A look inside Discovery's digital journey

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has more than 15 years' experience in broadcast, media and entertainment and is Director of Digital Asset Management for Discovery Communications, Inc. In her current role, Carin, a 12-year Discovery veteran, works with internal clients and business partners to ensure access to Discovery's digital assets (video, stills and music) for review, collaboration and approval. Leveraging her strengths in merging available media management technologies with business workflow, she creates enterprise-wide technology solutions in support of Discovery's ongoing digital strategy. Carin has also worked with other clients including Sony Pictures Digital Entertainment, deploying their video-on-demand service, www.movielink.com and with Liberty Livewire. Additionally, she participated in this year's panel for the DAM-NY conference.

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Abstract Discovery Communications, Inc. is the leading global real-world media and entertainment company. It has grown from its core property, the Discovery Channel, first launched in the USA in 1985, to current global operations in more than 160 countries and territories with 1.3 billion cumulative subscribers. This paper outlines solutions implemented by Discovery as a part of its larger digital vision and strategy, detailing how a custom-built tool has streamlined processes and enabled a digital workflow. DCI's over 90 networks of distinctive programming represent 25 network entertainment brands including TLC, Animal Planet, Travel Channel, Discovery Health Channel, Discovery Kids, Discovery Times Channel, The Science Channel, Military Channel, Discovery Home Channel, Discovery en Espanol, Discovery Kids En Espanol, Discovery HE Theater, FitTV, Discovery Travel & Living (Viajar y Vivir), Discovery Home & Health and Discovery Real Time. DCI's other properties consist of Discovery Education and Discovery Commerce, which operates 120 Discovery Channel Stores. DCI also distributes BBC America in the United States. DCI's ownership consists of four shareholders: Discovery Holding Company (NASDAQ: DISCA, DISCB), Cox Communications, Inc., Advance/Newhouse Communications and John S. Hendricks, the Company's Founder and Chairman.

THE DIGITAL FUTURE

Discovery's goal of building a robust digital work environment involves a multi-tiered approach that includes building a flexible and efficient production and content distribution network to service the current and growing needs for accessing, sharing and manipulating high-quality content. ''Going digital'' is providing the foundation at Discovery for strategic growth and the opportunistic workflow changes and technology implementations associated with a digital, file-based business. A digital course also addresses the convergence of media and information management and continues Discovery's evolution from a linear to a non-linear content creation and distribution environment. In order to support varied and evolving business ventures — from launching a new

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network to supporting new media areas, such as cell phone content, video-on-demand and broadband — Discovery's digital roadmap is setting the stage for the future.

GETTING STARTED

In 2003, Discovery Communications launched the Digital Media Center (DMC), a highly-customized digital asset management (DAM) solution that supports the storage and collaboration of Discovery's media assets through a web-based application. The DMC provides 3,200 staff and external producers with access to footage, finished programs, rough cuts, acquisition content, promos, images, audio and other digital media. Key features of the DMC include the ability to upload content, collaborate with other users, to search for and review available media, and to select, share and order media. Other key facts include:

- Over 3,200 internal and external users worldwide.
- Over 270,000 digital assets available covering a broad range of media categories:
  - 166,375 video assets;
  - 95,580 images;
  - 2,706 audio assets;
  - 5,712 text, PDF, and other asset types.
- Over 4,100 assets uploaded by users to Screening Rooms since November 2004.
- Over 650 hours of video content uploaded directly by DMC users.
- Over 2,300 Program Library assets.
- Most widely adopted area of DMC: Screening Rooms.

With offices and ventures around the world, Discovery was faced with the challenge of having production partners on multiple continents and the ongoing need for producers to have timely review of rough cuts, footage, imagery and in-production work. An ancillary goal was to reduce the substantial costs of shipping VHS cassettes for producers to review, approve or help influence the editorial direction of a program.

REMOTE INGEST AT DISCOVERY

To facilitate the ingest of assets, Discovery built a custom extension to their core DAM solution and branded it the Personal Work Area (PWA). This is a flexible area where users can review, approve and collaborate using digital content. In November 2004, Discovery embarked on its first step towards an end-to-end digital workflow, the launch of their Remote Ingest tool as part of the PWA. Technology and Media Services' Media and Online Systems team, expanded the DMC to allow any user to easily upload new files directly into the DAM solution.

