



Executive Briefing: Corporate Applications for Streaming Media

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Prepared by	Christopher Leone, Correlative Incorporated Bob Haines, Viwork Studios Incorporated

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Purpose of this Document

The purpose of this document is to provide an overview of current and emerging streaming media technologies and the practical applications of these technologies in a corporate environment.

Streaming Media Overview

What is Streaming Media?

Streaming media is video and audio content that is encoded for delivery over a computer network or the Internet. Generally, this content is digitized and compressed to allow the media to be efficiently transmitted over network links with limited bandwidth available.

Streaming media content can be either recorded and broadcasted live or produced and stored on the streaming server for later playback.

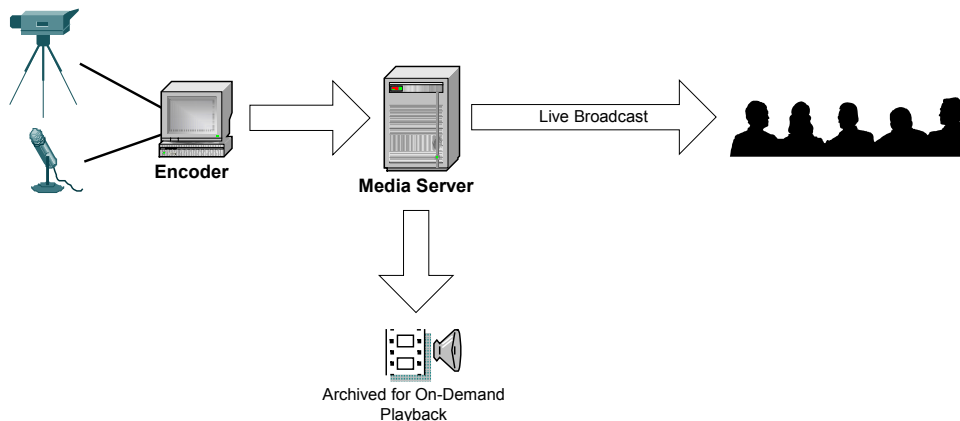
What Components are Involved in Streaming Media Solutions?

In its most basic form, a configuration providing streaming media consists of a camera and microphone, an encoder, a media server and one or more clients accessing the streaming media.

Encoder: The encoder digitizes the subject audio and video. The digitized media is then compressed to allow optimal transmission over various network bandwidths.

Media Server: The media server stores and forwards the streaming media received from one or more encoders. The media server controls access to the media content and serves this content to the audience. The media server can determine the bandwidth available for each target user and serve a stream optimized for that bandwidth. Multiple bandwidth-optimized streams can be served concurrently.

Clients: Playback of this streaming media content can be accessed from a variety of clients including media players, web browsers or multimedia-enabled applications.

