Cisco Content Delivery Applications: Internet Streaming (Version 2.2)

Product Overview

The Cisco® Content Delivery System (CDS) is an integrated system with a network-based architecture that transcends existing streaming solutions. It incorporates both TV streaming applications for content delivery to digital televisions and set-top boxes as well as Internet streaming applications for content delivery to IP-enabled devices such as PCs and Wi-Fi connected mobile phones.

The Cisco CDS product line includes the Cisco Content Delivery Applications (CDAs), which enable service providers, broadcasters, content owners, and enterprises to stream and download rich-media content to their customers' Internet-connected devices. Cisco CDS technology incorporates three main functions: content ingest, service routing, and content delivery.

Content Delivery Applications for Internet Streaming

Table 1 lists the individual Cisco CDAs in the suite of Internet streaming applications. Figure 1 provides an overview of the Cisco CDS.

Table 1.   Cisco Content Delivery Applications

Content Delivery Applications	Description
Cisco Content Acquirer	The Cisco Content Acquirer application provides content ingest and storage functionality. It supports both a pull-and push-based model to ingest content from a variety of sources including the web.
Cisco Internet Streamer	The Cisco Internet Streamer application provides edge caching, content streaming, and download to subscriber IP devices such as PCs.
Cisco Service Router	The Cisco Service Router application is used to mediate requests from the subscriber IP devices. It is responsible for choosing the most appropriate Internet Streamer based on location and load conditions of individual Internet Streamers.
Cisco Content Delivery System Manager (CDS Manager – Internet Streaming)	The Cisco Content Delivery System Manager is a graphical, browser-based application designed to manage the elements of a Cisco CDS network. It offers a workflow-based approach, automating and centralizing the major system management functions, including configuration, monitoring, troubleshooting, reporting, and maintenance.

Figure 1.   Cisco Content Delivery System (CDS) Overview
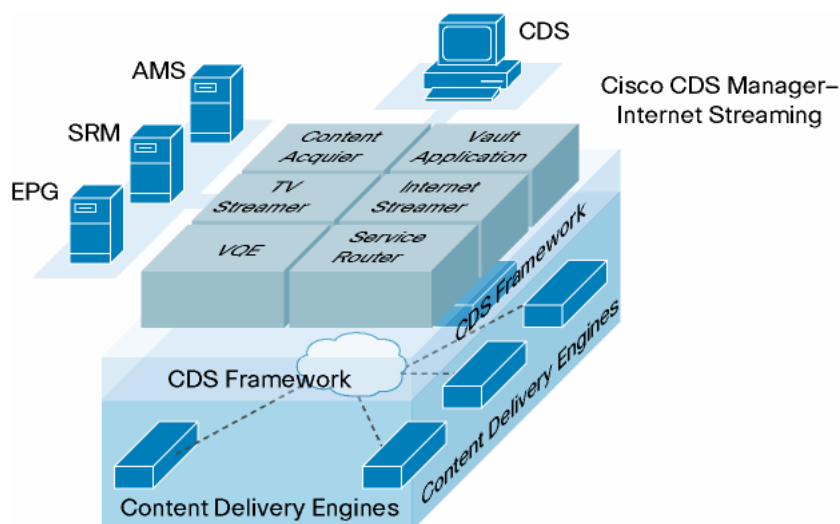
Internet streaming functions include the following:

Content Ingest

Content ingest is the process of taking in content from the Internet for distribution to devices throughout the Cisco Content Delivery System. The system makes use of standard Internet protocols (such as FTP, HTTP, HTTPs, and CIFS) to acquire content from Internet sources. It supports both "pre-ingest," where popular content is ingested before it is needed, as well as "dynamic ingest" where it is acquired in real time. The Cisco CDS is therefore able to quickly adjust to changes in content demand; when a new piece of user-generated content becomes hugely popular, it will be automatically cached for very scalable distribution to a large number of users.

