Application note
File-based broadcasting with R&S®VENICE

Case summary

Need: A major US East Coast broadcast network was looking for a solution that would enable them to orchestrate multiple business units to handle the increased demand to deliver content with a very fast turnaround. Moreover, systems were needed that would allow efficient ingest, content preparation, transcoding and playback – while at the same time being able to switch between different video resolutions and codecs. They also required a system that offered complete automation support. All in all, the new workflows had to be more reliable, flexible and future-ready.

Solution: Innovative Rohde & Schwarz DVS equipment is at the heart of the new infrastructure. Six ingest and production servers VENICE, a R&S®DVS-SAN with 100 TB as well the content control software R&S®Spycer helped the broadcaster to successfully transition to file-based workflows.

Introduction

As broadcast workflows evolve into tapeless file-based workflows, the demand on broadcast equipment has grown significantly. The following paper describes the innovative, file-based workflow implemented at a major US East Coast broadcast network using the Rohde & Schwarz DVS systems VENICE and DVS-SAN. The VENICE systems with their ability to handle a multitude of codecs and video help the network achieve cutting-edge, cost effective workflow. The DVS-SAN solution allows the consolidation of the storage infrastructure with an extremely high performance central storage that dramatically improves the workflow with real-time sharing of content between disparate equipment in the broadcast chain.

Requirements

There were multiple business units at the broadcaster that had to handle increased demand to deliver content in different formats with very tight turnaround. The broadcaster was looking for systems that would enable efficient ingest, content preparation, transcoding and playback which could easily switch between different video resolutions and codecs. They were also looking to streamline and consolidate their storage, allowing their users to share content across the network. They also required a system that offered complete automation support and media management. Last but not least, a future-ready solution that would allow them to use and support new codecs in the future was required.

Original infrastructure

The original infrastructure at the broadcaster consisted of systems from different vendors each with its own limited codec support and its own proprietary storage. They had very limited ways to get content in and out of the systems. This resulted in increased transfer times and needless movement of files between the systems. Managing the infrastructure and storage space was increasingly complex as more servers were brought online.

ROHDE & SCHWARZ

Solution

VENICE – The ingest and production server VENICE from Rohde&Schwarz DVS GmbH enables real-time capture and playout of popular broadcast formats like Avid DNxHD®, Panasonic AVC-Ultra®, DVCPRO®,

Sony XDCAM® and Apple ProRes 422 material. Equipped with a vast feature set, VENICE includes four independent channels, run-down lists, intelligent global presets and a sophisticated transcoding and transwrapping engine. Positioned as the core of a distribution environment, VENICE provides fast, consistent workflows with both compressed and uncompressed video formats. The entire workflow is built around the VENICE solution bridging the video and the data world seamlessly. Content coming in as baseband video stream is converted to files in the required format easily while preserving all the VANC metadata and audio.

Spycer® – The innovative Spycer® content control software enables managing extremely large volumes of data and video content. SpycerNet is a transparent network that makes the contents of all connected systems available for viewing and editing and eliminates the chaos to automatically provide an overview of the contents in all storage systems and workstations. Spycer® removes the uncertainty of finding data in complex networks. An extensive set of search parameters helps you find image data, video and audio clips, and metadata with confidence. Search external drives even when they are disconnected. The intelligent R&S DVS data manager gives you a complete overview of all storage components in your SpycerNet. Spycer® supports multiple MXF variants typically used in broadcast workflows with codecs like DVCPRO®, XDCAM® and Avid DNxHD®.
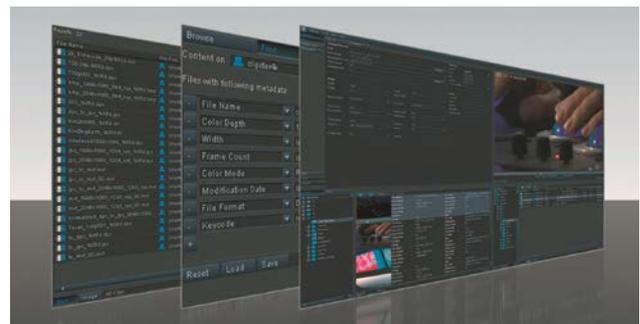
DVS-SAN – The custom-built Storage Area Network (SAN) supports a wide variety of data rates: From 600 MB/s to 10 GB/s and more. The DVS-SAN's modular architecture enables the addition of storage clusters to yield even higher data rates and a larger number of parallel video streams.

