Cisco CDS Internet Streaming: Enabling New Video 2.0 Experiences

Introduction

Today's video consumers want choices, personalization, community-based content and instant gratification. At the same time, they are demanding new "Connected Life" services – available anywhere, anytime, and on any device. In today's competitive landscape, service providers need to meet these evolving demands by providing a differentiated, highly personalized customer experience.

A new paradigm shift in video-based entertainment – also known as Video 2.0 – is making old business models obsolete and enabling new ways to create and consume content. Video 2.0 builds on Web 2.0 constructs to bring interactivity and community to video services. At the same time, high-speed Internet connections, quality Internet content, and the success of early "Video 2.0" services such as YouTube are heightening interest in new services that blur the lines between traditional video services and the Internet. For example, Comcast's Ziddio service allows consumers to submit user-generated content from their home PCs, and the most popular videos are subsequently made available on the set-top box through video on demand (VoD). Similarly, Time Warner Cable's "Quick Clips" service automatically takes online content from CNBC, CNN, and The Weather Channel, within minutes of its posting, and makes the content available for set-top box viewing.

The popularity of internet video services is growing fast. In fact, more than half the US population will view online video by 2009 (source: eMarketers). In order to scale existing internet streaming services and make new services a reality, cable operators are recognizing the need for a new and flexible IP-based delivery system that can provide the Video 2.0 services that subscribers demand – anywhere, anytime, and on any device. The system must be capable of handling not only multiple streaming protocols, to support multiple devices with different capabilities, but must also be capable of file downloads. And in order to scale the media service and ensure a high quality user experience, they must also push content closer to users – distributing closer to the network edge.

Today, service providers typically either outsource the digital content management using third-party Content Delivery Network (CDN) providers or make use of in-house, proprietary streaming systems. Both of these options have significant disadvantages. Outsourcing the digital asset management results in recurring monthly expenses that become increasingly expensive as service adoption grows. Proprietary systems, meanwhile, only work with specific players and can quickly run into scaling issues.

Better Solution Needed

As service providers scale their rich IP multimedia offerings, and endeavor to deliver new Video 2.0 services, the significant disadvantages of existing methods clearly must be overcome. Following are the requirements that must be met by the delivery system. It must provide:

- A flexible and intelligent infrastructure that can serve as a platform for existing and future services
- Unified delivery to set-top boxes, PCs, and mobile devices
- Efficient and scalable distribution and delivery, capable of serving millions of subscribers
- Support for both media streaming and file download delivery models
- Operational simplicity
- Capability to provide a high quality consumer experience regardless of device

The Cisco CDS Alternative

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 devices such as PCs and Wi-Fi connected mobile phones and personal digital assistants (PDAs).

Because Cisco CDS uniquely delivers personalized services to both set-top boxes and IP devices, it empowers service providers to transform themselves into “experience providers” in order to offer Connected Life services to subscribers.

Because of its tight integration of TV streaming and Internet streaming capabilities, Cisco CDS unleashes new capabilities never before possible. For example, it enables “session shifting” between devices; a television viewer can now pause a program on TV, leave home to catch a train, and resume watching the program from the same point on a laptop during the train ride. This is just one of the many possibilities.

Cisco CDS Internet streaming technology incorporates three main functions: content ingest, service routing, and content delivery.

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 IP 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 and RTSP 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 to the subscriber in multiple formats including Windows Media Technology, VC-1, and QuickTime for maximum client compatibility. A sophisticated caching protocol dynamically fetches content from other devices in the system when it is required.

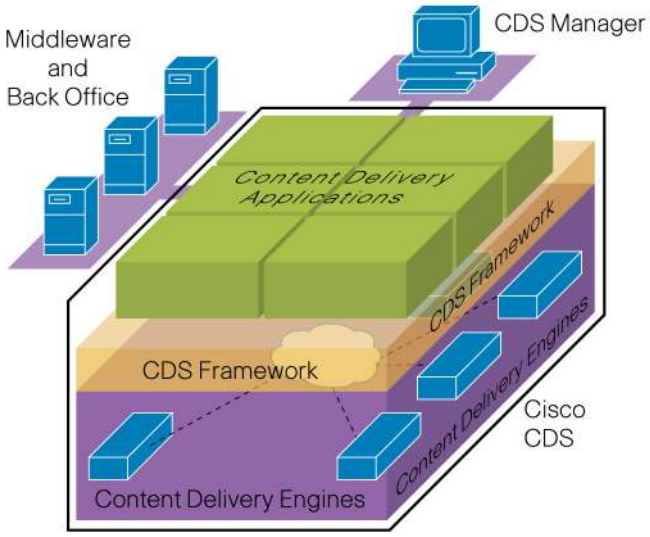
Popular content typically remains in the cache, thereby maximizing efficiency and reducing operating expenses (OpEx).