Service Routing

Service routing is the process of intercepting subscriber requests for content and ensuring that content is delivered appropriately by using a streaming device that is in close proximity to the end user, passing automated health checks, and running at acceptable load. Multiple standard HTTP, Real-Time Streaming Protocol (RTSP), and Routing Table Maintenance Protocol (RTMP) redirection methods are supported. Service routing makes the Cisco CDS scalable, flexible, reliable, and efficient. It also enables "location independence," meaning that subscribers can be served regardless of where they are on the network.

Content Delivery

For final delivery to the end user, content is either streamed or transferred (downloaded) to the subscriber. Content can be streamed or downloaded to the subscriber in multiple formats-such as Windows Media / VC1, Adobe Flash, H.264, and QuickTime-for maximum client compatibility. Cisco has also partnered with Adobe. Together, Cisco CDS and Adobe Flash Media Server bring together powerful building blocks to deploy resilient and highly scalable streaming solutions with the largest reach (Figure 2). Cisco makes it easier to build a delivery infrastructure without the customer needing to perform extensive integration or customization to integrate and enhance support for native Flash (RTMP) streaming. A sophisticated caching protocol dynamically fetches content from other devices in the system when it is required. Popular content typically remains in the cache, thereby maximizing efficiency and reducing operating expenses (OpEx).

Figure 2.   Cisco CDS: Internet Streaming Overview
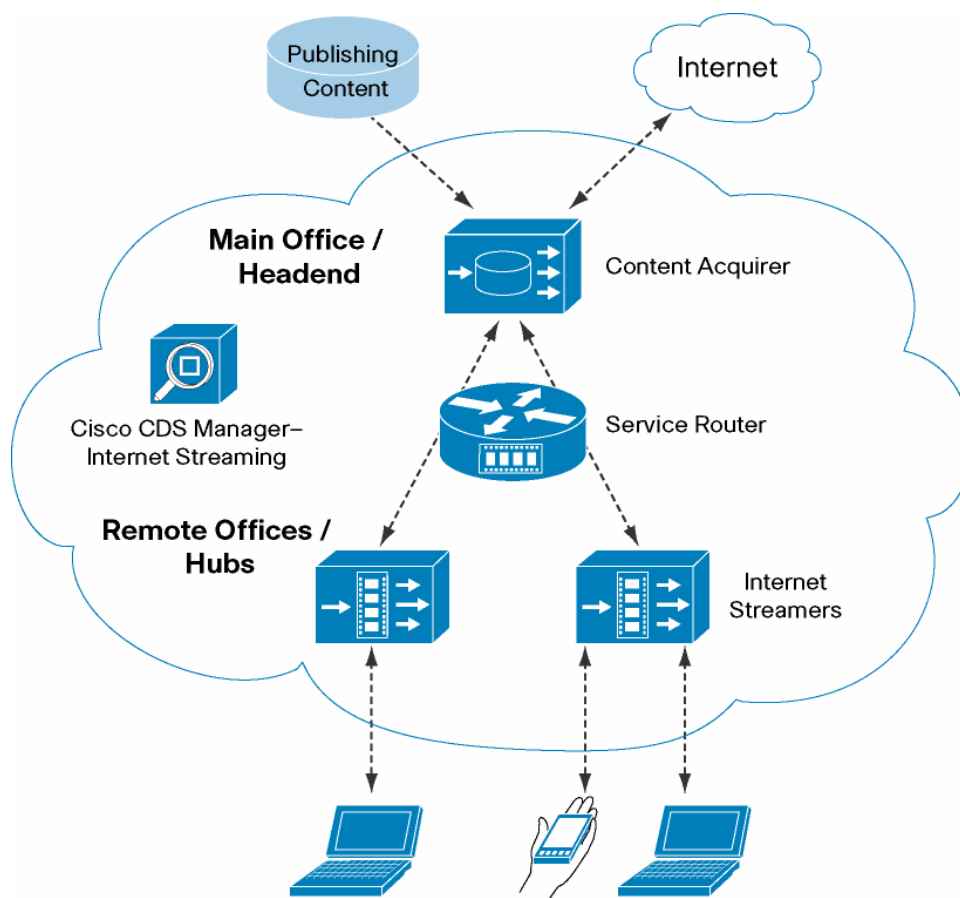
Applications

