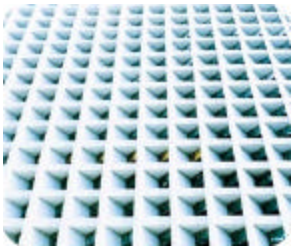

Rich Media Solutions

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business white paper
industry standard servers

enterprise digital media solution guide

part II: corporate communications

By: Microsoft Corporation - Digital Media Division
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abstract

This paper describes business scenarios and benefits for deploying digital media technology for corporate communications. The paper is intended for business and technical decision-makers. In addition, the products and technologies from both Microsoft® and HP are described in relation to the solutions presented. This paper will help you understand what to consider when deploying a digital media solution.

introduction

Business leaders are looking for faster, cheaper and more effective ways to communicate within their organization. They are responding to the pressures of rapid growth, mergers and acquisitions and shorter innovation cycles. Digital media technology has emerged as a critical mode for competitive business communications. This white paper introduces Microsoft and HP products and technology for building cost-effective, reliable digital media communications solutions.

This paper is targeted at business and technology decision-makers. It begins with a summary of various types of corporate communications. It then explores the paradigm shift taking place in the area of corporate communication, the increased business value being realized, and how digital media can meet emerging communication needs. Finally, it presents a brief overview of what is involved in deploying digital media-based corporate communication solutions, with an introduction to Microsoft and HP products and technologies.

What is Digital Media?

Digital media refers to a content format, a type of media that has been digitized. Digitizing content involves using encoders to convert analog input into a digital media file like the Microsoft Windows Media Format file. Digital media can be easily manipulated and visualized by computers, and is easily transmitted over computer networks.

Streaming media is a method of delivering digital media content across a network. Streaming occurs when a client begins to download content from a server and is able to play the content before the entire file has been downloaded. The client plays the content as the bits get transferred across the network in real time. Digital content can be streamed via unicast or multicast. A unicast stream serves a single client with a single stream from a central server, while a multicast can serve multiple clients with a single stream, similar to a radio or television broadcast.

corporate communication scenarios

Corporate communications lies at the heart of effective strategic management, planning and control. Digital media technologies are having a big impact on news management and the monitoring and evaluation of corporate identity, organizational reputation and overall performance. Corporate communications leaders are using digital media technologies to develop, manage and enhance relationships with key stakeholders. Digital media technology enables companies to continuously refine and position key message points; develop and update public relations materials for investor relations, manage the press release process more effectively and deliver a more consistent message to employees internally.

Three scenarios follow which illustrate how digital media provides a significant advantage for the delivery of corporate information to employees, customers, vendors and news media. Digital media can deliver critical information on key business events to a larger audience, faster, more cost-effectively and more clearly than can traditional communications methods.

- Executive broadcasts
- New product introductions
- Shareholder meetings

Corporate Communications - Executive Broadcast

Executive broadcasts allow an executive to not only deliver an important message, but also

connect with employees and build a sense of identity. Using audio and video for an executive broadcast is typically a requirement, therefore limiting executive communications of this nature to medium and large companies. However, even for medium and large companies this is challenging, especially when dealing with a highly distributed organization. Video broadcasts are usually reserved for companies that have a satellite distribution network or closed circuit television network, for all others it is not feasible, without outsourcing the distribution.

Digital media solutions make it possible to reach employees with video broadcast over an IP network, while making it affordable for any size company. Digital media also provides a range of distribution options, increasing the reach to remote offices and employees.

Business Challenge: The new CEO of a large enterprise needs a mechanism to speak directly to the company's 30,000 employees spread across 90 locations in three countries.

Opportunity: The CEO can communicate company results and strategic direction to all employees in a short time period, ensuring that a consistent message is delivered while building a rapport with the employees. Executives may be concerned about their message being diluted or translated incorrectly as it descends the corporate hierarchy. A live CEO broadcast eliminates this problem and delivers the message unfiltered with the visible passion of the executive.

Solution: To reach all employees across all locations, the company implemented a global content delivery network (CDN) and enabled multicasting on over 85% of the network. The company enhanced their existing studio used for the creation of corporate videos by deploying a series of media encoders and media servers that can stream a live broadcast across the network.

Employees are notified of the event via email, or by browsing a list of events on a corporate portal. At the time of the event they get a calendar reminder to view the webcast. When the event starts, viewers have video and audio streamed live to the desktop. The live stream from the studio is multicast across the network globally. The network segments that do not support multicasting use the live stream splitting capabilities of the CDN, which distributes the stream to the edge using multicast where users can then view the event via a unicast stream.

Slides and other visual information are synchronized with the media stream, creating a fully-integrated digital media experience. As soon as the presentation is finished, the audio, video and associated slides are archived and stored for viewing at a later time. Users who missed the live presentation can view it on-demand or during a scheduled re-broadcast of the event.

Over 60% of the company views the live CEO broadcast generating excitement around the event and more importantly awareness. One week later nearly 90% of the company has viewed the CEO broadcast, aligning the company with the new CEO's vision for their future. Best of all, the broadcast was completed with almost no incremental cost, leveraging the investments in the studio, network and CDN.

