Cisco 7301 Router

The Cisco® 7301 Router is a compact, high-performance one-rack-unit (1RU) router coupled with a broad set of interfaces and Cisco IOS® Software features, which makes it ideal for both service providers and enterprise applications.

As part of the industry-leading Cisco 7000 Series Routers, the Cisco 7301 packs high performance in a space—and power-efficient chassis that includes a single Cisco 7000 Series port adapter slot, three onboard Gigabit Ethernet (copper or optical) or Fast Ethernet ports, and new high-speed bus technologies.

The main features of the Cisco 7301 are:

- Three times the performance compared to existing 1RU routers

- Compact, power-efficient 1RU form factor

- Single Cisco 7000 Series port adapter slot

- Complete Cisco IOS Software feature support

- Three onboard Gigabit Ethernet (copper or optical) or Fast Ethernet ports

- Pluggable Gigabit Ethernet optics (Small Form-Factor Pluggable [SFP] optics)

- Up to 1 GB of available DRAM, supporting up to 1 million routes

- Up to 256 MB of removable compact flash memory

- Front-to-back airflow and single-sided management

The Cisco 7301 delivers a full suite of Cisco IOS Software services for managing network security, allocating quality of service (QoS) among applications and users, and providing value-added services such as NetFlow accounting and encryption. QoS applications such as Committed Access Rate, Weighted Random Early Detection (WRED), and Weighted Fair Queuing (WFQ) can be flexibly applied to provide precedence across IP addresses, applications, and specific users with a high level of granularity.

With its combination of scalable performance, compact architecture, high density, and low price per port, the Cisco 7301 is ideally suited for a variety of crucial applications in both the service provider and enterprise markets.

Service Provider Applications

The Cisco 7301 is designed for five principal application areas within a service provider network:

- Broadband aggregation: Point-to-Point Protocol (PPP) termination and aggregation (PTA) and Layer 2 Tunneling Protocol (L2TP) access concentrator (LAC), or L2TP network server (LNS) and tunnel switching (LTS) aggregation router capable of handling up to 16,000 simultaneous sessions and enabling a pay-as-you-grow "rack and stack" architecture

- IP Version 6 (IPv6) gateway: Linking between an IPv4 network and an IPv6 network, including IPv6 VPN architectures

- Managed services: High-end customer premises equipment (CPE) or Multiprotocol Label Switching customer edge (MPLS-CE) devices, due to its high-performance, feature-rich support with both Gigabit Ethernet LAN connectivity and WAN port adapter connectivity

- High-availability design: 100 percent redundancy through the use of two CPE devices configured for Hot Standby Router Protocol (HSRP) or Layer 3 load balancing

- Cost-effective route reflector: Ideally suited as a low-cost route reflector with its capability to hold 1 million routes with its maximum of 1 GB memory installed

Enterprise Applications

The Cisco 7301 is designed for these principal enterprise application areas:

- Secure Internet gateway: Support for features such as IP Security (IPsec) Protocol and stateful firewall at very high speeds, making it an ideal Internet gateway (security) appliance

- Large-branch-office router: High-performance branch-office router with support for up to OC-3/STM-1 or Gigabit Ethernet connectivity

- Network-appliance router: Support for CiscoWorks QoS Policy Manager and other management tools, making it an ideal QoS appliance at the edge of enterprise networks

- By enabling the multifunction capabilities of the Cisco 7301, customers can simplify their network architectures, significantly reduce initial equipment costs, and increase revenue opportunities through value-added services.

Features and Benefits

Table 1 describes the features and benefits of the Cisco 7301.

Table 1.   Features and Benefits of Cisco 7301 Router

Features	Benefits
Performance	Provides processing performance of nearly 1 million packets per second (mpps)
Compact form factor and low power consumption (75 watts)	• Uniquely positioned as one of the fastest 1RU routers in the industry today; customers can increase router performance where space is constrained • "Rack and stack" capability, allowing customers to make better use of space in expensive ISP data centers • Ideal for a dedicated security or QoS appliance at the edge of enterprise networks
Support of Cisco IOS Software	Supports a wide range of IP network services including QoS, MPLS, Layer 2 VPN, and IPv6 and all other Cisco IOS Software features depending on the release used, thereby enabling the use of multiple revenue-generating and productivity-increasing applications
3 fixed 10/100/1000-Mbps ports (RJ-45 or SFP optics) directly on the processor	• Increases LAN connectivity and performance without taking up slot capacity • No need for high-speed LAN interfaces to share a peripheral component interconnect (PCI) bus with port adapters

