

Media Asset Retrieval Systems

ASIST'02

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November 21, 2002, 8:30 AM

Thank you for the opportunity to speak with you today. I am flattered and somewhat terrified that I've been invited to speak to such a scholarly assembly. I do have to say however, that if there is an ivory tower in public broadcasting, it's my organization, CPB.

This morning's topic, asset management, is near and dear to our hearts in Washington, because public broadcasting's ability to master this new mindset and new technology will, to a great extent, define our public service options and determine our value to the American people during the next decades.

By carefully managing our editorial assets and by recognizing to whom they might have value, we'll have more opportunities than ever before to contribute to our local communities and to resonate with individual consumers.

Media Asset Retrieval Systems

- **Welcome to Public Broadcasting**

- a complex, democratic organization
- in a changing media environment
- with more content demands
- and no more \$\$\$
- with unchanging principles



Considering asset management from an enterprise-wide perspective is a daunting task – it forces one to honestly contemplate the organization, its value and challenges.

Implementing asset management will be even MORE daunting.

For public broadcasting, our key considerations are:

- our organizational structure,
- the rapidly changing media environment,
- the rising cost of delivering more content on more platforms,
- Our enduring responsibility to the public.

Begging your indulgence, I'd like to start with a short primer on public broadcasting, because it's critical to understanding our asset management and metadata challenges.

Media Asset Retrieval Systems

- **Organizational structure**

- National series, delivered locally
 - NOVA, Masterpiece Theatre, ATC, Fresh Air, etc.
- “Network” is voluntary alliance of individual licensees



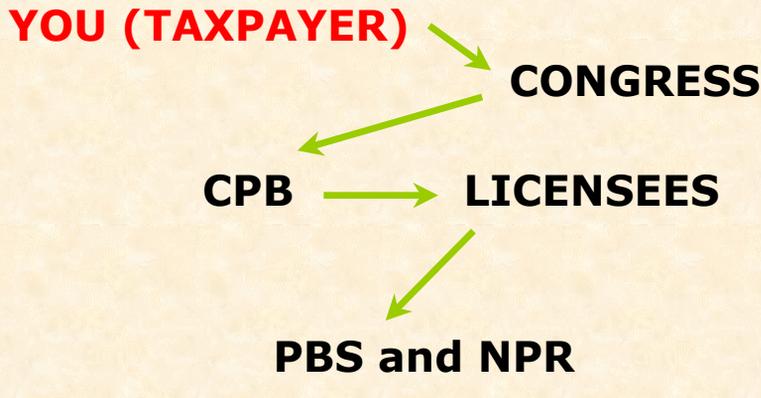
Hopefully, when you think of public broadcasting, you think of our signature television and radio series: NOVA, Masterpiece Theatre, All Things Considered, Fresh Air, even Car Talk.

What I hope you also realize is that those programs come to your from your LOCAL public television or radio station.

While we like to call ourselves a network, and be listed next to CBS, ABC, NBC and even Fox, PBS and NPR are in fact member organizations – voluntary alliances of public broadcasting licensees all over the U.S.

Media Asset Retrieval Systems

- **Follow the money...**



Here's how it works, or at least how the money flows.

The Federal government – Congress – appropriates your tax dollars, a little more than a dollar a year per citizen, to CPB, the Corporation for Public Broadcasting.

We distribute that money to public radio and televisions licensees using a complex, but ultimately very sensible construct called the Community Service Grant.

Stations then use that Community Service Grant money to become members, at various levels, of PBS and NPR, in order to be able to air those signature series and to get delivery of the content using satellite distribution systems.

Generally speaking, the CSG makes up only 15% of any station's budget; the remaining 85% comes from a state or university, and/or the local community in the form of individual donations and corporate sponsorship. So I urge you to go home and make a pledge of support.

Media Asset Retrieval Systems

- **Organizational structure**

- Local licensees
 - 176 TV licensees, operating more than 300 stations
 - 384 radio licensees, operating more than 700 stations
- National producers and distributors



The main point is that public broadcasting consists of 176 independent television licensees, operating more than 300 stations, and 384 independent radio licensees operating more than 700 stations.