The DVS-SAN storage system is built to sustain these data rates continuously, not just in short peaks. The DVS-SAN sports a completely open architecture – it is not a proprietary, insular solution. Whether working with compressed or uncompressed material in SD, HD, 2K or even 4K, all connected clients can direct access digital film and video data on the DVS-SAN at sustained data rates.

Moreover the DVS-SAN enables multiple workstations to access the stored material simultaneously across multiple operating systems. Bandwidth-intensive data streams can be accessed in parallel – and in many cases faster than real-time. Process data even while capturing. This results in a very collaborative workflow without users wasting time transferring content between their workstations.

One of the other important requirement for this broadcaster was the reliability and 24/7 availability. So the customized solution was engineered with a very high level of reliability. The storage was configured using RAID-6 and multiple metadata servers. The system allows workstations to access the data over Fibre Channel or Ethernet connectivity. Engineered to support up to 800 million files and high-speed content sharing, the DVS-SAN offers the perfect solution to maintain rapid growth of file data.

Workflow

The workflow was designed around six VENICE systems connected to a 100 TB DVS-SAN over a Fibre Channel infrastructure. The six VENICE systems provide 24 channels for ingest or playout across the entire workflow. The content coming in from tapes or satellite sources are ingested using the VENICE systems. The VENICE systems can be controlled either using the GUI or via VDCP. Preset configurations saved in the VENICE systems can be recalled in a snap to make it easy for the end users to quickly set up the systems for ingest.

Video, audio and metadata are efficiently ingested into a wide variety of formats. In this particular case, the broadcaster utilizes GXF and MXF formats primarily. The ingest and production server manages native real-time capturing and simultaneously scaling different formats. All content is available within the network immediately. Files coming from the outside can be either ingested directly or transcoded and ingested into the DVS-SAN.

The DVS-SAN is configured as the central storage for production. Thanks to its fault-tolerant design, the DVS-SAN ensures smooth production providing with the greatest possible reliability. With up to 6 GB/s of sustained bandwidth the DVS-SAN can handle hundreds of real-time streams. All the VENICE systems ingest directly onto the DVS-SAN system. The content is available on every other system instantaneously. There is no transferring of content from one workstation to another. The DVS-SAN uses the Quantum StorNext file system that allows Windows®, Linux® and Mac® clients to mount and share the common storage pool. Once the content is available on the DVS-SAN, the Spycer® content control system catalogues the data and keeps track of all the metadata this way making it instantly searchable across the entire network.

Other systems on the network including third-party transcoders, Quality Control systems etc. all connect to the DVS-SAN to utilize the content. The automation systems orchestrates various processes like Quality Control, transcode etc. Six file servers are connected to the DVS-SAN to allow various other systems to access the content over the network.

The Spycer® web services allow the automation system to catalogue and keep track of the ingested data. Using SOAP services, the automation system even moves the content at the appropriate time to the on-air playout systems for playback of the content. The Spycer® also allows remote systems with only Ethernet connection to search, QC and move the content.
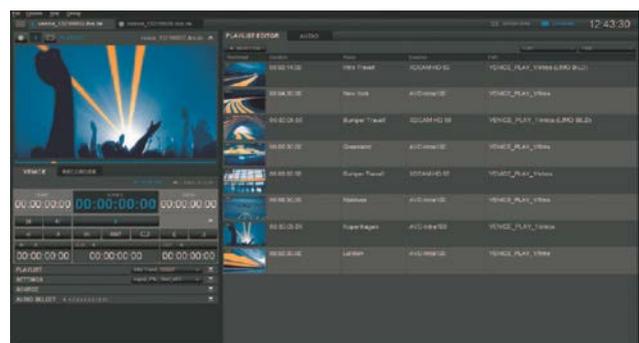
Moreover, the automation system also uses the Spycer® web services to trigger the proxy generation. Remote systems, connected to the DVS-SAN over Ethernet through the R&S DVS file servers, can use the proxy files to QC the content.

The Rohde&Schwarz DVS Avid® workflow option offers a server appliance connected to the VENICE base system and enables direct signal ingest via HD-SDI. In this configuration, up to four channels can be ingested in parallel together with simultaneous proxy file generation. The transcoding mode can convert all media supported by VENICE, such as Apple QuickTime® with Apple ProRes422, MPEG-2 program streams or even uncompressed file sequences directly into Avid® editing environment. All files are immediately checked in into Interplay® and will be ready for editing on a connected Media Composer® within seconds. All ingest operations support "edit while write", so that you may start editing immediately, regardless of whether the source is an SDI signal, a P2 or XDCAM® media or an uncompressed file sequence.

The VENICE system has powerful transcoding and transwrapping capabilities that allow the network to transcode the content into various deliverables.