Marketing - Product Introduction

Communicating the latest product information across a company is a continuous challenge as new products get launched. Increasing the amount of print media or brochures for internal distribution can be too expensive and using simple web pages or emails is often not enough. In addition, the requirements for internal communications on new products may be different than for external customers.

Using digital media, a new product can be announced to a widely dispersed and varied audience with remarkable timing and accuracy. Consistent messages are delivered across language and cultural boundaries. Resource utilization increases, since the subject matter expert broadcasts are stored for later reference. Content stays consistent; and less time traveling means that sales staff has more time to focus on strategic and business goals. All of these benefits mean a more effective use of the marketing department resources.

Business Challenge: A medium size international company must quickly and cost-effectively introduce a new line of products to their distributors and resellers located around the world.

Opportunity: Adapt the product introduction to the language and culture of each of their direct sale forces, distributors and OEMs. Significantly reduce travel and lodging costs while increasing product awareness and knowledge.

Solution: The company implements a global CDN for the distribution of digital media content and a private extranet for distributors and OEMs to access content. The marketing and product management team use video, audio and Microsoft PowerPoint to get their message out. The marketing team creates video and audio content highlighting the key differences between the old and new products. All of the talking points are scripted and then recorded in the four primary languages identified. Using Microsoft Producer, the product team integrates PowerPoint slides with the video and audio content.

Several weeks prior to the event, sales personnel, distributors and OEM customers pre-register via email for the initial programmed broadcast. The event will not be live, since it needs to be delivered in four languages; instead the content is produced ahead of time and broadcast on a scheduled basis. A participant can join the event by simply clicking a web link. All the necessary video and audio are streamed to the viewer's desktop with synchronized graphics, and pictures of the new products. The viewers can participate in interactive polls and real-time surveys providing instant feedback and market data to the central marketing group. When the event is over, the streamed content is stored for future reference and review.

With in two weeks 90% of the sales channel has been updated on the new product information, preparing them to drive new sales. The marketing group is confident the product information has been consistently delivered and is able to respond to feedback given during the initial broadcast.

Investor Relations - Shareholder's Meeting

Investor-relations represents a scenario where communications must extend beyond employees, suppliers and even customers, where the consumer is the public. Broadcasting a shareholder's meeting before the Internet was not possible and now with digital media it can be done live using all of the presentation effects used on stage.

Broadcasting the annual shareholder's meeting live using digital media provides controlled access to targeted and timely information that can be archived and referenced later. It offers an effective way for shareholders to participate, and creates a convenient mechanism for distributing information to the media.

Business Challenge: Provide greater access to a company's annual shareholder meeting for shareholders, media and financial analysts. Increase the accuracy and spread of information while reducing cost.

Opportunity: Develop a more cost-effective means of delivering the company's annual shareholder information. Efficiently capture feedback and insights from shareholders.

Solution: To ensure that the shareholder meeting can be streamed across the Internet with acceptable quality, the company used the services of an Internet-based content distribution network (CDN) provider. This CDN has points of presence across the Internet to ensure global access to the shareholder meeting online.

Prior to the event, Corporate Communications staff prepared all the necessary video, audio, charts and graphs. All the components of the presentation are reviewed by executives and legal personnel prior to the shareholder's meeting and all presentation materials are pre-produced and readied for integration with the live camera feed once the event has started. Chat and email are used to enable interactive questions and comments throughout the event.

Attendees register to attend the meeting in the same way as for other "live" events. Each attendee will log into the event using an ID and password issued when they registered. This ID will be used to determine who they are and what information they have access to. Leveraging the audio and

video production equipment typically in place for such an event provides the means for broadcasting it over the internet.

As the audience logs into the event, demographic information can be captured. Using a short questionnaire, feedback on who has attended, how the message is being received, and how it can be improved is gathered for improving future meetings.

Over 5,000 people attend the shareholder's meeting virtually online via the webcast. This provides an unprecedented level of reach for an annual shareholder's meeting. Publicly, the company is applauded by analysts and shareholders for providing such high quality access into such an important event.

Components of the Solution

Software: The video is encoded using Windows Media Encoder software and the rich media presentations are created using Microsoft Producer. All digital media content is hosted on a Windows Media server.

Hardware: The Windows Media Encoder and Windows Media server are hosted and streamed from a ProLiant DL360 G2 server and the presentations themselves are distributed and cached using a content delivery network based on the ProLiant platform.

benefits of corporate communications with digital media

Digital media used for corporate communications is quickly becoming a key business tool for any size of company, due to the availability and effectiveness of the technology. Until recently, the use of corporate communications has been limited to larger companies, due to the economies of scale. Digital media now allows smaller companies to use voice and video digital media technology cost-effectively to keep their entire workforce informed, focused, and aligned with key business initiatives.

Voice and video can now be delivered using industry-standard servers, combining the power of audio and image with the reach of IP networks. Corporations can leverage the Internet and their intranet investments to more effectively communicate with their employees, reaching larger audiences quickly at lower cost.

The benefits of using digital media technology for corporate communications include:

- Increased reach, by delivering content right to the employee's computer
- Ability to track and monitor the delivery of communications, for measured results
- Ability to deliver a consistent message with the use of audio and video
- Audio and video presentations are more engaging than printed materials or static websites, which contributes to an increased level of comprehension

Changing How We Communicate

The reusability and portability of communications using digital media technology means that content remains current, and can be correctly positioned on a website, securely streamed in real time over the company intranet, or stored for re-viewing on the company network. Communications can also be delivered to external parties over the Internet for truly limitless reach.

