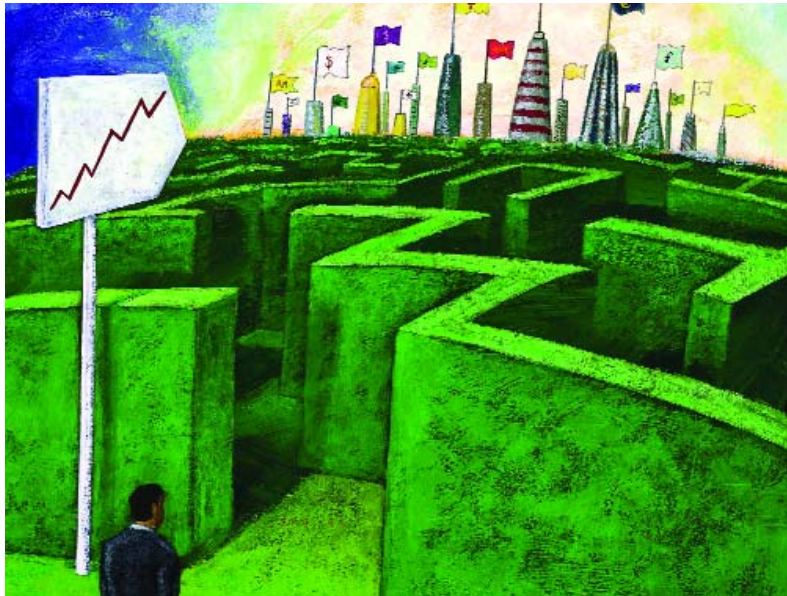


## GSN, The Network for Games Case Study



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### Overview

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#### Design Goals

- Broadcast-centric media content management system that was easy to use.
- An integrated system that would include the archive and cache.
- A system that could be interfaced to Pinnacle video servers, Harris automation, Spectra Logic digital tape library, and IBM cache.
- Low-resolution proxy generation of selected material that could be viewed on a desktop—a key selling point with corporate executives.

#### The Solution

- MassStore end-to-end advanced nearline, archive and content management solution for professional broadcast environments. Provides nearline and archive audio/video storage with full content management and tracking.
- MassProxy MPEG-4 proxy creation.
- MassBrowse browsing and edit decision list (EDL) creation.

GSN, the network for games, is the only U.S. television network dedicated to game-related programming and interactive game playing. Jointly owned by Sony Pictures Entertainment and Liberty Media Corporation, GSN reaches 54 million Nielsen homes. Providing an east coast and a west coast feed, the network is distributed in the U.S. through all major cable systems and satellite providers.

Since GSN launched over eleven years ago, the network has amassed a collection of over 70,000 episodes of such classic game shows as I've Got A Secret, Jeopardy!, Match Game (70s, 90s, and PM editions), Newlywed Game, and Password, plus updated versions of favorite game shows, as well as contemporary reality series, documentaries, video game programs and casino games, much of this original programming.

In addition to its network fare, GSN features 84 hours per week of interactive programming making it an industry leader in interactivity. Viewers get a chance to win prizes by playing along with GSN's televised games via GSN.com.




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*"Part of the appeal of the MassStore system is that it is entirely broadcast-centric."*

Ryan Tredinnick,  
Vice president Network Operations, GSN.

## The Benefits

- Programs can now be ingested a week or more in advance in an automated fashion, where in the past they could only be loaded in manually 12 hours in advance.
- Because content is now available on the company computer network and viewable through MassBrowse, the number of tape dubs have dropped dramatically from 600 to 700 a month to less than 100.
- Consequently, costs for tape stock, tape transportation, and tape storage also dropped.
- Staff was now freed for more essential tasks, increasing their productivity.
- For those viewing material, MassBrowse was a huge timesaver. No more searching for an available VTR. Material is now conveniently available on the desktop whenever someone wishes to watch it.
- With extensive metadata collected by GSN and read by MassBrowse, files and clips can be found quickly and easily, a boon especially for the promo department.



*"You don't need an engineering degree to figure it out. MassStore is real easy."*

Ryan Tredinnick,  
Vice president Network Operations, GSN.

## Masstech Provides a Complete Content Management System

With such a huge investment in program inventory, GSN was primed for a digital content management system, but it had to be just the right product at just the right time.

*"Three years ago digital content management was a kluge. It took a number of companies to make one system", remarked Ryan Tredinnick, Vice president Network Operations, GSN. "There were too many companies to deal with so we decided to wait for technology to be cheaper and provide a more integrative system."*

The wait was worth it. After extensive research, GSN chose the Masstech Group family of products. Part of the appeal of the Masstech system was that it is entirely broadcast-centric.