Using these Cisco Content Delivery Applications, service providers can deploy a variety of next-generation, value-added video entertainment services, including the following:

Cost-Effective Content Delivery Service

The Cisco Internet Streamer application enables a service where broadcasters and content owners can publish content to be cost-effectively viewed by a wide audience. The hierarchical design of the Cisco CDS enables the system to scale distribution as content popularity grows, and to deliver the content to the device type appropriate to the user. CDS Internet streaming provides such customers a broadband video distribution network that is very easy to build and manage and that reduces the total cost of ownership and time to market.

Live and VoD TV streaming Service for IP Devices

Live and video-on-demand (VoD) content ingested for delivery to set top boxes can be redirected by the Cisco Internet Streamer to provide a "live TV" or a "TV VoD" service that can be viewed on any IP- and streaming-enabled device, thereby allowing subscribers to view their cable or IPTV service anywhere and anytime. And Cisco CDS is QoS-enabled through integration with various QoS mechanisms, such as PacketCable• Multimedia, for high-quality delivery. Furthermore, VC1 and MPEG4/AVC can be used to minimize bandwidth consumption.

Webcasts of company events and VoD content

Cisco CDS Internet streaming supports efficient delivery of video and web content across WAN links. By supporting stream splitting at the remote offices, CDS Internet streaming can enable high-quality reception of live broadcast events. CDS Internet streaming supports pre-positioning and automatic caching of popular VoD content at remote sites, hence optimizing the WAN link. CDS Internet streaming supports simultaneous delivery of different bit rate content across a wide variety of devices and clients, such as Adobe Flash clients on a Linux machine and Windows Media on a PC running Microsoft's operating system.

Scalable Adobe Flash Streaming Service

Cisco CDS Internet streaming enhances the rich functionality of Adobe Flash Media Server by adding powerful infrastructure features to make it easier to deploy, manage, and scale solutions for streaming to the Flash platform. The Cisco CDS solution also has the capability to provide interactive applications that are created by Cisco. Every Cisco CDS Internet Streamer (Version 2.1 and later) ships with base-level support for streaming to Adobe AIR, and Adobe Flash Lite clients. Customers can optionally purchase upgrade licenses from Cisco.

Wholesale Services

CDS Internet streaming allows an operator to create a content delivery infrastructure. The operator can logically partition the Cisco CDS to offer wholesale services to multiple customers such as content owners. The CDS operator can allow content owners to manage and publish content into the CDS system by using a variety of publishing tools and interfaces. Extensive logging and analytics by CDS, provides content owners with detailed reports on content usage, which can serve the CDS operator as a basis for billing.

Music Streaming Service

Cisco CDS Internet streaming can provide either live or on-demand music streaming services. Using this service, subscribers can have access to CD-quality, QoS-guaranteed music channels on either IP devices or the television.

File Distribution

Cisco CDS Internet streaming provides highly efficient, scalable distribution of any file or file type using standard protocols such as HTTP, and support for secure, QoS-enabled file distribution. Service providers can use this capability as a means of delivering software updates for devices either inside the service provider network or inside the subscriber's home (for example, set-top box software).

Features and Benefits

Key benefits of Cisco CDS Internet streaming include:

- Enables delivery of Video 2.0 applications
- Supports a hierarchical deployment model that enables service providers to scale their offerings to millions of subscribers
- Supports multiple streaming protocols and file transfer protocols, enabling service providers to converge to a single multipurpose infrastructure for distribution and delivery of rich media
- Sophisticated management software simplifies operations and reduces OpEx
- Provides a flexible platform with application-layer intelligence that can serve as the basis for both existing and future service offerings

Table 2 summarizes features and benefits.

