

Cisco CSS 11500 Series Content Services Switch

The Cisco® CSS 11500 Series Content Services Switch is a market-leading compact platform, delivering the richest Layer 4 to 7 Application Delivery services in the data center.

The Cisco CSS 11500, with the award-winning Cisco Web Network Services (WebNS) Software, is specifically designed to provide robust application delivery (Layer 4 to 7) services for Internet and intranet data centers in six key areas:

- It introduces an intelligent, distributed architecture to help organizations meet the real-world scaling requirements of today's application infrastructure.
- It improves application and site availability and transaction integrity by introducing Adaptive Session Redundancy (ASR), an industry standard in stateful failover.
- It delivers the greatest flexibility of any content switch in its class for customizing combinations of ports, performance, and services.
- It scales secured application transaction performance through support of an integrated, high-capacity Secure Sockets Layer (SSL) module. Off-loading SSL onto the network improves the overall performance of the web and application server enabling better application performance.
- It provides an integrated high-capacity web application (Hypertext Transfer Protocol, HTTP) compression module. Web application (HTTP) compression improves application response time by 20 to 50%, off-load the compression from the server, which reduces server workload, and decreases the traffic traversing wide area networks (WANs), which reduces bandwidth requirements and improves overall application response times; improving productivity.
- The Cisco CSS modular design protects investments by enabling upgrades of performance, ports, and services to meet your current and future application demands.

The Cisco CSS 11500 Series Content Services Switch enables businesses to simultaneously reduce costs by optimizing, scaling and securing data center, network, and application resources, which improves productivity of those resources, therefore offering a superior experience for customers, business partners, and employees. Through content fast switching and forwarding, the Cisco CSS 11500 Series improves utilization, responsiveness, availability, scalability, and security of Websites, server farms, cache clusters, firewall systems and many others application infrastructure components.

Figure 1. Cisco CSS 11500 Series Content Switch



PREMIER TRAFFIC MANAGEMENT FOR E-BUSINESS

In addition to the Cisco CSS 11500 Series, Cisco Systems® delivers a complete product line that includes the Cisco CSS 11501, CSS 11501S-C, CSS 11503, CSS 11506, and content switching modules (CSM/CSM-S) integrated service modules for the Cisco Catalyst® 6500 Series Switch and Cisco 7600 Series Router. The Cisco CSM attains superior performance and offers transport and application (Layer 4 to 7) features as rich as those in WebNS Software. Through full integration with Cisco IOS® Software, the Cisco Catalyst 6500 Series Switch, and the Cisco 7600 Series Router, Cisco CSM also supports high port density and comprehensive internetworking features. The Cisco CSM-S provides all the functionality of the CSM, and adds hardware acceleration of SSL processing. Together, the Cisco CSS 11500 and CSM are ideal choices for enterprises and service providers deploying content services.

NEW STANDARD IN HIGH AVAILABILITY

The Cisco CSS 11500 delivers Adaptive Session Redundancy (ASR), a method for achieving stateful Layer 5 session redundancy feature that enables failover of important flows while maximizing performance.

Some flows, such as a long-lived FTP or a database session, may be mission-critical, but many flows are not. Most of today's solutions require all traffic—important or not—to be backed up from one unit to another. If the majority of flows are not critical, most of system performance is wasted on unnecessary backups.

With ASR, the Cisco CSS 11500 can be configured so that critical flows are marked as replication-worthy, whereas others need not be marked as such. ASR focuses traffic management resources precisely where needed.

SSL AND COMPRESSION INTEGRATION FOR SECURITY, SERVER, AND WAN OPTIMIZATION

Cisco offers a scalable, hardware-based integrated SSL and compression solution. SSL, the industry standard for secure transport of traffic from client browsers to Web servers, presents two critical challenges for today's e-business infrastructure. First, because SSL encrypts data and headers, it obscures the request-specific information on which Layer 4 to 7 switching decisions are made. Second, SSL authentication places a high processing load for each SSL flow setup.

The Cisco CSS 11500 with integrated SSL modules meets both of these challenges by combining leading SSL acceleration technology with the Cisco WebNS technology. In addition to superior price performance, the SSL module simplifies the management of digital certificates.

