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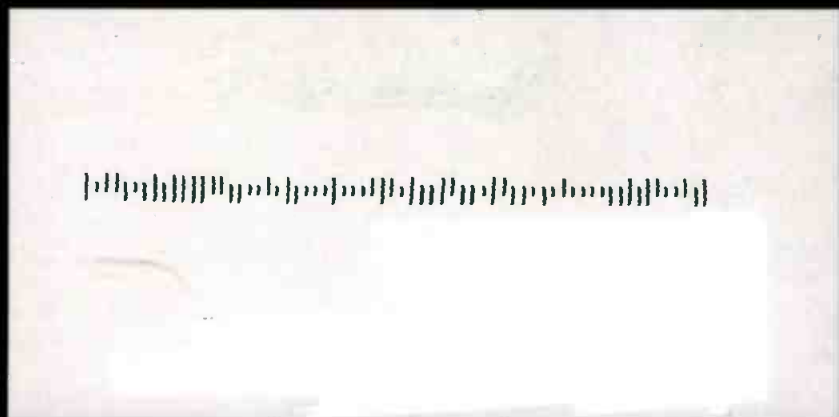
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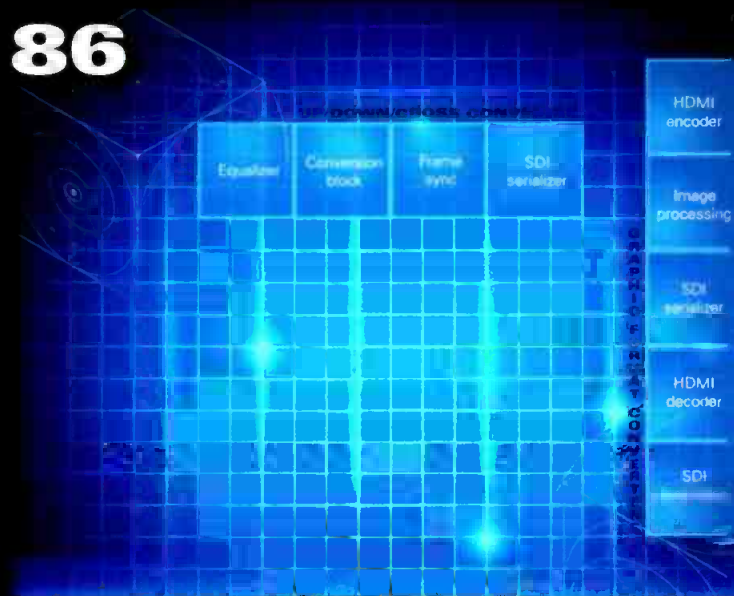
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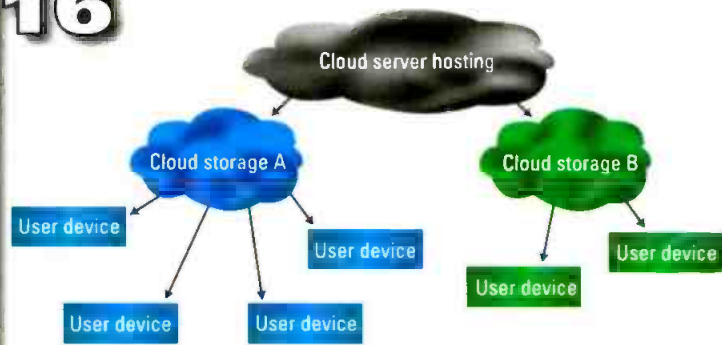
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World standard?

Try compatible, first ...

There is a hidden, but closing, gorilla following in your shadow. This behemoth, or benefit, depending on your viewpoint, consists of two new ATSC standards called 2.0 and 3.0. These new standards will be applied in serial fashion, one after the other, perhaps years apart.

Think of ATSC 2.0 as an improved and backward-compatible version of today's technology. ATSC 2.0 could become a candidate standard as early as this month. The ATSC 3.0 candidate standard will not be backward compatible, and it is years away from completion.



The ATSC 2.0 standard more resembles a software upgrade and is fully compatible with today's DTV transmission system. It will enable non-real-time transmission, advanced video compression, enhanced service guides, audience measurement and conditional access. The standard will also enable interactivity by creating connections between live TV and Internet content.

ATSC 3.0 will be an entirely different, non-backward-compatible standard. It will support increased flexibility and efficiency and likely use different operating parameters for fixed and mobile services. The standard will accommodate Internet-connected television receivers, immersive content and personalization. The ATSC 3.0 candidate standard could be submitted to the entire ATSC membership for approval sometime in 2016.

But, don't panic yet because ATSC 3.0 has not even been defined, and no one knows yet how complex the required changes might actually be.

"The parameters of the ATSC 3.0 system have not yet been established," ATSC spokesman Dave Arland said. "And, any cost estimates at this point are premature."

I'm less concerned about the actual elements within the standard than the actual roll-out of the standard. With mobile DTV, broadcasters were the early adopters. The consumer equipment manufacturers and service providers are still late to the mobile DTV game, providing few products and virtually no "CES-type hype." This industry cannot push a string, and it will need the full commitment and muscle of the CES community to make the adoption of a new and non-backwards compatible standard a success.

Finally, in a recent *Broadcast Engineering* article, Arland said the work of the ATSC 3.0 Technology Group 3 (TG-3) will be shared with the Future of Broadcast TV group, with the hope to create a worldwide TV broadcast system. The broadcast group is a global consortium of 50 organizations on five continents. While establishing a global technological standard is a lofty goal, I don't see it happening. The U.S. can't even agree with the rest of the world and adopt the metric system.

However, I do agree that the new standard is likely to be *compatible* with other new DTV standards. And, it may increase the portability of viewing between geography. But, governments and large manufacturing sectors often hold the trump card when it comes to such decisions. Think NTSC, PAL, SECAM, Beta, VHS, 8-VSB, COFDM, DMB-T/H, DVB and ISDB; the list goes on.

But, that's OK because the U.S. marketplace is sufficiently such that CES vendors can profitably create new products and services that support any new standard. As long as the roll-out of new technology comes simultaneously from groups, manufacturers and broadcasters, the new benefits accrue to everyone. **BE**

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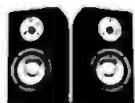
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Content delivery networks

There's more to it than simple distribution.

BY ANDREW JONES

The classic definition of a CDN, or content delivery network, is an aggregation of servers dishing out live streams, on-demand content and other files to end users on behalf of various clients. In broadcasting, typical clients range from small radio and television stations to larger broadcast networks and media conglomerates.

The CDN's role in the broadcast space isn't so much changing but evolving. The now-simple idea of distributing content to a desktop grows more complex by the year. The explosion of mobile streaming and the ever-expanding OTT universe is evidence alone.

Simply put, there are more formats to learn, varying bit rates to accommodate and more devices in the consumer space. But it's clear that broadcasters have as much to gain by diversifying their streaming blueprint as they have to lose by standing pat. The good news is that CDNs have the tools, the knowledge and the relationships to help broadcasters evolve their platforms.

How effectively a broadcaster communicates its needs to a CDN will go

a long way toward establishing and growing a successful streaming strategy. Multiformat streaming and bandwidth management are two key engineering aspects to understand for enhancing quality and reach, along with software tools to effectively realize the associated business opportunities.