Communications can be created with the impact of voice and video, which enhances understanding and retention of the message. Content can be available to individuals, anytime and anywhere, so they can view it when it fits in with their schedules.

Understanding ROI Factors

Digital media-based corporate communications technologies provide an immediate financial advantage over traditional communications methods. By leveraging a digital media foundation, companies can utilize the Internet to efficiently distribute information and promote understanding. It is no longer necessary for managers and employees to be present in the same physical space to get the message across. The elimination of the physical constraints of traditional communications methods reduces overhead and expenses. The production and distribution of materials is streamlined, travel time and expenses are reduced, and the time and effort of the management and employees is used more effectively.

Using digital media ensures that the most recent information is quickly made available to employees. The speed of information dissemination is increased, and the production costs reduced. The availability of more timely data leads to better operational support by providing more accurate and relevant information. For example, access to up-to-date company information helps employees stay informed and connected, enabling them to deliver better product and customer services support.

The implementation of corporate communications helps companies to establish informational synergies and economies of scale, promoting consistency, efficiency, and effectiveness. In the competitive business environment, a company's ability to develop and capitalize on intangible assets—such as worker knowledge—has become a decisive factor in its performance. By creating and maintaining a central depository of information, communication can be better managed and enhanced throughout the enterprise. Top management is able to effectively communicate and shape the company's mission, strategic vision and culture. This message is then delivered consistently, accurately and efficiently to all levels of the organization. Interactive capabilities

allow for the integration of feedback loops and compliance documentation.

Expenditures for implementing a digital media corporate communications infrastructure are justifiable through the cost avoidance of items such as:

- Travel and hotel expenses
- Production of materials (print, CD-ROMs, video tapes etc.)
- Facilities: building, hire, and maintenance

Although the savings identified above are immediate and substantial, there are long-term benefits that provide additional return:

- Increased productivity
- Increased sales
- Increase reach of communications
- Improved decision making
- Improved customer service
- Improved product quality

Cost Factors

Providing the end-user with a quality corporate communications experience begins with planning the content production. The audio and video streams are then captured, encoded and readied for delivery. The encoded file is stored on a Windows Media Server where it is managed and staged for delivery to cache nodes located at the edge of the network. Finally, the end-user can view and interact with the content via their client device.

Digital media solutions such as these are affordable and have a quick return on investment. The cost elements will vary for each company, but for the most part the costs can be generalized and are predictable, based on the factors listed below. Solution costs break down into three areas; hardware, software and services. Typical cost factors include:

- Infrastructure - number of locations, network complexity, network bandwidth
- Content - amount of content, support for multiple bit rates, hardware and software for content creation
- End-points (users) - number of users, desktop configuration

The infrastructure costs are a function of the number of office locations and the current state of the network. If the network is not well-positioned to support the additional bandwidth consumption that digital media solutions demand, this may require a more significant investment in cache appliances or a network upgrade. There are options when preparing the network infrastructure. For example, a solution that uses low bit rate video-on-demand that is distributed during non-business hours will reduce the need to increase the capacity of the central network and WAN, but will require additional storage at local sites. Conversely, if content is distributed on-demand across the corporate network during business hours, storage needs at the local site will be reduced, but the capacity of the central network and WAN will need to be upgraded.

The costs associated with content are a function of the volume of content generated, but also the number of bit rates that must be supported. The bit rate at which content is encoded determines the bandwidth required to stream. It is typical to require that content be encoded at low, medium and high bit rates (56kbps, 128kbps, 256kbps) to support the various network connections users may have, such as dial up VPN, across the corporate WAN or LAN. There will also be costs associated with the hardware and software required to create content. For example, Microsoft Producer requires PowerPoint 2002 and Windows 2000 or Office XP, so if Producer is going to

be a standard for business users to create rich media presentations additional client software may need to be deployed. Modifying studio environments or creating mini-studios will also require additional hardware, such as a video camera, microphone, channel mixer, teleprompter, capture card and lighting.

Preparing the client devices will tend to have the least effect on cost. The Microsoft Windows operating system includes the Windows Media Player which is usually all that is required to play digital media content.

Additional Reference Materials

The following case studies highlight the ROI of digital media-centered solutions:

Williams
http://www.microsoft.com/windows/windowsmedia/archive/casestudies/williams/default.asp

J.D.Edwards
http://www.microsoft.com/windows/windowsmedia/archive/casestudies/jdedwards/default.asp

Rapid Economic Justification white paperhttp://www.microsoft.com/windows/windowsmedia/enterprise/value.asp#rej

infrastructure requirements

The framework for an enterprise digital media solution has three main areas:

- Content creation
- Content distribution and management
- Content consumption

Considering the specific requirements of each area will enhance the quality, scalability, manageability, and reliability of the resulting solution.

Content Creation

Content creation can be seen as a set of guidelines, processes and tools which enable personnel to efficiently create and prepare digital media content. There are four primary infrastructure requirements for creating content:

- Encoding
- Storage
- Authoring tools
- Development tools

Companies will want to address video production needs if they are creating original content in a professional studio setting. This is not addressed in this paper, but is worth considering when implementing a digital media solution.