Benefits

ı Support for a wide variety of video/audio file formats

ı All relevant broadcast codecs such as Sony XDCAM® HD, Panasonic AVC-Ultra®,

ı Avid DNxHD®, Apple ProRes 422, MPEG-2, etc.

ı Numerous file formats like MXF OP-Atom, MXF OP-1a, QuickTime®, TGA, TIF, DPX

ı Comprehensive feature set (playlists, transcoding)

ı Flexibility: complete openness to storage architecture

ı Multi-format capability: SD/HD

ı Integrated scaler for real-time up- and downscaling

ı Simultaneous proxy file generation

ı Easy integration into existing infrastructures
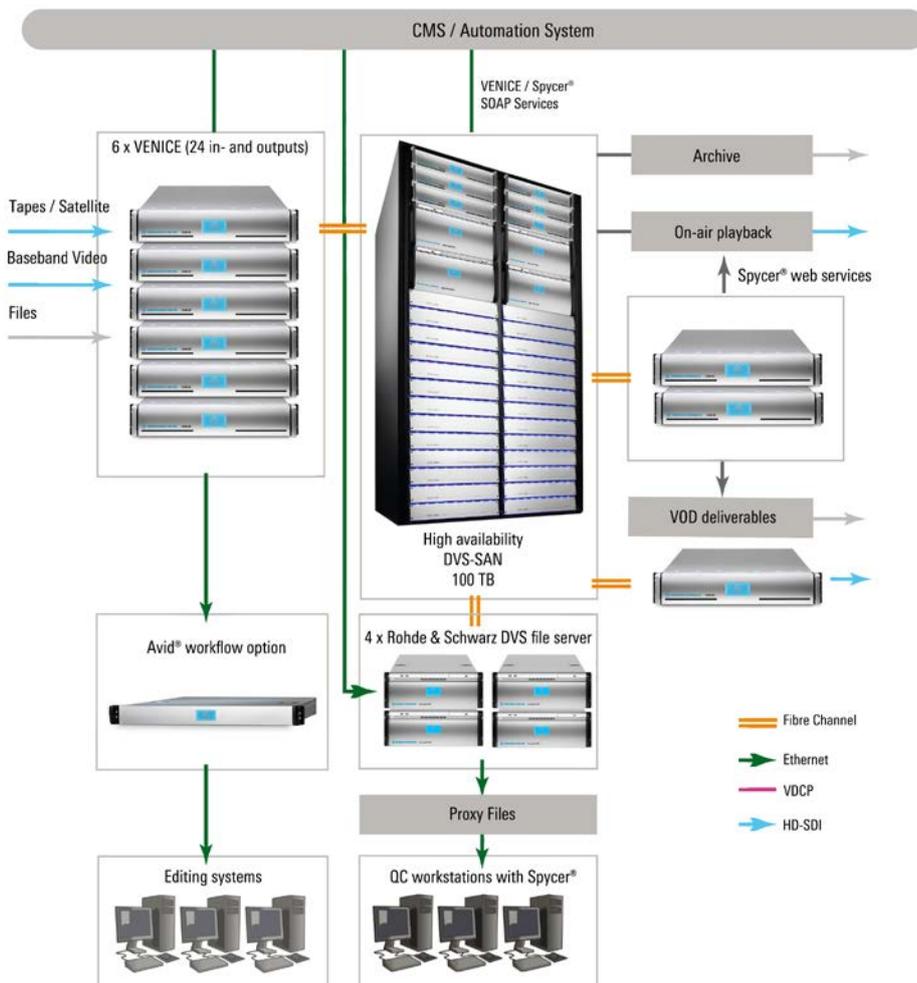
About Rohde & Schwarz DVS

For more than 25 years, Rohde & Schwarz DVS GmbH has been very successful in the professional film, video post production and broadcast markets. The specially developed and manufactured hardware and software are applied to the production of popular TV series, Hollywood blockbusters and in Digital Cinema. R&S®CLIPSTER was the first system in the world to make real-time 4K processing possible. The future-proof ingest and production server R&S®VENICE offers a flexible solution for modern, file-based workflows in broadcast environments.

www.dvs.de

Regional contact

Europe, Africa, Middle East
+49 1805 12 42 42* or +49 89 4129 137 74
customersupport@rohde-schwarz.com

North America
1-888-TEST-RSA (1-888-837-8772)
customer.support@rsa.rohde-schwarz.com

Latin America
+1-410-910-7988
customersupport.la@rohde-schwarz.com

Asia/Pacific
+65 65 13 04 88
customersupport.asia@rohde-schwarz.com