*"We decided to take baby steps in our approach to content management," Tredinnick said. "Instead of providing content management for our entire system that would include things like static media, we decided to concentrate on playout only. That narrowed the list. We chose Masstech because it's a simple system to use. The graphical user interface is laid out nicely and once the system was installed, it worked, it's easy to navigate, and it's pretty easy to understand."*

The Masstech system for GSN includes:

- MassStore end-to-end advanced nearline, archive and content management solution for professional broadcast environments. Provides nearline and archive audio/video storage with full content management and tracking and includes web based client software for database interaction and proxy viewing.
- Interface to the Harris/Louth Broadcast Automation System.
- Interface to Pinnacle MSS 1600 and MSS 8000 broadcast servers which act as video storage and are connected by Fibre Channel to Pinnacle Connect Plus gateways and then to Gigabit Ethernet switches, for the MSS 1600, or directly via Gigabit Ethernet for the MSS 8000.
- Interface and management to Spectra Logic T120 tape library digital tape library (archive) using Sony SAIT-1 Drives, connected via Fibre Channel (15 Terabyte extendable to 60) Files are MPEG-2 at 15 Mbps.
- Interface to an IBM TotalStorage DS4100 disk storage array (2 Terabytes nearline cache).
- MassProxy WM9 proxy creation.
- MassBrowse browsing and edit decision list (EDL) creation.

The configuration supplied also includes redundant components for automatic failover protection of the MassStore Application Server/DataMover. The system was installed in 2005.

## Towards a Digital Workflow

The installation of the MassStore system prompted GSN to implement a more fully digital workflow. GSN had already been using two Pinnacle MSS 1600 video servers (one as main, the other as backup) for the playout of short form material, like commercials and promos. Long form programs were on tape and played from a Sony Flexicart with digital Betacam VTRs. All playout was under Harris/Louth automation control, which has been upgraded to the Harris Automation System's new H-class system.

To replace the tape-based playout system, GSN added a Pinnacle MSS 8000 video server for ingest of long form programming. The Flexicart now became available for a new function-to play tapes for ingest.

Workflow begins with the GSN-developed Tape Library System (TLS), which is in near-constant communication with the traffic system. TLS generates a dub list of the material to be ingested.

Commercials are ingested directly into the Pinnacle MSS 1600s, while long form programs and promos are recorded to the Pinnacle MSS 8000 for eventual migration to the on-air MSS 1600's.

Until the implementation of the Harris Automation System's new H-class system,

ingest was performed manually, segment by segment in the case of the long form programming. During ingest, a technician performs a quality control (QC) check of the material.

GSN took graduated steps in developing its ingest workflow, starting with one day-part, then gradually ingesting material for more and more dayparts until the entire broadcast day was covered.

*"We limited ourselves to a small day-part to see what impact there would be on existing staff," Tredinnick said. "Workflow looks good on paper, but not until you have the media do you realize how long it takes."*

Ingest actually does add a step to GSN's workflow, but it offers the benefit of allowing staff to do a lot more at one time. Previously, tapes that were played to air from the Flexicart could only be pre-loaded 12 hours in advance. Now programs can be loaded into the on-air MSS 1600's a week or more in advance.

The H-class system allows an even more automated ingest procedure. Tapes to be ingested are loaded in the Flexicart, and the automation system takes over from there. QC is then easily handled by the over night master control operator, now freed up by the more advanced automation functions.