Cisco Content Delivery System Components

Cisco Content Delivery Applications (CDAs) bring application-level intelligence to Internet streaming, and use the Cisco Content Delivery Engines (CDEs) to deliver revenue-generating services. The Cisco CDEs are a family of carrier-class appliances at the foundation of the Cisco Content Delivery System. Networked Cisco CDEs work together to provide scalable and flexible content ingest, storage, distribution, personalization, and streaming capabilities.

Figure 1 illustrates the components of the Cisco CDS.

Figure 1. Cisco Content Delivery System Components



Content Delivery Applications for Internet Streaming

Table 1 lists the individual Cisco CDAs in the suite of Internet streaming applications.

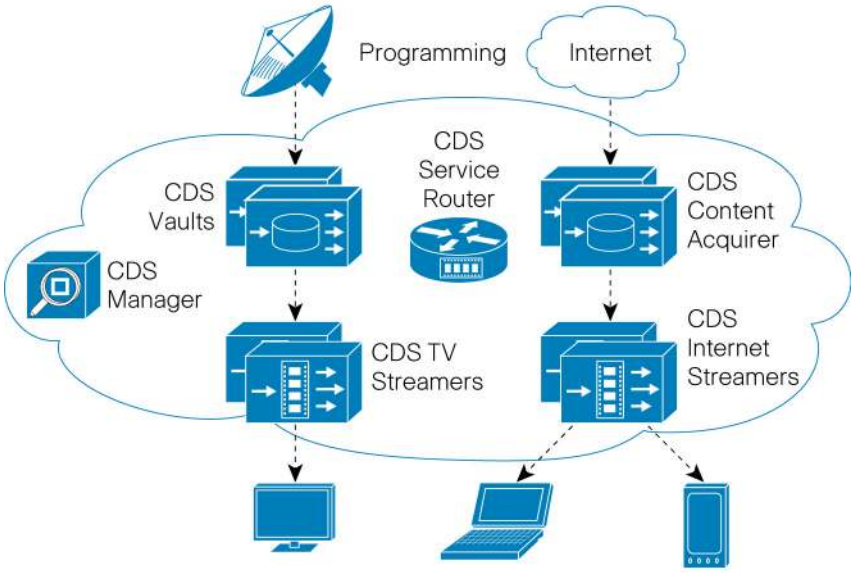
Table 1. Cisco Content Delivery Applications

Content Delivery Applications	Description
Cisco Content Acquirer	The Cisco Content Acquirer application provides content ingest and storage functionality. It supports both pull- and push-based models 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	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.

System Diagram

Figure 2 below shows the system diagram of the Cisco CDS including the Internet Streaming CDAs.

Figure 2. Cisco Content Delivery System with Content Delivery Applications



Service Opportunities

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

User Generated Content Service

The Cisco Internet Streamer application enables a service where subscribers become TV producers and publish personal content to be viewed by a wider 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.

Live TV Streaming Service for IP Devices

Because of the unified nature of the Cisco CDS, live content ingested for delivery to set-top boxes can be redirected via the Cisco Internet Streamer to provide a “live TV” 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 may be used to minimize bandwidth consumption.

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. Service providers can use this capability as a means of delivering software updates for devices either inside the service provider network (through QAMs or DSLAMs) or inside the subscriber’s home (for example, set-top box software).

Cisco CDS Internet Streaming 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
- 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

Summary

As consumers continue to experience new forms of content delivery, their expectations for video entertainment services are evolving. Operators that can deliver the large content libraries and highly personalized services that subscribers demand stand to cement their position in the dynamic market for entertainment services and develop longer-lasting, more profitable relationships with their customers. The Cisco Content Delivery System is the ideal platform for intelligently and cost-effectively delivering the full range of next-generation video content on demand, personalized entertainment, and Internet streaming services.

Employing proven Cisco IP networking intelligence and a unique distributed architecture, the Cisco CDS provides exceptional scalability and the flexibility to accommodate both streaming and file-based transfers. It functions as part of an integrated system that provides both TV and Internet streaming for the next generation of converged Video 2.0 applications. Recognizing these advantages, major service providers worldwide have deployed the Cisco CDS to deliver high-value entertainment services today, while positioning themselves for expansion in scale and service offerings that will deliver to their subscribers a true “Connected Life” through access to personalized content anytime and anywhere they want.

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