A critical step was defining a corporate encoding standard that would provide the maximum viewing quality, while resulting in files small enough to store efficiently and stream over the internet. After in-depth research of various resolutions and codecs for launch, Discovery selected Windows Media 7, viewable at 240×360 and requested that producers send in files between 300–500 kbs at 15–30 frames/second. This was later upgraded to the new corporate standard of Windows Media 9, viewable at 480×360 at 700kbs and 30 frames/second, resulting in screen quality comparable to VHS.

The goal of the Remote Ingest project was to enable staff and producers to upload a digital file directly into the

DMC, replacing programming currently being received as VHS cassettes, 3\4″ tapes or FTP files. By opening a Java applet, staff and production partners can upload an asset, add baseline metadata, comment on the editorial direction of the content and share it with others for review. Additional features include an email notification that a file is in the DMC for further collaboration. File formats most commonly ingested are video files that are WM9 or ASF files and other files types, such as BMP, JPEG, GIF, TIFF, TXT, DOC, XLS, PPT, PDS and MPP.

Within the PWA's specialized viewing area called ''Screening Rooms,'' users can share, collaborate and review digital content securely (see Figure 1). Nearly any type of digital file can be imported directly into a Screening Room. As a Screening Room manager, a user can set up the room, invite and grant access or usage privileges to other users and stream the content in Windows Media 9 format. By streamlining access, users can comment on the editorial content being reviewed and influence the production direction in a very timely manner. The benefits of this new solution were recognized immediately. The first digital file that was uploaded came from Television New Zealand's Natural History unit where, within hours, a producer in Discovery's Silver Spring, MD office was able to screen the video, something that would have previously taken days to happen.

Prior to the launch of Remote Ingest, only system administrators and trained catalogers could add new assets to the DMC. The new tool equipped all DMC users with an easy-to-use and secure alternative for collaboration (see Figure 2). Previously, content ingest was

Figure 1: Digital Media Center Screening Room

Figure 2: Digital Media Center Remote Ingest upload form

limited to regular business hours and staff; however, now there were no limitations on the real-time sharing of content through the DMC. With regional offices for Latin America/Iberia, Europe, the Middle East and Africa, and Asia, Discovery Networks International staff could now access content in hours instead of days.

Two examples of the business benefits associated with Remote Ingest come from Discovery's UK reversioning and our billboard projects. The UK reversioning team, based in Silver Spring, typically edits programming late into the evening and needs timely review and approval of edits from Discovery Networks Europe staff across the Atlantic. Revised programs can now be uploaded immediately following the night mix session at 2 AM and reviewed just a few hours later when London starts its business day. Upon approval, Discovery can make additional changes and then ship the master for air. With Discovery's billboard project, production staff edit advertising sponsorship packages that accompany the end of select shows. These programs need to be reviewed by advertising sales staff in Discovery's New York office and often by the advertiser, as well. By leveraging the functionality in the DMC, these billboards can be edited in Silver Spring and reviewed the same business day by all parties for sign off. In some cases there are multiple billboards created at varying lengths and this tool also aids in the selection, review, approval and placement of specific spots.

Almost a year after the launch of Remote Ingest, Discovery has seen many of the VHS cassettes that were shipped around the company and to production partners replaced with the Remote Ingest tool. The DMC is now receiving 875 uploads a month from a user base that has grown 210 per cent.

With the Remote Ingest tool's core goal being to streamline the delivery process for production partners and internal Discovery users around the globe, Discovery has proven it could reduce the time required for approving content and drive cost savings, while bringing the company one step closer to an all-digital production workflow. With the success of Remote Ingest, producers wanted more content and global access. Discovery's next challenge

was to expand the network to reach additional international offices with content.

EXPANDING INTERNAL REACH

To extend global reach further and to advance along the digital roadmap, Discovery made another strategic play by deploying a streaming network. With larger regional offices in the UK, India and Singapore and an expanded presence in cities such as Amsterdam, Beijing, Buenos Aires, Madrid, Mexico City, Sydney, Tokyo and Warsaw, Discovery had to continue to push greater volumes of content to producers who were clearly geographically removed from Discovery's world headquarters in Silver Spring and its international staff. Since launching its streaming solution, Discovery is averaging approximately 175 hours of securely streamed content each week, with week-over-week numbers steadily increasing.