Encoding

Encoding is the process of digitizing analog audio and video input into a desired format for distribution and play back. Encoding is a two-phase process; analog content is first digitized by a hardware-based encoder card that produces a "raw" uncompressed format, this is typically .AVI or .WAV. These raw files are then encoded by a software-based encoder (Windows Media Encoder) into the specified format with the desired bandwidth and quality settings. This two phase process is typically done as one seamless process, where the hardware encoder will feed the software encoder in real time, sometimes avoiding the production of the raw digital files. The Windows Media Encoder outputs the Windows Media format, .WMA and .WMV.

Storage for Original Content

When producing original audio or video content, encoding existing VHS or Beta tapes or encoding final produced content, storage requirements are significant. It is advantageous if all original content can be saved in its raw, highest-quality format so it can be re-purposed in the future if required.

Content production groups will generally want to maintain their own libraries of content, in its various phases of production. Often, multiple versions of a content element will exist to facilitate review and simultaneous work by several groups, in a similar way to when a large document is written. Scalable and reliable storage is essential.

Authoring / Development Tools

The right authoring tools and development tools are key to a good final product. The value of digital media lies in the integration and synchronization of content to make compelling presentations. There are two ways to achieve this, either use authoring tools or more sophisticated development tools.

- Authoring tools simplify the process by allowing drag and drop functionality in a graphical user interface. Two examples are Microsoft Producer and Microsoft Movie Maker, which are

both intended to be end-user applications. Distributing the content creation process out to end users will help increase the rate at which content is published and also reduce the burden on central IT groups.

- Development tools, typically in the form of SDKs are intended for web developers to program custom solutions. There are situations where it will be desired to create more sophisticated content for special events, such as integration of Flash or DHTML into a presentation.

The use of authoring applications is preferred if the creation process is going to be part of the business process on a regular basis. Leveraging development resources to create digital media presentations can be costly and generally more time consuming.

Content Distribution and Management

Once a piece of digital media content has been produced, it needs to be distributed to the intended audience in a timely and cost-effective manner. Enterprises will want to manage this distribution process to ensure appropriate availability and security. The majority of the infrastructure work for distribution and management falls into three areas:

- Storage
- Content delivery network
- Media services

Storage

As content is produced and made available to end users, large amounts of network and server storage will be required. Typically, content will be centrally managed but highly distributed. This means that the source content is found in one central location, but copies of the content are found near the edge for user consumption. Storage solutions can be implemented in a variety of ways, but one large central repository with many smaller repositories on the edge is a common design principle.

When designing a storage solution, consider the access requirements, as this will often dictate the solution with the appropriate bandwidth for getting storage off the disks. Typical options include direct attached storage, network attached storage (NAS) or a storage area network (SAN). NAS is an appliance that is network addressable by multiple devices across the IP network, while a SAN is based on a fiber channel storage system, connecting multiple hosts to central storage via 2GB fiber.

Content Delivery Network (CDN)

The CDN handles the distribution and management of the digital media content. This is key to any digital media solution serving a dispersed audience to ensure a quality experience

The CDN will typically need to handle two forms of streaming content: live and on-demand. Delivering "live" digital media is similar to a live television broadcast in that the streamed content is delivered in real time, so that all participants view it at the same time while the event itself is taking place. On-demand delivery of digital media is similar to a VCR player, allowing viewers to select content and then to control its playback by rewinding, pausing and fast forwarding.

Digital media will impose demands on the network. Introducing it will most likely require a cache-based CDN solution. Caching technology enhances network capabilities without needing to increase bandwidth or upgrade network components. Using ProLiant servers as edge servers, provides an industry-standard platform for rapid deployment, reliability and scalability. Adding content distribution capabilities gives the ability to deliver live and on-demand content throughout the enterprise without impacting the network's performance or bandwidth needs. Content can be proactively scheduled to be distributed to specific locations within the enterprise ensuring

availability and improving viewing quality while minimizing WAN expense.

CDN Management

Adding Web-based management tools to the CDN allows administrators to monitor stream quality, content bandwidth utilization and cache location performance. Content can be prioritized to ensure that business-critical content is delivered with the highest quality.

Media Services

Media services are a set of digital media components that determine the encoding standards, media servers, use of unicast or multicast distribution and media player functionality for playing media files. The Windows Media Services platform is the media service and it provides the fundamental building blocks for creating an enterprise solutions. The media services affect the format of the content, how it is assembled, how it is streamed, how content is secured and options for playback. The media services play a vital role in determining how an enterprise solution is implemented and how it is supported.

Content Consumption

Content is accessed from a PC or PDA and can be viewed with a stand-alone media player or with an embedded player found inside an intranet portal or Web page. This part of the solution framework has three infrastructure requirements:

- Device support (PC, PDA etc)
- Media player support
- Media portal

A user may be directed to a media portal to locate materials for viewing. Once the content is located, the user expects a quick and easy way of viewing it.
The three solution areas are interdependent; a weakness in any one can undermine the effectiveness of the overall solution. For an end-to-end solution to be viable and add value, regular, cost-effective content changes are needed. They can then be distributed and viewed by the target audience.

