CISCO SYSTEMS

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Cisco **2600/3600/3700 Series** Content Engine Modules

Intelligent Caching and Content Delivery Services for Cisco Routers

Cisco® 2600/3600/3700 Series content engine modules offer the industry's only router-integrated content-delivery system. Combining intelligent caching, content routing, and management with robust branch-office routing conserves WAN bandwidth for important branch IP services such as voice over IP (VoIP) and network security, while simplifying configuration, deployment, and operation. Cisco Application and Content Networking System (ACNS) Software combines the technologies of demand-pull caching and pre-positioning for accelerated delivery of Web applications, objects, files, and streaming media. Running Cisco ACNS Software, the Cisco 2600/3600/3700 Series content engine modules enable Cisco customers to extend the value of their branch routers to deliver strategic new application services—with no performance degradation—such as:

- Web-application acceleration (including software distribution)
- Secure Web-content access management
- Business video
- Point-of-sale video and Web kiosks

Figure 1
Cisco 2600/3600/3700 Series
Content Engine Module

Further, the content engine modules interoperate with all routers running Cisco IOS® Software, and important Cisco IOS Software features such as IP Multicast and Web Cache Communication Protocol (WCCP), while supporting a common command-line interface (CLI).

The Cisco 2600/3600/3700 Series content engine modules (Figure 1) fit into a single network module slot on the Cisco 2600 and 3600 series multiservice platforms and the Cisco 3700 Series multiservice access routers. Available configurations are a 40-GB hard disk, 80-GB hard disk, or Small Computer System Interface (SCSI) controller. The content engine module with a SCSI controller has no disk drive onboard and requires an external disk array.

Accelerating User Productivity with the Cisco ACNS Solution

The Cisco ACNS solution is an important component of the Cisco Full Service Branch, featuring intelligent application-enabling network services and adaptable "how-to" blueprints, addressing voice and video, network security, Web-application acceleration, Internet mobility, and connectivity services. These network-integrated, intelligent services allow organizations to boost productivity and customer satisfaction while lowering operational and capital expenses.

The primary benefits of the Cisco ACNS solution include:

- Intelligent content services at the edge of the network
  - Web-application acceleration with advanced Web-content serving
  - Software and file distribution with optimized content distribution
  - Proxy caching with secure Web-content access management
  - Business video and retail kiosks with comprehensive streaming-media support
- Scalable content acquisition and distribution
- Superior content and network management and rich APIs

Integrating Content Networking and Branch-Office Routing

By offering integrated content delivery and branch-office routing, Cisco Systems® reduces the complexity of value-added services, while optimizing WAN bandwidth and reducing operational costs. The complete solution, featuring ACNS software and content engine network modules, makes it easy for organizations to start with a simple service, such as content acceleration or WAN cost reduction, and then add e-learning or corporate communications and other more advanced services. Organizations can take a phased approach, starting small and then scaling to higher capacity and availability. They can quickly deploy their business-critical Web applications with ease of management while preserving their infrastructure investment. The integration of the Cisco 2600/3600/3700 Series Content Engine Module into the branch-office router provides a number of important customer benefits, including the following:

- Physical space savings—The content engine module uses a single network module slot in a Cisco 2600, 3600, or 3700 series router.
- Simple power and cable management—The content engine module takes advantage of the router's power options, including DC power and redundant power.
- Common management interface—The content engine module can be configured and managed from the Cisco IOS Software CLI.
- Choice of network interfaces for maximum flexibility—You can use the internal Fast Ethernet to the router backplane for maximum integration, or use the external Fast Ethernet to a LAN switch for maximum performance.
- Separate processor for the content engine module maximizes availability—A service interruption on the content engine module does not affect services on the router.
- Lower operational costs—The content engine module is covered under Cisco maintenance service for the router. This minimizes operational costs for the network.

Hardware Architecture

The Cisco ACNS Software runs in a separate processor on the Cisco 2600/3600/3700 Series Content Engine Module. The Cisco ACNS Software communicates to the Cisco IOS Software in the router through the internal Fast Ethernet interface, and the internal Cisco ACNS console (Figure 2). The Cisco IOS Software can establish a console session on the Cisco ACNS console via the `service-module content-engine <slot>/0 session` command. Content engine status is available with the Cisco IOS Software `service-module content-engine <slot>/0 status` command.

