

# Cisco Content Engine Network Modules for Cisco 2600, 3600, and 3700 Series Routers

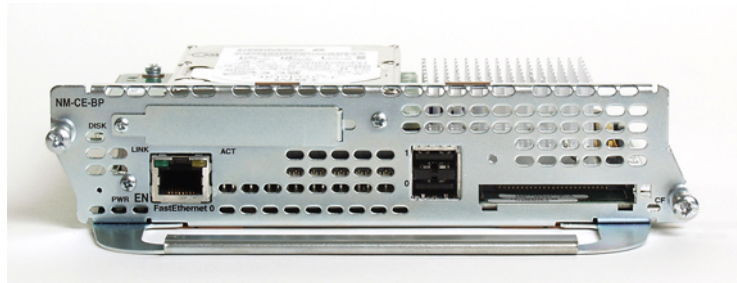
**Content acceleration and delivery enhance user productivity while optimizing WAN bandwidth. The Cisco Content Engine Network Modules combine the advanced content acceleration features of the Cisco Content Engine 500 Series with the Cisco 2600, 3600, and 3700 series into one easy-to-manage content networking solution.**

Cisco's Content Engine Network Modules for the Cisco 2600, 3600, and 3700 series routers offer the industry's first and 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), while simplifying configuration, deployment, and operation. Running Cisco Application and Content Networking System (ACNS) Software, Content Engine Network Modules enable Cisco customers to extend the value of their branch router infrastructures to deliver strategic new application services—such as employee Internet management, streaming media, and live and on-demand e-communications

and e-learning—with no performance degradation of core routing services. Further, the Content Engine Network Modules interoperate with all Cisco IOS® routers, and takes advantage of key Cisco IOS features such as multicast and Web Cache Control Protocol (WCCP), while supporting a common command-line interface (CLI).

Content Engine Network Modules fit into a single network module slot on the Cisco 2600, 3600, and 3700 series. Available configurations are a 20-gigabyte hard disk, 40-gigabyte hard disk, or Small Computer Systems Interface (SCSI) controller. The network module with SCSI controller has no disk drive on board and requires an external disk array such as the Cisco SA-6.

Figure 1  
Cisco Content Engine  
Network Module





## Accelerating User Productivity with ACNS Software

Content Engine Network Modules, running ACNS software, optimize delivery of Web applications and content to the network edge to ensure enhanced quality, availability, and performance for end users. ACNS software combines the technologies of transparent caching and content-delivery technologies for accelerated delivery of Web objects, rich media, and streaming audio and video.

ACNS software provides organizations with a turnkey solution that supports:

- Multiple *intelligent content services* at the network edge
- Branch router integration for *flexibility*, and ease of deployment and management
- Unsurpassed *network integration* for scalability, security, and reliability
- Superior *content distribution*, routing, and management control to ensure scalable performance, security, and reliability for mission-critical applications and services
- Rich *integration* with key business applications such as e-learning, content access management, and more

ACNS software provides the foundation that enables the caching and the Cisco Enterprise Content Delivery Network (ECDN) solution components to work as a cohesive system:

- The Cisco Content Distribution Manager (CDM) provides central distribution and management capabilities.
- Either the Cisco CDM or the Cisco Content Router provides content routing capabilities.
- The Cisco Content Engine Network Modules provide content edge delivery. The Content Engine Network Modules use transparent caching technology to store content at the network edge based on users' requests. The modules use ECDN technology to prepopulate rich media or large files ahead of users' requests. The Content Engine Network Modules extend the product line of Cisco CE 500 content engines and Content Engine 7300 Series to the branch router platforms.

The complete Cisco solution makes it easy for organizations to start with a simple service, such as content, and then add e-learning, internal communications, and other advanced services. Organizations can take a step approach, starting small and then scaling to higher capacity and availability. They can quickly deploy their mission-critical Web applications with ease of management while preserving their infrastructure investment.

## Integrating Content Networking and Branch-Office Routing

By integrating the Content Engine and branch-office routing, Cisco reduces the complexity of optimizing WAN bandwidth, while reducing operational costs. The integration of the content engine into the branch-office router provides numerous important customer benefits:

- *Physical space savings*—The Content Engine Network Modules use a single network module slot in a Cisco 2600, 3600, or 3700 series branch-office router.
- *Simple power and cable management*—The Content Engine Network Modules take advantage of the power options of the router, including DC power and redundant power.
- *Common management interface*—The Content Engine Network Modules can be configured and managed from the Cisco IOS CLI.
- *Choice of network interfaces for maximum flexibility*—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.