The latest hardware module to be added to the Cisco CSS 11500 product line is capable of supporting both SSL acceleration and HTTP compression independently or simultaneously. This combination of supporting SSL transaction and compression in the same module delivers the following benefits:

- Server-based compression and SSL termination, intensive processes that can rob server performance needed for computational tasks; with this new module, network designers can offload these processes to the Cisco CSS 11500.
- Both secure and non-secure client traffic can enjoy the improved server response times associated with HTTP compression.
- SSL and compression capacity can be scaled by adding additional modules to the Cisco CSS 11500 Series.
- Network designers will see a reduction in WAN bandwidth consumption for both secure and non-secure Web traffic.

The compression module takes advantage of the decompression capability found in all Web browsers. Traditionally the compression responsibility was assigned to the server. Now, this task can be offloaded to the Cisco CSS 11500. This feature supports a lossless data compression algorithm and two file formats GZIP (GNU zip) and Deflate.

By combining support for SSL acceleration and HTTP compression, Cisco offers new possibilities in optimizing the switch-to-server architecture for data center security and optimization.

MODULARITY FOR INVESTMENT PROTECTION

Through its modular design, the Cisco CSS 11500 will meet your functional requirements today while providing for expansion for future needs. The Cisco CSS 11500 Session Accelerator Module is a cost-effective way to add performance for flow setup and flow forwarding. A selection of input/output (I/O) modules not only offers the choice of port densities of Fast or Gigabit Ethernet, but also boosts flow performance. Optional memory upgrades increase the number of simultaneous flows supported. PCMCIA Flash Drive is supported.

LOCAL AND GLOBAL LOAD BALANCING

A network designer can select one of two options for global server load balancing (GSLB) solution. The first option is to use the Global Site Selector (GSS), a dedicated GSLB appliance. In this design option, the Cisco GSS 4491 redirects clients to the best data center while the Cisco CSS 11500 is dedicated to the content switching process that involves selecting the best server within the data center. Local server selection is based on server load and application response time, as well as traditional least connection and round-robin algorithms.

The second approach is to have the Cisco CSS 11500 perform the both the GSLB and content switching duties. In this design option the CSS 11500 will select the best data center and the best resource within the data center.

The first design option should be used if the enterprise is planning to support more than one active data center, needs to centralize GSLB management, or requires a data center proximity solution. The second option is a good solution for one active site, and the objective is to failover to a secondary disaster recovery site. Any application that uses standard TCP or User Datagram Protocol (UDP) or DNS can be supported by either GSLB option.

SITE AND SYSTEM SECURITY

The Cisco CSS 11500 with Cisco WebNS Software helps ensure high levels of security without compromising site performance. The Cisco CSS 11500 provides stateful, content-based access control and supports security policies based on any combination of source address, destination address, protocol, TCP port, or URL. Wire-speed Network Address Translation (NAT) protects real server IP addresses.

For additional security, the Cisco CSS 11500 intelligently directs traffic across multiple firewalls. By load balancing firewalls, the Cisco CSS 11500 eliminates performance bottlenecks and single points of failure that result in system downtime, a situation that can close off the connection to the network and disrupt e-commerce purchases or other mission-critical transactions.

MANAGE THROUGH SIMPLE GUIS OR SOPHISTICATED TOOLS

Effective management tools reduce the ongoing cost of operating a business-critical Website. The Cisco CSS 11500 with WebNS supports a wide range of management tools that offer simplicity, security, and flexibility. For configuration, administrators have a choice of a Cisco IOS Software-like command-line interface (CLI) or an intuitive, embedded GUI. The Cisco CSS 11500 may be managed through enterprise management systems such as CiscoWorks CiscoView Device Manager (CVDM) and for large networks, tiered-access tools such as the Cisco Hosting Solutions Engine. For integration with customized management systems or even user applications requiring network interaction, the Cisco CSS 11500 offers an Extensible Markup Language (XML)-based, programmatic management application programming interface (API), Simple Network Management Protocol (SNMP), Remote Monitoring (RMON), and log files. Effective management tools reduce the ongoing cost of operating a business-critical Website.