Implementation Challenges

The greatest challenge in implementing a digital media solution is selecting the right technology and delivering a cost-effective solution that meets the business need. A unique challenge enterprises face is identifying clear owners for the solution. Digital media attracts stakeholders from many business units, and several factions within IT. This often makes decision-making more difficult, since many business units will provide funding, and the networking, infrastructure and desktop groups each will participate in the design. Other key challenges are:

- Selecting an infrastructure provider with broad offerings that scale
- Utilizing a variety of vendors increases the need for expensive custom integration
- Contracting with fewer vendors that can provide the complete solution
- Selecting a digital media platform that will grow and scale as your business needs demand it. The applications of digital media are developing fast, so allow for rapid growth
- Delivering an initial solution that is sure to get a few early wins. It's best not to over-engineer the first version
- Developing business processes to drive the creation, distribution and consumption of digital media content

Deployment Process

Implementing a digital media solution can be accomplished in only a few months and begin delivering value immediately. This includes design, development, testing, and production deployment. Digital media solutions tend to transcend the organization, bringing a cross-functional team together as stakeholders. Typical stakeholders include:

- Infrastructure managers
- Network managers
- PR, corporate communications and human resources

When deploying a digital media solution three primary steps are worth taking to ensure success. The first step is to fully understand and document the requirements and goals. The requirements-gathering process is typically straightforward and takes a few weeks to conduct depending on the organization's size and complexity. The second step is designing and developing the solution. Depending on the requirements and current capability of the network, this should take 6-8 weeks. The third and final step is the physical deployment of the digital media solutions. This typically consists of hardware and software installations, network configuration and training on how to use the solution components.

A typical project plan will have three phases:

- Requirements
- Design and development
- Production deployment

Phase	Description of tasks	Duration
Requirements	Define business requirements, define critical success factors, enlist stakeholders,	2- 4 weeks
Design and development	Design server infrastructure (storage and web servers), network changes, CDN, client devices, encoding process, studio build out.	6 – 8 weeks
Deployment	Lab testing and QA, pilot, production deployment	4+ weeks

microsoft and hp technologies for digital media solutions

Microsoft and HP provide a comprehensive set of technologies and products to deliver a digital media solution for the enterprise.

Microsoft has several enterprise digital media technologies:

- Windows Media Services
- Microsoft Producer
- Windows Media Broadcast as part of the Microsoft Solutions for Intranets

HP has server platforms and infrastructure products designed to support digital media deployments:

- ProLiant DL and BL servers
- HP Enterprise Storage Network Architecture (ENSA)
- ProLiant Essentials Software from the new HP

- Compaq Evo
- iPAQ client devices from the new HP

Technologies for Capturing Content

- Microsoft Producer
- Windows Media Encoder
- Windows Media Services
- Windows Media SDK

Microsoft Producer for PowerPoint 2002

Microsoft Producer is a desktop tool used to create digital media content. It was designed so that enterprise media professionals and business users could easily create compelling digital media presentations. Producer allows users to combine and synchronize audio and video with Microsoft PowerPoint slides, HTML, and images, either manually or through built-in Wizards. Producer simplifies the process of creating and distributing digital media presentations, enabling even the novice business user to leverage digital media in professional-looking presentations.

Producer reduces the cost of creating rich media presentations by allowing end users to do the work themselves, without any intervention from IT. This reduces the cost of content creation, and increases the number of rich media presentations that an organization can publish.

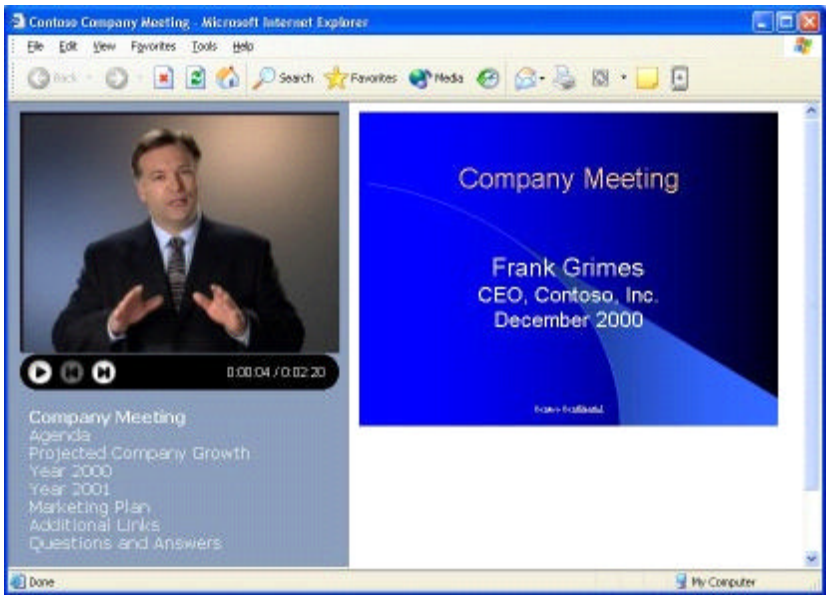

Figure 1: Microsoft Producer – Executive Broadcast

Windows Media Encoder

The Windows Media Encoder is part of Windows Media Services. The encoder takes analog audio and video input and digitizes the content in Windows Media Audio (WMA) or Windows Media Video (WMV) formats. The Windows Media Encoder leverages some of the most advanced codecs for producing high-quality content at low bit rates.