Table 2. Features and Benefits

Feature	Benefits
Content Ingest into the Cisco Content Delivery System	
Ingest predefined content	The digital assets such as long- and short-form video can be acquired from a variety of sources using different protocols and placed in resilient storage. This allows the operators to honor content agreements and provide a wide variety of content to subscribers.
On-demand content caching	Reduces operational complexity of ingest and delivery. The operator can offer long-tailed content, which is ingested based on content demand without knowing popularity in advance.
Live stream splitting	A single stream entering the Cisco CDS network can be efficiently split to serve multiple subscribers, allowing the operator to offer live streaming in a manner that scales.
Content Distribution to Subscribers	
Static content download using HTTP	Enables serving of long- and short-form content and offering services such as download-to-own.
Native Adobe Flash Streaming (RTMP, RTMPE, RTMPT, RTMPTE)	Enables content streaming to variety of PCs and mobile devices with Flash, AIR, and Flash Lite clients. RTMPE enables 128-bit encryption without use of certificates to help secure streamed media and communication.
Progressive content download using HTTP	Enables offering of video services using progressive rendering that avoids download time on web browser-based clients.
Content streaming using RTSP/RTP/MMS-over-HTTP	Allows streaming of video to commonly deployed PC clients such as Windows Media.
Streaming using RTP/RTSP	Allows content streaming using standard Rapid Transit Protocol (RTP) and RTSP protocol to clients such as QuickTime and 3GPP-compatible handsets.
Cisco CDS Service Router for Load Balancing, Location Independence, and Resiliency	
Load balancing	The Cisco CDS Service Router supports several routing methods to best determine which Cisco Internet Streamer should be used to serve content based on dynamic loading conditions.
Location independence	Allows serving any content to any place by factoring in the location of the requesting client to determine the choice of Cisco Internet Streamer.
System resiliency	Provides system resiliency against network and device failures by dynamically detecting and routing requests to alternative Cisco Internet Streamers.
Cisco CDS Manager as a Single Point of Management	
Management as a single system	Management is simple, with a single, easy-to-use GUI to configure, monitor, and troubleshoot the Cisco Internet Streamer applications throughout the entire system. Management simplicity contributes to reduction in OpEx.

Product Specifications

Table 3 lists product specifications.

Table 3. Product Specifications

Description	Specification
Protocols	Content acquisition: • HTTP • HTTPS • FTP • CIFS • RTSP/RTP • Acquisition from local disk (for example, user upload) Content delivery: • Web content via HTTP • Adobe Flash streaming via RTMP (T/E) • Windows Media VC-1 via RTP/RTSP, via MMS over HTTP, or via HTTP Progressive Rendering • Streaming MP3, MP4(H.264), MOV, M4V and 3GP(3GPP) content via RTP/RTSP