512 MB (default) DRAM, upgradable to 1 GB	• More memory offers the following benefits:
	   ◦ Supports routing tables with up to 1 million entries
	   ◦ Supports increased routes and additional MPLS virtual route forwarding (VRF) instances
	   ◦ Enables greater scalability for features such as NetFlow, Network Address Translation (NAT), and access control lists (ACLs)
	   ◦ Makes the Cisco 7301 an ideal route reflector in a service provider network

Single Cisco 7000 Series port adapter slot	Increases investment protection and flexibility by allowing customers to use existing port adapters, this feature also simplifies sparing

Cisco 7301 Product Specifications: Hardware Components

Chassis

The Cisco 7301 is designed to enhance operational efficiency. The Cisco 7301 incorporates a 700-MHz integrated processor and includes three 10/100/1000-Mbps interfaces with RJ-45, three SFP optical interfaces, a single Cisco 7000 Series router port adapter slot, a 64-MB compact flash memory card, and auxiliary and console ports in a compact (1RU) chassis.

The Cisco 7301 processor integrates functions such as the memory controller, system controller, NVRAM, console and auxiliary ports, and flash memory storage device controller all on the same chip as the system CPU. That means that these devices that were once spread across multiple chips are now integrated into a single network processor, enabling the system to run at much faster speeds.

Table 2 provides an overview of the available options.

Table 2.   Options for Cisco 7301 Router

Feature	Cisco 7301	Cisco 7301 Supporting Broadband Aggregation (Part Numbers Cisco7301-BB and Cisco7301-BB-8K)
Processor	700-MHz integrated processor	700-MHz integrated processor
Performance	900,000 packets per second (pps) or more	900,000 pps or more
LAN ports	3 Fast Ethernet (10/100/1000) or Gigabit Ethernet	3 Fast Ethernet (10/100/1000) or Gigabit Ethernet
Gigabit Ethernet optics	SFPs (SX, LX/LH, and ZX)	SFPs (SX, LX/LH, and ZX)
DRAM	512 MB default (1 GB maximum)	512 MB default (1 GB maximum)
Compact flash memory	64 MB default (256 MB maximum)	64 MB default (256 MB maximum)
Cisco IOS Software release	Cisco IOS Software Releases 12.2(11)YZ, 12.2(13)B,12.3.(2)T**,12.2SR, and 12.4T	Cisco IOS Software Releases 12.2(11)YZ, 12.2(13)B, 12.3.(2)T**, 12.2SR, and 12.4T with Broadband license for 16,000 or 8, 000 sessions

** When this Cisco IOS Software release is available

The Cisco 7301 chassis retains all the important features of the Cisco 7401, which enables it to deliver an exceptional price:performance ratio for enterprises and service providers alike.

As with the Cisco 7401, to help ensure the high system availability required for mission-critical applications, the Cisco 7301 also supports:

- Physical alarm relay in case of device failure
- Dual AC and DC power supplies
- Online insertion and removal (OIR) of port adapters
- Environmental monitors with levels of escalation to help ensure corrective action prior to system shutdown

Built-in LAN Ports

The Cisco 7301 processor includes three fixed 10/100/1000-Mbps LAN interfaces as part of the system CPU. These interfaces run at any speed from 10 Mbps Ethernet to 1000 Mbps Gigabit Ethernet. One RJ-45 connection and one SFP Gigabit Ethernet connection is provided for each interface, for a total of three Ethernet RJ-45 and three SFP Gigabit Ethernet connections on the

Cisco 7301 faceplate, any of which may be active at any time. The RJ-45 interfaces have the option of running at 10-Mb Ethernet, 100-Mb Fast Ethernet, or 1000-Mb Gigabit Ethernet over copper. Industry-standard SX, LX/LH, and ZX SFP Gigabit Ethernet transceivers provide Gigabit Ethernet connectivity over fiber.

Figure 1 illustrates these ports.

Figure 1.   Cisco 7301 Router LAN Ports

Connectivity

The Cisco 7301 includes a single Cisco 7000 Series port adapter slot, which protects existing customer investment in interfaces and simplifies sparing.