CISCO CSS 11500 SERIES: CHASSIS AND MODULES

The Cisco CSS 11500 Series Content Services Switch includes four models:

- A 1-rack unit, fixed-configuration Cisco CSS 11501 (6-Gbps aggregate throughput)
- A 1-rack unit, fixed-configuration Cisco CSS 11501S-C with integrated SSL termination and HTTP compression support (6-Gbps aggregate throughput)
- A 2-rack unit, 3-slot Cisco CSS 11503 (20-Gbps aggregate throughput)
- A 5-rack unit, 6-slot Cisco CSS 11506 (40-Gbps aggregate throughput)

The Cisco CSS 11501 and the Cisco CSS 11501S-C with SSL termination and compression supports eight 10/100 Ethernet ports and one Gigabit Ethernet port though an optional Small Form-Factor Pluggable gigabit interface converter (SFP GBIC). Both Cisco CSS 11501 models feature a console port, an Ethernet port for management and two PCMCIA slots that hold up to two 256-MB flash memory disks, up to two 1-GB flash drives, or one of each. The Cisco CSS 11501 with SSL termination and compression delivers 1400 SSL transactions per second and 250 Mbps of bulk encryption (ARC4) along with 500 Mbps compression capacity by exploiting an internal card with state-of-the-art cryptology and compression chips.

The Cisco CSS 11503 and Cisco CSS 11506 are both modular platforms with interchangeable modules. They can also share flash memory and GBICs. The Cisco CSS 11501 has fixed memory and does support the same flash memory as the other two models. The Cisco CSS 11506 requires at least one switch control module (SCM) and can be configured with a second in standby mode. With the required SCM in one slot, the Cisco CSS 11506 has five additional slots supporting any combination of I/O, SSL, or session accelerator modules. The Cisco CSS 11503 requires a SCM and accommodates any two of the other optional modules.

The Cisco CSS 11506 supports not only redundancy in switch control modules but also redundant power supplies and redundant switch modules (20 Gbps each). All SCMs support redundant disk drives.

All modules participate in flow setup, but they differ primarily in control functions, performance, SSL capabilities, and I/O. Each Cisco CSS 11500 Module consists of one high-speed MIPS RISC processor for flow setup, one network processor for flow forwarding, one classification engine for accelerated lookups in bridge/access control list (ACL) tables, and up to 288 MB of RDRAM.

SWITCH CONTROL MODULE FOR THE CISCO CSS 11500 SERIES

The Cisco CSS 11500 Switch Control Module not only governs the entire system, it also contributes to I/O density and flow performance. The SCM comes standard with 2-Gigabit Ethernet ports supporting SFP GBICs and has a console port and dedicated Ethernet port for management. The SCM also features two PCMCIA slots that hold up to two 1-GB flash memory disks.

SSL AND COMPRESSION MODULE FOR THE CISCO CSS 11500 SERIES

The Cisco CSS 11500 SSL and compression module is the ideal solution for handling high volumes of SSL transactions and that occupy today's e-business data centers. The module integrates state-of-the-art SSL and compression processors into the leading content switching technology of Cisco WebNS. In addition to superior price performance, the SSL and compression module simplifies the management of digital certificates and offers new possibilities in optimizing the switch-to-server architecture for security and optimization. The SSL compression module delivers 1400 SSL transactions per second and 250 Mbps of bulk encryption (ARC4) along with 500 Mbps of compression capability.

I/O MODULES FOR THE CISCO CSS 11500 SERIES

The Cisco CSS 11500 I/O modules deliver port density and flow performance. The product line supports three types of I/O modules:

- 2-port Gigabit Ethernet
- 16-port Fast Ethernet
- 8-port Fast Ethernet

The Fast Ethernet ports are 10/100BASE-TX with standard RJ-45 connectors, whereas the Gigabit Ethernet ports require SFP GBICs (1000BASE-SX, 1000BASE-LX, or 1000BASE-T).

SESSION ACCELERATOR MODULE FOR THE CISCO CSS 11500 SERIES

The session accelerator module is a cost-effective way to add flow performance when additional connectivity is not required. Using the same flow setup and forwarding processors as the I/O modules, it provides the flexibility to optimize the system for port density and performance. Table 1 lists the features of the Cisco CSS 11500 models.