Components	Cisco CDS components involved in a minimal setup: • Internet Streaming Manager • Service Router • Internet Streamer with Content Acquirer Optional components include: • Standby Internet Streaming Manager • Extra Cisco Service Routers for load balance and failover • Extra Cisco Content Acquirer or Internet Streamers for load balance and failover
MIBS	• SNMP v1, v2, v3 supported. • Supports ENTITY-MIB, CISCO-ENTITY-ASSET-MIB, CISCO-CONFIG-MAN-MIB, EVENT-MIB, HOST-RESOURCES-MIB, CISCO-SMI & v2-SMI, SNMP-FRAMEWORK-MIB, MIB-II, sr-tc, v2-TC, SR-COMM, v2-ADM, v2-MIB, v2-ARCH, v2-tm, Coex, v3-ACM, V3-MPD, V3-proxy.
Network Management	With Cisco CDS Manager, which supports: • Secure GUI over HTTPS • Configuration of Cisco content delivery engines (CDEs) • Provisioning of delivery services Provisioning of managed live programs • Traffic statistics and system health monitoring • Authentication, authorization, and accounting (AAA) and role-based management • Management failover using a warm-standby • Device Group for easy management of thousands of CDEs • Centralized system upgrade manager for easy upgrading of thousands of CDEs • Any number of network ports can be configured as dedicated management ports on the CDE
Internet Video Back Office Integration Interfaces	Supports Internet back office integration using XML-based "Manifest" files that describe content ingest tasks. Supports integration with entitlement services, digital rights management, and Internet publishing tools. Web services-like APIs are provided to: Check the content replication and listing status Provision the delivery system Obtain statistics • Protocol: HTTPS • Input: URL and XML body • Output: XML response
Security and Access Management	ACLs for content-engine interfaces: • Standard and extended IP access lists for inbound and outbound traffic
PacketCable Multimedia	Protocol engines supporting PacketCable Multimedia: • Windows Media: • HTTP Web Engine Supported capabilities • Bandwidth reservation • Secure URL signing and validation • Secure validation of externally signed sessions

Service Routing	Cisco Service Router supports the following routing methods:
	• Simplified Hybrid Routing
	• Load-Based Routing (least loaded)
	Delivery service-aware routing
	Content-aware routing
	• Last Resort (when all eligible streamers are overloaded)
	• Cisco Service Router avoids routing to Internet Streamers with:
	• Disk failure
	• Application failure
	• CPU, memory, and disk overload
	• Cisco Service Router supports multiple redirection methods based on the protocol and the user-agent of the client:
	• HTTP ASX Redirection
	• HTTP 302 Redirection
	• RTSP 302 Redirection
	• RTSP REDIRECT Redirection
	RTMP Redirection
Web Engine	HTTP server and proxy:
	• Support pre-ingested content delivery and dynamic caching proxy
	• Flexible rules template for cache policies and rules
	• Service rules
	• Pass-through authentication
	• Progressive rendering of MPEG, Advanced Systems Format (ASF), and QuickTime movie format files
	• Hierarchical caching proxy
	• PCMM integration
	• Wi-Fi streaming via HTTP Progress Rendering
Flash Streaming	• Adobe Flash Streaming
	• Pre-created application for VoD
	Dynamic live
	H.264 VoD and Live streaming
	Content authorization using URL rules
	• HTTP-based hierarchical caching proxy
	• Support for RTMP, RTPMT, RTPME, RTPMTE
	• Formats: Sorenson Spark, On2 VP, Nellymoser, MP3, AMF0, AMF3
	• Client-side playlist
Cisco Movie Streamer	• Support for content delivery using RTP/RTSP
	• Clients: QuickTime, 3GPP-compatible, VLC
	• Codecs: MPEG1/2, H.264, H.263, AMR, AAC, MP3
	• Container files: MOV, MP4, 3GPP
	• Support for Live streaming application
	• Managed live events and rebroadcast of scheduled events
	• Encoder fail over
	• SMIL based client side playlists
	• Live-stream splitting, including:
	◦ Multicast in and multicast out
	◦ Multicast in and unicast out
	◦ Unicast in and multicast out
	◦ Unicast in and unicast out
	• Hierarchical caching proxy

