Towards IT-based production for television

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This year’s EBU production technology Seminar tackled a subject that is likely to occupy the attention of all broadcasters, large and small, before long – the move towards IT-based production for television.

With the move away from videotape recorders and the increased use of servers in TV to store video as data, it’s important to agree the working practices and standards that will come to dominate this new structural model for the TV industry.

The goal is to reach a consensus for IT-based production that at least matches and preferably exceeds ITU Rec. 601 in video.

At the seminar, Maurizio Ardito, chairman of the EBU Production Technology Management Committee (PMC) laid out the challenges:

“Now that broadcasters are well on the way to making the change from analogue to digital, the new challenge is the transition from hardware to software. This is a paradigm change – it will require thinking in data modelling terms, changes to workflows and interaction with non-broadcast manufacturers and people. The hope was that by applying technologies from the IT world, broadcasters would benefit economically through faster production, better managing of content, and cheaper equipment costs – especially if that ‘equipment’ was mainly software.”

The technical benefits would involve the seamless handling of different standards, automated retrieval and storage of content, and file-based exchange of content. Mr Ardito pointed to areas of concern when adopting IT in a TV environment, not least that the user requirements of TV production are very different from those of traditional IT-based installations.

“The TV market is small – but the equipment and systems are extremely complex and demanding”, he said, and added his concerns on the lack of knowledge of TV needs within the IT manufacturing community. “Our present digital or analogue installations are the result of a long evolution – they are very efficient and reliable. It will not be easy to provide the same quality of service as today – but if this is not guaranteed, how do we convince the users to invest the money and make the changes?”, he asked.

“Even though the cheaper capital costs of IT equipment might appear attractive, the additional running and maintenance costs could mean that the final cost savings prove to be illusory”, he said. “Have we got the necessary knowledge to start big risky projects based on software? Our experience gained in small installations is not always very encouraging – and our biggest challenge is to connect installations from different manufacturers and make them interoperable”, he said.

The real benefits from the introduction of IT technology will come from changes in workflow and within organizations themselves, he believed.

The seminar set out to explore these issues, looking at the key areas of technology and examining early implementations of IT in broadcasting via a number of case studies.
In an environment where programme material no longer has a physical presence in the shape of videotape wound on to cassettes, keeping track of what you have means new methods to guarantee comprehensive and reliable content management.

There are an increasing number of competing content management systems in the market but, as yet, few standards are available that could serve to link them, and enable interoperability between them.

Several EBU committees are looking at this area, in particular at the metadata standards that might facilitate useful exchanges between systems.

Consultant Dr Jürgen Heitmann, of AV Media Technology, offered some suggestions for a generic architecture for content management systems, drawn from his collaboration with the EBU project group P/FTA, looking at future TV archives. Such an architecture should be designed to support ingest, archiving, editing and playout of high-resolution material in various formats. There should be the ability to mirror the high resolution format using browse copies and key frames. The system should generate, store, access and modify the metadata, support automatic indexing and advanced retrieval tools, and support the overall workflow by granting access to metadata and essence in suitable quality at various workplaces. For maximum scalability, the system should also be able to function across multiple server systems.

Dr Heitmann added that clear specifications for interoperability are required for CM systems, both in terms of functionality between systems and the interfaces they support.

Metadata is clearly going to be the essential element in managing future systems that deal with television material as data – and Carol Owens from BBC Technology gave delegates an update on her department’s work in this area, and on the current progress towards reaching standards in metadata, informed by her role as chairperson of the EBU P/Meta project group.

Development of BBC Technology’s data model, SMEF, continues – Ms Owens talked about “SMEF Beans”, which use the widely-used computer standard Java to create business objects that can easily be exchanged between different content management systems.

As to agreement on metadata standards or the rollout of metadata-based systems, Carol Owens admitted progress had been slow: “The plethora of standards to choose from has slowed down the takeup – and as an industry we need to resolve the disharmony that exists and pick those technologies in metadata and identification that we think will be winners”, she said.