Figure 2

Architecture of the Integrated Content Engine Module and Router
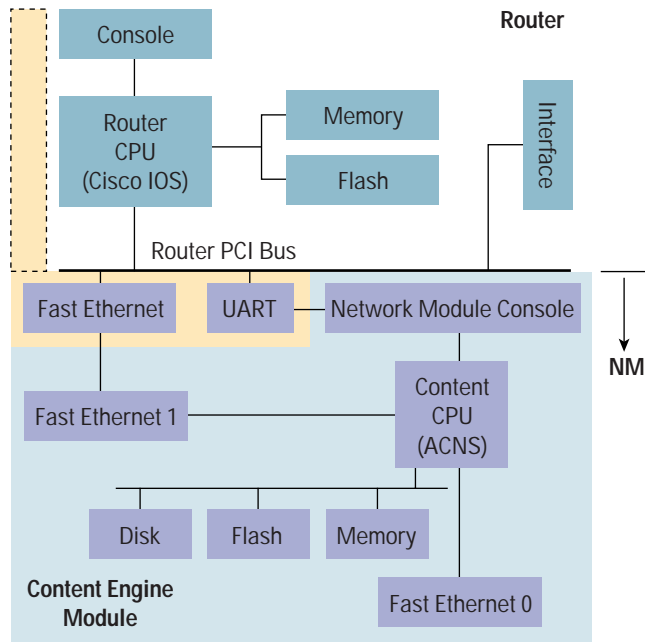
Important Features of Cisco ACNS Software Version 5.1

The Cisco 2600/3600/3700 Series content engine modules use the same Cisco ACNS Software Version 5.1 that is supported on the Cisco 500 Series content engines. For detailed specifications, see the Cisco ACNS Software v5.1 Data Sheet.

Cisco 2600/3600/3700 Series Content Engine Module Product Summary

Table 1 lists the part numbers and descriptions for the Cisco 2600/3600/3700 Series content engine modules.

Table 1 Network Modules

Part Number	Description
NM-CE-BP-40G-K9(=)	Content engine module, basic performance, 40-GB Integrated Drive Electronics (IDE) hard disk
NM-CE-BP-80G-K9(=)	Content engine module, basic performance, 80-GB IDE hard disk; supported in Cisco ACNS Software v5.1 and later
NM-CE-BP-SCSI(=)	Content engine module, basic performance, SCSI controller (requires external SCSI disk array

Table 2 lists the hardware options and spare parts for the Cisco 2600/3600/3700 Series content engine modules.

Table 2 Hardware Options and Spares

Part Number	Description
EM-CE-40G=	Expansion module, 40-GB IDE, field upgrade
EM-CE-80G=	Expansion module, 80-GB IDE, field upgrade
EM-CE-SCSI=	Expansion module, SCSI controller, field upgrade
MEM-CE-256U512D	512 MB DRAM factory upgrade for NM-CE-BP (Not required on 80-GB version; 512 MB is the factory default)
MEM-CE-256D=	256 MB DRAM field upgrade
MEM-256CF-5.1-K9=	256 MB Compact Flash with Cisco ACNS Software v5.1 recovery image

Table 3 lists the software options and licenses for the Cisco 2600/3600/3700 Series content engine modules.

Table 3 Software Options and Licenses

Part Number	Description
SF-ACNS-5.1-K9	Cisco ACNS Software v5.1
AK-ACNS-5.1-K9=	Cisco ACNS v5.1 accessory kit, spare
SF-NM-RCPS(=)	RealNewtorks RealSystem 9 combined proxy and server for Cisco NM-CE-BP
SF-WMS-56(=)	Microsoft Windows Media server—56 Mbps
SF-CE-510-TL-5.0(=)	Multicast client replication software for CE-510 and NM-CE-BP versions
SF-SMF12	SmartFilter software 12-month subscription for Cisco ACNS Software v5.1 (Pricing option depends on number of users)
SF-SMF24	SmartFilter software 24-month subscription for Cisco ACNS Software v5.1 (Pricing option depends on number of users)
SF-SMF36	SmartFilter software 36-month subscription for Cisco ACNS Software v5.1 (Pricing option depends on number of users)
SF-WEB12	Websense Enterprise Master Database 12-month subscription (pricing option per 100 users)
SF-WEB24	Websense Enterprise Master Database 24-month subscription (pricing option per 100 users)
SF-WEB36	Websense Enterprise Master Database 36-month subscription (pricing option per 100 users)
SF-WP112	Websense Premium Group I 12-month subscription (pricing option per 100 users)
SF-WP124	Websense Premium Group I 24-month subscription (pricing option per 100 users)
SF-WP136	Websense Premium Group I 36-month subscription (pricing option per 100 users)
SF-WP212	Websense Premium Group I 12-month subscription (pricing option per 100 users)
SF-WP224	Websense Premium Group II 24-month subscription (pricing option per 100 users)

Table 3 Software Options and Licenses (Continued)

Part Number	Description
SF-WP236	Websense Premium Group II 36-month subscription (pricing option per 100 users)
SF-WP312	Websense Premium Group III 12-month subscription (pricing option per 100 users)
SF-WP324	Websense Premium Group III 24-month subscription (pricing option per 100 users)
SF-WP336	Websense Premium Group III 36-month subscription (pricing option per 100 users)

Table 4 lists the routers that support the Cisco 2600/3600/3700 Series content engine modules. There is no limit on the number of content engine modules in a router.