Bandwidth management

There is an inherent value in understanding bandwidth management, and the techniques and technologies involved, when streaming in multiple formats to reach many devices.

The MPEG-4 AVC/H.264 video codec is the primary choice in streaming environments today. It is the most pervasive mainly because it excels at representing the video picture at an efficient bit rate. Some have claimed that similar codecs, such as WebM's VP8, offer higher efficiency, as well as real-time processing and licensing advantages. Most agree that H.264 offers an edge in picture quality.

However, many devices have difficulty supporting less well-known codecs because either the required decoding software is not widely supported or decoding the video

demands a faster CPU or specific graphic processor on the device. In broadcast-quality streaming, H.264 offers a comfortable middle ground between high efficiency and not taxing devices at the decoding stage.

The most appropriate bit rate used for a specific frame size is dependent on the efficiency of the codec, as well as the amount of motion, color and

The CDN's role in the broadcast space isn't so much changing but evolving.

detail of the picture. We often measure Netflix, Hulu, Vudu and other professional OTT delivery platforms to determine the appropriate high-end bit rate for the content in question.

With Netflix, we're used to seeing encoded bit rates of 3.5MB to 5MB for 1080p downloads; roughly 2.5MB to 3.5MB for 720p, and 1.5MB/s to 2.5MB/s for SD video. These bit rates are sufficient to reproduce the high motion and detail of a Hollywood blockbuster. A lower bit rate can be used if the content is of low motion, as in a talking head or presentation slides, without a noticeable degradation in image quality. In multiformat streaming, bit rates will also be determined by the efficiency of the video codec used within corresponding container files, or wrappers. An H.264 codec in a multiformat streaming scenario will have at least several different wrappers around it. Table 1 shows several wrappers and corresponding end devices.

Container type	Common delivery	Common video codecs	Common audio codecs
MP4	Desktop and mobile	MPEG-4, H.264	MP3, AAC, HE-AAC
MPEG-TS	OTT and STB	MPEG-2, MPEG-4, H.264	MP3, AAC
FLV	Flash	Sorenson, VP6, H.264	MP3, AAC, Speex
WebM	HTML5 browsers	VP8	Vorbis

Table 1. Shown here are several wrappers and the end devices that use them. H.264 video and AAC audio are the most common codecs in use for Web delivery. A CDN can deliver these underlying codecs as several different on-demand container types or live delivery protocols without changing the H.264- and AAC-encoded content. This process is often called packetizing or remuxing.



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Multi-bit-rate delivery

A growing number of OTT and mobile devices now offer bandwidth detection to determine the most appropriate bit rate stream for the current network conditions. Those devices and players can dynamically adjust the stream as the network performance changes.

Broadcasters can ensure a high-quality user experience across multiple network conditions by taking advantage of this functionality. This remains true whether the user is connected with a set-top-box on a high-capacity fiber network, or with a mobile phone over a congested cellular network. The proliferation of these devices makes multi-bit-rate delivery a growing trend for broadcasters and CDNs. This capability to monitor network conditions and dynamically adapt is integrated today within Roku OTT devices, iOS mobile devices and many digital set-top boxes. For example, the HLS protocol is used for content delivery to the iPhone and iPad, and supports multi-bit-rate delivery. Any iOS device capable of playing back an HLS stream can simultaneously activate bandwidth detection.

A CDN will generate playlists that note which files and live streams are available at what bit rate. The high-bit-rate stream might be 2.5MB/s, the medium 1.5MB/s, and the low 700kb/s. The device accesses this playlist and determines which stream is most appropriate to play based on network conditions. (Flash Player and Microsoft Silverlight also support multi-bit-rate delivery.)

The technique of encoding multiple codecs for a particular stream is also more prevalent. For example, there is a Baseline and a Main level of H.264, the latter of which offers better video compression. This means the consumer with a device supporting H.264 Main will receive better picture quality at the same bit rate. A broadcaster looking to maximize video quality for every device being reached will want to direct its CDN to deliver H.264

Baseline to older mobiles and legacy iOS devices, while delivering Main to Roku and modern iOS handhelds.

Key frames

Multi-bit-rate delivery is more about delivery than compression. However, in H.264 applications, there are additional benefits on the encoding side — notably the ability to unlock advanced features of the H.264 codec for added efficiency. This includes the effective use of key frames.

Tablets have become an especially important streaming target as consumer sales escalate.

Key frames, or i-frames, are complete image frames on which neither previous nor subsequent frames are based. Frame 1 might be an i-frame, and frames 2 through 5, known as p-frames, are based off that initial i-frame. This means that the only data the video codec needs to recreate frames 2 through 5 is the data that is different from Frame 1.

Some advanced encoders, like Haivision's line of KulaByte live encoders, make use of b-frames. These can be used preceding or following i-frames as reference. This means when Frame 5 is the i-frame, Frames 1-4 can serve as b-frames, based off the following Frame 5.

Less data is needed to accurately recreate the video when the video codec only has to use data to store the difference between two images. The result is lower bandwidth costs and less network congestion.

Multiformat delivery

The term multi-platform delivery is oft-heard in the broadcast industry, but multiformat delivery is a more

appropriate description in the streaming universe. This is chiefly because a CDN is supporting multiple streaming formats to ensure it is delivering high-quality video and audio to every device the broadcast client is targeting.

Simply put, there is no "one-size-fits-all." That makes the server technology in the CDN architecture extremely important. Wowza Media particularly excels in supporting all major streaming protocols, and with minor changes can quickly adapt to new devices and software. Wowza has grown from strictly RTMP-to-Flash delivery to quickly supporting most emerging OTT and mobile-device protocols.

Adobe of course developed RTMP and remains a reliable, if expensive, service for targeting a wide range of platforms. RealNetworks, which originated RTSP streaming to Real Media Players, has grown to support more protocols, but it is an expensive option compared to Wowza. Meanwhile, emerging companies like EvoStream are building a niche for themselves in specific markets; they would have some catch-up work to do to compete in all fields. The point is that CDNs rely on these technologies to enable multiformat delivery and support desktops, phones, tablets, OTT devices and smart TVs — and all of these devices play an integral role in modern viewing habits.

Although the OTT and smart-TV markets show some overlap effects, tablets have become an especially important streaming target as consumer sales escalate. Tablet users expect to see full-resolution HD quality filling the screens, and as Wi-Fi-enabled devices, tablets can support higher bit rates than their cellular network counterparts. This makes the tablet a viable target for high-bandwidth encoded content to maximize quality.

Regardless, the most important aspect for broadcasters to communicate to the CDN is the list of devices they require the CDN to support. This will help the CDN identify format needs, and make recommendations on how

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live streams and on-demand files are prepared. It also helps the CDN tailor server configurations to reach all targeted devices.

On the cutting edge

Content delivery networks do more than simply deliver content. Many CDNs are equipped to help broadcasters increase reach, expand viewer bases and generate revenue through supporting mobile apps, offering audience and business analytics, and/or enabling dynamic ad insertion to work sponsors into the mix.

This is an emerging trend in streaming for broadcast that will surely make its mark on the television side moving forward. With the proliferation of OTT devices, there is a growing demand for on-demand viewing in comparison to live program viewing. This makes pre-, mid- and post-rolls a potential new revenue stream

— and also opens the door wider for subscription-based streaming.