The Windows Media Encoder is available free from the Internet and can be downloaded from microsoft.com and installed on any Windows 2000 or Windows NT Server. The software is easy to install and configure. With minimal time and no money invested you can begin encoding audio and video content into the Windows Media format.

Windows Media Services

Media services provide the framework and origination of media content for distribution. Windows Media Services 4.1 provides the most reliable, scalable, and highest-quality digital media platform offered today for enterprise solutions. Windows Media Services on Windows 2000 Advanced Server is the premier origin server and delivers superior quality audio and video to the desktop.

Windows Media Services includes the Encoder, Media Server and Media Player, which come as part of the Windows 2000 platform. The entire platform is extensible via SDKs, which enable third parties to build custom solutions. The extensibility of Windows Media is for many customers the most important factor.

Windows Media Development Tools and SDK

Developing digital media content often requires the integration of audio, video, HTML, DHTML, PPT and Flash. Microsoft offers a robust development environment to integrate and synchronize audio, video and web content. Windows Media supports the entire Microsoft development suite of tools including Visual Basic, VB Script, HTML+Time and SMIL 2.0.

The Windows Media 7.1 SDK makes it possible to develop sophisticated content that is flexible, allowing developers to use the development tools they are most comfortable with. The SDK enables application developers and systems integrators to develop web applications that are Windows Media-compatible. There are five components in the Windows Media 7.1 SDK:

Windows Media Player SDK

Windows Media Encoder SDK

Windows Media Services SDK

Windows Media Rights Manager SDK

Windows Media Format SDK

For more information on the Windows Media SDK, visit:
http://msdn.microsoft.com/library/?url=/library/en-us/dnwmt/html/wm_ds_options.asp

Content Management and Distribution

HP provides a broad set of options for content management and distribution, including:

- Dynamic Internet Solution Architecture (DISA) from the new HP
- ProLiant BL and DL servers
- Enterprise Network Storage Architecture (ENSA)
- ProLiant Essentials for Advanced Management and Deployment

Dynamic Internet Solution Architecture (DISA)

DISA provides the basis for building scalable, highly available Internet environments. Leading Internet application architects are utilizing multi-tiered, distributed architectures. Rather than a single server that performs all application functions, the trend is toward environments that involve many servers working together to deliver the application to the end user, with the ability to increase computing power, storage and network resources dynamically through:

Server clusters for storage and data

Caching and load balancing

Web servers and application servers

The ProLiant line of servers scales from ultra-high density ProLiant BL server blades to high-end DL servers. ProLiant servers are well suited for streaming applications because they can scale from powerful encoding servers to edge devices for serving streams.

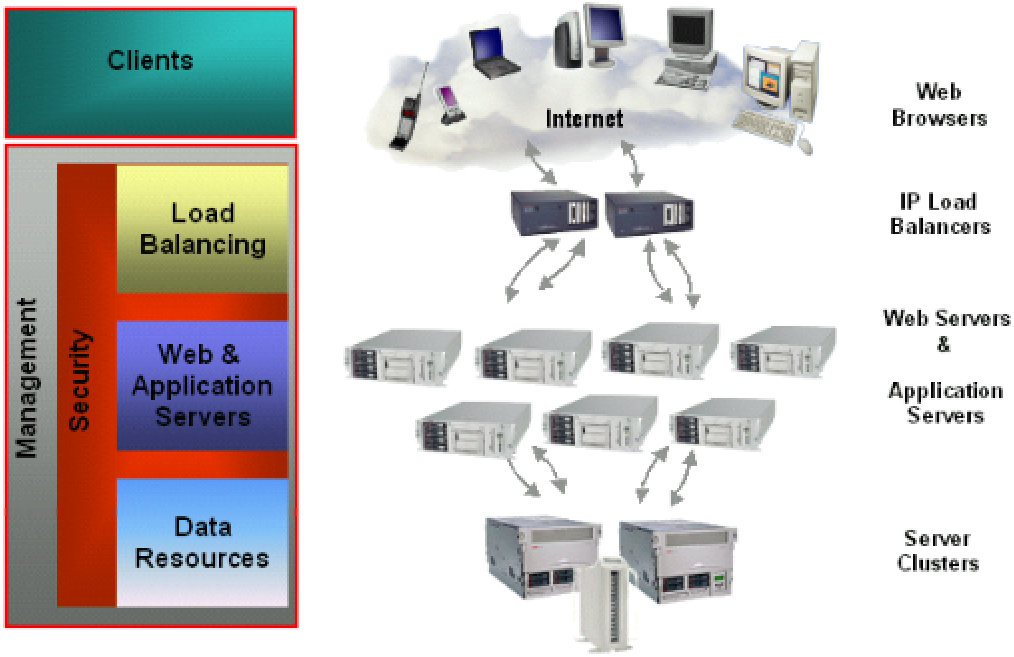

Figure 2: Dynamic Internet Solution Architecture (DISA)

ProLiant DL 360 G2 and 380 G2 servers

ProLiant DL360 G2 and 380G2 servers are the leading industry-standard servers. They are well suited for encoding as they feature full size expansion slots for the Osprey-500 digital capture card. The ProLiant DL server line also has the performance capabilities and the required form factor for running the Windows Media Encoder software.