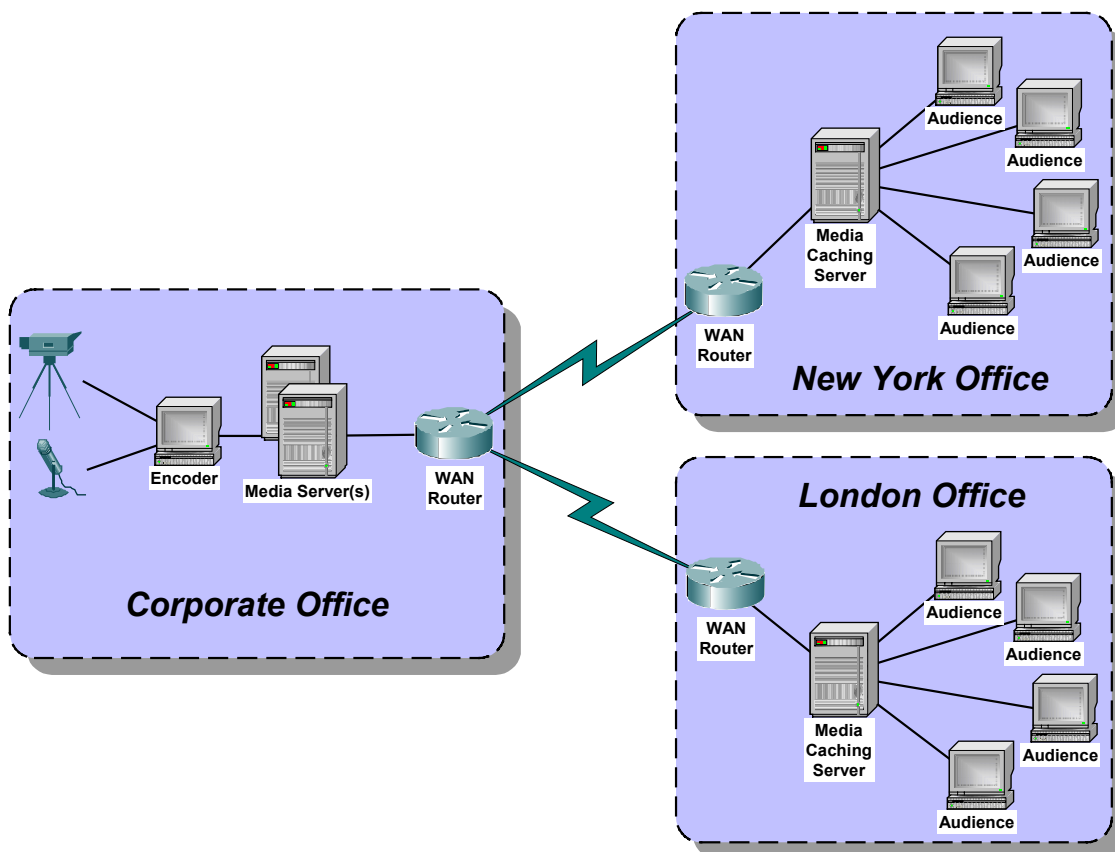


Basic Streaming Media Configuration

In mid to large-scale network infrastructures consisting of remote sites, wide-area networks links and a large number of users, additional components would commonly be implemented such as:

Caching (Proxy) Servers: Caching servers allow media servers to service more clients and optimize bandwidth requirements over limited network links (such as WAN links). Caching servers sit between the clients and the media server(s). Clients request media streams from the caching server, rather than directly contacting the media server. The caching server then proxies the client's request, retrieves the stream(s) from the media server and serves it to the requesting client.

In addition, the caching server caches the media streams and stores them locally so subsequent clients requesting the same streams can retrieve them locally from the caching server—rather than forcing the stream to be retransmitted from the media server and potentially across slow WAN links.



Infrastructure Implementing Caching Servers

Load-Balancing Devices: Commonly in large environments, more than one media server will be required to service the entire user community. In these situations, two or more media server may be organized into a **server farm**. Load-balancing devices regulate and direct traffic to and from the server farm. From the client's perspective, they see one logical media server. However, the client's requests are intercepted by the load-balancing device(s) and directed to an available media server to complete the request.

Load-balancing devices will normally implement intelligence that tracks the amount of load currently on all media servers, determine the media server with the least load and then direct the requests to that server. Also, should one or more media server become unavailable (e.g. as a result of a server crash or network link failure), the load-balancing device will avoid sending further requests to these servers.

Streaming Media Technologies

A number of streaming media technologies exist today. These technologies include: **RealMedia, QuickTime, Windows Media, MPEG-1, MPEG-2** and **MPEG-4**.

RealMedia, QuickTime and Windows Media: are competing technologies optimized for streaming over corporate networks and the Internet.

MPEG-1: is an industry-standard technology that was adopted by the Moving Picture Experts Group (MPEG). MPEG-1 technology is optimized for data playback at 1.5 Mbps. This data rate works well for CD-ROM playback.