Business analytics are also taking off in the streaming world, offering richer data that note audience numbers, geographic locations and average dwell times. These services are important to help CDNs and broadcast clients understand the appropriate time to scale services at the infrastructure, from adding new live server nodes to increasing storage and for on-demand files.

The exploration and support for emerging, high-efficiency codecs is also a trademark of a reliable CDN. At press time, the International Telecommunications Union announced first-stage approval for HEVC H.265, the next-generation video codec following the MPEG-4 AVC/H.264 standard. Early reports tout efficiency gains of 30 percent to 50 percent over the previous standard.

The role of the content delivery network has certainly evolved, from supporting more formats, bit rates and devices today to helping broadcasters develop a future roadmap through audience analytics and measurement to generate revenue now and into the future. **BE**

Andrew Jones is director of sales engineering at StreamGuys.

+ ADDITIONAL RESOURCES +

The following are available on the Broadcast Engineering website:

- Analysis finds media, entertainment top business segment list for CDNs
- Router caching may be cheaper alternative to CDNs
- CDN rolls out tool to help owners monetize second-screen content

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Inspire the Next

The cloud for broadcast

Cloud storage serves the demand for interactive content.

BY ALDO CUGNINI

Traditionally, video content transmission has been solely based on a baseband service, in which multimedia data (program content) was transported across a single channel, such as OTA, coax cable and/or satellite. Today, multimedia transmission is transitioning toward a broadband service, in which multimedia data is transported across multiple channels of signals and traffic types simultaneously.

Cloud storage

Cloud storage has emerged from the desire to give the consumer more content. Content delivery methods have evolved over the years from one-way broadcasting to user-interactive, two-way methods such as VOD and digital video recorder (DVR). With VOD services, the content is stored on large servers located at remote sites, and the media are streamed to large numbers of independent and perhaps simultaneous (but asynchronous) users. Thus, as more and more devices — particularly handhelds and mobiles — consume multimedia content via streaming (as opposed to traditional “broadcast”) services, content and software capabilities are moving toward off-site remote storage systems.

A distributed system of servers deployed over the Internet at multiple data centers constitutes a content delivery network (CDN). Personal (consumer) multimedia storage systems are also moving toward network-based solutions such as network-attached storage (NAS) or network DVR (NDVR). Taken together, all of these storage approaches now constitute “the cloud.” With cloud services, users are afforded

access to cloud computing and cloud storage resources, on-demand, over the network. In general, storage hosting companies and cloud storage service providers are not equivalent. Cloud storage is an online storage system where (multimedia) data is stored in virtualized pools of storage, connected by a network, as shown in Figure 1; users on a network terminal device access the data.

Cloud for broadcast services

There are several areas in which broadcasters can take advantage of cloud storage technology. The first is using cloud storage for content serving and management. As interactive content access becomes realized through smart TVs and similar initiatives, on-demand services will require a large capacity (and quantity) of data

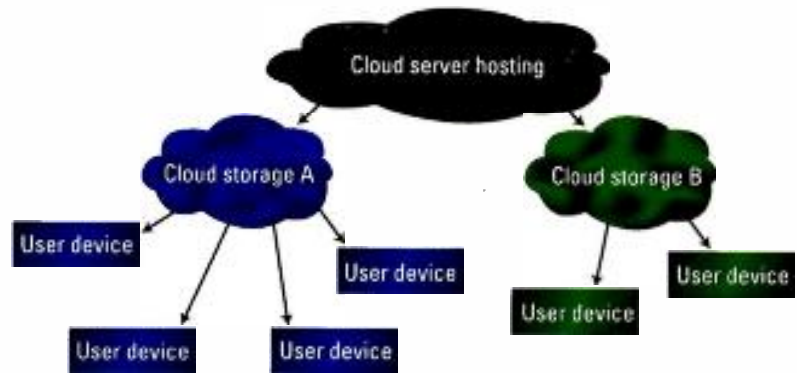


Figure 1. Cloud storage is realized as a virtualized storage pool.

In general, storage hosting companies and cloud storage service providers are not equivalent.

Hosting companies operate large data centers, and users (individual or company) buy or lease storage capacity from them. The data center operators virtualize the resources in the background according to the requirements of the user and expose them as storage pools, which the users use to store files or data objects. The safety of the files depends upon the hosting websites.

servers that can be accessed by multiple transmission media and multiple device terminals. In order to support multiple device types from the same content data server, there is a need for users to manage content at one place that can be accessed by every (or any) device terminal owned.

Broadcasting services can also play a role as cloud hosting or cloud storage service providers. Current transmission media providers, such as cable, satellite, DSL, mobile or broadband, are taking a role as cloud hosting services by distributing content to multiple subscribed devices using VOD services and Internet streaming services; all of these form a virtualized online storage system to end-user terminal devices. Broadcasting services can also provide a personal content management tool

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for users to manage their viewing preference and improve viewing experiences across devices.

Another area of broadcast implementation is in providing a cloud DVR solution to users. Currently the DVR is based on personal storage, but the NDVR is gaining popularity, and affords users online data storage to record and access their favorite content. The cloud DVR service can add a service for users to store their

purchasing additional storage devices, are the responsibility of the cloud hosting companies.

- Cloud storage can be used for copying virtual machine images from the cloud to on-premise locations or to import a virtual machine image from an on-premise location to the cloud image library. Also, cloud storage can be used to move virtual machine images between user accounts or between data centers.

Cloud services provide a flexible, cost-effective alternative to the "traditional" mode of storing content.

personal videos as well as recorded content. This service allows users to build their own content library that can be accessed by any device they own, on-demand, at any location.

Content management

The cloud offers flexible content management to users. Cloud storage services offer users the opportunity to flexibly manage their content as they wish, to be delivered to any device in the most cost-effective way. The major cost factor of an on-demand service is the amount of storage resources and the number of simultaneous streams that can be supported, which are all dependent on media bandwidth. Because a large up-front investment is needed to establish such a service, the cloud solution offers flexible options that service providers can design to meet their objectives and budget:

- Users need only pay for the storage they actually use, without a full investment to build up a large storage system.
- Cloud service providers can choose between off-premises and on-premises cloud storage options, or a mixture of the two, depending on the cost-savings potential.
- Storage server maintenance tasks, such as backup, data replication and

In addition, traditional multimedia delivery methods cause a user to tie one transmission medium to one device type. Cloud services, on the other hand, enable device architectures to become more decoupled from transmission schemes. This medium-device relationship is getting fuzzier over time, as users want to maintain a seamless viewing experience across their various media devices.

Challenges to broadcast services

Despite the many benefits afforded, cloud services also present challenges for broadcasting services, such as security and the reliability of the streaming performance.

Data distributed and stored at numerous locations increases the risk of unauthorized physical access to the data and also increases the number of networks through which the data travels. Instead of just a local area network (LAN) or storage area network (SAN), data stored in the cloud requires a wide area network (WAN). The risk of having data read during transmission can be solved by encryption technology. However, when more people have access to the data, the potential for error also increases, requiring highly secure content protection.

The basic idea of a cloud storage service is to "borrow" storage from a hosting company — but tying a content delivery business to a particular third party means the stored content is partially under a different entity's control. Technically, with outsourced broadcasting services, multimedia quality is affected significantly by the network condition, including availability and reliability of bandwidth; streaming performance is thus a critical challenge for the multiplexing and smoothing technology used to buffer data.