ProLiant BL e-class server

The ProLiant BL as part of the DISA architecture ,provides ultra-high density server blades. The ProLiant BL line has a power-efficient blade architecture that delivers the most processor power per U, reducing power and rack space requirements as well as cooling costs. The ProLiant BL server is ideal for highly scalable front-end Web applications.

ProLiant BL server blades are ideal for last minute, rapid allocation of computing power to support the next quarterly broadcast from the CEO or an important announcement about a recent merger. When additional web servers, media servers, caches or firewalls need to be mobilized rapidly, the ProLiant BL server blades make it easy to deploy. ProLiant Essentials Rapid Deployment Pack Software is used to manage and configure the server blades remotely, which saves on time and resources for large deployments.

ProLiant Essentials Software

ProLiant Essentials Software provides the tools to rapidly deploy and manage ProLiant DL and BL servers remotely. ProLiant Essentials Software is part of the Insight Management Suite from the new HP, providing:

Rapid deployment of ProLiant BL, DL and ML servers

Advanced optimization

Advanced SmartStart scripting

ProLiant Essentials Software makes a distributed server environment manageable, with out-of-the-box functionality for the entire line of ProLiant servers. The console has drag and drop functionality for applying automated builds and configurations to remote servers.

Enterprise Network Storage Architecture (ENSA)

Storage costs can often account for up to 50% of the total costs of a digital media solution, which indicates its significance. HP has a broad range of storage solutions, including DAS (direct attached storage), NAS (network attached storage) and SAN (storage area network).

HP has created an integrated approach to storage called the Enterprise Network Storage Architecture, or ENSA, which supplies topologies, tools, and a roadmap for the future for enterprise storage. ENSA answers the full range of customer needs by addressing DAS, NAS and SAN. ENSA is already in its second generation. ENSA 2 encompasses six advanced technologies designed to scale, virtualize, automate, and simplify storage while remaining open and protecting your investments in ENSA solutions, as well as increasing the business value of your storage.

The ENSA architecture supports the creation of an "Open Networked Storage Infrastructure". The HP DAS to SAN architecture provides instant consolidation of existing DAS data into an HP SAN or NAS solution for simple storage consolidation and minimizes application disruption during data migration.

Content Delivery Networks

The design and implementation of an enterprise Content Delivery Network (CDN) is probably the most crucial phase in the delivery of a true enterprise digital media solution. The solution components from content creation to user consumption are interdependent. However, the CDN is technology that enables the network to support the distribution of digital media content. ProLiant servers can be used to implement a wide variety of edge server solutions that can often support forward and reverse proxy configurations.

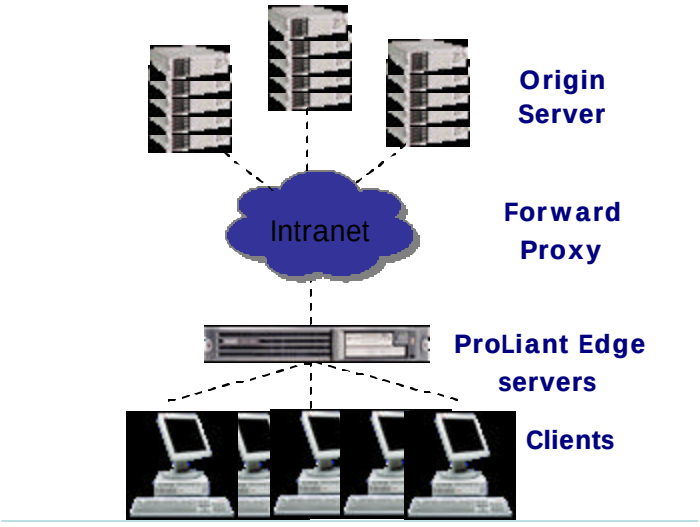

Figure 3: Forward Proxy CDN

Content Consumption

The presentation of digital media content is critical to the overall user experience. HP and Microsoft offer an integrated user experience with the Windows Media Player on HP desktops, notebooks and PDAs.

Desktop, Notebook or PDA

HP and Microsoft have partnered to deliver the complete Windows Media experience on the entire line of products for the business, including:

Compaq Evo desktops and notebooks

iPAQ Pocket PC

The digital media experience is fully supported on the desktop, notebook or PDA. Microsoft has a Windows Media Player for Pocket PC making it possible to play video and audio content on an iPAQ Pocket PC via a wireless network (802.11b).

Windows Media Player

Microsoft Windows Media Player is the most widely deployed media player for business users. The Windows Media Player is included with the Windows operating system (Windows 95, 98, NT, 2000 and XP), so virtually every Windows client is already prepared to play and enjoy the benefits of digital media. The Windows Media Player supports the broadest set of devices and operating systems, giving business users the flexibility to playback digital media content where and when they need it. Windows Media Player supports MAC OS X, Solaris, Pocket PC, and palm-size PCs.

