

Public Broadcasting Metadata Dictionary “PBCore” Implementation: An Overview of the Recommendations of the Compliance & Sustainability Working Group Corporation for Public Broadcasting

Introduction

There have been few occasions when public broadcasting interests have had the opportunity to reinvent their central circumstances. The change from “bicycling” physical media to terrestrial interconnections was one. The change from terrestrial to satellite interconnections was another. The change to digital transmission capabilities will be another.

Those of us – from all corners of public broadcasting – who have maintained an active interest in the nature and possibilities of the digital transition (of which the transmission transition is only a part) believe that the prosaic metadata dictionary effort underway for some two years is yet another and one that could prove to be the most significant of all. It will prove to be as fundamental to our digital future as mapping the genome will be to health care – and, in fact, is in some ways analogous. PBCore is the tool we will use to map the genome of our content going forward.

The CPB has recently received two documents on the project – a case statement, “Public Broadcasting’s Future Is PBCore’s Future,” and a description of the scope of work that remains to be done to make this a permanent part of our future, “PBCore Scope of Work.” These are appended as Attachments A and B, respectively.

The purpose of this document is to review the actions which urgently need to be undertaken to implement this effort – that is, to make it a useful, ubiquitous and permanent part of our generation and management of content. These actions are discussed at some length in Attachment B, but are shown in summary form in the diagram of Attachment C. The following discussion relates to that attachment.

System Actions

There are two classes of actions that are needed in carrying forward this work. The diagram terms these “System Actions” and “PBCore Entity Actions.”

System Actions are shaded in light green on the diagram and include two that are already done – the funding and development of the dictionary itself. Those of us who were involved to a greater or lesser degree in that development would probably argue that was the most difficult component.

The Working Group recommends that CPB allocate additional funding (see cost discussion below) to provide start-up funding to an entity to perform advocacy, communications, training, technical assistance and PBCore maintenance work on public broadcasting’s behalf. This funding would continue until such time as the

system can implement a sustaining business model – perhaps two years. *The Working Group also recommends that, because of the central importance of PBCore to the digital transition and the equal importance of this to the radio and television communities, this funding should come from funds appropriated to CPB to support that transition.*

The Working Group discussed several possible candidate organizations, including the Dublin Core Metadata Initiative, NPR, PBS, PRSS, SMPTE and major radio and television producers. The Working Group felt it did not have enough information to make a recommendation but agreed that the entity chosen should have the appropriate skills, credibility and track record to be successful. It tasked two of its members of both the Working Group and the Digital Consultation Panel, Dennis Haarsager of KWSU/KTNW-TV and Northwest Public Radio and James Steinbach of Wisconsin Public Television, to conduct an investigation and make a recommendation. *Their recommendation is that the existing organization which best fits the criteria is the National Center for Accessible Media (NCAM), a part of the Media Access Group at WGBH (see ncam.wgbh.org).* NCAM¹ has recognized credibility, a range of related experience and contacts, and has served a wide variety of organizations in its current work. It would be able to “hit the ground running,” which, given the urgency involved, is another asset.

PBCore Entity Actions

The Working Group recommends that the designated PBCore entity conduct the following actions on behalf of public broadcasting. Since they are discussed in more detail in Attachment B, they are presented here only in outline form.²

- ◆ Advocacy
 - Develop plan to bring visibility
 - Secure support from NPR, PBS and other key organizations
- ◆ Create communication channels with industry groups and vendors
 - Update/maintain web site
 - Develop marketing efforts
 - Develop communication vehicles
- ◆ Training
 - Ascertain what tools will be most useful
 - Ascertain training needs
 - Develop effective approaches, tools and procedures for delivering training
 - Develop plans for scaled implementation
 - Create demonstration models

¹ Originally suggested by Doug Weiss at CPB.

² The Working Group discussed the general scope of work at its May 2004 meeting and based its rough cost estimates on the results of that discussion. However, the substance of that discussion was refined and extended by the subgroup consisting of Haarsager, Steinbach and project director Marcia Brooks for the purposes of writing the Scope of Work and constructing this outline.