Advantages

Cloud services can be a cost-effective way to compete. Multimedia content consumption has been changing due to the growing number of mobile "smart" devices serving as a primary multimedia terminal for the masses. Cloud services provide a flexible, cost-effective alternative to the "traditional" mode of storing content and delivering broadcast services. The need for smart content management and delivery to multiple platforms can create huge costs for content resource management, but cloud storage has a big head start to optimizing this expense.

Challenges for cloud-based broadcasting services include handling multimedia data that are often time-critical, while providing a reliable and secure transmission. Obtaining stable, reliable and secure data transmission is a key factor for a solid cloud storage system for broadcasting. **BE**

Aldo Cugini is a consultant in the digital television industry and a partner in a mobile video services company.

? Send questions and comments to: aldo.cugini@penton.com

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Media services

A services architecture enables functional flexibility in building complex workflows.

BY BRAD GILMER

Unfortunately, the term “media services” contains two overloaded terms — “media” and “services.” In this case, when we talk about media services, we are talking about small (some would say atomic), network-based applications “services” that perform simple, focused tasks. These tasks are somehow related to either essence or metadata used by professional broadcasters, post-production facilities and the film industry.

The orchestration system is responsible for not only dealing with normal flows, but it is also responsible for dealing with error conditions.

An example of a “media service” might be a service sitting out on a network that is available to transcode content from one popular video format to another. One can imagine a host of services, including tape ingest, QC and file movement. Each of these services is available out on the network, and can be used to perform a discrete unit of work. Services perform higher functions by grouping a number of atomic services together in a logical way. But, at their core, media services are small, discrete pieces of software that can be combined in different ways to perform work.

This is a significant departure from traditional media infrastructures, where an ingest station consists of

tape machines, routers, monitors and other hardware — all hard-wired together to perform a specific function. In fact, entire broadcast chains are built this way. They are highly optimized and efficient, but they can be very difficult to change. And, if one thing is certain these days, it is that change is a permanent part of our business.

A media services architecture allows discrete blocks of functionality to be combined to build complex workflows. As workflows change, blocks can be recombined into modified workflows. If new functionality is added, new services can be deployed. Additionally, discrete services may be used in multiple workflows. So, a transcoder may be deployed in a post-production scenario for one job and then redeployed in a conversion for web applications next.

Building workflows

When using media services, it is not enough that the services are available out on the network; something must consume those services in order to perform valuable work for the organization. There are several

approaches to using services, but, for this article, we are going to focus on two of them — orchestration and event-driven architecture.

Orchestration

Orchestration systems sit on top of media services and use media services to move work through a defined pipeline from start to finish. For example, an orchestration system might have a workflow that ingests a tape, transcodes the content and then saves the file on a large central server. The orchestration system tracks the progress of the workflow, calling on various services to work on the job as it moves through the pipeline. The orchestration system is responsible for not only dealing with normal flows, but it is also responsible for dealing with error conditions such as a failed transcode. Orchestration can start out simple, but it can become complicated as engineers consider all of the various states and error conditions possible in the workflow.

Event-driven architecture

Event-driven architecture is another way to use services to perform work. At a high level, in this

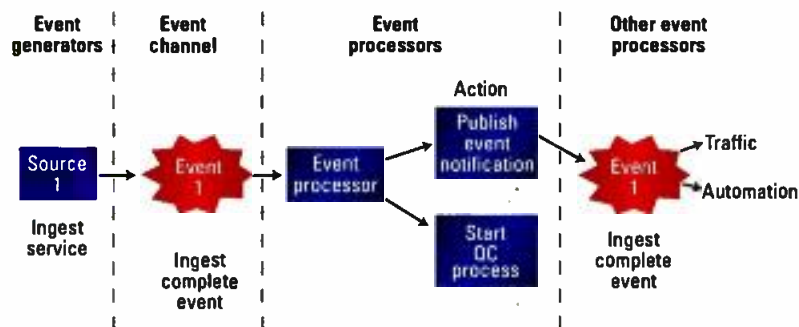


Figure 1. In an event-driven architecture, the movement of work through the facility is caused by a sequence of events and processes.

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architecture, something causes something else to happen (an event) that is of significance to the business. Processing engines can be set up to listen for that event, and when the event happens, they can perform actions based on the event. Other processing engines can be listening downstream, and when one event engine finishes, others can be triggered. In an event-driven architecture, there is no central system guiding the flow of work through a pipeline. The movement of work through the facility is caused by a sequence of events and processes. (See Figure 1 on page 20.)

The Framework for Interoperable Media Services (FIMS) taskforce is the first industry effort focused on developing services for the professional media industry.

An operator finishing an ingest activity might create an “Ingest Complete” event. Event processing engines subscribe to event channels, such as the “Ingest Complete” event channel. This particular event-processing engine might have two actions: the first is to notify the QC operator that the file is available for quality control checking; and the second is to publish an “Ingest Complete” notification for other systems that might be interested in the event, such as traffic and automation systems. Both of these systems might update the status of the media based on the “Ingest Complete” event.

Note that, in this example, it would be extremely easy to add another event process engine to the event channel. This engine might be responsible for creating a number of different

formats from the original ingested file format. Adding this process does not require modifying a workflow in a central system. All one has to do is to subscribe the transcoding engine to that particular event channel.

SOA and EDA

It is important to realize that orchestration and event-driven architecture are complementary, and they are frequently deployed together. For example, in the earlier referenced figure, the tape ingest function might be driven by an orchestration system that precisely controls workflow and error-handling conditions. Event-driven architecture would be used to notify other SOA processes once the ingest is complete.

Common approach

Common service interface definitions are critical. One can imagine a whole universe of services: a content repository service, a media identification service, a publish content to ISP service, and so on. And, one can imagine that several different vendors would make such services available. If each vendor defined the interface to their service independently, the amount of software integration required to build these systems would be huge. On the other hand, if the industry would agree on the service interface definition for an ingest service, for example, then it would be possible to integrate various ingest services into a workflow with minimal additional development.

Common service interface definitions are critical, but it is also critical that we have a common overall framework within which services can be deployed. How do services communicate with orchestration systems and with each other in event-driven architectures? How do newly commissioned services make their presence known on a network? Again, having a harmonized approach to an overall media service architecture will lower costs and shorten implementation time.

Governance

One last critical element in the discussion of media services is governance. Governance brings logic and structure to media services. Areas typically in governance include: service life cycle (how services are developed, deployed, deprecated and eventually decommissioned); helping to prioritize the deployment of new services; and how the quality of deployed services can be ensured.

FIMS

There is a task force in the industry called the Framework for Interoperable Media Services (FIMS). FIMS is a collaboration between the Advanced Media Workflow Association and the European Broadcasting Union. FIMS is the first industry effort focused on developing services for the professional media industry. The FIMS group consists of a Business Board that develops business priorities for service development, and a Technical Board that oversees the development and deployment of FIMS services.

You can learn more about FIMS at <http://www.fims.tv>. For technical information, you can visit the FIMS wiki at <http://wiki.amwa.tv/ebu>. This activity has already yielded an overall framework for media services and several specific media service definitions. Work is ongoing, all the work is public, and anyone can participate. **BE**

Brad Gilmer is executive director of the Advanced Media Workflow Association, executive director of the Video Services Forum, and president of Gilmer & Associates, a media consulting firm.