The Cisco 7301 offers scalable density with a wide range of interfaces including:

- Ethernet, Fast Ethernet, and Gigabit Ethernet
- Serial and multichannel T1/E1 and T3/E3 interfaces and packet-over-SONET (POS) OC-3
- OC-3/STM-1 POS, T3/E3 and OC-3/STM-1 ATM, and T1/E1 Inverse Multiplexing over ATM (IMA)
- ISDN Primary Rate Interface (PRI), Basic Rate Interface (BRI), and High-Speed Serial Interface (HSSI)
- Support for hardware encryption and Layer 3 compression (VPN accelerator modules)

For a detailed list of all port adapters supported on the Cisco 7301 Router, please contact your Cisco sales representative.

The Cisco 7301 architecture is based on a new memory architecture type called double data rate (DDR) memory. This new form of memory roughly doubles the speed of access to system memory. In a store-and-forward router such as the Cisco 7301, this feature provides a clear advantage because each packet must be individually stored in memory, rewritten by the system CPU, and then transmitted out of memory to the outbound interface.

The Cisco 7301 supports DRAM of 512 MB (default), upgradable to 1 GB. There are two DRAM memory slots, so 1 GB consists of two 512-MB small-outline dual in-line memory modules (SODIMMs).

NVRAM and Boot Flash Memory

The NVRAM in the Cisco 7301 is 512 KB.

Boot flash memory on the Cisco 7301 has been doubled over previous Cisco 7000 Series Routers, to 32 MB. This increase allows the end user to keep a full boot image in boot flash memory or to have plenty of room for multiple log file locations or backup configuration files.

Compact Flash Memory

The Cisco 7301 includes a single 64-MB default compact flash memory slot for removable flash storage, upgradable to 256 MB. The chassis is also formatted using the Advanced Technology Attachment (ATA) standard file system format so they can be read in other ATA routers and PC systems with a simple compact flash memory–to–PCMCIA adapter module or compact flash reader. It is large enough to hold at least two Cisco IOS Software images.

Console and Auxiliary Ports

The Cisco 7301 has built-in console and auxiliary ports on the front end of the chassis.

Software

The Cisco 7301 supports the following Cisco IOS Software releases:

- Release 12.2(11)YZ (a special release of Release 12.2(11)S; its migration path is the third release of Release 12.2S)
- Release 12.2(13)B (required to support 16,000 subscribers)
- Release 12.3(2)T (when the release is available)
- Release 12.4T
- Release 12.2SR

Product Specifications

Table 3 describes the power requirements and Table 4 describes the physical and environmental specifications of the Cisco 7301. The following list describes how the Cisco 7301 complies with regulatory and standards requirements.

Table 3. Power Requirements of Cisco 7301

Description	Cisco 7301
Single and Dual AC Power Supply	
AC-input power	75W maximum (single supply configuration)
AC-input voltage rating	100 to 240 VAC wide input with power factor correction
AC-input current rating	• Rated for 2A • Not to exceed 1.0A at 100 VAC and 0.5A at 240 VAC
AC-input frequency rating	50 and 60 Hz
AC-input cable	18 AWG 3-wire cable, with 3-lead IEC-320 receptacle on the power supply end and a country-dependent plug on the power source end
48V Single and Dual DC Power Supply	
DC-input voltage ratings	–48 VDC nominal in North America and –60 VDC nominal in the European Community; maximum range is -–40.5 to –72 VDC
DC-input current ratings	Rated for 3A Not to exceed 1.6A at –48 VDC
DC-input cable	18 AWG recommended minimum, with at least 2 conductors for 48V single and 4 conductors for 48V dual power supplies respectively, rated for at least 140℉ (60℃)

Table 4.   Physical and Environmental Specifications

Description	Cisco 7301
Dimensions (H x W x D)	1.73 x 17.3 x 13.87 in. (4.39 x 43.9 x 35.23 cm)
Weight	Chassis fully configured with a port adapter: approximately 10.5 lb (4.76 kg)
Heat dissipation	50W (170 BTU typical and 75W (255 BTU) maximum
Power dissipation	75W maximum configuration
Temperature	32 to 104°F (0 to 40°C) operating; −4 to 149°F (−20 to 65°C) nonoperating
Humidity	10 to 90% humidity noncondensing

Regulatory Compliance

- CE marking

Safety

- UL 60950
- CAN/CSA-C22.2 No. 60950
- EN 60950
- IEC 60950
- AS/NZS 3260
- IEC 60825-1
- IEC 60825-2
- EN 60825-1
- EN 60825-2
- 21CFR 1040

EMC

- FCC Part 15 (CFR 47) Class A
- ICES-003 Class A
- EN55022 Class A
- CISPR22 Class A
- AS/NZS 3548 Class A
- VCCI Class A
- EN55024
- ETS300 386
- EN50082-1
- EN61000-3-2
- EN61000-3-3
- EN61000-6-1
- ETS 300386

Industry Standards

- GR-64-Core NEBS Level 3 (pending)
- GR-1089-Core NEBS Level 3 (pending)
- ETSI 300 019 Storage Class 1.1 (pending)
- ETSI 300 019 Transportation Class 2.3 (pending)
- ETSI 300 019 Stationary Use Class 3.1 (pending)

Software Requirements

The minimum software requirement for the Cisco 7301 is Cisco IOS Software Release 12.2 (11)YZ or later.