Media Asset Retrieval Systems

- **Changing media landscape**

- Broadcasting based on scarcity model; content platforms into the home no longer a scarce commodity!
- Increasing power of media gatekeepers
- Growing consolidation of ownership and operations



Now, a moment to view the complex, dynamic media landscape in which public broadcasting operates.

It's important to remember that the nature of local broadcasting – its content, services and business models – was formed in an environment characterized by “scarcity.”

That portion of the electromagnetic spectrum capable of delivering content from one location to many locations was considered precious public property, and therefore licensed to a limited number of worthy organizations, who would follow certain sets of rules.

Today, many more platforms for delivering content to the home have evolved. Perhaps none as cost-effective as broadcasting, but some serving important niche markets and emerging consumer interest. The Internet, satellite broadcasting, cable distribution and even technologies like wi-fi threaten the broadcasting model, by fragmenting audiences into smaller and smaller groups.

Media Asset Retrieval Systems

- **Changing media landscape**
 - Broadcasting based on scarcity model; content platforms into the home no longer a scarce commodity!
 - Increasing power of media gatekeepers
 - Growing consolidation of ownership and operations



You may not have been really thinking about this, but during the last decade or so, a variety of institutions have come between you and the people you like to get your content from. Broadcasting used to be relatively unfettered – a broadcaster sent out a signal, and you received it at your house.

Today there are powerful media gatekeepers all around us, for example cable MSOs, and Internet portal services, like AOL. What makes this particularly pertinent to a conversation about asset management and metadata is that these gatekeepers don't only control access to the content, they control access to INFORMATION about the content.

One way to get around a gatekeeper is to buy them; that's what some content companies are doing. Another way is to get so big, that the gatekeeper can't ignore you or your stations; that's also happening with large station groups.

In general, the media industry is consolidating rapidly, and by doing so, saving lots of money on operations.

The only good news in this for public broadcasting is that we may soon be the only locally-run broadcasters in the U.S., a strategic advantage.

Media Asset Retrieval Systems

- **Rising content delivery costs**
 - Mandated DTV conversion and dual analog/DTV broadcast
 - Multicast, datacast and HD content required
 - Web content expected for local/national
 - VOD: killer app for digital cable



Another factor affecting public broadcasting is the rising demand for content across new platforms, and the need have content on those platforms just to keep a seat at the media table.

First, we've been forced by Federal mandate to convert our television facilities and transmitters from analog to digital broadcasting. This is mostly a good thing, but the cost is staggering – in the hundreds of millions for public broadcasting alone. A digital, or DTV signal CAN carry much more content; many of our stations have plans to multicast four different standard-definition channels at once, each serving a particular local need, such as workforce training, or legislative coverage. We'll also have the ability to use some portion of our spectrum for datacasting – a way of providing broadband services over the air. Whether all this content would be carried on cable or satellite systems, is a whole 'nother can of worms.

Our national producers and our local stations all now have web sites with original content; this is pretty much de rigeur for any public institution of moderate size.

Finally, cable MSOs have begun providing video on demand services. Public television will need to make both national and local programs available for this distribution venue, because it's likely to emerge as the killer app of digital cable. This will take more rights, more time, more money, and most of the profits will go to the gatekeeper, not to the content owner.

Media Asset Retrieval Systems

- **A vision of Public Broadcasting's future**

- Licensees able to deliver core content, on-demand, across a variety of platforms: DTV, Web, Wireless, HD Radio, etc.
- Licensees engaged in a peer to peer network with other licensees and various partners



Despite all these challenges, and despite the swirl of emerging technologies and business models, the fundamental role of public broadcasting won't really change. Communities still need objective, non-commercial content of the highest editorial integrity, delivered free or nearly free to individual citizens.

In the midst of all this chaos, we ARE able to describe what we want to be when it's all over.

First, we'd like all of our licensees to have the capacity to have editorial impact across a range of media platforms.

Second, we'd like to see our licensees taking advantage of the latest terrestrial interconnection technologies to engage in collaborative content creation with each other, and with partners.

