



Single-Encode Streaming for Multiple Screen Delivery

Easy and Affordable Live Video Production and Unified Streaming for iPhone, Web and TV

Executive Overview

With today's rapidly growing demand for live video consumption, users want the ability to view video wherever they are – in their homes, on the desktop, or on the go. But the workflow needed to provide delivery to multiple screens over IP networks – including Flash players on personal computers, iPhones and other mobile devices, and televisions – presents significant challenges for content owners and service providers alike. The issues are many and complex, including different transport networks and protocols, a multitude of streaming servers specific to each player and device, varying bandwidths, and more.

Telestream and Wowza are now providing a new approach to video encoding that streamlines the workflows for multiple screen delivery using standard H.264 video. This white paper will introduce Telestream's Wirecast live production tool and Wowza Media Server 2 Advanced, and explain how the combined solution is changing the conventional paradigm by creating an operationally efficient, cost-effective, and unified multiple screen encoding and streaming model.

Meeting the Growing Demand for Streaming Video

Video consumption on mobile handsets and desktop computers continues its significant growth path. Recent statistics include:

- The value of the total online-video market will be \$15.6 billion by 2012. (Source: ABI Research)
- Adobe Flash is now installed on 99% of Internet-enabled desktops. (Source: Millward Brown survey, June 2009)
- Apple's iPhone holds a majority share of all mobile browser use and is currently the most sought-after screen by content owners seeking to expand audience reach. With more than 40 million iPhone OS devices sold (including iPod touch), this is a screen that simply cannot be ignored by developers, content owners, video producers, and content distribution networks.
- Other player clients, like Microsoft's Silverlight, are gaining traction on the desktop and in the mobile space where more video-ready devices are emerging.

The potential market for streaming media is huge, but to take advantage of this rapid growth in demand, new technologies that can simplify the processes required to deliver streaming video to multiple screens are needed.



The Challenges of Multiple Screen Delivery

Producers and service providers are eager to meet the growing demand for anywhere, anytime, any screen access to video content. Unfortunately, there is no consistent video streaming protocol standard across the various desktop clients, mobile devices, and TV screens on the market today. Video content producers must now encode and deliver video separately for each destination screen. Consider the following three scenarios:

- A video producer is streaming the latest space shuttle launch. The producer would like to enable viewers with either desktop computers, iPhones, or TVs to see the video, but the streams destined for each audience must be encoded separately in formats compatible with each screen. Constrained by the significant time and expense of performing multiple encodes for delivery to the three different screens, the producer must limit the availability of his content to a smaller subset of all potential audiences.
- A video producer is streaming a live event – perhaps a political gathering, a film festival, or a sporting event. But due to the event's remote location, bandwidth is extremely limited, making it impossible to send more than one stream to its destination. The producer must choose just one format and screen (desktop computer, mobile device, or TV) for the content.
- And finally, a video service provider has signed on to stream all of the presentations given at a company's annual meeting. During the event, the company's marketing team asks if the streams can also be delivered to the employees' iPhones. Unfortunately, the service provider did not have the necessary encoders to stream to the iPhone, and missed a lucrative opportunity to provide additional services to its key client.

Separate Encoders and Networks Required for Each Destination

While most devices and screens are converging on a common video encoding format (H. 264), they differ in how that video is transported from the encoder through the distribution server/network to the screen (iPhone, computer player, TV, etc.):

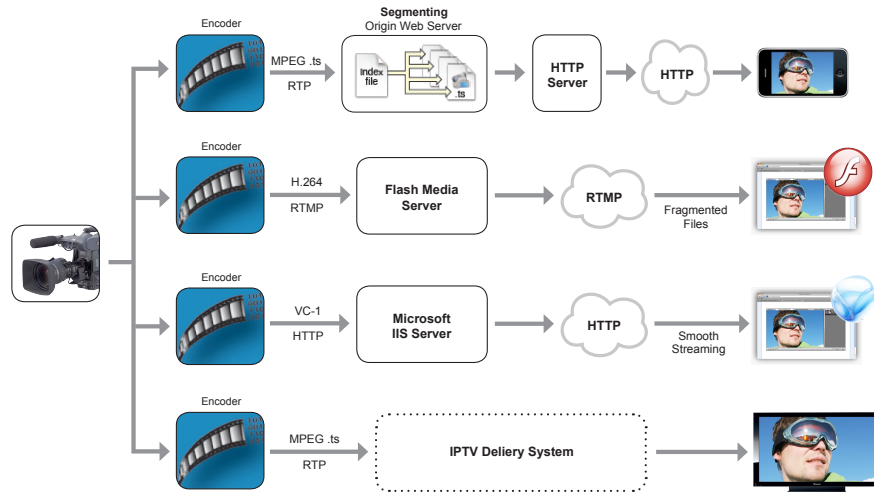
Currently, formatting the same live event for delivery to multiple screens requires separate encoders and transport protocols for each destination:

1. **iPhones:** The encoder delivers an MPEG-2 Transport stream over IP containing H. 264 video to the server. The server (i.e., the encoder) segments the stream into a series of short files (about 30 seconds long). These files are delivered via HTTP along with an MP3 playlist that tells the iPhone what files to play.