- Usability assistance
- ◆ Technical assistance
 - Build freely available content cataloging tool for PBCore markup
 - Provide expert advice to vendors and developers for PBCore interfaces
 - Provide expert advice for mapping efforts
 - Support minimal implementations
- ◆ PBCore maintenance
 - Create PBCore standards committee
 - Review related standards processes
 - Propose & implement processes and systems for PBCore
 - Propose & implement management entity

Costs

The Working Group's estimate of costs was done to gauge the order of magnitude of the costs of this work in order to provide a test of reasonableness to whether this enterprise might be self-sustaining in the future. The costs enumerated below have not been further refined by subsequent work nor have they been informed by the subgroup's work described on the footnote on page two. *We recommend that CPB, NCAM and representatives of the Working Group spend additional time and research in refining the budget preparatory to the negotiation of a contract.*

Year One

Web site redesign, maintenance and hosting	\$30,000-\$55,000
Tool development	\$30,000-\$40,000
Business development and operations	\$100,000
Marketing/communications	\$20,000
Training and usability assistance	\$150,000
PBCore updating	\$75,000
Administration/fiscal agent	\$40,000
Total	<u>\$445,000-\$480,000</u>

Years Two and Three

Web site redesign, maintenance and hosting	\$15,000-\$20,000
Tool development	\$30,000-\$40,000
Business development and operations	\$100,000
Marketing/communications	\$20,000
Training and usability assistance	\$150,000
PBCore updating	\$75,000
Administration/fiscal agent	\$40,000
Total	<u>\$420,000-\$435,000</u>

Urgency

The implementation of PBCore is urgently needed because of the imminent implementation of major new distribution systems – the ContentDepot in radio and the NGIS in television, because of the ongoing digitization of transmission in both radio and television (PAD, PSIP and increased content distribution being drivers), because of the rapid development of repurposing and distribution of public broadcasting content via the internet, because of the dramatically altered and changing media universe, and because of the urgent need to control costs and encourage collaborative production and distribution activities. These factors are discussed in more detail in Attachment A.

It is also urgent because any standard is valid for a finite period of time. Needs for description and manipulation of content change and so all standards evolve over time. For example, automated methods of collecting metadata from archived audio and video assets, not yet “ready for prime time” but under development, will likely drive the need for changes in our standard. So will commercial vendors of asset management systems.

We believe that CPB’s support for this important work so far has been a far-sighted and far-reaching investment of historical importance. While this activity is not as easy to explain to lay governance and appropriators as programming or interconnection investments, it is of profound importance. We urge your continued leadership in this area.

For the Working Group

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Attachment A

Public Broadcasting's Future Is PBCore's Future

The following is excerpted from CPB's internal description of the project:

“As public broadcasting endeavors to maintain our value and values, we know we must do three things: develop and deliver content across multiple platforms, heighten our content and service partnerships, and develop more efficient methods to conduct our work. Our ability to exchange our highly valued content within and across our institutions and those of our educational and community partners has never been greater. We have been afforded a tremendous opportunity for service and for efficiency.

Metadata are fundamental to the exchange of this content. The Public Broadcasting Metadata Dictionary (AKA “PBCore”) creates a single protocol for describing all public broadcasting content, both radio and television. The PBCore will be a “touchstone”, a single, streamlined standard to which other database structures and other asset/content management systems will be “mapped”. It can also be used as a guide for the onset of an archival or asset management process at an individual station or institution.”

Those of us who have been seduced by the clear audio of compact discs (and, more recently, surround sound) and by the sparkling video of HDTV – and haven't we all – tend to think of enhanced quality when we think of the primary attribute of digital technology. For those of us who grew up professionally in analog radio and television, it is the realization of what we have always strived to achieve.

Yet, digital technology will arguably prove just as valuable when it reduces content quality (Web) as when it enhances it. The most important benefit of digital technology is simultaneously more prosaic and more profound than the one which seems most obvious to us. The real power of digital technology – of “being digital,” to use Nicholas Negroponte's 1995 book title – is control and flexibility.

We can now control every aspect of production and distribution to a degree never possible with analog technology. Need to produce a spectacular over-flight series in high definition video? No problem; watch the PBS HD loop. Need to give listeners or viewers a second chance to benefit from content you've produced on their own schedule? No problem; check out most station web sites. Need to reach programmers with your radio feature? No problem; PRX.org does it every day. Need to develop new business models for public broadcasting? No problem; datacast programming on demand over your own digital transmitter.

PBCore will prove valuable for each of them. But let's say you want to design a new interconnection system that will “pre-ingest” everything from multiple producers and distribute programs to stations just once instead of seven times on the average. Or that you want to collaborate on a production with two other stations across the country, enabling them to perform edits from a distance. Or that you want to break up that traditional program into short segments for Web distribution as niche content for specific community, service and institutional needs. For these applications where granular manipulation and interoperability are required, PBCore will not just be valuable, it will be essential.

