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pharos whitepaper

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1 Abstract

The increasing affordability of LCD and plasma panels is encouraging television viewers throughout the world to replace their CRTs with larger displays. The quality of digitally delivered 525- and 625-line SD when viewed on a new flat panel 40in monitor can be extraordinarily good and will be further improved as the industry moves forward into HD. Larger screens inevitably encourage viewers to invest in surround-sound equipment, bringing the cinema experience direct to their homes. This in turn imposes on broadcasters the need to deliver multiple signal channels, transmitting Dolby 5.1 surround as a digital stream. The increasing globalisation of program delivery has added to the requirement for multichannel audio by expanding demand for multilanguage soundtracks. Through case studies, this article will look at improving audio workflow in modern file-based broadcast environments.

2 Centralised audio storage

2.1 RedBee Media

A Pharos digital audio server system forms the central audio storage resource at the Red Bee Broadcast Centre in White City, London, one of Europe's most modern playout facilities. Designed specifically for broadcast and post-production applications, it allows programs to be captured and filed using an integral SQL database. Audio files can be located quickly and used in playlists or played directly to air. Applications include radio announcements, program store-and-forward, automated voice-over playout and multichannel audio playout. A record screen enables announcers or voice-over artists to make their own recordings. Audio files required for playout can be recorded automatically from DAT or CD using the ingest screen. Multiple tracks on one tape can be recorded in a batch, speeding up the process. BWAV files can also be copied directly on to the audio server and then logged in the database. Files can be copied from server to server automatically or manually, allowing configuration for full one-to-one redundancy.

The server system brings many advantages both to production and playout operations, and supersedes traditional audiotape, cartridge-based and MiniDisc play-in devices. Recordings can be made to the server without having to load, label and archive individual media. Audio content held on the server can be accessed rapidly using its integral database, giving all the benefits of a massive library without risk of items being lost in transit from shelves of individually archived storage media. The system also provides levels of redundancy not normally associated with traditional magnetic media.

Stored content is accessible from continuity and the automation-driven playout suites throughout the facility. The system's primary function is to store speech clips for end-credit and other program-junction announcements. It can also be used for other audio-based objects, such as music or effects, as channels evolve their output content. Each automated playout channel has access to at least one replay port from the server-cluster. The continuity booths are equipped both for record and replay.

The audio server is fully integrated into automation systems chosen for playout operations and normally plays prescheduled clips to air without manual intervention. It can also be accessed under direct control by playout directors, retaining at all times their freedom to initiate an immediate manual audio playout for highly reactive channels such as BBC One and BBC World.

A major advantage to the production workflow is the facility to populate the database directly from individual channel planning schedules. Very little metadata needs to be keyed as part of the authoring process. Recording productivity is thus high and expensive vocal talent costs are kept to a minimum.

2.2

ITV

Voice-over recording UK commercial network, ITV, uses a server system as the core of the voice-over recording facilities at the Southern Transmission Centre (STC) on London's South Bank. This facility enables voice-over presenters to create audio interstitials for the ITV1 network and regions, as well as for ITV2 and ITV3, all played out under the control of the transmission automation system. The installation consists of three audio servers integrated to a database-driven media manager.

ITV's first digital audio server, installed in 2002, replaced a PC-based audio recorder that served ITV1 Network and ITV2. The new three-server system has a total of 12 audio ports that are routed to the individual regional destinations served by the STC. In addition, files destined for the Northern Regions are automatically sent by FTP to the ITV Northern Transmission Centre in Leeds, for regional playout. Similarly, voice-overs recorded for HTV Wales in Cardiff, on their digital audio server, are sent automatically to London for playout.

Because the three servers are mirrored, voice-overs can be recorded for any region. The items are then automatically copied between servers. Operators in each voice-over booth have access to a make-list and fingertip control of everything they need for fast recording and audition. Each voice-over is recorded in stereo as a 48 kHz 16-bit BWAV file, including metadata. The Pharos record workstation installed by ITV is very easy to use; essential when a typical session may require more than 100 announcements spread across all services. The presentation suites can preview their recorded announcements via a direct playback workstation. The software is modular and highly logical, allowing ITV staff to maintain and configure the system themselves.

The audio server allows recordings to be made without having to trace, load, label, back-up or archive individual media. Stored content can be accessed rapidly using the integral database, giving all the benefits of a massive library without risk of items being lost in transit from shelves of individually archived storage media. The server can also be configured to provide levels of redundancy not normally associated with traditional magnetic media. BWAV files can be copied directly on to the audio server and then logged in the database. Files can be copied from server to server automatically or manually, allowing configuration for full one-to-one redundancy.

3 Digital audio router control

3.1 BBC World Service

BBC World Service uses a highly flexible automated scheduling and playout system at its Bush House headquarters in London. An equally flexible audio system was required so World Service consulted Pharos.

The new system is IP-based and replaces earlier analog routing equipment. It enables an NTP digital audio router to be accessed and operated via 96 existing control panels in various parts of the building. It also gives each of BBC World Service's 43 language sections the facility to control transmission output using a web browser. The BBC's analogue system already used a proprietary control panel within each studio, showing the time to air and the designated network to be used. Integrating the new audio server system with the existing panels was more cost efficient than supplying, installing and configuring 96 new panels. It also eliminated the need to familiarise the staff with a new control interface. Software records no longer existed for the previous system so we reverse-engineered it, designing an interface to communicate with each control panel and using XML to integrate with legacy protocol interfacing.