Table 1. Cisco CSS 11500 Models: Quick Look

	Cisco CSS11501 and Cisco CSS11501S-C	Cisco CSS11503	Cisco CSS11506
Module Slots	0 (Fixed configuration)	3	6
Base Configuration	Switch control module with 8 10/100 Ethernet and 1 GE (GBIC) port	Switch control module with 2 GE (GBIC) ports	Switch control module with 2 GE (GBIC) ports
Maximum GE Ports	1	6	12
Maximum 10/100 Ethernet Ports	8	32	80
SSL Termination	<ul style="list-style-type: none"> • CSS11501 = No • CSS11501S-C = Yes 	Yes	Yes
2-Port GE I/O Module		Maximum of 2	Maximum of 5
16-Port 10/100 Ethernet I/O		Maximum of 2	Maximum of 5
8-Port 10/100 Ethernet I/O		Maximum of 2	Maximum of 5
SSL and Compression Modules	Integrated into the Cisco CSS11501S-C	Maximum of 2	Maximum of 4
Session Accelerator Modules		Maximum of 2	Maximum of 5
Redundancy Features	<ul style="list-style-type: none"> • Active-active Layer 5 ASR • VIP* redundancy 	<ul style="list-style-type: none"> • Active-active Layer 5 ASR • VIP redundancy 	<ul style="list-style-type: none"> • Active-active Layer 5 ASR • VIP redundancy • Active-standby SCM • Redundant switch fabric module • Redundant power supplies
Height	1.75 in. (1 rack unit)	3.5 in. (2 rack units)	8.75 in. (5 rack units)
Bandwidth Aggregate	6 Gbps	20 Gbps	40 Gbps

	Cisco CSS11501 and Cisco CSS11501S-C	Cisco CSS11503	Cisco CSS11506
Storage Options	1GB-MB flash memory disk	1GB-MB flash memory disk	1GB-MB flash memory disk
Power	Integrated AC	Integrated AC or DC	Up to 3 AC or 3 DC

* Virtual Internet Protocol (Address)

ORDERING INFORMATION

Table 2 lists the product numbers and their descriptions for the Cisco CSS 11500 Series.

Table 2. Cisco CSS 11500 Series Product Numbers

Product Number	Description
CSS11506-2AC	Cisco 11506 Content Services Switch including SCM with 2 GE ports, flash drive, 2 switch modules, 2 AC power supplies, and a fan (requires SFP GBICs)
CSS11506-2DC	Cisco 11506 Content Services Switch including SCM with 2 GE ports, flash drive, 2 switch modules, 2 DC power supplies, and a fan (requires SFP GBICs)
CSS11503-AC	Cisco 11503 Content Services Switch including SCM with 2 GE ports, flash drive, and integrated AC power supply, integrated fan, and integrated switch module (requires SFP GBICs)
CSS11503-DC	Cisco 11503 Content Services Switch including SCM with 2 GE ports, flash drive, and integrated DC power supply, integrated fan, and integrated switch module (requires SFP GBICs)
CSS11501	Cisco 11501 Content Services Switch including 8 10/100 Ethernet and 1 GE port, flash drive, and integrated AC power supply and integrated fan (optional SFP GBIC)
CSS 11501S-C-K9	Cisco 11501 Content Services Switch with SSL termination and HTTP compression including 8 10/100 Ethernet and 1 GE port, flash drive, and integrated AC power supply and integrated fan (optional SFP GBIC)
CSS5-SCM-2GE	Cisco CSS 11500 System Control Module with 2 GE ports and hard disk (requires SFP GBICs)
CSS5-IOM-8FE	Cisco CSS 11500 Fast Ethernet I/O Module: 8-port TX
CSS5-IOM-16FE	Cisco CSS 11500 Fast Ethernet I/O Module: 16-port TX
CSS5-IOM-2GE	Cisco CSS 11500 Gigabit Ethernet I/O Module: 2-port (requires SFP GBICs)
CSS5-SAM	Cisco CSS 11500 Session Accelerator Module
CSS5-SSL-C-K9	Cisco CSS 11500 SSL and HTTP Compression Module

CISCO CSS 11500 SERIES SPECIFICATIONS

Table 3 lists the specifications for the Cisco CSS 11500 Series.