MPEG-2: is the successor to the MPEG-1 technology. MPEG-2 provides higher-fidelity video and audio (full resolution standard and high-definition video). MPEG-2 technology is optimized for data playback rates from 2 - 15 Mbps. DVD and satellite television commonly use MPEG-2.

MPEG-4: is an emerging standard that combines the fidelity of MPEG-2 with the ability to encode and playback multimedia formats other than just video and audio.

Corporate Applications for Streaming Media

Everyday, streaming-media solutions become more mainstream in the corporate environment.

Distance Learning (e-learning)

One such solution leveraging streaming media is distance learning (or e-learning). Distance learning is the use of technology to provide end-users training without the requirement of a live trainer or a classroom environment. Although a number of distance learning technologies and solutions exist, streaming media plays a significant role in these solutions.

In a distance-learning scenario, a training session is captured via streaming media technology. This training session can be broadcasted to a much larger audience via the corporate network, wide-area network and/or Internet. The attendees can receive the training broadcast via their desktops or from designated conference rooms or training rooms in their respective offices. Alternatively, the same streaming-media setup can be used to archive the training session for later, on-demand viewing. The audience can retrieve the archives directly from the server or the archived sessions can be used to produce CDs, DVDs or video tapes.

More and more, distance-learning solutions are incorporating additional collaborative capabilities such as instant messaging, white boarding and audience polling to facilitate audience interactivity with the presenter and other audience members.

Organizations are using distance learning for common training applications including:

Specialized Job Training: training on virtually any job-related function. For example: IT training.

Sales Training: training targeted for sales staff.

Human Resources Orientations and Procedures: such as new employee training, benefits, compliance procedures, etc.

Webcasting

Webcasting is similar to distance learning, but targeted for potentially larger audiences attending over the Internet. The primary application that the audience uses to attend a webcast is an Internet browser. Some common events that are candidates for webcasting include:

Corporate Briefings and Announcements: shareholder briefings, annual reports, and sales briefings can be economically broadcasted to a company's customers and partners.

Marketing Announcements: such as new product announcements and rollouts can be made available to the public via webcasting.

Customer Training: live or prerecorded streamed training in the usage of a company's products and services can be available to the customer base.

Video Conferencing

Traditionally, video conferencing solutions involved costly fixed configurations requiring the placement of meeting rooms enabled with video conferencing equipment and dedicated WAN circuits. As employees, partners and customers become more mobile, the ability to participate in true bi-directional conferencing from any location is very desirable. As the proliferation of broadband Internet and multimedia computers grows, desktop video conferencing solutions are quickly becoming more common and reliable.

Video Walls and Kiosks

There is an increasing use of streaming media in video walls and kiosk applications. In these scenarios, corporate messages, commercials, company information or help is provided on monitors and information kiosks located in public areas of the business. For example, bank branches may have information regarding current financial rates, services and offers playing on a video wall. Another example may be interactive maps, directories and advertisements implementing streaming media being available in office buildings, malls, museums or other public gathering places.

About Correlative and the Author

Correlative is an international consulting and outsourcing company. Correlative specializes in providing cutting-edge networking, directory services, e-commerce, groupware, and multimedia solutions.

Christopher Leone is Correlative's President and Senior Project Manager. Christopher brings 18 years of IT and 13 years of management experience to the company. Christopher has extensive professional experience in the legal, corporate consulting, government contracting, and technical education industries. Christopher resides in both the United States and Asia and is very knowledgeable in Asian cultures. He has also served as an active member of a number of technological professional organizations and advisory boards. Christopher can be reached via e-mail at cleone@correlative.com.

**Philadelphia**

Executive Center of Greentree
1 Eves Drive, Suite 111
Marlton, NJ 08053-3125

+1 856.810.0411 (Voice)
+1 856.810.0431 (Fax)

Singapore

9 Yio Chu Kang Road
#02-07 Kovan Centre
Singapore 545523

+65 6487.1885 (Voice)
+65 6487.1889 (Fax)

Internet

www.correlative.com (web)
info@correlative.com (e-mail)