Windows Media	WMT server and proxy:
	• Codec WM 7, WM 8, WM 9, VC-1
	• Protocols
	• RTP/RTSP UDP
	• RTP/RTSP TCP
	• MMS over HTTP, or
	• HTTP Progressive Rendering
	• Container files: ASF, WMV, WMA
	• Client side playlist
	• Fast Start and Fast Cache
	• Managed live events and rebroadcast of scheduled events
	• Live channel priming
	• Live channel fast start
	• Live-stream splitting, including:
	◦ Multicast in and multicast out
	◦ Multicast in and unicast out
	◦ Unicast in and multicast out
	◦ Unicast in and unicast out
	• Hierarchical caching proxy
	• PacketCable Multimedia integration
	• Pass-through authentication
	• Wi-Fi streaming of VC-1
Content Acquisition and Storage	Acquisition modes supported:
	• Pre-ingest of content known to the operators ahead of the delivery time (for short-tail content)
	• Dynamic ingest of content not known to the operators until the end-user requests (such as caching proxy, for long-tail content)
	• Pre-ingest via HTTP, HTTPS, FTP, CIFS, or from local disk (for example, user upload)
	• Dynamic ingest via HTTP and RTSP
	• Centralized content removal to quickly delete problematic or illegitimate content throughout Cisco CDS
	Distribution modes supported:
	• Caching proxy from the origin server
	• Hierarchical caching proxy within Cisco CDS
	• Hierarchical live streaming routing within Cisco CDS
	Storage management:
	• Sharing a single storage abstraction across various protocols going through a Cisco Internet Streamer
	• Popularity-based cache replacement algorithm across different protocols

Product performance is shown in Table 4. Performance measurements conducted on CDE200-2-500TXA-K9 use the following configuration (Table 4):

- Configuring four Gigabit Ethernet interfaces into a single port-channel bonding interface.
  - This provides instantaneous failover between ports.
  - Port channel load balancing algorithm is set as "destination IP" (that is, the client IP).
- The remaining two Gigabit Ethernet interfaces are configured for management traffic exclusively (either standby or port-channel mode is ok).

Table 4.   Product Performance

Description	Specification
Storage	For CDE200: • Total of 6-TB space spanning 12 SATA disks of 500 GB each (where 1 KB = 1000 bytes). • 1 TB used for system partitions, fully mirrored, yielding 500 GB effective useable space • 5 TB used as content cache, spanning 10 disks, with automatic disk failure detection and bypass • Up to 3 million unique assets in the content cache For CDE100: • Total 292-GB space spanning four SCSI disks of 73 GB each • 146 GB used for system partitions in a mirrored RAID, yielding 146 GB for content cache
Service Routing	For CDE200: • 9000 maximum transactions per second (TPS) for HTTP including ASX redirection (either load-based or round-robin algorithm) • 7000 maximum TPS for RTSP redirection (either load-based or round robin) • 8000 maximum TPS for HTTP (80 percent geo-location-based, plus 20 percent load-based) • 800 maximum TPS for RTMP redirection, for Flash streaming (either load-based or round robin)
Windows Media-VoD Streaming	All measurements use 1-Mbps streams, cache hit, unless otherwise noted. For CDE200 over 4 Gigabit Ethernet port channel: • 3-Gbps maximum throughput for RTSP-UDP, non-unique streams • 1.4-Gbps maximum throughput for RTSP-UDP pre-position all unique streams – that is, limited by the Filesys read throughput streams• 1.2-Gbps maximum throughput for RTSP-TCP, non-unique streams – that is, limited by TCP overhead • 14,000 maximum concurrent WMT sessions, non-unique streams, measured using 100-Kbps streams For CDE100 over 1 Gigabit Ethernet port: • 880-Mbps maximum throughput for RTSP-UDP, non-unique streams
Windows Media-Live Streaming	All measurements use 1-Mbps streams, live, unless otherwise noted. For CDE200 over 4 Gigabit Ethernet port channel: • 2-Gbps maximum throughput for RTSP-UDP, a single incoming stream splitting to 2000 outgoing streams • 1.7-Gbps maximum throughput for RTSP-UDP, 20 incoming streams splitting to a total of 1700 outgoing streams For CDE100 over 1 Gigabit Ethernet port: • 800-Mbps maximum throughput for RTSP-UDP, Unicast-In/Unicast-Out
Flash Media-VoD Streaming	All measurements use 1-Mbps streams with 20-min test duration, cache hit, unless otherwise noted. For CDE200 over 4 Gigabit Ethernet port channel: • 1.14-Gps maximum throughput, non-unique streams (1040 concurrent streams) • 525-Mbps maximum throughput, all unique streams (500 concurrent streams) • 914-Mbps maximum throughput, 12.5 percent unique streams and 87.5 percent of a total of 1008 non-unique streams • 3000 maximum concurrent sessions, non-unique streams, measured using 200-Kbps streams. (This test is done by a limited number of clients.) • Flash live streaming; maximum throughput: 973 Mbps; single, incoming stream split to 960 outgoing streams For CDE100 over 2 Gigabit Ethernet port channel: • 1.03-Gpbs maximum throughput, non-unique streams (1320 concurrent streams) • 207-Mbps maximum throughput, all unique streams (200 concurrent streams) • 640-Mbps maximum throughput, 12.5 percent unique streams and 87.5 percent of a total 600 non-unique streams
Movie Streamer-Live Streaming	All measurements use 1-Mbps streams, live, unless otherwise noted. For CDE200 over 4 Gigabit Ethernet port channel: • 1.3-Gbps maximum throughput for RTSP-UDP, a single incoming stream splitting to 1300 outgoing streams on CDE200 • 1.5 Gbps maximum throughput for RTSP-UDP, 4 incoming streams splitting to a total of 1500 outgoing streams on CDE200 For CDE100 over 1 Gigabit Ethernet port: • 0.5 Gbps maximum throughput for RTSP-UDP, a single incoming stream splitting to 500 outgoing streams on CDE100

