

A Case Study: Using a Rich Media Solution which Includes Live Streaming Video, Web Collaboration and Interactive Participation Tools to Effectively Execute Distance Learning

Dan Acquafredda, President of STARBAK Communications, Inc.

ABSTRACT:

The availability of new technologies can be overwhelming even to the most seasoned pro. Furthermore, most educational organizations have existing infrastructures that have not yet returned their investment. This paper effectively explores the best way to combine live streaming video, web collaboration, and interactive participation tools for a true e-learning solution in a single, comprehensive environment. It addresses issues such as interoperability and seamlessness in an infrastructure with multiple protocols, vendors, and formats. Finally, it looks at the impact on management systems and explains the IT manager's needs for the execution of such an environment.

DEFINITION:

To effectively explore the most efficient solution for the seamless integration of rich media into existing infrastructures, one must first define the term "rich media". To that effect, I have put together a definition that I think holds true for any true end user, and that is: "The content I want, on the computer I am using, in the format that I am able to view it...RIGHT NOW." I call this theory: "Dan's definition of Rich Media", and if you think about it, any other use of the term rich media is purely theoretical, and not very practical in our real world scenarios, where thousands of IT dollars need to be justified. A typical user case study would be a higher-education learning situation, which this paper will explore as I discuss the various scenarios in existence at several high-ed campuses, along with the range of applications and requirements that are currently being looked at to integrate into this existing infrastructure.

THE SITUATION:

The typical university infrastructure has most if not all of the following components in existence: some type of Learning Management System (LMS), a system that manages rich media content, a repository of stored digital media, an audio-visual department that provides AV equipment, a TV studio that generates learning content, and an IP-based videoconferencing infrastructure.

THE CHALLENGE:

Whether the organization has just some of the above equipment and networking infrastructure in place, the question arises – how do you connect everything into a single, cohesive network that can be managed absolutely? This raises connectivity issues in terms of the interoperation between IP, ISDN, and cable based equipment, as well as interoperability issues between the various viewing formats (Windows Media and QuickTime), protocols (MPEGs) and delivery formats (multicast and unicast).

THE SOLUTION:

To reach the end result we desire, we first need to envision it. In my mind, a comprehensively managed cohesive network would ideally be made up of three components: a content generation system, a content delivery system, and a content management system. Let's take a closer look.

Content Generation System - A content generation system is a tool required to capture live content from multiple sources, be it from the campus' television studio, audio-visual department, or videoconferencing center.

Content Delivery System - For a content delivery system to meet all of your requirements, you need a structure that can handle the challenge of delivering content across multiple networks, ie multiple formats, bandwidth and parameters. The three networks that generally need to be accounted for are the Internet, the campus-wide intranet, and the campus television network.

The Internet: The Internet is recognized as the most complicated delivery network because of limited bandwidth availability and reliability issues. However, when looking to merge the delivery of content, an additional challenge arises – that of delivery format, since the Internet does not support multicast and your television studio generated content requires multicast delivery. So your content delivery system needs to support the delivery of both unicast and multicast of the same content – simultaneously.

The intranet: Your campus intranet is generally the best of both worlds, since it has all the bandwidth, as well as all the content available to all of the users, all of the time! The challenge there arises in terms of addressing the requirements of the satellite campuses on your intranet. How do you speed the delivery of your content across the Wide Area Network (WAN) connection that determines the bandwidth availability between your intranet and your remote facility? The answer is video caching devices. By building a content distribution network with caching devices at its edge, you allow for storage of pre-recorded content available for on-demand playback as needed, while preserving the WAN connection for live content viewing.

The television network: Your campus TV network is yet another infrastructure that provides for unlimited bandwidth and excellent quality of viewing. The issue there is interoperable distribution of multi-formatted content to that network as well. With the advent of Windows Media enabled set top boxes, you will be able to distribute content to the devices currently connected to the systems cable television network.

Content Management System – A content management system gives you the ability to control both live and stored content. To better visualize the ideal content management system, think of a digital television set up, where you can choose to watch a live program from multiple shows offered, or a movie from several videos on demand available. The content management system is your online program guide, which allows you to choose from live content being delivered or from pre-recorded video content lying on the edge of the network or some other digital content storage system.

PUTTING IT ALL TOGETHER:

Although each of the components discussed offers its own unique challenges and solutions, the final environment will be comprised of an array of parts, protocols, formats and bandwidth. The critical key to ensuring the success of your network is the network management system. Your content management system needs to provide intelligent management and seamless

interoperability with multiple vendors' videoconferencing equipment, content creators, storage and caching devices on the network. Ideally, this will be a browser based video content management system. This way you can have your own theory of managing rich media. It might be something to the effect of "Managing the system the way I want to, on my web browser, from wherever I am...RIGHT NOW"!

Contact Information:

Dan Acquafredda
President
STARBAK Communications, Inc.
757 Brookside Plaza Drive
Columbus, OH 43081
Tel: 614.865.9150
Fax: 614.865.9149
dan@starbak.com
www.starbak.com

Website links:

Blackboard - www.blackboard.com
Pace Micro - www.pacemicro.com
STARBAK Communications - www.starbak.com
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