Drilling down, the attribute of digital technology that gives it this asset management power is its ability to carry with each piece of content some data describing that content in a useful way. These descriptive data are called metadata. PBCore is designed to provide – for television, radio and Web activities within public broadcasting’s diverse community – a standard way of describing and using those data. Without such a standard, the real power of digital technology will not be available to our mission. The creative/operational problem that the PBCore will solve is “You can’t use it if you can’t find it”. If we can’t sensibly organize, re-use and re-purpose our assets, we will find ourselves delivering less and less product, and having less and less relevance to our audiences.

We joke that, when you’ve seen one station, you’ve seen one station. Our diversity and distributed governance make it impossible for one station or even one national organization to drive a metadata standard. Yet all stations will have in common continued financial pressures to increase efficiency and lower costs. The PBCore effort was designed to provide us these benefits that we could not otherwise achieve. A common metadata protocol will make it easier to locate and retrieve content, so that it is used in new ways, on new platforms, by new constituents.

But a metadata dictionary is not a static thing. The technology we use and the content relationships we develop are dynamic and will of necessity drive revisions and additions to the dictionary. And our inherent structure means that we have hundreds of production shops and thousands of vendor relationships. To be successful, this effort needs a permanent focus for maintenance, communication and coordination of mapping and interface efforts.

In the March 2004 Request for Comments, 47 participants were drawn from public radio and television stations, PBS, NPR, national distributors, educational institutions and private-sector organizations that either partner with public broadcasting or supply metadata-related services to it. As an indicator of acceptance of the PBCore, *96 percent of the respondents “strongly” or “very strongly” agreed that “public broadcasting needs a core metadata dictionary”*. After completing the RFC process, *the same percentage “strongly” or “very strongly” agreed that the proposed PBCore met this need*.

PBCore is, within our industry, an unprecedented collaboration that has resulted in a document that is critical to our future. External to our industry, PBCore has generated interest from organizations world-wide, further extending the global brand and reach of American public broadcasting. Standards increase in value as they become ubiquitous.

It requires a modest investment of system resources to launch and gain momentum. Without this investment, public broadcasting will continue to operate as a fundamentally analog business with prettier pictures and clearer sound, and “being digital” will happen for our competitors, not for us, and not for the people we serve.

Attachment B

PBCore Scope of Work

The Compliance and Sustainability working group (“the C&S team”), an ad hoc team working as part of the CPB-funded Public Broadcasting Metadata Dictionary project (PBMD) under the overall project management of WGBH, met on May 27-28, 2004 to discuss and make recommendations for the implementation of the Public Broadcasting Metadata Dictionary (“PBCore”).

Overall project recommendations are fully detailed in the Compliance and Sustainability Plans, submitted to CPB as part of the final project deliverables. This document describes the anticipated scope of work for initial implementation of PBCore.

Implementation requires action in four main areas:

- Advocacy
- Training
- Technical assistance
- PBCore maintenance

The C&S team believes that these factors are critical to success:

- Sustained momentum
- PBCore implementation must be managed by a single entity with the necessary skills, credibility, and track record.
- PBCore implementation requires initial funding from CPB.
- Public broadcasting interests must develop a business model to sustain the effort long term.

The above-referenced final project deliverables represent a full discussion of the need for a public broadcasting metadata standard, and why PBCore is the appropriate choice. As André Mendes, chief technology officer at PBS, says,

PBS is fully aware of and behind the implementation of PBCore as the metadata standard for public broadcasting. Furthermore, PBS believes that the PBCore effort is essential to the evolution into a more efficient supply chain environment that will allow public television stations to fully leverage their content across legacy and new media distribution platforms.

Implementation of PBCore must address a range of technical, cultural, workflow, and economic considerations.

- *Technical* issues will center on forms in which the PBCore is expressed, interoperability between different applications, databases and networks, and its role in initiating a digitizing/archiving process;
- *Cultural* issues relate to values, mission, and roles and well-developed and deeply entrenched practices;

- *Workflow* is the active implementation of the values and premises defined by the culture and are fundamentally changed by the implementation of digital systems; and
- *Economic* factors relate to local and system-wide costs. In addition, an overarching concern for PBCore implementation is sustainability—including financial sustainability—over the long term.