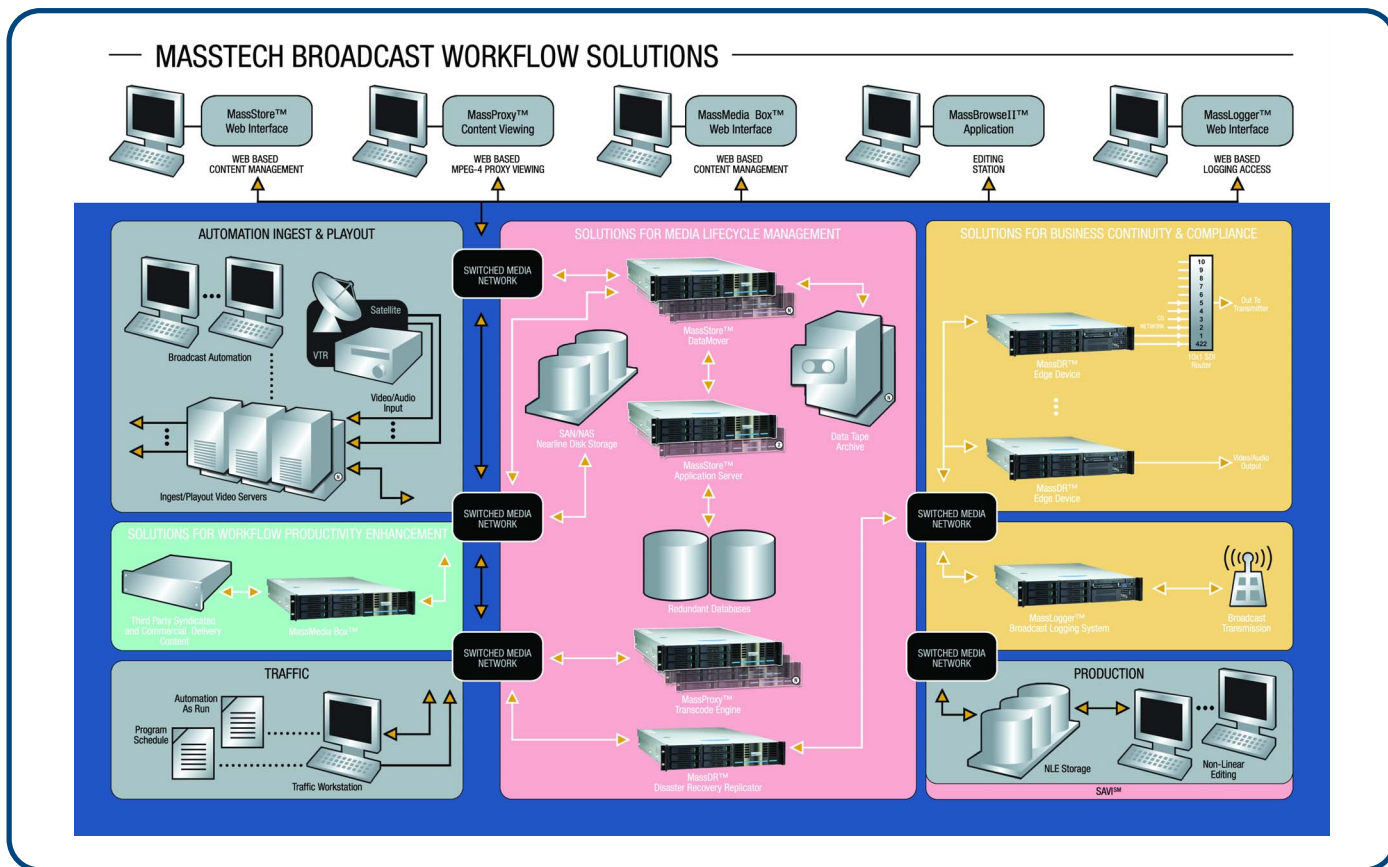
### How MassStore Works

Ingest is handled through the Harris Automation Media Client, whereby content is dubbed from tape to the appropriate Pinnacle server.

The MassStore system regularly checks the Pinnacle video servers to see if any new content has been ingested or whether any content has been deleted. This information is used to keep the MassStore content management database updated with which assets are in which physical location to provide an accurate picture of the location of all assets in the network environment.

*"Proxies are part of the culture these days. People just expect it on their desktop. One of the ways we sold the system to company executives is the proxy capabilities. Once we got the system going, they saw the other efficiencies and money savings."*


Ryan Tredinnick,  
Vice president Network Operations, GSN.



If a new item is found on the Pinnacle video servers and the system is running in Passive Mode, the content management database is updated to show that this item exists on that particular server. If a subsequent Harris automation command to copy that item into nearline/archive storage is received, the MassStore system performs that operation and updates the database. An operator can also archive material manually through the easy-to-use MassStore GUI interface.

Normally, an operator performs quality control checks on the ingested material before entering the command to archive material.

GSN archives everything except commercials. Short form content is stored only on the MassStore cache and MassStore is configured with rules to prevent the copying of short form content to the archive.



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The MassStore application also performs these functions:

- Provides an active picture of the location of all assets in realtime.
- Continuously tracks all digital media assets and makes them available for payout automatically as needed.
- Stores and uniquely identifies different formats of the same asset.
- Provides dynamic definition of the metadata associated with each asset.
- Provides a data structure that can be expanded at any point with no negative impact on the system.
- Allows the use of facility specific terminology such that each facility can define its own metadata fields at any point in the asset capture process, even after 10,000 or more items have already been stored and tracked in the system.
- Provides access to asset Database via XML interface.