By incorporating a video-streaming service from Akamai, DMC users can play video from the DMC with much better performance than had been previously possible. The streaming solution distinguishes users by their location, both geographically and in relation to the Discovery network (DWAN), and results in three possible access paths. For example, when a user located in one of our Silver Spring or Miami offices launches a video asset the F5 checks the user's location to verify that they are on the DWAN and then directs them to a video server in Silver Spring. If they are accessing the DMC from a regional or international office not on the DWAN, the F5 will direct them to the internet and Akamai's network. Akamai then determines the user's location by way of their IP address and will lead them to the nearest Akamai streaming server which can pull video assets from the Silver Spring server. The third scenario involves someone accessing the DMC via the internet. In this case, Discovery's external DNS redirects the user to the Akamai network and they are connected to the nearest streaming server, as detailed above. Once a file has been copied to an Akamai video server from the Silver Spring server, it will remain there for immediate streaming if the same or another user requests the video in the future. Of course, security is an important, well-developed part of this design and only Akamai can access videos directly.

The primary benefit of the streaming solution is that users can now play *any* video in the DMC and expect a consistent level of performance, with buffering times for regional offices and internet users at only 8–15 seconds. This includes *all* video in the Screening Rooms, in addition to promos, footage and encoded production masters in the new Program Library for which users have specified access.

MAKING PROGRAMMING MORE ACCESSIBLE

In June of 2005, Discovery took yet another digital step forward by making core programming available through DMC. The Program Library provides a more cost-effective and accessible alternative to the 3\4″ or VHS screener tapes that have been in use for years to view, share and select programming. Distinguishing itself from the Remote Ingest tool, the Program Library's goal is to make programming accessible as it arrives and is prepared for air.

Consequently, marketing, communications and program planning teams can review programming almost as soon as it arrives. Six months after the initiation of the project, Discovery employees have access to more than 2,300 programs through the DMC's Program Library.

By leveraging the quality control (QC) step in the production process, Discovery is posting all quality controlled content to the DMC. Encoding takes place via a custom-built Visual Basic encoding graphic user interface (GUI) (see Figure 3), controlling Windows Media Encoder and a Sony J-Deck. Video ingest is conducted through another custom application that uses some of the same technology implemented for Remote Ingest. A Java file-transfer applet in an Apache Struts and Tomcat web application with web services to existing program databases results in an integrated encoding and ingest tool that allows operators to add the production master that they are currently quality controlling to the DMC with one click.

Through existing programming data, the DMC is intelligently linked to various business systems, including a programming database that populates the Program Library with the metadata commonly used by production staff and other applications. By simply entering the unique asset identifier or scanning the barcode, technicians can link to 12 pieces of metadata and programmatically have the asset added to the DMC. This includes a thumbnail given to the asset simply by leveraging the existing unique numbering system used by Discovery's US Networks. The asset numberer is also contacted by the DMC to create a unique identifier for the program master digital file. The DMC asks the system for this identifier and then stores the code as a piece of metadata associated with that asset. This implementation was the first Discovery system to begin using the unique asset identifier, which was implemented last

Figure 3: Digital Media Center Program Library media upload — barcode or asset identifier selection

year to begin centralizing the metadata for digital assets.

The process starts when the QC technician scans the tape's barcode and clicks ''start.'' When program quality control is complete, they simply click ''stop'' and ingest is complete. All program data are automatically retrieved from the programming database without any manual data entry. After the technician confirms the information (see Figure 4), the file is ingested to a streaming video server and the metadata are stored in the DMC.

Osprey 560 encoding cards along with Harita RS422 translators were installed to enable the six existing HP 8200 workstation PCs in QC suites, along with four workstations in the duplication area. While the installation was challenging due to the multi-record environment of the QC suites that also handle closed captioning functions, the configurations were modified with no issues. The encoding process is facilitated by Windows Media Encoder, which at implementation provided the best balance of the required bit rate versus cost.

To enhance the user experience further, Discovery built a custom media player (see Figure 5) to support users' time code needs and to mirror the functions available on a VHS deck. One important aspect of the project involved ensuring that the time code associated with the media matched the code displayed in the Program Library. Utilizing an embedded SMPTE time code, newly ingested content is frame accurate within Windows Media Player, increasing the ease and usability of the encoded assets. For example, a producer