? Send questions and comments to: brad.gilmer@penton.com

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Branding graphics

Get the best out of your graphics system with an integrated solution.

BY EUGENE PLAWUTSKY

Good branding expresses a channel's personality and identity. If it is conveyed properly, it builds a loyal audience that is retained for upcoming content. In the not-so-distant past, it was fairly common to only change a channel's branding once a year, but that's no longer the norm. Variations for special events, time of day, or special branding directly linked to the content itself is now not only common, but increasingly expected.

Unfortunately, while the quantity of branding is increasing, staff allocated to create it is not. Budget constraints are a reality for all broadcasters these days, and operations need to be streamlined any way possible. Graphics departments are no exception. The amount of hardware and software needed to create and play out quality branding, and the human effort required to add branding to a channel, make it a likely target for shaving a few dollars off of a budget.

Given that scenario, which is likely to remain fairly constant for at least the near-term, what can be done to create, distribute and operate branding graphics more efficiently without compromising the level of quality and interest that will entice and retain viewers?

Similar to how other broadcast systems have been optimized, an integrated solution could help get the best out of a graphics system. For example, the full graphics creation capabilities of a platform like Adobe After Effects can be leveraged within an integrated solution without adding to costs or compromising on capabilities. So, how can a branding graphics workflow effectively integrate with the rest of the playout ecosystem?

And, most important, what are the benefits to the broadcaster?

First, let's pause for a quick review of the four basic steps common to contemporary graphics workflows. Most follow a straightforward model of: creation, versioning, verification and playout. (See Figure 1.) The only genuine way for broadcasters to add value to this four-step process is to integrate, and therefore simplify, the workflow at every step. Let's take them in turn.

Creation

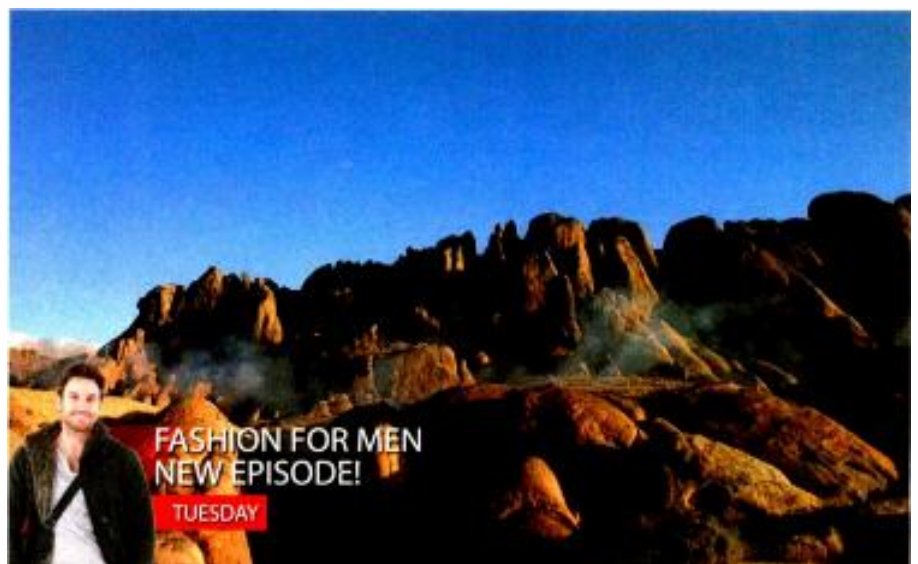
The most efficient graphics creation method is a templated graphic, where a basic graphic template is created to be

used multiple times but with different information. Versioned graphics begin with a basic graphics template that establishes each element to be included in the graphic, including effects, animations and the playout timeline.

Creating broadcast graphics — for example, an overlay snipe — begins with some base elements. Snipes typically consist of a background that matches the network or station's look and feel, with the addition of show-specific images and clips. Those media elements are reused on multiple versions, with perhaps only the show date and time varying as text elements.

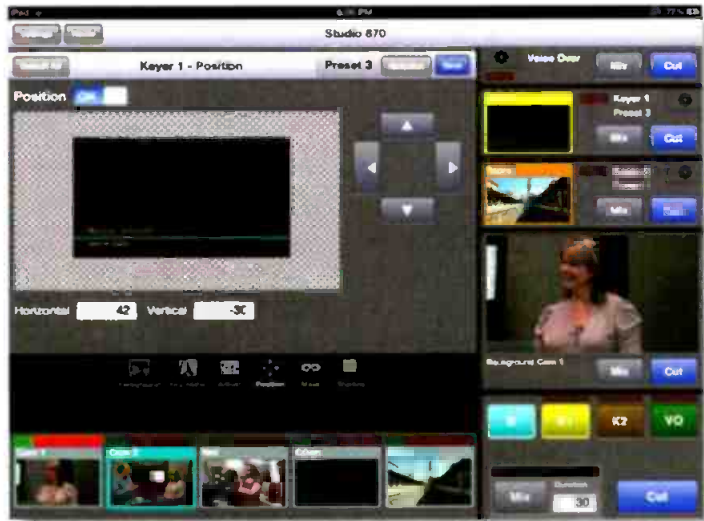


Figure 1. There are four basic steps common to contemporary graphics workflows: creation, versioning (copy), verification (validate) and playout (air).



An overlay snipe typically is a background that matches the network or station's look and feel, with the addition of specific images and clips.

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Versioning

The templated graphic is used to create multiple versions, whether as real-time or clips, by merging the template with the instance-specific information. For example, the show name, date and time it will appear, plus audio and footage related to the show, all can be included.

For versioning, the simplification we look for comes from automating the process as much as possible by providing a solution that integrates graphics versioning with traffic and automation.

This same versioning process can be repeated for various types of branding graphics — for interstitial promos, end-credit squeezes, hot starts and other types of graphics. For a single channel or a cross-channel promotion, the versioned branding is likely to follow this type of formula, whether the branding is to be played back as real-time rendered graphics or as a clip. The only differences are how those processes are automated.

Verification

Each graphic to be played back needs to be verified before air. Is it the correct layout? Does the text fit in the prescribed space? Is the information accurate? However, given the increase in the number of graphics being generated (sometimes by a staff equal to or reduced from what had existed), the practicalities of verifying each and every graphic is a difficult task. It's so difficult, in fact, that this step is increasingly being left out altogether.

Playout

Each individual version of the graphic is recalled, via automation or manually, to play back on a graphics device. Automation can recall a completely finished graphic or a template, plus supply a key to the data to be looked up in a data source to accompany it. Both of these approaches have strengths and weaknesses, but either will get the job done because it is, in the end, the presence of the data that enables the workflow to take place,

regardless of the process used to make it happen.

Media management

Media management is not one of the four basic steps I referred to earlier. However, think of it as a fundamental necessity for this type of system to work efficiently. A central system

entire creation step. This opens new possibilities for new branding ideas and implementations.