When a program is required for air, the Harris automation system, via the VACP interface, makes requests to access program content to MassStore. MassStore then automatically locates and moves content from the data tape library archive or cache storage to the appropriate video server. When required, the Masstech Internal RAID storage (cache) is used to buffer content being moved from or toward the data tape library archive.

### Proxies to the Rescue

In addition to archiving, selected content is transcoded into frame-accurate, low bit-rate Windows Media 9 (WM9) proxies via MassProxy. (MassProxy also supports MPEG-4, but GSN elected to use WM9.) The MassProxy engine is available as a network resource within the MassStore environment. The proxy asset is created directly from the original high resolution MPEG-2 data stream enabling the frame accurate synchronization between the two files.

GSN creates proxies for original programs, high-profile acquired product like The Amazing Race and Who Wants to be a Millionaire?, short form promos, any pilots, and presentation (sales and marketing) tapes. Once made, the proxies are accessible within the network environment.

*"We limit what we proxy to save space," Tredinnick commented. "We anticipate what people at the corporate level will want to watch on their desktops and proxy only that material. We can send out automated e-mails to certain e-mail groups, and let them know that the proxy is available for viewing."*

With the broadcast operations center in Culver City, CA and corporate headquarters in Santa Monica, just the proxies themselves provided immediate benefits. The number of tape dubs dropped dramatically from 600 to 700 in a typical month to less than 100. Not only did MassProxy save the time and expense of making the dubs, but of transporting them to Santa Monica as well.

And away went the inconvenience of finding a VTR to view the tape. Now through MassBrowse, the proxies are available on the corporate network. "Whenever they want to watch something, there it is," Tredinnick said.

The MassBrowse client application can be installed on any computer with network access to the low-res proxy content generated by the MassProxy system. The MassBrowse client provides a user-friendly interface with full metadata support and a hardware jog/shuttle panel for an editor look and feel.

Indeed, it was the proxy capability of the Masstech system that company executives enthusiastically embraced and was a major factor in the product purchase.

Tredinnick observed that "workflow doesn't sell that well unless it cuts costs, and typically in the form of staff reductions. In our case, we weren't reducing staff, but rather re-deploying them." However, once the entire MassStore system became operational, its

power was readily apparent in boosting workflow efficiencies and in saving money in many areas of the company.

In addition to proxy viewing, MassBrowse provides a "cut edit" and "content preparation" tool which can be used to manipulate assets via any TCP/IP connection without the need for traditional expensive equipment and costly dedicated bandwidth. The edits performed on MassBrowse map directly to the parent asset.

Using MassBrowse, GSN can create frame accurate EDLs that can be imported into the Avid non-linear editing environment.

"What this provides is the opportunity to manage Avid Unity [storage] by doing more work off-line and then move selections to Unity when doing final editing," Tredinnick said. "It's a more cost effective way of working."

Down the road, GSN is also considering giving the people who do closed captions and interactive files limited access to MassBrowse providing them easy and immediate access to the shows and obviating the need for more dubs.

### Linking Metadata between MassStore and TLS

A unique feature of the GSN system is the metadata link between the Masstech system and the Tape Library System (TLS). GSN developed an interface from the TLS to MassStore to deliver all pertinent content metadata to MassStore. MassStore pushes the segment metadata to the Harris Automation database.

GSN employs a software programmer who was able to rather quickly create the interface between the TLS and the Masstech system using Masstech's XML interface protocol.

The metadata also shows up on MassBrowse, greatly enhancing the search capabilities for a particular show or segment,

especially useful to the promo department.

Metadata includes the normal items, like house ID, SOM/EOM (start of message/end of message), and title. But GSN hasn't stopped there. Using MassStore's capability for customizable fields, GSN has augmented metadata for all its programs to include such show details as the host and actors on the show, where the program was made, the game winners, etc.

*"We have more detailed information on the programs than the syndicators do,"* Tredinnick remarked.

### Benefits

Since the installation of the Masstech system, GSN has been able to greatly reduce the number of dubs needed for company executives, the promo department, the interactive group, among others, plus dubs for redundancy, not to mention the cost of transporting dubs between the broadcast operations center and corporate headquarters. The Masstech user interface is very easy to understand and navigate.

Corporate executives love being able to watch programs on demand at their desktop.

The promo department can easily find selected clips through the detailed metadata accessible through MassStore and MassBrowse.

Programs can be entered into the system much farther in advance of air than ever before. Previously the old tape-based system could only hold 12 hours worth of long-form programming.

Staff didn't have to be cut, and they were able to be re-deployed to areas that needed them most, such as the tape library.

In time, interfaces to Avid and to closed captioning will add further efficiencies.



### Partners:



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