There are also key differences between how and when public broadcasting stations as well as those broadcasters' use of the emerging “third” medium, the Web, will use PBCore. As a whole, public radio is furthest down the metadata road, with the creation of the ContentDepot and other activities. In part this is due to the relative ease with which audio can be delivered over IP, in part due to the structure of public radio nationally, and in part due to the early work of some visionary leaders in radio. Additionally, interesting work is already being done by our new media community in the area of constructing a human-friendly interface to PBCore. As a general rule, implementation in television will be more complex, expensive, and difficult than in radio or the Web. PBCore must serve our full range of public service media, including emerging digital services. Our collective experience has shown that implementing a next-generation metadata schema is something that is universally under scoped by technologists and vendors.

Metadata implementation is a nuts-and-bolts issue in the digital transition, not something headlined in news releases, funding requests, and constituent briefings. Few public broadcasting managers give the subject any thought until it is right in front of them as they develop digital facilities and services, when they're faced with a series of seemingly esoteric, yet critical, issues. Currently, only a handful of stations are able to make any use of a metadata standard, because—while useful—extensive metadata implementation is not required in an analog model; and because broadcasters have not had affordable digital asset management solutions available to them. This has created a situation where stations increasingly need solutions that will enable them to share content with their production and distribution partners, as well as help ease the burden on their current digital production, broadcast, and archive systems.

Things will change rapidly in the next few years. The rollout of the ContentDepot and PBS Next Generation Interconnect System will accelerate the adoption of metadata, as will PBS ACE and other automation systems. Readying broadcast content for distribution on alternative platforms will also require metadata implementation. The C&S team anticipates that relatively few public broadcasting stations will adopt PBCore in the next 12 months, but that an increasing number will do so in a 2-3 year time frame, (including vendors who service their needs), with virtually all stations being PBCore-compliant within 5 years.

There is some urgency. Public broadcasting has made a substantial investment in PBCore, and there's considerable momentum behind the PBCore project. There is also a significant risk to delay. There's no question that metadata will be integral to our services. The only issue is, what metadata standard will stations and producers

use? If we don't act quickly to secure PBCore's position as the public broadcasting standard, we risk a period of competing systems at the precise time we need to focus our energies on working together.

Advocacy

Perhaps the most important lesson learned in the PBCore test phase was how important educating potential PBCore users will be in achieving rapid adoption. The cultural change necessary for organizations to adopt PBCore is likely a more difficult challenge than overcoming the technical learning curve, and support is needed throughout organizations attempting to benefit from PBCore. Even though there has been significant work in this area, we still need to continue educating management and opinion leaders on why PBCore is needed. We would also see more rapid adoption if we can give them enough information to help them envision, and get green-lighted, system upgrades and new development projects that use the PBCore.

In the first phase of implementation, advocacy is critical, spreading the word about the capabilities of PBCore and its importance to our digital distribution future. "PBCore" should be a recognized term within public broadcasting, as well as within the larger communities with which public broadcasting interfaces, especially including vendors. And, some efforts should be focused on major program suppliers and producing stations, independent producers, and vendors that will, of necessity, be among the early adopters.

In addition, active support from PBS and NPR PRSS is essential. Both organizations are in the process of designing next-generation distribution platforms. Without enthusiastic support from these organizations, and other leaders in the industry, we may be left with an elegant, but stranded, standard.

Scope of work: develop an effective plan for bringing PBCore onto the radar screen of appropriate public broadcasting executives at the station level, as well as regional and national distributors; create communication channels with appropriate industry groups and vendors; create communication channels with major suppliers and stations. Define PBCore in a concise and compelling way; secure support from PBS, NPR, and other key organizations.

Training and Technical Assistance

The PBCore can be thought of in two ways, each having an impact on its respective training and technical assistance scenarios.

- The PBCore metadata application profile itself.
- The ways in which PBCore can be implemented.

Regarding the first bullet, it is fairly clear what would be involved in training and familiarizing potential users about the PBCore descriptive elements, their meaning, their vocabularies, and their proper usage. This is ground level training that insures

the PBCore elements are being used appropriately. Technical assistance refers to help with the fundamentals of the schema, not necessarily how it can be applied in real world situations.

Regarding the second, it will require additional experience and analysis to understand what a useful “demonstration model” of PBCore implementation would be. PBCore is not a single, shrink-wrapped product that is installed and applied. It is a building block that can be inserted into many different applications and many different models, all depending on individual station infrastructures, capabilities, and needs. There will almost certainly be multiple demonstration models.

