Encoders/Decoders Produce for Public TV Stations

Aug 11, 2014
by Frank Klimko

As today's interactive communication universe continues to grow, public access television stations are delivering video content to a widely splintered audience that ranges from desktops watching live streaming to smart-phones and mobile devices—all using various formats and bitrates.

Elemental 200 Series server/transcoder system

Public access stations are in a tough spot: They don't have the virtually unlimited budget of a major broadcast outlet, but still must produce and broadcast content for a broad array of devices simultaneously. On top of that, the organization's broadcasts have to look at least professional. At the same time, they know that the cavalcade of new tech threatens to swamp content producers.

"Almost continually, there is the launch of a new device that will add its own little tweak," said Keith Wymbs, chief marketing officer for Elemental Technologies, which makes encoders and decoders. "They all have slightly different protocols and technology. That increases the complexities."

However, today's electronic boxes of technological magic can almost instantaneously transform unfriendly video files into watchable content, and are becoming even more essential and affordable. Devices that public or government video operations wouldn't dare think of buying years ago are now well within reach. It hasn't been a matter of just moving the price points; the underlying technology has just gotten vastly better.

At the District of Columbia's Office of Cable Television, Director Eric Richardson is faced with delivering content for the District's two municipal government channels, gavel-to-gavel coverage of the live and recorded activities of the DC City Council and its various committees, the school board as well as miscellaneous public service programs.

SAVING TIME

Richardson recently upgraded the station to Elemental Servers from Elemental Technologies headquartered in Portland, Ore.

Keith Wymbs, chief marketing officer for Elemental Technologies

"It's a time saver," Richardson said. "We have the ability to streamline workflow and to transcode multiple files at once which enables us to get our content out in a fraction of the time."

"The Elemental Server has allowed us to move away from the restrictive/proprietary file formats we were using before that were only available on Windows PCs," he said. "We are now able to broaden our reach to multiple platforms such as IOS and Android, and to desktop operating systems with the widely compatible MP4 file format."

The Elemental Server is engineered to be both fast and upgradable, Wymbs said. Elemental devices from four years ago have gone through generations of software upgrades, allowing them to stay up to speed. The company has built a really fast encoder—most encoding systems run in real time, taking two hours, for example, to convert a two-hour video. The Elemental encoder can do it in as little as 10 minutes, according to Wymbs.

"That's how we save our customers time," he said.

For public access operations, encoders and transcoders play important roles at a number of different points along the distribution workflow. On the production side, ingest encoders for live, tape and file-based sources provide gateways for conforming varying input sources. At the other end, encoders compress and encapsulate outgoing live and linear signals into the required file formats for distribution to the cable head-end.

Imagine Communications, which is one of two companies that formerly comprised Harris Broadcast, acquired Digital Rapids and now offers a comprehensive array of encoding solutions spanning all aspects of the content chain, according to Steve Copeland, the company's director of product management.

At the production side, the Texas-based company's SelenioFlex Ingest provides multi-format live-to-file capture and encoding from live sources or recording, as well as transcoding from file-based sources. This works well for the wide variety of input sources that may be provided by volunteers and contributors to a public access channel, Copeland said.

Imagine Selenio MCP1 transcoder

For outgoing signals, the Selenio MCP media convergence platform combines video and audio processing, compression and networking in a space-saving form with a choice of encoder modules (including MPEG-2, H.264 and JPEG-2000) to support the station's contribution or distribution architecture.

"And of course, a very hot topic today is encoding those signals into the varying formats," Copeland said.

The SelenioFlex Live multiscreen encoders provide high-quality encoding of live and linear source signals into the multiple adaptive bit-rate streaming formats that can be sent to viewers on multiple platforms, he said.

ONE-BOX DESIGN

Since Blackmagic Design's 2011 acquisition of Teranex, the Teranex 2D and 3D Processors have been wowing the post-production crowd with lights-out results. The Teranex, with its Thunderbolt connectivity, is also a good fit for public access TV, said Bob Caniglia, the company's senior regional manager for Eastern North America. BMD is headquartered in Melbourne, Australia, with its U.S. base in Fremont, Calif.

Teranex 3D from Blackmagic Design

"The majority of today's public access outlets have to deal with a range of video sources, formats and frame rates when acquiring and delivering content," Caniglia said. "And it often takes multiple devices just to receive, transcode and output that content, increasing the time and money spent."