Specifically, this is about a type of a workflow that involves controlling a non-real-time graphics engine like Adobe After Effects to manufacture clips for multiple versions. This change provides access to the full

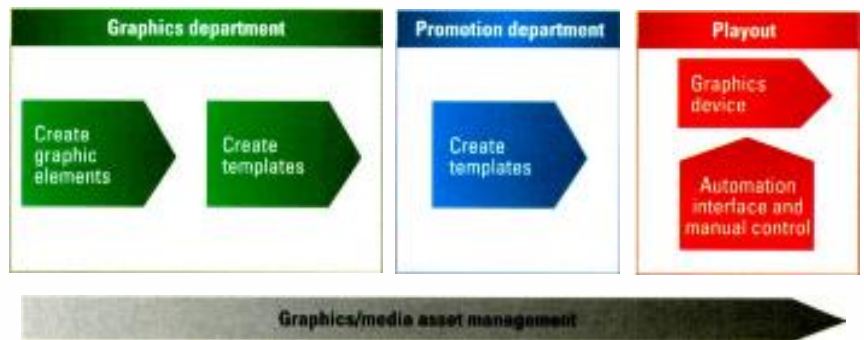


Figure 2. A MAM system needs to pull together media needed for content, present it to be verified and ensure it is delivered to the correct graphics device for playout.

needs to pull together the media needed for the show content, present it to be verified and ensure that it is delivered to the correct graphics device for playout. All of this responsibility rests with an efficient, and intelligent, media management system. (See Figure 2.)

So, what's new?

Having said all of the above, I can hear graphics teams saying, "Well, you've just described the current state-of-play in my graphics design world. So, what's new?"

What's new is that advances in processing power and richer automation interfaces have now combined to offer the ability to create near real-time graphics with pre-rendered workflows. These powerful workflows provide new approaches to creation, versioning and verification, and they greatly simplify the playout step as well.

Moreover, this approach provides graphics teams with a richer creation toolset to work with. Artists are no longer restricted to graphics creation tools that accompany, for example, a character generator because, for many types of graphics, popular graphic design tools can be used for the

range of visual effects and layering, all presented within a creation environment that already has a well-established, global user and support base. At the very least (and this makes station managers and financial directors happy), training costs and creation times are kept to a minimum because graphic artists get to work with a tool that they already know and love.

In terms of versioning, the availability of the information that needs to be presented, whether from the traffic or automation system, is a key step. The contents for a snipe, such as the name of an upcoming show, can now be easily extracted from the automation or traffic system with an integrated approach. It is that sort of ability that is crucial to a more efficient workflow.

This data is used in a couple of ways. First, it provides the ability to automate the creation steps for all versions of the snipe with high accuracy and efficiency. Second, the data can be used as the driver of the media management system to determine which elements are required, as well as which can be expired from the playout devices. Any changes to schedule data are important

events that need to trigger workflows to make the appropriate changes to the graphics. The timeliness of those changes — days, hours, minutes or even seconds ahead of the event — drives many decisions in choosing the final workflow. Last-second changes will drive the tendency towards a real-time workflow, but even a few minutes grace can provide enough of a window for a pre-rendered workflow.

With an integrated workflow, rendered clips can be verified completely, rather than as a component of a templated graphic, because they contain the entire event as it will be played out. Web-based verification tools provide access to the full set of clips to ensure every version is correct, which provides a high degree of confidence.

The beauty of such an approach for media management is that only a single clip needs to be transferred to the playout device, rather than a collection

of elements to be stitched together in real-time. Again, this is a huge time saver and a fundamental boost to overall efficiency. So, it begs the question: Do we really need a fully-featured graphics device to play out clips?

The answer is sometimes. We can't forget that branding graphics devices fulfill other roles, including EAS insertion (a function often possible in a master control switcher), information crawls and tickers, and social media insertion. So, there are certain types of graphics that require a real-time rendering system, and for which a pre-rendered model is admittedly not ideal.

However, clip playback is progressively becoming the staple of many graphics solutions. Branding clips can be rendered elsewhere, previewed, manipulated as a whole and played back with confidence.

By integrating the individual systems typically required to prepare,

version, verify and play out these graphics, it makes the previously painstaking process a whole lot easier, while at the same time unleashing substantial improvements in what can be created and played out. All of this leads to retaining viewers by more easily providing them with highly attractive guideposts leading straight to your content — the content they want to see. What's not to like about that?

BE

Eugene Plawutsky is product manager, Workflow and Playout, Miranda Technologies.

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Choosing JPEG 2000

Several reasons exist as to why it should be the master compression format.

BY JEAN-BAPTISTE LORENT

Broadcasters, film studios and post-production houses are currently facing a major challenge in that the volume of generated video material is increasing dramatically. The result is a significant increase in the need for storage and archive capability.

Broadcasters and video archivists are also looking for long-term digital

in the future? Various options are possible, and organizations have to decide carefully.

Today's broadcasters understand the industry's keywords: highest image quality, flexible delivery formats, interoperability and standardized profiles for optimal preservation.

They also have a vested interest in a common high-end format

process concerned with the impacts of changing technologies, whether it is the support of new media and data formats or a changing user community. "Long term" may extend indefinitely.

To standardize digital preservation practices and provide a set of recommendations for preservation pro-

gram, the Reference Model for an Open Archival Information System (OAIS) was developed.

OAIS is concerned with all technical aspects of a digital object's

life cycle: ingest into and storage in a preservation infrastructure, data management, accessibility and distribution.

Continued interoperability is strategic; one needs easy and fast format conversion, as well as playback compatibility between manufacturers. For instance, a master file format must not be linked to any specific application, production format or major user.

- *Use open, well-documented industry standards — no proprietary formats.*

Ideally, focus on standards recognized and used for archiving applications. Open-file formats are published specifications, usually maintained by standards organizations, which can therefore be used and implemented by anyone. For example, an open format can be implemented by both proprietary and free/open-source softwares, using both types of software licenses. Open formats are also called free-file formats if they are not burdened by any copyrights, patents, trademarks or other restrictions. Anyone may use it at no cost for any desired purpose.

JPEG 2000 in OP1a MXF

JPEG 2000 is based on discrete wavelet transformation (DWT), scalar quantization, context modeling, arithmetic coding and post-compression rate allocation. (See Figure 1.) JPEG 2000

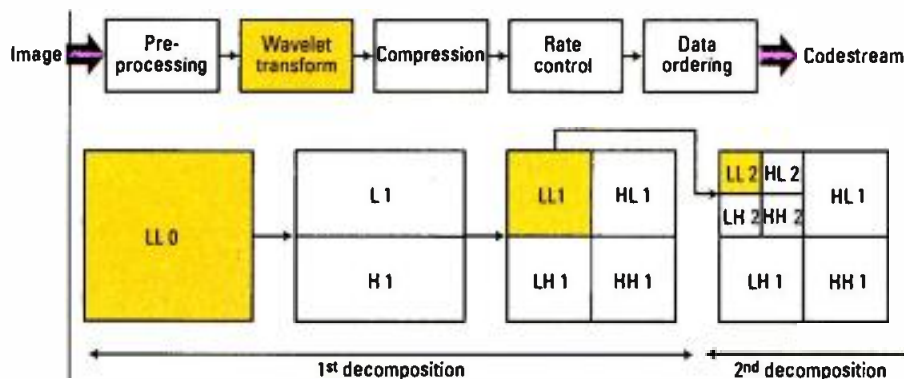


Figure 1. JPEG 2000 is based on discrete wavelet transformation, scalar quantization, context modeling, arithmetic coding and post-compression rate allocation.

preservation. In most cases, the source material is not digital. Instead, it is on film that needs to be scanned or high-quality analog video tape.