Training

The major training-related work of the first phase will be to ascertain what tools will be most useful as the adoption of PBCore gains momentum. The C&S team believes that there’s relatively little benefit in conducting traditional PTV training activities. Until stations or other users have a real need to implement PBCore, training can do very little. Put simply, there’s little to be trained *about* until a user is actually looking at implementation. What this means is that implementation needs to anticipate the inevitable need for information and training, using a just-in-time approach. It’s likely that some combination of a robust web site, “help desk/answer-person”, and targeted one-on-one consulting will be developed to flexibly address and advise on how a station can implement PBCore, offering options and helping stations understand those options.

It’s also likely that only the largest of public broadcasters can support a full implementation of PBCore without external assistance. On a system-wide basis, scaled implementation is important, so that any organization is able to start wherever their experience level and internal systems would currently allow, and be able to grow into a more comprehensive use of the PBCore over time. The C&S team suggests that a small set of current or upcoming projects be identified, which need assistance in PBCore implementation. Expertise provide to these organizations would create solid models from which we can all learn and build on in the future.

Scope of work: Ascertain training needs of public broadcasters, including major producing stations/entities; develop effective approaches, tools, and procedures for delivering training; develop plans for scaled implementation; create demonstration models of what PBCore looks like implemented and how it is used.

Technical Assistance

Usefulness and wide availability of PBCore will be enhanced if (1) the human interface to PBCore is developed in a way that is natural to the widely varying needs and professional experience of television, radio and web producers and distributors; and if (2) there is a seamless integration of PBCore into the tools or work processes people are already using (for example, mapping to asset management systems).

An important finding of the PBCore test implementation is that the apparent simplicity of the PBCore design may cause users to underestimate the complexity of the implementation task. While users may have the technical capacity for manipulating the data once it was expressed as XML, the procedure of mapping the metadata to existing, or future, internal system databases was something that called for skills that may not be readily available.

This work would include building a freely available tool for markup, providing a basic content cataloging tool. This would allow users with limited technical capacity to produce PBCore compliant metadata records and to express these records as PBCore -compliant XML.

Scope of work: Provide expert advice liaison to vendors and public broadcasting developers who design and implement PBCore interfaces for easy data entry or who map PBCore to their asset management systems. , Create a basic content cataloging tool.

PBCore Maintenance

To be useful, a standard must be stable *and* flexible. In the course of normal use, improvements are suggested. As technology and services change, standards adapt. All standards bodies have formal processes for collecting, reviewing, adopting and publishing changes. It will also be important to stay in communication with other standards organizations, since PBCore is influenced by standards set by those bodies. In addition, work remains to be done to simplify and explain the language within PBCore, and provide more “producer friendly” documentation and examples.

To develop and manage these processes, a PBCore Standards Committee needs to be created; and a management entity designated.

Here is another opportunity to drive adoption. If we create/maintain some simple tools which will convert metadata to and from PBCore into the required format for other standards, we can lower the real and perceived risk for producers and vendors who are thinking about using PBCore.

Scope of work: under the direction of the PBCore Standards Committee, review standards processes from other organizations (e.g., SMPTE, Dublin Core), propose processes and systems for PBCore; manage initial implementation of these processes and systems, including development of PBCore website.

Recommended Next Steps

Advocacy

- Based on existing work, define PBCore in a concise and compelling way
- Develop a plan for putting PBCore onto the radar screen of public broadcasting executives

- Create communication channels with appropriate industry groups and vendors
- Create communication channels with major content producers and distributors
- Create a demonstration model of what PBCore looks like implemented and how it is used

Training

- Evaluate current awareness and understanding of what PBCore is among constituencies
- Ascertain training needs of public broadcasters, including major producing stations/entities
- Develop effective approaches, tools and procedures for delivering just-in-time training

Technical assistance

- Provide expert advice liaison to stations; and to vendors and public broadcasting developers creating PBCore interfaces for easy data entry or mapping PBCore into their asset management systems
- Work with key leading technology suppliers to PBS broadcasting solution efforts to build PBCore compliancy into their solutions
- Establish a “helpdesk”/monitored BBS support tool
- Create publicly available cataloging tool

PBCore maintenance

- Review standards processes from other organizations
- Propose processes and systems for long-term maintenance of PBCore
- Manage initial implementation of these processes and systems, including development of PBCore website
- Monitor developments of other standards that relate to PBCore
- Maintain a set of mapping/conversion utilities to translate to and from PBCore metadata