: 1998 • EN61000-3-2: 2000 • EN61000-3-3: 1995 [+ amd 1: 2001] • ICES-003 Issue 4 : 2004 • KN 22: 2005 • VCCI: V-3/2006.04 Immunity <ul style="list-style-type: none"> • CISPR24: 1997 [+ amd 1 & 2] • EN300386: V1.3.3 : 2005 • EN50082-1: 1992 • EN50082-1: 1997 • EN55024: 1998 [+ amd 1 & 2] • EN61000-6-1: 2001 </td> </tr> </table>	CE Markings <ul style="list-style-type: none"> • Safety • UL 60950 • EN 60950 • CSA-C22.2 No. 60950 • IEC 60950 • AS/NZS 3260 • IEC 60825-1,-2 • EN 60825 -1,-2 • 21CFR1040-10 • TS001 • EMC • FCC Part 15 (CFR 47) Class A • ICES-003 Class A • EN 55022 Class A • CISPR 22 Class A • AS/NZS 3548 Class A • VCCI Class A • EN55024 • ETS300 386 • EN50082-1 • EN61000-6-1 	Emission <ul style="list-style-type: none"> • 47 CFR Part 15: 2005 • CISPR22: 2005 • EN300386: V1.3.3 : 2005 • EN55022: 1994 [+ amd 1 & 2] • EN55022: 1998 • EN61000-3-2: 2000 • EN61000-3-3: 1995 [+ amd 1: 2001] • ICES-003 Issue 4 : 2004 • KN 22: 2005 • VCCI: V-3/2006.04 Immunity <ul style="list-style-type: none"> • CISPR24: 1997 [+ amd 1 & 2] • EN300386: V1.3.3 : 2005 • EN50082-1: 1992 • EN50082-1: 1997 • EN55024: 1998 [+ amd 1 & 2] • EN61000-6-1: 2001
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Ordering Information

To place an order, visit the [Cisco Ordering Home Page](#) and refer to Table 10.

- The Cisco 7600 Series RSP720-10GE is generally available from the Cisco IOS Software 12.2(33)SRE release train.
- RSP720-10GE system bundles are available starting from the 12.2(33)SRE release train.
- Support for the RSP720-10GE is only available on a limited basis for 12.2(33)SRC and 12.2(33)SRD release trains.

Please contact your Cisco sales representative for any further questions.

Table 10. Ordering Information for Cisco 7600 Series RSP720-10GE

Product Number	Description
RSP720-3C-10GE(=)	Cisco 7600 Series RSP720-10GE with PFC-3C includes: <ul style="list-style-type: none"> • Two X2-based 10 GE ports • Two GE SFP ports and one 10/100/1000 gigabit port for additional flexibility • Integrated 720-Gbps switch fabric • PFC-3C and Multilayer Switch Feature Card (MSFC4) • Route processor: 1- to 4-GB DRAM (1-GB default) • Switch processor: 1- to 2-GB DRAM (1-GB default) • One external Compact Flash Type II slot • 4-MB nonvolatile RAM (NVRAM) • 512-MB internal boot memory (Compact Flash)
RSP720-3CXL-10GE(=)	Cisco 7600 Series RSP720-10GE with PFC-3CXL includes: <ul style="list-style-type: none"> • Two X2-based 10 GE ports • Two GE SFP ports and one 10/100/1000 gigabit port for additional flexibility • Integrated 720-Gbps switch fabric • PFC-3CXL (high capacity) and Multilayer Switch Feature Card (MSFC4) • Route processor: 1- to 4-GB DRAM (2-GB default) • Switch processor: 1- to 2-GB DRAM (1-GB default) • One external Compact Flash Type II slot • 4-MB NVRAM • 512-MB internal boot memory (Compact Flash)
MEM-RSP720-2G(=)	This memory option upgrades RSP720-10GE RP memory from 1G to 2G
MEM-RSP720-4G(=)	This memory option upgrades RSP720-10GE RP memory from 2G to 4G
MEM-RSP720-SP2G	This memory option upgrades RSP720-10GE SP memory from the default 1G to 2G

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 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 the Cisco 7600 Series Routers and the Cisco 7600 Series RSP720-10GE, visit: <http://www.cisco.com/en/US/products/hw/routers/ps368/index.html>.



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