ITEA

INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT

PROJECT RESULTS

Innovating in live TV
Driving IP-based networking and production

PELOPS made key innovations in content creation for TV production focused on networked studio and content-based analysis for live sports. Its software-based, network-oriented distribution approach enables content enrichment for immediate and later use. PELOPS also developed novel methods to display a large amount of video in combination with computer imaging to reduce cost and complexity of multi-viewpoint presentation. IP infrastructure technologies developed are now driving video and IT network convergence.

A lot of equipment coexists in a TV studio – including cameras, servers, video routers and switchers, and audio mixers. This is interconnected by dedicated point-to-point links using interfaces dependent on the format of the audio-video material. Additional signals ensure equipment control and support for efficient programme production.

Successive revolutions in formats for digital and high-definition TV have inevitably strongly influenced this production environment. Each change requires new production infrastructure and equipment with associated investments for TV channels and content producers. The concurrent existence of standard and high definition as well as the new formats requires development of a format-independent infrastructure.

Technical trends to IT convergence

On one hand, due to the convergence of technologies, many sources of pictures exist: TV/ personal computer (PC), standard/ high definition (SD/HD), interlaced/ progressive scan, etc. On the other hand, the cost of connectivity – based on the Internet Protocol (IP) – is decreasing dramatically. Furthermore, it is not economically viable for content producers to renew their infrastructure each time a new standard is decided.

Consequently, Ethernet/IP technology is beginning to move the studio from being format/hardware centred towards being network/ software centred. This ensures the studio is ready for a future that will require more than video- and audio-signal processing. It offers a unique link to convey multiple video and audio signals, control

PELOPS (ITEA 04010)

Partners
Acotec
Barco
EVS Broadcast Equipment
IBBT
INRIA / IRISA Rennes
Leo Vision
Telefónica I+D
Thomson R&D France

Countries involved
Belgium
France
Spain

Start of the project
January 2005

End of the project
June 2007

and programme-associated data, voice over IP (VoIP) and general computer data.

Migrating to a network/software-centred infrastructure required:
- An IP-based architecture for real-time video production;
- Efficient equipment synchronisation for seamless mixing and switching of pictures;
- A studio software-management tool to ensure quality of service over the IP network; and
- A distributed monitoring platform using off-the-shelf PC display components and technology.

Very accurate synchronisation
The main difficulty in synchronising equipment over an Ethernet/IP network comes from the packet-transmission time, which is not a constant. PELOPS combined the IEEE 1588 standard with a specially developed jitter-filtering mechanism to provide an accurate network-timing service.

The project also demonstrated that combining IT network technology with the high-end graphical processors (GPU) used in current PC gaming platforms can provide an effective solution to build enhanced monitoring systems. Results achieved in PELOPS on synchronisation and video IP encapsulation have been taken to the IEEE (802.1AVB) and Internet Engineering Task Force (AVT) standardisation bodies.

Creating business opportunities
Arrival of new production formats offers a real opportunity to switch to IP technologies in the studio, in

a global media technology industry market expected to reach more than €13 billion in 2010.

Introduction of IP technology in the studio will start with external interfaces to existing products such as cameras, video switchers, video recorders and video servers. In the future, these interfaces will be integrated in such products to reduce costs. Control-room expenditure can be reduced dramatically by an efficient use of cost-effective IP switches, which can carry more than one signal, compared with the expensive high bandwidth video router used traditionally.

The monitoring multi-viewpoint controller can also benefit from the high visualisation power of current gaming PC technology, reducing the price of the video monitoring system.

Applying the technology
A new product called 'Networked Digital Studio' from partner Barco uses technologies developed in the project. This makes it possible to connect digital systems for archiving, editing and re-purposing of multi-format and high-definition media, increasing ease of live production as well as off-line editing. The first equipment is already in place at alpha and beta customer sites, showing IT-based solutions are finding acceptance in the broadcast community and paving the way for a market with high potential.
Several sports applications have been developed, including live video on demand (VOD). Advances include:
- Integration of automatically generated metadata for segmentation and annotation of sports sequences or VOD applications;
- Support for multiple displays and a virtual stadium; and
- Development of a VOD demonstrator allowing end users to access important scenes of soccer matches only a few seconds after these happen.