The Windows Media Player 7.1 is the most advanced player for the business, delivering the best quality audio and video experience for end users. Windows Media also provides the ability to:

- Develop custom skins
- Lock down the player for corporate deployments
- Embed the player in a web browser via the Media Player SDK

SharePoint Media Portal

Microsoft SharePoint Portal Server, Producer for PowerPoint 2002 and Windows Media provide all of the functionality to build an intranet-based media portal. Producer enables users to create digital media content and publish it right from their desktop to the SharePoint server. All of the encoding, and web integration is handled by Producer, while SharePoint manages the meta-data and source content. The media content is placed on a Windows Media server and the web content is placed on the SharePoint server automatically.

SharePoint Portal Server makes it easy to publish and manage content across the extended enterprise. Users can search, browse and view digital media content right from their browser. By publishing digital media presentations directly from Producer to SharePoint, users can make their knowledge available to the entire organization, without requiring the involvement of IT staff to execute complex web replication tasks. Once the presentations are published to SharePoint, they can be approved and made available to all users via the Intranet.

Microsoft Solutions for Intranets

The Windows Media Broadcast component of Microsoft Solution for Intranets is a turnkey solution

to create and deliver broadcast content to the desktop. The solution leverages Microsoft Windows Media, SharePoint Portal Server, Office XP, SharePoint Team Services and SQL Server 2000. Microsoft Solutions for Intranets deliver live audio and video communications to the desktop for enterprise broadcasts. It makes it easy and simple to produce, manage and deliver a live broadcast by providing automation of event production, scheduling via a central calendar and automatic archiving of events. Microsoft Solutions for Intranets deliver clear business value and leverage your existing investment in Microsoft technologies.

Third-Generation Windows Media

The third generation of Windows Media will be integrated with the .NET Server Platform. Windows Media Services under the .NET platform, currently in beta, will take Windows Media to the next level by delivering value in four key areas:

- Fast Stream
- Dynamic content programming
- Industrial strength
- Extensible platform

Fast Stream provides an instant-on playback experience on the client, virtually eliminating buffering. Fast Stream technology captures the user's attention and engages them in the content as soon as they click the play button. The new Fast Stream feature provides the high performance users expect from an enterprise solution.

Dynamic content programming provides more TV-like broadcast capabilities to digital media solutions by supporting server-side playlists and changing the content on the fly on the backend as content is being delivered. This works both for live and on-demand content.

Windows Media under .NET Server is the most scalable and extensible digital media technology available. Windows Media Technologies have the industrial strength to scale to the most demanding enterprise solution and provide the reliability necessary for mission-critical systems. The Windows Media Platform is extensible to support the most unique enterprise requirements, allowing developers and third parties to develop custom solutions around your business.

for more information

The best way to move forward will be different for each organization. Take the time to understand your business requirements and develop a plan to assess the infrastructure. To help you understand the infrastructure requirements in more detail, read the white paper "Enterprise Digital Media Solutions Guide – Part III: Infrastructure", which is the third paper in this series.

HP Online Resources

ProLiant Solutions for Streaming Media
http://www.compaq.com/solutions/showroom/streamingmediasolutions.html
ProLiant Servers
http://www.compaq.com/products/servers/platforms/index.html
Storage Solutions
http://thenew.hp.com/country/us/eng/prodserv/storage.html Client and Handheld Solutions -
http://thenew.hp.com/country/us/eng/prodserv/notebooks_handhelds.html

HP Services

HP Services has the expertise to help your business deploy enterprise solutions. For more information visit:

http://www.compaq.com/services/
Mobile and Media Systems Lab
http://www.hpl.hp.com/research/cp/cmsl/publications/streamingmedia_publications.htm

Microsoft Online Resources

The Windows Media website has a large selection of resources to help you get started, with everything from "How tos" and business justifications to case studies:

Windows Media
http://www.microsoft.com/windowsmedia
Windows Media in the Enterprise
http://www.microsoft.com/windows/windowsmedia/enterprise.asp
Windows Media Download Center
http://www.microsoft.com/windows/windowsmedia/download/default.asp
Microsoft Producer
http://www.microsoft.com/windows/windowsmedia/technologies/producer.asp
Rapid Economic Justification (REJ) white paper
http://www.microsoft.com/windows/windowsmedia/enterprise/value.asp#rej
Executive Broadcast white paper
http://www.microsoft.com/windows/windowsmedia/Enterprise/deploy.asp

Microsoft Consulting Services

Microsoft Consulting Services (MCS) has a national presence and the expertise to help you implement an enterprise digital media solution. The MCS Home page is:
http://www.microsoft.com/business/services/mcs.asp

Microsoft Partners

Microsoft has over 32,000 Certified Partners worldwide that can also help you get started with their expertise on Windows Media and enterprise solutions:

http://www.microsoft.com/business/partners/
Windows Media Service Providers
http://www.microsoft.com/windows/windowsmedia/service_provider/programs/wmsp.asp

About Approach Inc.

Approach was a contributing author to this paper in conjunction with Microsoft and HP. Approach is a consulting company advising on and delivering digital media solutions for the enterprise. Approach has significant expertise in designing and implementing Windows Media based solutions for the enterprise.

For more information, email digitalmedia@approach.com or visit www.approach.com