Table 3. Cisco CSS 11500 Series Specifications

Product Name	Product Description
Key System Parameters For Cisco WebNS Software Version 8.10	
	<ul style="list-style-type: none"> • Maximum supported keepalives: 2048 • Maximum concurrent connections per I/O module: 200,000 with 256-MB RDRAM
Cisco CSS 11506	<ul style="list-style-type: none"> • One slot for SCM • 5 rack units • Five slots for additional modules • Two slots for switch modules • Aggregate switch throughput: 40 Gbps • Dimensions (height x width x depth): 8.75 x 17.0 x 12.5 in. (22.2 x 43.2 x 31.8 cm)
Cisco CSS 11503	<ul style="list-style-type: none"> • One SCM slot • 2 rack units • Two slots for additional modules • Integrated switch fabric module • Aggregate switch throughput: 20 Gbps • Dimensions (height x width x depth): 3.5 x 17.0 x 12.5 in. (8.9 x 43.2 x 31.8 cm)
Cisco CSS 11501 Cisco CSS 11501S-C-K9	<ul style="list-style-type: none"> • Requires Cisco WebNS Software 8.10 or later versions for CSS11501S-C-K9 • Fixed configuration with 8 10/100 Ethernet and 1 GE (GBIC) port • 1 rack unit • Aggregate switch throughput: 6 Gbps • Dimensions (height x width x depth): 1.72 x 17.3 x 18.1 in. (4.4 x 43.9 x 46.0 cm)
Key Cisco WebNS Features	
	<p>The Cisco CSS 11500 supports all WebNS 8.10 features, including:</p> <ul style="list-style-type: none"> • Full URL parsing • HTTP (1.0, 1.1) • Sticky cookie insertion • All TCP services, UDP, and SSL • HTTP Compression GZIP and deflate file formats • Content policy ACLs on all HTTP headers • VLAN 802.1Q • Management: SSH Protocol, SNMP, SSL browser-based interface, embedded GUI • Integrated global load balancing with HTTP and DNS-based redirection • Routing Information Protocol (RIP) versions 1 and 2, Open Shortest Path First (OSPF) • Server/node operating system compatibility: Any TCP/IP OS, including Windows XP, Windows 2000, Windows NT, Windows 98, Windows 95, all UNIX platforms, Linux, and Mac OS

Product Name	Product Description	
	<ul style="list-style-type: none"> Dynamic content support: Active Server Pages (ASPs), Visual Basic Script, ActiveX, Java, Virtual Reality Markup Language (VRML), Common Gateway Interface (CGI), CoolTalk, NetMeeting, SIP, LDAP, IMAP, Exchange OWA, RDP, RADIUS, NetShow, QuickTime, PointCast, any HTTP encapsulated data 	
Secure Sockets Layer (SSL)		
	<ul style="list-style-type: none"> Full and transparent proxy modes SSL session reuse SSL termination, SSL initiation, and back-end SSL URL rewrite Number of digital certificates: 256 per module Clock with battery backup (on switch control module) Key sizes 512, 768, 1024, and 2048 Security protocols SSL 3.0 and Transport Layer Security (TLS) 1.0 Importing certificates: Apache, Microsoft IIS, Netscape PEM: Privacy Enhanced Mail PCKS#12: Personal information exchange syntax standard Security algorithms Rivest, Shamir, Adelman (RSA), Digital Encryption Standard (DES) Triple DES (3DES), and RC4 Encryption (3DES) of certificates and keys in configuration file 	
HTTP Compression	<ul style="list-style-type: none"> Support both GZIP and Deflate files format (RFC 1952) Supports deflation algorithm (RFC 1951) 	
Environmental		
Temperature	<ul style="list-style-type: none"> Operating: 32 to 104°F (0 to 40°C) Nonoperating: -4 to 149°F (-20 to 64°C) 	
Humidity	<ul style="list-style-type: none"> Operating: 10 to 90% noncondensing Nonoperating: up to 95% noncondensing 	
Altitude	<ul style="list-style-type: none"> Operating: 0 to 10,000 ft (0 to 3000m) Nonoperating: 0 to 15,000 ft (0 to 4570m) 	
Electrical	AC <ul style="list-style-type: none"> 100–240 VAC input, 50-60 Hz Cisco CSS 11506 current rating: 9A Cisco CSS 11503 current rating: 5A Cisco CSS 11501 current rating: 1.6A 	DC <ul style="list-style-type: none"> 46 to -60 VDC input Cisco CSS 11506 current rating: 18A Cisco CSS 11503 current rating: 9A