P/Meta has started this process by recommending a process model for business-to-business exchange between broadcasters, and Ms Owens told the Seminar how active collaboration was proceeding with all the different standards bodies concerned with metadata, in the hope of reaching a useful consensus. “A pattern is starting to emerge – but it’s a very complicated one”, she said. She pointed to
areas where de facto standards were beginning to settle, but some had drawbacks – for instance, in the set-top box area, de facto standards were being driven by commercial broadcasters and she asked whether there was more of a role for the EBU when participating in such discussions. “Does EBU membership need a higher profile to ensure public service broadcasting requirements are met?”, she asked. “Metadata is the key to content management, but only if we’re using the right standards – and ensure that the key and lock fit each other. Now is the time to get on with it and implement what we’ve learned so far”, she added.

Learning from broadcasters’ experience is an important part of the annual winter EBU Seminar, and several broadcasters gave presentations explaining what they’d been doing.

Gordon Castle, senior vice president of technology at CNN, explained CNN’s progress in implementing an integrated digital production environment. “We began the technical planning in 1997. It was motivated by the change in our competition, which meant we had to be faster and more flexible in the acquisition, production and distribution of news and information – and we wanted to take advantage of the improvements in IT”, he said.

A key element was moving CNN to a compressed video environment – long GoP MPEG-2 – but Mr Castle stressed that what was most important was combining technology changes with changes in workflow. “It’s workflow that drives the technology changes”, he said.

CNN had added more channels, but had centralised the workflow for video production, using media servers and non-linear editing systems, and had added video browsing facilities on the journalists’ workstations. “The changes had a staggering effect on efficiencies”, he said. A digital archive facility that can handle 20,000 hours also boosted the efficiency of the operation.

Gordon Castle said that CNN had already begun the work to implement the MXF and AAF file format standards that he felt were essential components of future systems. “Integration through middleware is an important concept in what we’re doing – implementing MXF and AAF, and moving to a three-tiered middleware structure to connect applications, middleware and storage. It gives us common access to content and a flexible enterprise framework. We’re moving towards a global content management and storage system”, he said.

The seminar heard detailed presentations reviewing the progress in establishing and standardizing the file formats that have been optimized for TV production – GXF, MXF and AAF – and presentations on using file transfer in the broadcast environment.

Al Kovalick, principal architect at Pinnacle Systems, explained the problems and solutions required to guarantee the seamless operation of servers in TV production and distribution – and it left no-one in any doubt that the level of expertise required by broadcasters to understand such issues and avoid mistakes needed a serious boost.

Chris Chambers, senior research engineer at BBC Research & Development, explained how his department’s ORBIT research project was investigating exactly the subject matter of the Seminar. ORBIT stands for “Object Re-configurable Broadcast using IT” and is aimed at harnessing the economies of scale of IT technology, using metadata and open standards such as MXF and AAF, and developing standards for networking and control of IT-based studio components – especially the middleware software to connect studio components together.
Mr Chambers spoke of the importance of using open standards, in allowing the design of infrastructures at a higher level, and said the open object framework, that is the core of ORBIT, represented the possibility of a new Rec. 601 for the IT world.

One clear result of this Seminar was that much work needs to be done to ensure broadcasters of all sizes make the right decisions when moving towards IT frameworks – and a new EBU project group was announced to take this work on. Chaired by Gyorgy Agoston, the technical director of Hungarian TV, this project group, P/FTP (Future Television Production) will attempt to draw together recommended practices in the entire IT-based production chain.

It aims to produce status reports on available technologies, production architectures and the operational practices of IT-based systems, drawing up reference architectures for broadcasters and a comprehensive list of user requirements.

There will be an extensive EBU report on the experience gained in the project, with practical guidelines recommended for system design and operation. “We want to find a common broadcast/IT language between manufacturers, and between broadcasters and manufacturers – and we hope to initiate discussions with broadcasters and manufacturers to achieve a high degree of interoperability and interchangeability between the different hardware and software elements”, said Mr Agoston.

There was a clear consensus at the Seminar that IT-based technology will become dominant in broadcasting in the next few years – and it was up to broadcasters to begin the process now of thinking through what they want from this technology. “Broadcasters have to be careful they’re not dominated by the technology – it needs to be the other way round” said EBU senior engineer, Hans Hoffman.

Given the changes in operational practice required, if this transition to IT is going to be successful, a fundamental re-think of how TV stations are organized is needed – and it will then be up to broadcasters to actively participate in driving the development of IT in broadcasting, and to optimize the way it is introduced to the TV environment – the new EBU P/FTP project group is a good first step in that process.