Media Asset Retrieval Systems

- **A vision of Public Broadcasting's future**
 - Personalized, customized relationships with constituents
 - An infrastructure that combines strength of local ownership with economic benefits of consolidation



Third, we'd like to have two-way, personalized relationships with our constituents: viewers, listeners, teachers, students, donors, sponsors, legislators, etc. We want to be able to deliver content and information to them in a way that feels like personal public service.

Finally, we'd like to develop an infrastructure that helps us to be competitive with our highly consolidated media neighbors, while maintaining the important functions of local ownership and local editorial control.

Media Asset Retrieval Systems

- **Asset management framework**

- National distribution of full-length programs from HQ to consumers
- Multiplatform production
- National/local distribution of object-length assets
- Peer to peer content exchange



This vision of ourselves has helped CPB and our licensees to approach the management of our content in a structured way.

We've identified four critical applications of asset management:

- First, the centralized network distribution of our full-length programs.
- Second, the efficient and creative management of content assets in a multiplatform production environment.
- Third, the national-slash-local distribution of object-length assets, such as clips and frames and scripts.
- Finally, the facilitation of peer to peer content exchange and collaboration.

Media Asset Retrieval Systems

- **National distribution: current**
 - Straightforward satellite system to deliver full-length programs
 - Licensees ALL record, save, play back
 - Key program data feed in print and Web formats



As broadcasters, we are expert at creating and distributing long-form linear content, and our distribution systems have historically been designed for this format.

During the last several decades, we've used a straightforward satellite feed system, in which radio and television programs are sent from producers, on tape, to the national distributors, where they are technically evaluated and timed, then scheduled for satellite feeds.

Once the shows reach our licensees, they are evaluated and timed again, and stored locally, on tape usually, until played back during broadcast.

Key program information, such as duration, description, and rights is fed via one-way print and Internet communications.

Media Asset Retrieval Systems

- **National distribution: advances**
 - Compression of audio and video
 - Server storage capacity
 - Terrestrial fiber availability
 - IP file transferring



As you can imagine, this was an efficient design for its time, but with the stunning advances in video and audio compression, server storage, terrestrial fiber interconnection and Internet Protocol file transfers, it is not the most efficient design for the future.

Media Asset Retrieval Systems

- **National distribution: Next Gen**
 - Hybrid of satellite and terrestrial fiber
 - NRT satellite delivery of non-live content, using IP file exchange
 - Local caching, with national asset management
 - Terrestrial fiber peer to peer



One of our most profound asset management challenges is developing a sensible “next generation” program distribution system.

Our television satellite lease expires in a few years, and PBS has been busy creating a new design that reflects a more modern, consolidated approach.

In the new design, a program would be timed and evaluated just once, at PBS. Most non-live programs will be delivered to stations using non-real-time satellite-IP. They would “wrapped” in such a way core metadata, such as timing and evaluation information goes along with the program in the file. The files would then be cached on a local server controlled by PBS, and delivered as requested to the station’s master control for broadcast.

PBS will have to purchase or design an asset management system that can manage the distribution of program assets all the way from delivery to them, through delivery to local broadcast operations.

Media Asset Retrieval Systems

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 - Hybrid of satellite and terrestrial fiber
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However, being a collection of independently minded institutions, however, it remains unclear whether our local television licensees will go for this plan. They don't really want anything within their walls to be controlled by an outside entity, even if it is PBS.

Things are further complicated by the fact that stations have their own local programs, and content acquired from other sources, such as BBC Worldwide, that needs to get into the local asset management mix.

I should add that the next generation distribution system includes at least some degree of terrestrial fiber interconnection, such that stations can exchange information, requests and even programs from PBS or each other, in a low bandwidth peer to peer model.

Media Asset Retrieval Systems

- **National distribution: Next Gen**
 - PBS "Orion" program database
 - NPR's "Content Depot"
 - PBS' cable MSO VOD/EPG metadata work



A glimmer of hope for metadata management can be found in PBS' new program information system, "Orion." CPB has supported the development of this web-enabled program database, which will migrate as a part of the interconnection system into a "transaction management" capability between stations and PBS.

