Webcaster and Hybrid Flash® Multicasting

The Next Generation of Enterprise Video

By Greg Pulier

Founder and CTO of MediaPlatform, Inc.
Introduction
In the spring of 2010, MediaPlatform began working closely with Adobe to implement the first real world test of hybrid Flash multicasting using Flash Media Server 4 (FMS 4) and our own WebCaster enterprise webcasting tool. The breakthrough of this hybrid multicast technology is its ability to leverage both IP (Internet Protocol) multicasting and application level (peer assist) multicasting to reach 100% of the users on a network without the need for a costly and time-consuming network upgrade.

We chose to test this revolutionary multicasting technology at the site of a long-time client, a Fortune 500 company with the kind of massive, global network infrastructure that made the process challenging, but exactly the type of real world scenario MediaPlatform and Adobe wanted. In the process, we developed the world’s first multicast enabled Flash player. The successful test illustrated how WebCaster and hybrid Flash multicasting can transform the economics of enterprise video. It’s a true game changer, with the potential to revolutionize the next generation of corporate rich media. The arrival of this technology couldn’t have come at a better time. Just as shifts in worker behaviors are driving increased video traffic on budget-constrained corporate networks, hybrid Flash multicasting offers a solution that eliminates the usual tradeoffs between video consumption and network investment.

Hybrid Flash Multicasting – The Decisive Innovation in Streaming Video
Hybrid Flash multicasting is the second and decisive wave of innovation that will enable enterprises to stream video without overtaxing their network infrastructures. When online video first appeared on the corporate scene, it could only be unicast, a cumbersome process wherein a separate and dedicated stream is delivered to each destination. Figure 1 illustrates the inherent limitations of unicasting, in which just three viewers of a 500 Kbps stream can shut down a T1 connection to a remote office. As a result of its potential to impair networks, most companies will simply not allow any unicast video.

To solve the unicasting problem, many organizations turned to IP multicasting, a network technology that enables a video to stream just once to a node on a network and then is shared by all the viewers in that node, regardless of connection type or speed. IP multicasting, though effective, is entirely reliant on hardware upgrades, router configurations, and other network related factors, which makes it difficult and costly to implement initially. Additionally, in most
companies there are frequent changes in network topologies, due to internal reorganizations or mergers and acquisitions, which greatly complicate the maintenance effort needed to sustain IP multicast enablement. As a result, very few companies have succeeded in IP multicast-enabling their entire network, which means at least some, or even many, employees simply can’t get video.

Hybrid Flash multicasting solves the cost and complexity challenges of IP multicasting. By combining a new form of multicasting, known as “application multicasting,” which leverages a peer assisted model of video sharing, to an IP multicast network, a video stream can reach virtually everyone on the network using existing bandwidth and infrastructure. Hybrid multicasting finally unlocks the full potential for video within the enterprise by combining IP and application multicasting to deliver streaming media using the most efficient algorithms within a dynamic self-optimizing topology.

The Significance of Hybrid Flash Multicasting

Hybrid Flash multicasting arrives at an opportune time. The use of online video is growing rapidly within corporations. Industry data shows that video consumption inside the corporate firewall is growing at an unprecedented rate, following consumer trends of the past few years. Approximately 12% of large enterprises were generating more than 100 hours of video content per month in 2009, up from 9% in 2008. The number of corporations generating 25-100 hours of video jumped from 21% to 29% in the same period. At that rate, a company could have amassed a 6,000-hour library of video since 2005! In the consumer public, video as a percentage of Internet traffic is projected to reach 91% by 2014, with corporate network traffic likely to mimic that consumer pattern. Gartner Research projects that 25% of content that workers see in a day will be dominated by pictures, video, or audio by 2013.

From an internal cost perspective, hybrid Flash multicasting enables corporations to keep up with growing video usage while cutting enterprise video expense across several cost centers. IT managers will appreciate it for the ability to deliver the greatest level of video service while minimizing the need for additional media servers, edge caching devices, eCDNs, and WAN acceleration hardware. And by having fewer physical servers to install throughout the network, FMS4 promises a shorter deployment cycle than existing video streaming technologies and lower ongoing IT maintenance and support costs.

Hybrid Flash multicasting is also as valuable to media producers as it is to IT managers. Flash is compatible with all operating systems, so corporations can now stream video to Macs, PCs, and Linux machines with relative ease. It’s compatible with all browsers, making the video experience seamless for users of Internet Explorer, FireFox, Chrome, Safari, and Opera. Media producers will no longer have to produce video in multiple streaming formats when a corporate video is intended for both internal and external audiences, which is potentially a huge money and time saver.

---

1 Interactive Media Strategies Executive Web Communications Survey, Q4 2009
2 Cisco Visual Network Index 2009
3 Gartner Data 2008
Piloting Hybrid Flash Multicasting

On paper, all of the new benefits of hybrid Flash multicasting sound impressive. However, no one really knew how well it would work until it was implemented in a real-world, global corporate environment. To test hybrid Flash multicasting, MediaPlatform, an early adopter and advocate of Flash and Flex-based webcasting applications, worked closely with Adobe on the development of the industry’s first Flash multicast enabled player.

As part of the player development process, we decided to commit to working within the Open Source Media Framework (OSMF) standards. Adobe founded OSMF as an open software framework for building feature-rich video players and applications based on the Adobe Flash Platform. The goal of OSMF is to reduce the complexity of player development and give developers more time to focus on the overall user experience. OSMF facilitates the publication of numerous third party plug-ins for advertising, reporting, and content delivery, as well as standard features such as play, pause, seek, buffering, bitrate switching, and so forth.