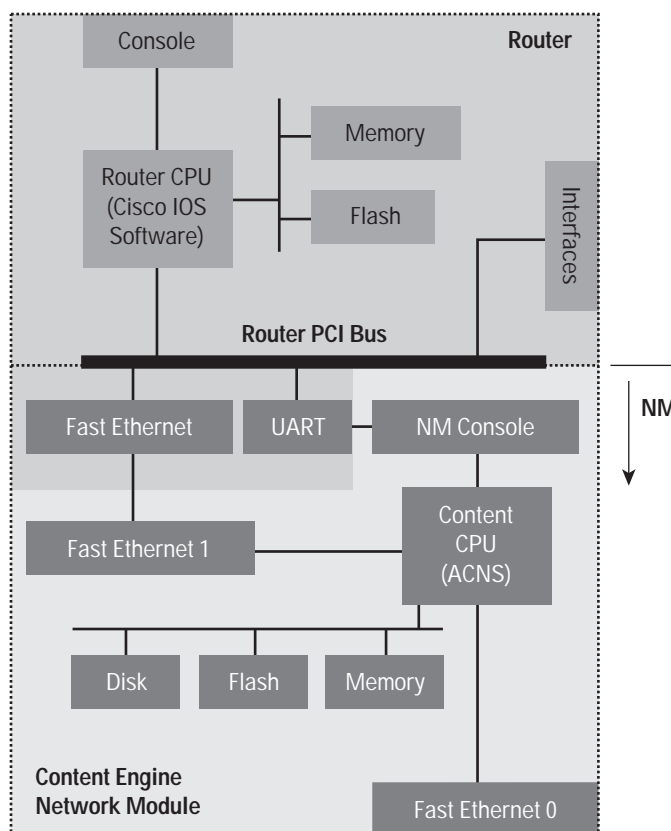


- *Separate processor for the content engine to maximize availability*—A service interruption on the Content Engine Network Modules does not affect services on the router.
- *Lower operational costs*—The Content Engine Network Modules are covered via Cisco maintenance service for the router. This minimizes operational costs for the network.

## Hardware Architecture

The ACNS software runs in a separate processor on the Content Engine Network Modules. The ACNS software communicates to the Cisco IOS Software in the router via the internal Fast Ethernet interface and the internal network module console. The Cisco IOS Software can establish a console session on the network module via the `service-module content-engine <slot>/0` session command. Content Engine status is available with the Cisco IOS `service-module content-engine <slot>/0 status` command.

Figure 2  
Architecture of the Integrated Content Engine and Router



## Cisco ACNS Software 4.2 Key Features

The Content Engine Network Modules use the same Cisco ACNS Software 4.2 that is supported on the Cisco CE 500 Series. For detailed specifications, see the Cisco ACNS Software 4.2 Data Sheet.



## Cisco Content Engine Network Module Product Summary

Table 1 gives a product description of the Cisco Content Engine Network Modules, and Table 2 gives hardware options and spares information. Table 3 gives software options.

**Table 1** Network Modules

Product number	Description
NM-CE-BP-20G-K9(=)	Content Engine Network Module, basic performance, 20-GB IDE hard disk
NM-CE-BP-40G-K9(=)	Content Engine Network Module, basic performance, 40-GB IDE hard disk
NM-CE-BP-SCSI-K9(=)	Content Engine Network Module, basic performance, SCSI controller (requires external SCSI disk array such as the Cisco SA-6)

**Table 2** Hardware Options and Spares

Product number	Description
EM-CE-20G=	Expansion module, 20-GB IDE, field upgrade
EM-CE-40G=	Expansion module, 40-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
MEM-CE-256D=	256-MB DRAM field upgrade
MEM-256CF-4.2-K9=	256-MB Compact Flash memory Cisco ACNS Software 4.2 recovery image

**Table 3** Software Options and Licenses

Product number	Description
SF-NM-ACNS4.2-K9	Cisco Enterprise Application and Content Networking System Software Version 4.0 for Cisco NM-CE-BP-20G-K9, NM-CE-BP-40G-K9, and NM-CE-BP-SCSI-K9
SF-NM-RCPS-8.0	Combined RealSystem Version 8 Proxy and Subscriber for Cisco NM-CE-BP-20G-K9, NM-CE-BP-40G-K9, and NM-CE-BP-SCSI-K9
SF-NM-WMS-1.1	Microsoft Windows Media Server Version 4 for Cisco NM-CE-BP-20G-K9, NM-CE-BP-40G-K9, and NM-CE-BP-SCSI-K9
SF-SMF12	SmartFilter 12-month subscription for Cisco ACNS Software 4.2 (pricing option depends on number of users)
SF-SMF24	SmartFilter 24-month subscription for Cisco ACNS Software 4.2 (pricing option depends on number of users)



## Supported Routers

The number of Content Engine Network Modules is limited only by the number of available network module slots in the router. Table 4 lists the platforms capable of supporting the module.