Product Name	Product Description
Heat Dissipation	<ul style="list-style-type: none"> • Cisco CSS 11506 maximum: <ul style="list-style-type: none"> – AC: 860VA at 2936 Btu per hour – DC: 860VA at 2936 Btu per hour • Cisco CSS 11503 maximum: <ul style="list-style-type: none"> – AC: 430VA at 1468 Btu per hour – DC: 430VA at 1468 Btu per hour • Cisco CSS 11501 maximum: <ul style="list-style-type: none"> – AC: 150VA at 512 Btu per hour
Acoustic Noise	70 dB maximum
Shock	<ul style="list-style-type: none"> • Operating (half sine): 21 in. per second (0.53m per second) • Nonoperating 20 G, 52 in. per second** (1.32m per second**), trapezoidal pulse
Vibration	<ul style="list-style-type: none"> • Operating: 0.35 Grms from 3 to 500 Hz • Nonoperating: 1.0 Grms from 3 to 500 Hz
Weight	<ul style="list-style-type: none"> • Cisco CSS 11506: <ul style="list-style-type: none"> – Shipping: 67.65 lbs. (30.69 kg) – Chassis weight fully configured: 57.7 lb • Cisco CSS 11503: <ul style="list-style-type: none"> – Shipping: 42.85 lb – Standalone: 33.3 lb • Cisco CSS 11501: <ul style="list-style-type: none"> – Shipping: 21.5 lb – Standalone: 18.0 lb • Cisco CSS 11501 with SSL Termination and HTTP Compression: <ul style="list-style-type: none"> – Shipping: 24.5 lb – Standalone: 21.0 lb
Safety Certification —This section identifies safety requirements with which Cisco content services switches comply.	
United States	<ul style="list-style-type: none"> • UL 60950 Third Edition—Safety of Information Technology Equipment.
Canada	<ul style="list-style-type: none"> • CAN/CSA 22.2 No. 60950-00 Third Edition—Safety of Information Technology Equipment.
Europe	<ul style="list-style-type: none"> • EN 60950—Safety of Information Technology Equipment; incorporating amendments 1, 2, 3, 4, and 11 with all national deviations. • IEC 60950 Second Edition—Safety of Information Technology Equipment; incorporating amendments 1, 2, 3, and 4.
Mexico	<ul style="list-style-type: none"> • NOM-019-SCFI-1998, Safety of Data Processing Equipment
Australia	<ul style="list-style-type: none"> • ACA TS001 1997 Test Report and Statement of Compliance AS/NZS3260 incorporating amendments 1, 2, 3, and 4.
Laser Safety —This section identifies laser safety requirements with which Cisco content services switches comply.	
United States	<ul style="list-style-type: none"> • 21CFR 1040, Subchapter J
Europe	<ul style="list-style-type: none"> • EN60825-1 • EN60825-2

Product Name	Product Description
International	<ul style="list-style-type: none"> • IEC60825-1 • IEC60825-2
Electromagnetic Compatibility (Emissions)	<ul style="list-style-type: none"> • AS/NZS 3548:1995, Class A or CISPR 22:2002 • CISPR 22 Class A, 1997 • EN55022 or CISPR 22 Class A, Korean criteria for in country testing • FCC, 47CFR15 Sub Part B, Class A • EN55022 Class A, 1998 • VCCI V-3/2001.4, Class A • CNS13438 (Taiwan) • ICES-003:1998, Class A • EN61000-3-2:2000, harmonic current emissions • EN61000-3-3:1995, power line flicker
Electromagnetic Compatibility (Immunity)	<ul style="list-style-type: none"> • EN55024:1998 [Reference] • EN61000-4-2, ESD • EN61000-4-3, Radiated Immunity • EN61000-4-4, Electrical Fast Transients • EN61000-4-5, Surges • EN61000-4-6, Conducted Immunity • EN61000-4-11, Dips, Sags, and Voltage Interruptions • EN50082-1:1992, Generic Immunity Requirements—Light Industrial

** Nonoperating (trapezoidal pulse): 20G 1, 52 in./sec (1.32 m/sec) 1 G is a value of acceleration, where G equals 32.17 ft/sec** (9.81 m/sec**)



Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters

Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters

Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

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