HTTP Progressive Download and Streaming	This category applies to long-form HTTP sessions that last more than a couple minutes, and is typically used for streaming or for large file downloads. All measurements use cache hit, unless otherwise noted. For CDE200 over 4 Gigabit Ethernet port channel: • 6000 maximum concurrent sessions, non-unique streams, using 100 Kbps streams (no pacing) • 980-Mbps maximum throughput, all unique streams, with 1000 sessions at an average of 900 Kbps per stream • 1.1-Gbps maximum throughput, 12.5 percent unique and 87.5 percent non-unique streams, with 1100 sessions at 1 Mbps per stream • 2-Gbps maximum throughput with HTTP server-side pacing at 1 Mbps, non-unique streams, with 2000 sessions For CDE100 over 1 Gigabit Ethernet port: • 795-Mbps maximum throughput, non-unique streams, with 740 sessions at an average of 1 Mbps per stream
Nonstreaming HTTP Traffic	This category applies to short-form HTTP sessions that last no more than a couple seconds, and is typically used for small object downloads, such as JPG images or HTML pages. For CDE200 over 4 Gigabit Ethernet port channel: • 3500 TPS for pre-positioned content, cache hit of 25-KB file, average response time < 1 second • 3100 TPS for dynamically cached content, cache hit of 25-KB file, average response time < 1 second • 800 TPS for memory-cache-miss and disk-cache-hit, average response time < 1 second • 350 TPS for memory and disk cache miss of 8-KB files, proxy to the origin server, average response time < 1 second For CDE100 over 1 Gigabit Ethernet port: • 1400 TPS for pre-positioned content, cache hit of 8KB file, average response time < 1 second
Flash Media-VoD Streaming	All measurements use 1-Mbps streams with 20-min test duration, cache hit, unless otherwise noted. For CDE200 over 4 Gigabit Ethernet port channel: • 1.14-Gps maximum throughput, non-unique streams (1040 concurrent streams) • 525-Mbps maximum throughput, all unique streams (500 concurrent streams) • 914-Mbps maximum throughput, 12.5 percent unique streams and 87.5 percent of a total of 1008 non-unique streams • 3000 maximum concurrent sessions, non-unique streams, measured using 200-Kbps streams. (This test is done by a limited number of clients.) • Flash live streaming; maximum throughput: 973 Mbps; single, incoming stream split to 960 outgoing streams For CDE100 over 2 Gigabit Ethernet port channel: • 1.03-Gpbs maximum throughput, non-unique streams (1320 concurrent streams) • 207-Mbps maximum throughput, all unique streams (200 concurrent streams) • 640-Mbps maximum throughput, 12.5 percent unique streams and 87.5 percent of a total 600 non-unique streams

Table 5 shows Internet streaming application support for Cisco CDEs.