A production and digital archive compression format, with no concessions in video content quality and the actual fabrication process, is the obvious choice — one that reduces storage costs compared to uncompressed video, while still maintaining indefinite protection from loss or damage. Such a format should preserve original quality, while also easily enabling the generation of most of the commonly used formats.

Several questions are frequent when selecting a format. What is the best physical long-term storage media for video content? What is a good candidate for a digital preservation? Can digital content be interpreted

to store, preserve and commercialize the avalanche of video footage generated globally. JPEG 2000 is the growing choice for master file format.

Digital storage keys

There are three keys to digital storage preservation:

- *Ensure continuous access to content over time.* Archive and storage covers all activities necessary to ensure continued access to digital materials for as long as necessary. This includes strategies to ensure access to reformatted and digitally-born content, regardless of the risks of media failure and technological changes. Quality preservation is crucial. A conversion system of archived items is important for dissemination or distribution.

- *Everything that belongs together fits in one package.* Archiving is an enduring

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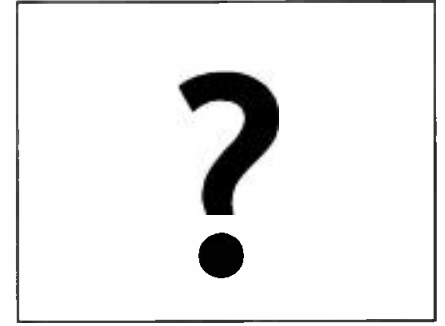
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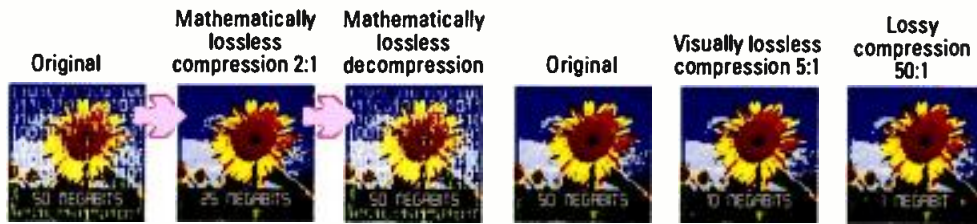


Figure 2. JPEG 2000 can be fully lossless or bit-to-bit reversible. Also, the intra-frame quality of the future-proof codec prevents error propagation over multiple frames.

provides random access (i.e., involving minimal decoding) to the block level in each sub-band, thus making it possible to decode a region, a low resolution or a low-quality image version without decoding the whole picture.

Functionally, JPEG 2000 is a true improvement that provides lossy and lossless compression, progressive and parseable code streams, error resilience, region of interest, proxies, random access and other features in one integrated algorithm.

In the video domain, JPEG 2000 is conceived as an intra-frame codec, so it closely matches the production workflow in which each video frame is treated as a single unit. Its ability to compress

frame-by-frame has made it popular in the digital intermediate space in Hollywood. If the purpose of compression is the distribution of essence, and no further editing is expected, long-GOP MPEG will typically be preferred.

JPEG 2000 brings a storehouse of features to the broadcast process, whether ingest, transcoding, captioning, quality control or audio-track management is requested. Its inherent properties fully qualify it for high-quality, intermediate creation and masters archives. JPEG 2000 supports every resolution, color depth, number of components and frame rates; in short, the codec is future-proof.

The intra-frame quality of JPEG

2000 prevents error propagation over multiple frames and allows video signal edition at any given time. Two wavelet filters are included: the irreversible 9/7 and the fully reversible 5/3. The 5/3 wavelet filter offers a pure mathematically lossless compression, allowing an average 60-percent reduction in storage, while still allowing the exact original image information to be recovered. (See Figure 2.) The 9/7 wavelet filter still performs visually lossless encoding. JPEG 2000 offers uncompressed quality, with no concession in video content quality and an important reduction in bandwidth and storage consumption.

Additionally, its scalability features a “create once, use many times” approach for a wide range of platforms. Easy transcoding of the codec appeals to high-end applications where workflows vastly benefit from transcoding to an intermediate version. JPEG 2000 ensures a clean, quick operation when bit-rate is at a premium. (See Table 1.)

Correctly transcoded HD1080p JPEG 2000 files compressed at 100Mb/s have been labeled “visually identical” to the 2K original footage by professional viewers. Furthermore, the wavelet-based JPEG 2000 compression does not interfere with the final — usually DCT-based — broadcast formats.

Post-production workflows consist

Programs	JPEG 2000 compression
SD programs	“Math lossless” — at average bit rate of 100Mb/s
Common TV HD programs	“Visually lossless” — at average bit rate of 200Mb/s
High end » HD productions or film	“Math lossless” — at average bit rate of 450Mb/s

Table 1. Shown here are typical profiles in use for the JPEG 2000 MXF OP1a master for preservation.

	Adoption for archiving app.	Open vs. proprietary	Quality preservation	4:2:2 10 sampling	I-frame only	Lossless	Robustness to multi-generation
MPEG-2 Long GOP	N/A	Royalties	Limited	N/A	No	N/A	Poor
H.264 Long GOP	N/A	Royalties	Limited	N/A	No	N/A	Poor
MPEG-2 intra	Adopted	Royalties	Limited	N/A	Yes	N/A	Poor
H.264 AVC intra	Adopted	Royalties	Good	Yes	Yes	N/A	Good
JPEG 2000 visually lossless (9/7)	Most adopted	License-free and royalty-free	Excellent	Yes and more	Yes	N/A	Excellent
JPEG 2000 lossless (5/3)	Most adopted	License-free and royalty-free	Perfect	Yes and more	Yes	Perfect	Perfect

Table 2. Looking at different parameters, JPEG 2000 appears to be ideal as a mezzanine file format.

of several encoding/decoding cycles. JPEG 2000 preserves the highest quality throughout this process, without any blocking artifacts creation. Moreover, all common bit depths, whether it is 8-bit, 10-bit, 12-bit or 16-bit, are supported.

Uniquely matching current industry needs, standardized broadcast profiles were adopted in 2010 (JPEG 2000 Part 1 Amd 3 – Profiles for Broadcast Application - ISO/IEC 15444-1:2004/Amd3), ensuring this wavelet-based codec its benchmark position in contribution, while fulfilling the industry-wide request for compression standards to archive and create mezzanine formats. A variety of media distribution channels can be transcoded. The ongoing standardization process of the Interoperable Master Format (IMF) by SMPTE, focused on JPEG 2000 profiles, brings the adoption full-closure. The SMPTE standards also specify,

in detail, how JPEG 2000 video data should be encapsulated in the widely adopted MXF.

Finally, a non-technical feature makes the JPEG 2000 open standard even more attractive for long-term projects; it is license- and royalty-free.

Other codecs

Most other codecs are proprietary. Some have compliancy issues and several limitations to support any video formats or resolutions. (See Table 2.) The MPEG family is ideal for last-mile content delivery to viewers, but not for production and storage, since pictures have to be post-processed.

Conclusion

JPEG 2000 has gained significant attraction as a mezzanine format. Open and well-documented, the codec is future-proof and extendable. That said, it is not surprising that the

Library of Congress, France's Institut National de l'Audiovisuel and several Hollywood studios, such as 20th Century Fox, have selected the codec for storage and preservation.