It is also notable that the public radio interconnection system, which is effectively an independently operated distribution company, has been designing a new interconnection model called the "Content Depot." In this model, a giant asset management system and repository at NPR is accessed by station programmers, via a web interface. They can search for and preview content, and actually retrieve it through the same terrestrial system. The Content Depot model is made possible by the fact that audio takes up so much less bandwidth than video, and because the public radio interconnection system is already a "pay per use" business model, as opposed to the TV system, which is a flat fee.

As I mentioned earlier, we are convinced that increasingly, the last link in the chain of television content distribution will be Video on Demand. Whether as a consumer, you have the capacity to view content when you want it by owning a personal video recorder, like TiVo, or because you have a pay per view option on your digital cable, PBS and other content distributors need to associate and deliver important metadata to you, so that you can find the content you want. No matter how the business model evolves, consumers must be able to find public broadcasting content that matches their interests and schedules. PBS is working with cable MSOs, PVR manufacturers and Electronic Program Guide services to make this a reality.

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Media Asset Retrieval Systems

- **Multiplatform Production**

- Editorial assets are “digital dowry”
- Difficult to convert people and processes to AM mindset
- Costly to implement software/hardware solutions
- No proven ROI



Our next asset management tier takes place at our major producing entities, both radio and television. These organizations, such as WGBH, WNET, Minnesota Public Radio and Public Radio International create the bulk of primetime public broadcasting content. They also develop content for non-broadcast applications, such as web pages, teacher’s guides and educational videos.

Many of these organizations consider their editorial assets to be their “dowry” for the future, both in service and financial terms, and are therefore highly motivated to manage these assets sensibly. Nonetheless, the cost for implementing both the asset management mindset and technology into their multiplatform workflows is extraordinary; the return on investment has not yet been proven even at their counterparts in content creation, such as CNN and National Geographic.

While CPB does not directly fund these efforts, we do seek to coordinate the work happening at these institutions with that happening at the national distribution level. It’s like a lot of train tracks being built at once: we need the gauges to match when they meet.

Media Asset Retrieval Systems

- **National/local distribution of object-length assets**
 - **onCourse** (K-12)
 - Identify and aggregate object-length assets
 - Metatag and curriculum-correlate
 - Deliver to stations via next generation distribution stations



The next tier is a new one for us – that of creating, managing and delivering editorial assets at the “object” level – individual clips, frames, text documents, etc.

Public television, as you probably know, has a longstanding commitment to formal K through 12 education, both at a national and local level. About 18 months ago, CPB committed support to a project called OnCourse.

OnCourse seeks to aggregate the instructional television assets of public broadcasting and our ITV partners, and to reshape that content into “learning objects” for use in K-12 classrooms. The plan is to create a single repository of clips and frames of video that illustrate key curriculum concepts, to correlate those to national and local standards, and to deliver the assets and their metadata to local stations using the next generation distribution system. Stations would then deliver the content “essence” and metadata to local school districts via Internet, broadband or DTV datacasting.

Media Asset Retrieval Systems

- **National/local distribution of object-length assets**
 - **onCourse** (K-12)
 - Enable search and preview via locally branded website
 - Deliver to school via DTV Datacast
 - LAN distribution to classroom



The OnCourse model goes something like this: a teacher logs on to the locally branded OnCourse web portal at her desktop computer, with a lesson plan in mind. She locates and previews the assets that are relevant, including programs, clips, single frames and even lesson plans, then requests delivery of those assets to her school. The delivery is likely to occur via non-real-time DTV datacast to a dedicated broadcast receiver down the hall. The material is cached on a local server, and delivered to the classroom or computer lab using the school's local area network, or LAN.

As you can imagine, the identification of assets, their ingest or digitization, the addition of pedagogical metadata, including local curriculum correlation, and the storage, preview and delivery of these assets is an extraordinary asset management challenge, both for OnCourse and the local stations who are participating in the alliance.

Media Asset Retrieval Systems

- **Peer to peer content exchange**
 - Between producing stations/entities in communities of practice
 - Between stations and partners – universities, historical or art societies, museums, libraries, etc.



The final asset management tier for public broadcasting is the open exchange of content essence and metadata both within our station community and between our stations and their university and community partners. Editorial collaborations, using a shared asset management infrastructure, may be the only way we can meet the multicasting and multiplatform content demands of the future.