**Table 4** Routers Supporting the Content Engine Network Modules

Router	NM-CE-BP-20G-K9, NM-CE-BP-40G-K9, and NM-CE-BP-SCSI-K9
Cisco 2600 Series Router	Yes
Cisco 2600XM Series Router	Yes
Cisco 2691 Router	Yes
Cisco 3620 Multiservice Platform	No
Cisco 3631 Access Router	No
Cisco 3640, Cisco 3640A Multiservice Platform	Yes
Cisco 3660 Multiservice Platform	Yes
Cisco 3725 Multiservice Access Router	Yes
Cisco 3745 Multiservice Access Router	Yes

## Software Support

Table 5 gives the required software releases for the Content Engine Network Modules.

**Table 5** Required IOS and ACNS Releases

Software	NM-CE-BP-20G-K9, NM-CE-BP-40G-K9, and NM-CE-BP-SCSI-K9
Cisco IOS Software	12.2.(11)YT or 12.2(13)T
Cisco ACNS Software	4.2.3

## Performance

The Content Engine Network Modules have ample performance to deliver accelerated content to end users. The performance results that follow were measured using a Content Engine Network Module with 20GB] NM-CE-BP-20G-K9 with 256 MB of memory. Actual performance will vary from these measurements. Cisco recommends that customers perform their own testing with parameters that reflect their actual usage.



## HTTP Caching Performance

Hypertext Transfer Protocol (HTTP) caching performance is measured using the Polygraph test tool (<http://www.web-polygraph.org>) and the Polymix-4 workload (refer to Table 6).

**Table 6** 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 SmartFilter	140	7.8

## Streaming Video Performance

The streaming media benchmark tests each transmit a single short video stream 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.

### Windows Media Technology Stream Serving

The Cisco Content Engine Network Modules deliver a maximum of 28 Mbps of Windows Media Technology (WMT) video streams. Individual stream rates and the number of users have little impact on overall throughput (refer to Table 7).

**Table 7** Windows Media Technology Proxy 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 deliver cached RealSystem streaming media format content. This configuration cannot take advantage of prepositioned content.

**Table 8** 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 Stream Serving

The RealSystem Server Subscriber allows the Content Engine to deliver RealSystem streaming media content directly to the users. This allows for the prepositioning of content in the Content Engine.

**Table 9** 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

## Hardware Specifications

Table 10 gives hardware specifications of the Cisco Content Engine Network Modules.

**Table 10** Hardware Specifications of Cisco Content Engine Network Modules

Feature	NM-CE-BP
<b>Network sizing</b>	Small branch offices
<b>Hardware Features</b>	
Processor	500-MHz Intel Mobile Pentium III
Default memory (SDRAM)	256 MB
Maximum SDRAM	512 MB
Internal disk storage	NM-CE-BP-SCSI-K9—None NM-CE-BP-20G-K9—20 GB IDE, 4200 rpm NM-CE-BP-40G-K9—40 GB IDE, 5400 rpm
External disk storage	NM-CE-BP-SCSI-K9—External SCSI disk arrays (such as Cisco SA-6) External disk arrays are not supported on the NM-CE-BP-20G-K9 and NM-CE-BP-40G-K9
Network interfaces	One internal 10/100-Mbps Ethernet to router backplane, plus one external 10/100-Mbps Ethernet
Flash memory	16-MB internal plus optional external Compact Flash memory
<b>Physical Specifications</b>	
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 lb maximum 0.7 kg maximum
Operating humidity	5 to 95% noncondensing
Operational temperature	32 to 104 F 0 to 40 C

**Table 10** Hardware Specifications of Cisco Content Engine Network Modules

Feature	NM-CE-BP
Nonoperating temperature	-40 to 185 F -40 to 85 C
Operational altitude	0 to 10,000 feet 0 to 3,000 meters
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



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.  
Capital Tower  
168 Robinson Road  
#22-01 to #29-01  
Singapore 068912  
www.cisco.com  
Tel: +65 317 7777  
Fax: +65 317 7799

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