2. **Web Delivery:**

Flash players: A Flash media server delivery network "reflects" encoder streams over a proprietary streaming protocol (RTMP) connection to the viewers' desktop Flash player

Silverlight players: The encoder delivers "fragmented" MPEG-4 files containing H. 264 video to the HTTP server (typically the Microsoft IIS server), the server delivers a special "manifest" file to the Silverlight player that tells it which MP4 files to play.



3. **TVs:** MPEG-2 transport streams with very specific formatting are delivered over IP to the set-top box.

Figure 1. Delivering video to multiple screens requires separate encoding/delivery workflows for each destination.

Current workflows for multi-screen delivery are complex, inefficient, and expensive for both video producers and service providers, and will not scale with the exploding demand for video content. As a result, difficult choices have to be made affecting the scope of distribution of the live video, severely limiting potential revenue and visibility for the video content. Clearly, a new model that can scale up and simplify the encoding and delivery workflow to multiple screens – without overwhelming production and network resources as well as budgets – is required.

The New Solution for Multi-Screen Delivery

Now there is an easy and affordable new solution that eliminates the need for separate encoders and networks for delivering live video to multiple screens. Telestream's Wirecast live video production software works in conjunction with Wowza Media Server 2 Advanced, the first multiprotocol platform that provides simultaneous media streaming to iPhone, iPod touch, Flash, Silverlight and QuickTime Web players, and IPTV set-top boxes. This solution makes it possible to live stream to multiple destinations from a **single** platform, without special pre-processing of source content.

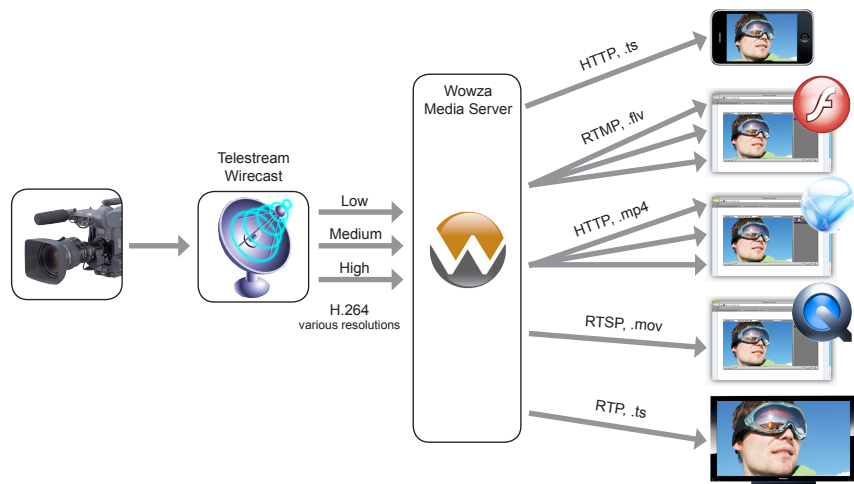


Figure 2. Single encoding/delivery workflow with Wirecast and Wowza Media enables simultaneous delivery to multiple clients and devices.

In contrast to the conventional approach to streaming live video to multiple screens, the Telestream/Wowza model requires just a single encoder and media server delivery network, resulting in just one workflow.

This is possible because Wowza Media Server 2 Advanced provides on-the-fly delivery protocol conversion, and segmentation if required, for HTTP streaming to the iPhone and other clients.

Different screens require different resolutions (bitrate and size) on the stream, in order to optimize the viewing experience with regards to picture quality. Wirecast has the ability to simultaneously produce several different resolutions and stream these live to the streaming server. Wowza Media Server 2 Advanced will combine these streams and deliver the appropriate resolution, over the required network, in the right format, to each screen. All this in *one single workflow*.

The joint Telestream and Wowza offering combines the many strengths of the two industry leading software solutions – simplifying the creation and delivery of high-quality streaming content for live entertainment, news, press or sports events, and business or university presentations to mobile, desktop, and TV screens.



Features and Benefits of the Telestream and Wowza Solution

For Producers

Minimizing the number of encoders reduces cost and complexity for the producer and increases consistency of the content delivered to the screen.

Requires less bandwidth to send streams to the content delivery network (CDN), enabling the producer to deliver content quickly and easily in areas with limited connectivity.

For Content Delivery Networks

Provides a much lower Total Cost of Ownership with just one network to architect, manage, and operate.