Figure 1. Pharos at BBC World Service

4 File-based multichannel audio

The increasing globalisation of television broadcasting has greatly expanded demand for multi language television channels. This is particularly relevant within the European Union. In 2004 Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia joined the EU. And more recently, the EU admitted Bulgaria and Romania. Satellite delivery was the great catalyst for the shift from national to international program delivery, enabling broadcasters to address multiple countries with a single signal stream.

A growing number of broadcasters are adopting media asset management based workflows to increase their operational productivity. This introduces the opportunity to repackage content for multiple applications more efficiently than was ever possible with tape. Multilanguage audio channels are no longer limited by the number of independent tracks available on commercial videotape recorders. The inefficient and resource-consuming workaround of running two or more synchronised VTRs to gain extra audio tracks is also eliminated.

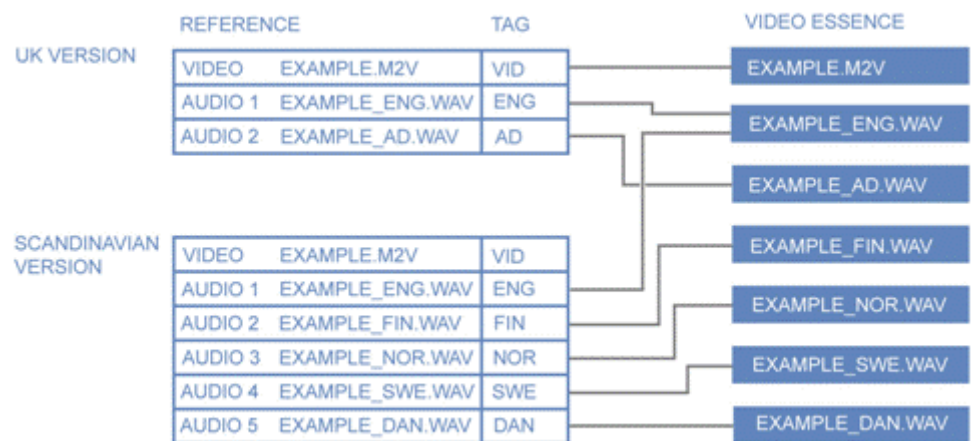


Figure 2. Diagram: multi language audio tracks

Three major international broadcast networks have recently implemented Pharos file-based multichannel audio handling as part of their investment in media asset management systems. Each company was finding its audio workflow constricted by the limitations of tape even using the eight-channel Sony IMX tape format.

At one of these customers, the initial requirement was to ingest an unlimited number of audio channels from which the desired one or more channels could be securely associated with the appropriate video clip and then automatically selected for playout. The facility to add further languages after the original asset had been ingested to the archive was also essential. The objective was to allow easy management of the entire process end to end, to show which channels had been acquired and which remained to be obtained, then to add the extra language dubs as these become available.

The solution combines the inherent flexibility of efficient audio media asset management with the open file wrapper format used by Omneon's Spectrum server. The only limitation is on the output side, with the number of audio channels that can be transmitted via an SDI port. A new wrapper file with the extra audio channel in it is created for each program. Each audio channel is tagged with the relevant ISO language code inside the file wrapper. This enables the playout system to select any language from the file. The system includes software that allows implementation of a rule to prioritise. For example, the first choice might be to play Danish if available, otherwise Swedish or, if that too is missing, then English. The primary server is a large system that includes multiple encoders, decoders and storage. It provides ingest and playout capability and is used as an intermediate store, online archiving being performed on an external high-capacity server.

A typical operation would begin with a request from the traffic system for a specific new language track to be added. It is then held in the media asset management system among a queue of actions that need to be completed ahead of transmission. Each new language dub arrives as a wav file.

The Pharos system then automatically adds the new files to the existing asset and places it in a cue for approval. Once checked and authorised, it is ready for transmission. The system knows all the processes involved. Manual involvement is only required at specified points in the approval chain.

4.1 Technicolor Network Service

File-based media asset management also plays a central role at Technicolor Network Services' UK multichannel playout facility at Chiswick Park, London. This facility can accommodate over 30 channels supporting both SD and HD playout, and was designed from its inception with scalability and cost-efficiency in mind.

The system provides workflow management, which integrates asset tracking, rules management, reporting and status. It also provides the tools Technicolor needs to ingest content from different sources, generate MPEG-4 proxy browse copies and to tag the audio with the relevant language descriptors. The new installation has reduced the network's costs and, more importantly, reduced the processing time required to deliver additional languages and channels to Technicolor clients' existing inventory of assets, compared with pulling tapes from a library and managing time-consuming re-edits and ingest. The system delivered by Pharos includes touch screen-based master control with an intuitive graphic user interface.



Figure 3. Pharos Mediator media management system in use at Technicolor Network Services

5 Summary

The demand for multichannel audio capabilities is likely to increase further as IP-based television program delivery becomes increasingly common. File-based media asset management makes program repackaging and reformatting far easier than was ever possible with the traditional combinations of storing video videocassettes on shelves and delivering them by hand.