The Teranex line solves that. The processors are essentially three products in one: a high-end broadcast processor, a capture and playback device via Thunderbolt, and UltraScope waveform monitoring, all in a single, affordable device. With Teranex, any facility can handle real-time standards conversion in SD, HD and even UHD/4K, Caniglia said.

With real-time video conversion, standards conversion and capture and playback, public access stations can take advantage of Teranex's flexibility to adapt to virtually any workflow. The new Teranex Express is a real-time broadcast up/down converter that operates in SD, HD and Ultra HD, and includes new 12G-SDI technology, Caniglia said.

"Teranex lets users move between hundreds of video formats instantly, providing public access outlets with the flexibility to convert from virtually any television format to any other television format," he said.

MINDING THE BANDWIDTH

Video quality is also an issue. Low-definition video is out and public access operations must provide superior video quality if they want to be taken seriously, said Norman Krebill, vice president of sales for Media Excel, headquartered in Austin with offices in Seoul and Silicon Valley.

To pack all that content into an existing Internet stream can be a problem, but the company's HERO encoding and transcoding line can improve bandwidth efficiency. The H5000E.HEVC is a low-latency encoder platform specifically designed for point-to-point distribution over IP and ASI networks, Krebill said.

Media Excel H5000E-HEVC encoder

The H5000E.HEVC and H5000D.HEVC (contribution decoder) provide operators the ability to transmit HD video over IP or satellite at the same bitrate as standard-definition video.

"This is a huge cost savings for operators, as they are able to transmit their content using half the bandwidth at half the cost of their current transmission requirements," he said.

The product line also includes support for live video for traditional MPEG2 and H.264 for times when the operator has limited legacy systems. This flexibility means that operators are not saddled with equipment that is obsolete or sitting idle, Krebill said.

CONVERSION TO HD

Stations must also deal with the inexorable march toward high-definition, said Barry Verrill, executive director of KLTV in Longview, Wash. The station recently jettisoned its decade-old encoders for high-tech devices that are HD capable.

"I just bought a full set of 12 encoders and five decoders," Verrill said. "This transports our video/audio signals back to our station from three council locations. We wanted reliability and good quality and HD-SD capabilities."

"We needed something to convert to HD," Verrill said. "We think standard def is on way out. In fact, it's hard to buy any TV equipment that is standard def these days."

Two products, from Matrox Electronic Systems, in Quebec, Canada, stand out for the application in the HD conversion world. The Matrox Monarch HD streaming and recording appliance and the Matrox Convert DVI Plus HD-SDI scan converter have been widely adopted by public access groups, said Janet Matey, the company's media relations manager.

Matrox Monarch HD is used to stream live local content and provide live coverage of city/county council meetings directly to a user's computer or mobile device. At the same time, Monarch HD also provides a master-quality recording of the live meeting that can be uploaded immediately following the meeting for on-demand viewing by people who could not connect live, Matey said.

MORE INFO

Blackmagic Design:
www.blackmagicdesign.com

Elemental Technologies:
www.elementaltechnologies.com

Imagine Communications:
www.imaginecommunications.com

Marshall Electronics: www.lcdracks.com

Matrox Video: www.matrox.com

Media Excel: www.mediaexcel.com

The scan converter is used to incorporate computer-based content (such as PowerPoint, Google Maps, local traffic sites or viewer-generated content) into local broadcasts. The computer content is converted into a high-quality HD-SDI signal that is locked to the rest of the production gear, ensuring that the switch to the computer-based content is glitch free, she said.

For stations that lean heavily on the Internet for video distribution, Marshall Electronics, of El Segundo, Calif., just launched a new IP encoder/decoder that supports all popular HD video formats. The VS-104-3GSDI simplifies the delivery of HD video and embedded audio via an IP network, said Devan Cress, director of sales for the company's broadcast A/V Division. The device has configurable inputs and outputs: CVBS, HDMI, SDI, HDSDI, and 3GSDI. Also, it supports unicast, multicast, push and pull streaming via an easy-to-use browser interface now featuring 4:2:2 color space.

"Integrators will like the simplicity of implementing one device that offers encoding and decoding of a 1080p/59.94 signal plus embedded audio," Cress said. "The VS-104-3GSDI provides all the capabilities you might need to transport high quality video and audio content simultaneously."