As public broadcasters, we ARE accustomed to partnering; it's nonetheless almost always problematic. Different institutions have different aspirations, workflows, timelines and ways of describing and framing what they do and what they offer. Our licensees are particularly uncomfortable with the idea of relinquishing editorial control over anything that goes out with their brand on it. Their editorial integrity IS their stock in trade, and why they're worth partnering with in the first place.

Change is inevitable, however, and mostly good for us.

Media Asset Retrieval Systems

- **Peer to peer content exchange**
 - Rich Media Utility (Internet2)
 - Participants: WPT (UW), KWSU (WSU), Iowa PTV (Iowa State), WPSX (Penn State)
 - Media Asset Retrieval System (MARS)
 - Participants: KCTS/Seattle, University of Washington, KUOW, Seattle public libraries



A developing peer to peer project that CPB has been watching closely is the Rich Media Utility. This is an effort by a group of university licensees to use Internet2 as the backbone of production collaboration. They plan to digitize and uplink full-bandwidth locally-produced segments and raw footage to a central repository and asset management system – that’s the utility part – and then through a web browser interface, actually edit the content into new programs from a distance.

Through our television Future Fund, CPB has also supported the Media Asset Retrieval System, a collaboration made up of radio, television, university and library partners in the Seattle area.

In a few moments, Efthimis Efthimiadis, of the University of Washington, is going to tell you about this project in detail.

Media Asset Retrieval Systems

- **Asset management framework**

- National distribution of full-length programs from HQ to consumers
- Multiplatform production
- National/local distribution of object-length assets
- Peer to peer content exchange



So you've seen our asset management framework: national program distribution, multiplatform production, the identification and delivery of object-length assets, and peer to peer collaboration.

There are some obvious foundation layers for all this work.

Media Asset Retrieval Systems

- **Asset Management foundation**
 - Coordination between our large scale tech investments
 - Shared metadata and other protocols
 - Shared Digital Rights Management (DRM) policy and protocols



First we need to make sure that our large scale technology investments are coordinated. This sounds simple, but takes considerable effort. Through a formal CPB initiative, we keep all the parties routinely speaking with each other. We try to identify areas of potential overlap, and minimize duplication of effort.

On the metadata front, CPB and public broadcasting's other key institutions have realized that none of the future visions of ourselves can be realized without a federated approach to metadata. We know that the information about our content may ultimately be as important as the content itself. We have banded together to create a single Public Broadcasting Metadata Dictionary to describe our assets, big and small, taking advantage of the metadata work already done by our producing licensees and by other standards groups. Paul Burrows of KUED in Salt Lake City is a major player in that endeavor, and will speak to you about our progress in the last third of this presentation.

A wonderful side benefit of the Metadata Dictionary project is that we have established a model for coming to agreement on protocols; hopefully we'll be able to apply to other data issues in the future.

Media Asset Retrieval Systems

- **Asset Management foundation**
 - Coordination between our large scale tech investments
 - Shared metadata and other protocols
 - Shared Digital Rights Management (DRM) policy and protocols



We are just beginning to look at the issue of Digital Rights Management. Naturally, it was addressed to some degree in the metadata project, in terms of having enough fields and using the right terminology to express ownership and use restrictions.

But it might be most important for public broadcasters to develop a DRM position, or stance.

In the higher education community, the understanding of Digital Rights Management revolves around digitally enabled “access” and “attribution.” How can educators use digital technologies to obtain access to content that is useful to them, and how do they properly acknowledge the creator?

In the MEDIA environment, broadcasters and media conglomerates believe that DRM is about security and payment. They ask “How can we use digital technologies to deliver content to the person who has paid for it, and track his or her use of it to prevent illegal replication and distribution?”

Public broadcasting relates to both of these viewpoints. During the next few years, we will need to position ourselves in a way that is consistent with our public service mission, yet reasonably addresses our financial needs. CPB is expecting to take a leadership role in this endeavor.

Media Asset Retrieval Systems

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Well, hopefully I've given you a sense of the asset management and metadata priorities for public broadcasting. I believe we have a number of particularly challenging situations, but I also believe that our content and our service is worth the effort.

I'm going to turn this over to Efthi now, to describe the MARS project in detail.