The minimum software requirement for the Cisco 7301-BB is Cisco IOS Software Release 12.2 (13)B or later; this requirement is for 16,000 subscribers.

The Cisco 7301 will also be supported in Cisco IOS Software Release 12.3(2).T when the release is available.

Ordering Information

Tables 5 to 10 provide the information needed to order the Cisco 7301 and related products. Please visit: http://www.cisco.com/public/ordering_info.shtml to place an order.

Table 5.   Chassis Ordering Information

Product Part Number	Product Description
Cisco7301	Cisco 7301 single-slot chassis. Includes 512 MB default DRAM, 64 MB default Flash memory, AC power, and IP software.
Cisco7301=	Cisco 7301 single-slot chassis SPARE. Includes 512 MB default DRAM, 64 MB default Flash memory, AC power, and IP software.
Cisco7301-BB-8K	Cisco 7301 single-slot chassis. Includes 512 MB default DRAM, 64 MB default Flash memory, AC power, and broadband aggregation feature license to support 8000 sessions.
Cisco7301-BB	Cisco 7301 single-slot chassis. Includes 512 MB default DRAM, 64 MB default Flash memory, AC power, and broadband aggregation feature license to support 16,000 sessions.

Table 6.   SDRAM Memory Ordering Information

Product Part Number	Product Description
MEM-7301-512MB	2 256 MB memory modules (512 MB total) for the Cisco 7301 Router
MEM-7301-512MB=	2 256 MB memory modules (512 MB total) for the Cisco 7301 Router, SPARE
MEM-7301-1GB	2 512 MB memory modules (1 GB total) for the Cisco 7301 Router
MEM-7301-1GB=	2 512 MB memory modules (1 GB total) for the Cisco 7301 Router, SPARE

Table 7.   Compact Flash Memory Ordering Information

Product Part Number	Product Description
MEM-7301-FLD64	64 MB compact Flash disk for the Cisco 7301
MEM-7301-FLD64 =	64 MB compact Flash disk for the Cisco 7301 Router, SPARE
MEM-7301-FLD128	128 MB compact Flash disk for the Cisco 7301 Router
MEM-7301-FLD128=	128 MB compact Flash disk for the Cisco 7301 Router, SPARE
MEM-7301-FLD256	256 MB compact Flash disk for the Cisco 7301 Router
MEM-7301-FLD256=	256 MB compact Flash disk for the Cisco 7301 Router, SPARE

Table 8.   SFP Optics Ordering Information

Product Part Number	Product Description
GLC-SX-MM	Gigabit Ethernet SFP, LC connector SX transceiver
GLC-SX-MM=	Gigabit Ethernet SFP, LC connector SX transceiver, SPARE
GLC-LH-SM	Gigabit Ethernet SFP, LC connector LH transceiver
GLC-LH-SM=	Gigabit Ethernet SFP, LC connector LH transceiver, SPARE

Table 9.   Power Supply Ordering Information

Product Part Number	Product Description
PWR-7301-AC	AC power supply option for Cisco 7301
PWR-7301/2-AC	Dual AC power supply option for Cisco 7301
PWR-7301-DC48	DC 48 power supply option for Cisco 7301
PWR-7301/2-DC48	Dual DC 48 power supply option for Cisco 7301

Table 10.   Feature License Ordering Information

Product Part Number	Product Description
FR-BUS-16-73	Cisco 7301 Broadband Aggregation 16,000-User Services License
FR-BUS-16-73=	Cisco 7301 Broadband Aggregation 16,000-User Services License—SPARE
FR-BUS72	Broadband 8000-User Services License
FR-BUS72=	Broadband 8000-User Services License—SPARE

Customer Service and Support

Cisco offers a wide range of service and support options for its customers. More information about Cisco service and support programs and benefits, please see:
http://www.cisco.com/public/Support_root.shtml.