Adobe and MediaPlatform decided to approach a Fortune 500 client that had been using MediaPlatform’s webcasting solutions for several years. We selected this client for the Flash multicast test for several reasons. First, their global network is enormous, with offices in 95 countries on six continents and over 100,000 employees. Second, this corporation is actually comprised of two enterprises, one of which is the original company with a significant portion of their network IP multicast enabled, and the other of which is a large entity they recently acquired whose network is not IP multicast enabled. Third, a number of the client’s satellite locations around the world are not equipped for IP multicasting. Figure 2 shows a simple network map of the client as two entities, where there is an obvious division in multicast enabled networks.

![Figure 2 – High level network structure of the client site](image)

Stakeholders and Expectations

The employees within the client organization had expectations of enterprise video and hybrid Flash multicasting that varied depending on their roles. The line-of-business (LOB) people MediaPlatform worked with wanted the highest possible video quality wherever possible. They were most concerned about latency and performance and anything else that could potentially affect the quality of an online event for viewers or executive presenters. In addition to quality concerns, they wanted video to be as pervasive in the organization as possible. The LOB stakeholders wanted to utilize the multicast test to explore other streaming possibilities, which were currently limited, as their remote offices and scattered groups inside the two-network structure were not able to view videos in real time.
The IT department, however, had a different agenda for the hybrid multicast test. The most critical issue they wanted to address was the ability for the entire organization to access and watch videos without causing network failures. To implement this test, the client insisted on scheduling it during the middle of a major network upgrade project. This complicated matters, but we were able to work around the project so that the test would not cause any adverse network traffic patterns.

The Test Solution

Our test solution needed to accommodate four factors that the client requested:

- **Variable streaming rates** – These were needed to multicast across varying network conditions throughout the enterprise.
- **Support for multiple languages** – As a global corporation, the company wanted to make sure that hybrid Flash multicasting would support video streams in more than one language.
- **Primary and backup streams** – The video signal required a backup stream in the event that the primary stream became unavailable.
- **Streaming from multiple studios** – The client also wanted to be able to originate a video signal anywhere in the world and have it stream easily to any location. They had a goal of being able to produce videos and webcasts from either Studio A or Studio B and allow anyone in the company to watch the presentations live without any network performance issues or latency.

Our test solution resembled the high level overview shown in Figure 3. We started with the original video signal from the live event, which we sent to a battery of Flash Live Media Encoders (FLMEs) for encoding in different bitrates. We also set up FLMEs for different language versions of the video. Each language stream could then be encoded with a different audio track. Flash Media Server, running with MediaPlatform’s software, organized the streams and made them available to viewers using MediaPlatform’s OSMF compatible flash multicast player, WebCaster.

With multiple encoded streams hitting the server, the key to making hybrid Flash multicasting work is using MediaPlatform’s capacity to make a quick match between each player and the appropriate stream. In a process that is completely invisible to the end user, MediaPlatform’s software is able to
connect viewers with a Flash video stream that was configured for their language, location, and bandwidth. When viewers are invited to participate in the test, they receive a link to a Web page that contains our WebCaster player. The player is set up to transmit the viewer’s network location and language preference to the instance of MediaPlatform’s software running on top of FMS 4. Using a table of IP addresses and correlated multicasting factors, MediaPlatform’s software is able to match each player with a specific type of stream. The viewer then receives the correct type of stream. For example, one viewer might receive a primary low bandwidth stream in English, while another viewer in another part of the network might receive a high bandwidth stream in French.

The hybrid Flash multicasting test was a success. IT stakeholders were struck by how efficiently a high quality video stream could flow through their network. The bandwidth usage was, in their view, amazingly and unexpectedly low. Audiences involved in the test were pleased with the quality of the video. For some participants, it was the first time they had seen a video on their work PCs, because previous network limitations had prevented them from watching online video. The business stakeholders in the media production department were elated that they now had the ability to produce content in a single format that could span the entire internal audience and also be simultaneously usable for the external Web.

**Conclusion**

Enterprise video seems destined for a hybrid Flash multicast future and we plan to deliver it to end users through MediaPlatform’s WebCaster. The problem is clear: Online video use in the enterprise is on a growth trajectory, while corporate appetites for network upgrades and expanding media server infrastructure are definitely limited. Adobe’s hybrid Flash multicasting and MediaPlatform’s webcasting and media management products promise to provide a solution to this problem. Despite these major steps forward, hybrid Flash multicasting is still in its infancy, and the organizational knowledge needed to make it a success must be nurtured within IT and media production departments. We are encouraged by our early success with hybrid Flash multicasting on WebCaster and look forward to working with our clients and partners on continued deployment of this revolutionary technology.

**About MediaPlatform, Inc.**

MediaPlatform, Inc. (formerly IVT) delivers best-in-class webcasting and media management technology to global enterprises and digital media producers. MediaPlatform’s webcasting software enables high-impact presentations for lead generation, corporate communications and training. The company offers organizations the ability to take advantage of scalable cloud-based computing, as well as on-premises deployment, to present and manage rich media. With media management tools built on its platform, the company helps clients derive long term archive value from their investment in media content.

[www.mediaplatform.com](http://www.mediaplatform.com)  [www.twitter.com/webcaster](http://www.twitter.com/webcaster)  [info@mediaplatform.com](mailto:info@mediaplatform.com)