Table 4 Cisco Routers Supporting Cisco 2600/3600/3700 Series Content Engine Modules

Cisco Router	Support for Cisco 2600/3600/3700 Series Content Engine Module
Cisco 2600 Series	Yes
Cisco 2600XM Series multiservice platforms	Yes
Cisco 2691 Multiservice Platform	Yes
Cisco 3620 Multiservice Platform	No
Cisco 3631 Central Office Access Router	No
Cisco 3640, Cisco 3640A multiservice platforms	Yes
Cisco 3660 Multiservice Platform	Yes
Cisco 3725 Multiservice Access Router	Yes
Cisco 3745 Multiservice Access Router	Yes

Cisco IOS Software Support

The Cisco 2600/3600/3700 Series content engine modules support Cisco IOS Software Release 12.2(13)T and later.

Performance

Cisco 2600/3600/3700 content engine modules have ample performance to deliver accelerated content to end users.

HTTP Caching Performance

HTTP caching performance (Table 5) is measured using the Polygraph test tool (http://www.web-polygraph.org) and the Polymix-4 workload.

Table 5 HTTP Caching Performance

Feature	Transactions Per Second	Throughput Mbps
HTTP proxy cache	200	11.7
HTTP transparent cache	150	8.2
HTTP transparent cache with Secure Computing SmartFilter software	140	7.8

Streaming Video Performance

The streaming media benchmark tests each use a single short video stream transmitted to all users. This is a best-case performance scenario where the entire video clip is buffered in RAM. Real-world applications tend to use longer video streams, and multiple users watch different video streams. Cisco recommends that customers perform their own testing with parameters that reflect their actual usage.

Windows Media Technologies Stream Serving

The Cisco 2600/3600/3700 Series content engine modules deliver a maximum of 28 Mbps of Windows Media Technologies (WMT) video streams (Table 6). Individual stream rates and number of users have little effect on overall throughput.

Table 6 Windows Media Technologies Streaming Performance

Individual Stream Rate	Number of Simultaneous Viewers	Throughput Mbps
100 Kbps	269	26.9
256 Kbps	109	27.9
800 Kbps	35	28.0

RealSystem Proxy Stream Serving

The RealSystem Proxy uses WCCP redirection and acts as a proxy to the origin server to serve up cached content in RealSystem streaming media format (Table 7). This configuration cannot take advantage of pre-positioned content.

Table 7 Real Proxy Serving Video On Demand

Individual Stream Rate	Number of Simultaneous Viewers	Throughput Mbps
100 Kbps	200	20
256 Kbps	60	15.4
800 Kbps	20	16

RealSystem Server Subscriber

The RealSystem Server Subscriber allows the content engine to serve RealSystem streaming media content directly to the users (Table 8). This allows for the pre-positioning of content in the content engine.

Table 8 Real Server Subscriber Video-On-Demand Streaming

Individual Stream Rate	Number of Simultaneous Viewers	Throughput Mbps
100 Kbps	520	52
256 Kbps	200	51.2
800 Kbps	60	48

Table 9 lists the hardware specifications for the Cisco 2600/3600/3700 Series content engine modules.

Table 9 Hardware Specifications

Feature	Specifications
Network sizing	Small branch offices
Hardware Features	
Processor	500 MHz Intel Mobile Pentium III
Default synchronous dynamic RAM (SDRAM)	256 MB (512 MB for 80-GB version)
Maximum SDRAM	512 MB
Internal disk storage	NM-CE-BP-SCSI-K9 has none NM-CE-BP-20G-K has 20-GB IDE NM-CE-BP-40G-K9 has 40-GB IDE NM-CE-BP-80G-K9 has 80G-IDE
External disk storage	NM-CE-BP-SCSI has external SCSI disk arrays (such as HP DS2100). External disk arrays are not supported on NM-CE-BP-20G-K9, NM-CE-BP-40G-K9, and NM-CE-BP-80G-K9
Network interfaces	One internal 10/100 Mbps Ethernet to router backplane, plus one external 10/100 Mbps Ethernet
Flash memory	16 MB internal memory plus optional external Compact Flash memory
Physical Specifications	
Dimensions (H x W x D)	1.55 x 7.10 x 7.2 inches (3.9 x 18.0 x 18.3 centimeters)
Weight	1.5 lbs maximum (0.7 kg maximum)
Operating humidity	5% to 95% noncondensing
Operational temperature	41 to 104 F (5 to 40 C)
Non-operating temperature	–40 to 185 F (–40 to 85 C)
Operational altitude	0–10,000 feet (0–3000 meters)

Table 9 Hardware Specifications (Continued)

Feature	Specifications
Safety	UL 1950; CSA-C22.2 No. 950, EN 60950, IEC 60950
EMC	FCC Part 15 Class A; EN55022 Class B; AS/NZS 3548 Class A; CISPR22 Class B; VCCI Class B; EN55024; EN61000-3-2; EN61000-3-3

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