Table 5.   Internet Streaming Application Support for Cisco CDEs

Cisco CDS Content Delivery Application (CDA) and Engine (CDE)	Service Router	Internet Streamer and Content Acquirer	Cisco CDS Manager – Internet Streaming
Cisco CDE-100	–	Yes (CDE100-1-073TXA-K9)	Yes (CDE100-1-073TXA-K9)
Cisco CDE-200	Yes (CDE200-2-500TXA/D-K9)	Yes (CDE200-2-500TXA/D-K9)	–

Ordering Information

To place an order, visit the Cisco ordering homepage. To download software, visit the Cisco Software Center. Table 6 lists ordering information.

Table 6.   Ordering Information

Product Description	Part Number
CDS Internet Streaming Manager (2.2 release)	CDAIMGR-2.2-K9
CDS Manager – Internet Streaming – Basic Streaming Edition (2.2 release)	CDAISTR-B-2.2-K9
Service Router Application (2.0 release)	CDASR-2.0-K9
Internet Streamer Application – Content Acquirer (Release 2) (optional component with Internet Streamer application)	CDAISTR-CA-2.2-K9
Internet Streamer Application-Enhanced Streaming Edition (2.2 release)	CDAISTR-E-2.2-K9
100 Mbps upgrade of Windows Media streaming	CDAISTR-WM100M
500 Mbps upgrade of Windows Media streaming	CDAISTR-WM500M
Upgrade Web engine for 500 concurrent HTTP sessions	CDAISTR-WEB500
Upgrade to <500 Mbps, 500 streams> (whichever is lower) of Cisco Movie Streamer (RTP/RTSP)	CDAISTR-CM500M
Flash RTMP streaming license upgrade up to 1000 streams for CDE100 (no bandwidth limits)	CDAISTR-FLS-U-CDE1
Flash RTMP streaming license upgrade up to 1200 streams for CDE200 (no bandwidth limits)	CDAISTR-FLS-U-CDE2
2000 TPS upgrade for Service Router lookups	CDASR-LKP2000

Table 7 summarizes the differences between the basic and enhanced editions of Cisco Internet Streamer.

Table 7.   Cisco Internet Streamer: Basic Versus Enhanced Streaming Edition

Product Description	Basic Edition	Enhanced Edition
PCMM Support	No Policy Server integration	Support for third-party PCMM Policy Server for HTTP and WMT
HTTP Rules Engine	Basic (no URL alteration)	Basic + URL rewriting/manipulation + URL blocking
Multicast Reception and Distribution	Not supported	Supports multicast join and multicast streaming over RTP/RTSP
Product Description	Basic Edition	Enhanced Edition

Service and Support

Using the Cisco Lifecycle Services approach, Cisco and its partners provide a broad portfolio of end-to-end services and support that can help increase your network's business value and return on investment. This approach defines the minimum set of activities needed, by technology and by network complexity, to help you successfully deploy and operate Cisco technologies and optimize their performance throughout the lifecycle of your network.

For More Information

• For more about Cisco Content Delivery System, visit:
http://www.cisco.com/en/US/products/hw/video/index.html

• For more about Cisco Content Delivery Engine Series, visit:
http://www.cisco.com/en/US/products/ps7126/index.html

• For more about Cisco Content Delivery Applications, visit:
http://www.cisco.com/en/US/products/ps7127/index.html

Or contact your local account representative.