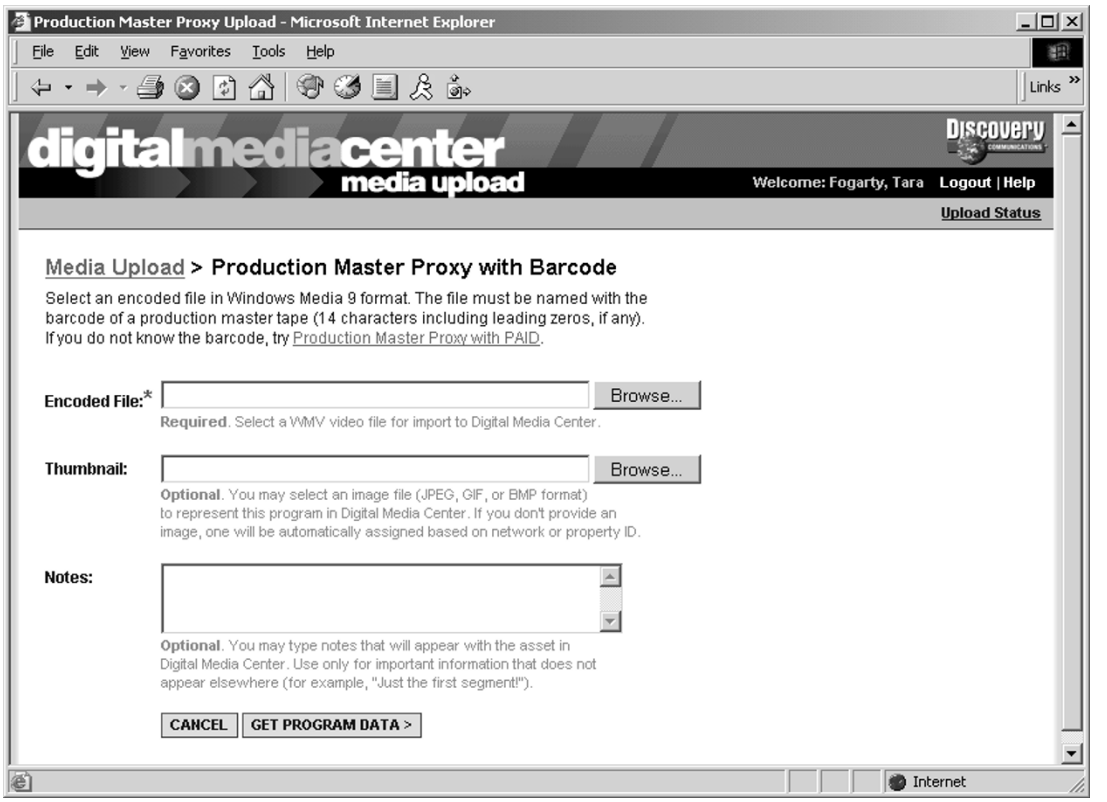

Figure 4: Digital Media Center Program Library media upload — barcode detail

Figure 5: Digital Media Center Program Library custom media player

can flag a sensitivity, such as a license plate that needs to be blurred, and reference the precise time code for changes during a future edit session.

Although the media files are purposely encoded below broadcast quality, they still have growing storage needs, with thousands of hours of programming being created annually. Stored centrally by Discovery, an external content distribution vendor, Akamai, ensures that the assets are streamed securely, quickly and accurately to our offices and production companies around the globe. As storage costs continue to fall, the cost for maintaining this growing Program Library is more than buoyed by the business benefits.

The DMC's Program Library continues to grow, adding on average 30 new programs daily, providing Discovery with 24/7 access to the highest-quality content, and empowering the production, buy-in and promo processes.

GOING DIGITAL: STREAMLINING PROCESSES AND CREATING SAVINGS

A testament to the value of these projects is that they could be justified solely on the immediate reduction in costs resulting from the elimination of unnecessary duplication and shipping of rough cuts and program master content. With thousands of 3\4″ and VHS tapes created internally in 2004, the savings in tape stock and labor alone are significant. Beyond these quantifiable benefits are a host of softer, long-term benefits, such as the reduction in time to

make programs available and the anytime secure access to a wealth of content. Moreover, there are countless other future benefits to digitizing content that previously resided in a physical media library that have not been fully leveraged yet as a part of Discovery's digital roadmap.

As discussed earlier, Discovery Networks International benefits greatly from the creation and evolution of the DMC. The International Program Operations team receives approximately 25 tapes a week for review and potential acquisition by one of its 16 networks in 32 regions. Previously, this content was dubbed multiple times and sent to each region for buy-in. With the DMC, Discovery can digitize the file, upload it with the buy information to the DMC and request a decision from its regions and networks by a certain date. This process single has resulted in substantial cost savings on shipping alone.

CONTINUING THE JOURNEY

The creation of a more robust media player with frame accurate scrubbing, greater integration with other business systems, enhanced digital rights management and transcoding are only a few of the areas of future development with regard to the DMC. Discovery will continue to expand and leverage its digital content and applications in order to meet the growing needs for on-demand access to content and information in the most cost-effective and secure manner. Discovery views the DMC as a critical application that will undoubtedly play an integral role in its digital mission.