For Consumers

Gives consumers a choice to view video on any screen, any device, wherever and whenever they want access

Provides a consistent viewing experience across different devices (iPhone, Flash and Silverlight webplayers, TV etc.)

Telestream Wirecast Live Production Tool

Telestream Wirecast is a live production tool that enables video producers to easily broadcast live events and create professional video productions from any location with only a digital video camera, a personal computer, and an Internet connection. With the intuitive and fully integrated streaming capabilities, Wirecast makes it easy for anyone to share live experiences and build a global community.

For a fraction of the cost of traditional broadcast hardware equipment, Wirecast works just like a video switcher, controlling real-time switching between multiple live video cameras, while dynamically mixing in other source media, such as QuickTime movies, music, audio, and slides. Features such as chroma key, 3D graphics, and built-in titles merge seamlessly with Wirecast's layering system, enabling users to easily create live and on-demand broadcasts for anyone who wants to stream to multiple screens.

Wowza Media Server 2 Advanced

Wowza Media Server 2 Advanced is an extension of the proven Wowza Pro platform that takes streaming beyond Flash players by adding support for Apple iPhone and iPod touch, Microsoft Silverlight, Apple QuickTime, and IPTV set-top boxes. A unique feature of the Wowza server is its ability to stream to any screen with a single content encode. H.264 live streams can be ingested from conventional off-the-shelf RTMP, RTSP/RTP, or MPEG-TS encoders. Video on demand (VOD) files can be in any of the common container formats (e.g., .f4v, .mp4, .m4a, .mov, .mp4v, .3gp, and .3g2). The server performs all necessary protocol conversion and content adaptation for each destination client.

Customer Example

The Telestream and Wowza solution has already provided significant benefits to NetBroadcasting.tv, a leading streaming service provider that produces many live events for its customers.

"We stream a large convention each year in early August," stated Wayne Coleman, General Partner of NetBroadcasting.tv. "For that event, we stream Flash video to more than 20,000 viewers via the Internet using the Wowza media servers. When we told the host that the convention's timing corresponded with Wowza's Advanced Server preview release of iPhone streaming, they asked us to conduct a test of this new technology in parallel with the Flash streaming we were already planning to deliver.

"Wowza provided us with a link to download Telestream Wirecast. We used a Wirecast-equipped PC to encode a continuous live stream for 150 hours. We then sent it to a Wowza 2 Advanced server which simultaneously streamed it to the Flash players and to viewers who wanted to try it on the iPhone. User comments were overwhelmingly positive. Together, the Wirecast and Wowza solution not only saved us time and money by enabling us to reach both screens from a single encode, it was easy to manage and performed flawlessly."





Summary

To take advantage of consumers' desire to view video in their homes, on the desktop, or on the go, producers need the ability to easily deliver video that can play on ANY digital screen. With Telestream's Wirecast live production application and multi-protocol streaming powered by Wowza Media Server 2 Advanced, it is accomplished easily and cost effectively, enabling producers to reach Flash players, iPhones, and other screens with just one encode delivered on a unified server infrastructure. Now video streamers have an affordable and efficient way to create and distribute professional looking live video to audiences anywhere and anytime – without having to worry about what screen they use to consume it.

About Telestream

Telestream products make it possible to get video content to any audience regardless of how it is created, distributed, or viewed. Throughout the entire digital media lifecycle, from capture to viewing, for consumers through high-end professionals, Telestream products range from components and encoding applications to fully automated workflow systems.

Telestream enables users in a broad range of business environments to leverage the value of their video content. Telestream corporate headquarters are located in Nevada City, California, and its team of video experts is located in France, Germany, Sweden, The United Kingdom, and the United States. The company is privately held.

For more information about Wirecast, a demo, free trial, or online purchase, visit www.telestream.net. Wirecast is also available for purchase through a network of Telestream resellers and affiliates.

About Wowza

Wowza Media Systems is the media server software company that provides an industrial strength infrastructure for live video, video-on-demand, live recording, and video chat. Wowza has a singular focus on delivering high performance media server software to service providers, media properties, enterprises, and other organizations serious about delivering video to any digital screen – computer, mobile phone, or home TV.

Wowza's media server software has been deployed by more than 30,000 global licensees in entertainment, social media, advertising, enterprise, education, government, and Internet commerce. Wowza Media Systems is privately held with headquarters in Evergreen, Colorado and offices in Silicon Valley, California. For more information, visit www.wowzamedia.com.

Copyright (c) 2009, Telestream, Inc. Telestream is a registered trademark and Wirecast is a trademark of Telestream, Inc. Wowza, Wowza Media Systems, Wowza Media Server and related logos are either registered trademarks or trademarks of Wowza Media Systems, Inc. in the United States and/or other countries. All other trademarks are the property of their respective owners.
September 2009