JPEG 2000 is a codec like no others. It gives users a superior quality, control and a unique flexibility of the image processing chain. The growing use of JPEG 2000 to archive and create mezzanine files, and the ongoing standardization process of the IMF based on JPEG 2000, are just a few of its advantages. **BE**

Jean-Baptiste Lorent is product manager, intoPIX.

+ ADDITIONAL RESOURCES +

The following are available on the *Broadcast Engineering* website:

- JPEG 2000, from master to archive
- JPEG 2000 over IP
- Ultra High Definition Television gains global standard status

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NAB 2013

CONTINUING COVERAGE

In addition to the nearly 200 products we featured in our March issue, here's an additional 300 products that will be on display at this year's NAB Show!

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PARTYLINE INTERCOM SYSTEM

Clear-Com HelixNet 1.1



New is a system linking capability, which extends digital partyline intercom communications over a network among a production's field users, mobile trucks and studio headquarters cost-effectively and efficiently, without compromising audio quality; combines the simplicity of a traditional analog partyline intercom with the advanced network capabilities of a matrix intercom.

www.clearcom.com
Booth: C8008

UHF/VHF TRANSMITTER

Screen Service Broadcast SDT
ULTRA HE Series

Innovative circuit topology for transmitter grants system efficiency of up to 43 percent, with a typical value around 38 percent without decreasing performance in terms of modulation error rate and shoulders; low-loss design uses state-of-the-art components and three highly efficient power supplies; can be easily tuned on all UHF bands with simple operations on field.

www.screen.it
Booth: SU4306

UNIVERSAL I/O VIDEO SWITCHER/SCALER

TV One C2-2355A



Provides high-quality bi-directional conversion between a variety of video formats; features include DVI/RGB/YPbPr up/down/crossconverter, PIP, key, mix, stereo switch and edge blending; inputs and outputs can be SD/HD-SDI, DVI, RGB, YUV, YPbPr, composite or S-Video (YC); incoming video parameters may be adjusted.

www.tvone.com
Booth: SL9416

UHF SUPER TURNSTILE ANTENNA

Jampro Antennas

Radome-enclosed antenna can be either top- or side-mounted on a tower; ideal for broadband multichannel UHF applications; features minimum wind loading with wide broadband response; ideal for applications where either one channel is defined or multiple channels are combined.

www.jampro.com
Booth: C2607

AUTOMATION

MYERS Automation Integration

When incorporated within ProTrack TV broadcast management system, it establishes a direct link between traffic and third-party play-to-air automation; provides a streamlined workflow; eliminates redundancy across departments.

www.myersinfosys.com
Booth: N6415

WIRELESS TRANSMITTERS

Shure FP wireless system

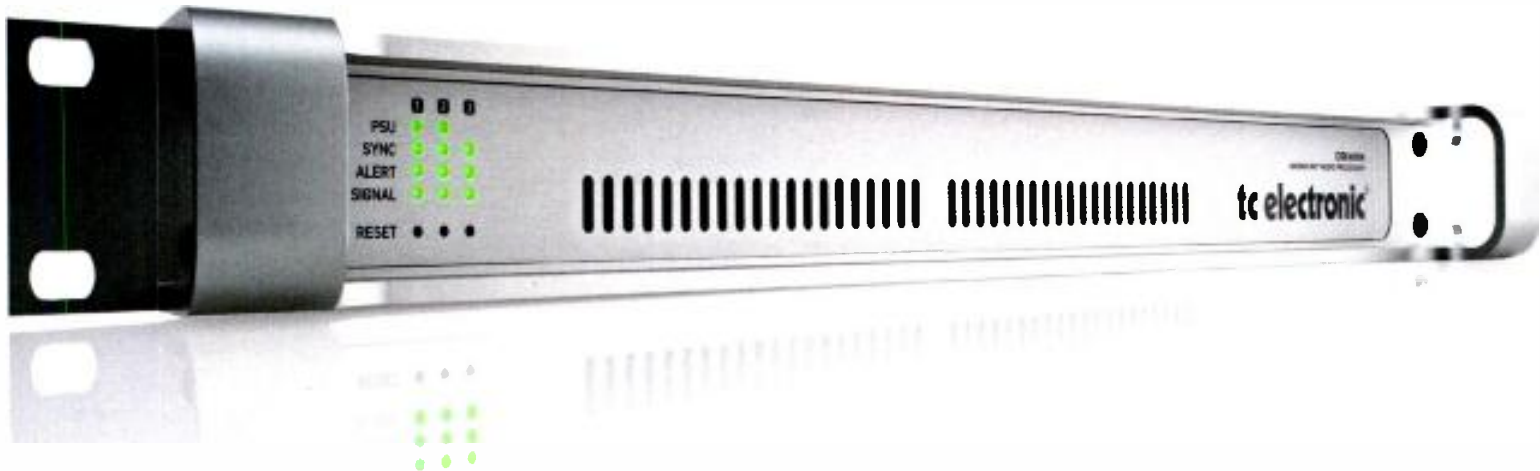


Flexible, intuitive components include portable receivers and XLR plug-on transmitters; built for needs ranging from reality television to event videography shoots and one-on-one interviews; incorporates Shure's Audio Reference Comparing for ultra-low noise, as well as Automatic Frequency Selection for locating and identifying open frequencies.

www.shure.com
Booth: C2627

DB6

INTELLIGENT LOUDNESS MANAGEMENT



Let DB6 manage your audio loudness to stay compliant with broadcast standards and legislation at all times. DB6 handles up to three SD/HD/3G streams in a single rack space unit, measuring and correcting loudness as well as up and down converting your signal and logging stats for documentation and evaluation.

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DB6 Multi - for Multistream Broadcast Transmission

DB6 Single - for the Local Broadcaster and OB Vans



tcelectronic.com/db6

tc electronic

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PROCESSOR

TC Electronic DB6



Able to handle everything regarding loudness in one process, including loudness metering at the input stage, up- and down-conversion at any stage, loudness processing, lip-sync delay, metering at the output stage and logging all relevant loudness statistics; takes 1RU of space; allows processing of up to three simultaneous SD/HD/3G streams.

www.tcelectronic.com

Booth: C204

VIDEO TRANSMISSION APP FOR ANDROID

Dejero LIVE+ Mobile

Bonds multiple wireless signals to deliver high-quality video from the street to the television or Web; aggregates both the Wi-Fi and cellular connections of the iPhone, iPad and now Android devices; provides higher-quality live video transmission with lower latency than a single connection would provide; now supports interruptible fallback (IFB).

www.dejero.com

Booths: N1110

MINIATURE SDI SWITCHER

BHV Broadcast Callisto Micro

Three-input SDI mixer is a broadcast specification (SMPTE-259M) 270Mb video switcher designed to fit into the smallest spaces; can handle fully asynchronous (unlocked) SDI inputs environment; offers remote control and broadside bus switching, so the unit can double as a miniature relocking matrix.

www.bhvbroadcast.com

Booth: N921

AUDIO ANALYZER

Rohde & Schwarz R&S UPP

Low cost-and high-functionality HDMI audio analyzer; supports users in various scenarios including R&D, quality control, consumer electronics and production; full HDMI 1.4a support; has built-in Dolby decoders to simplify HDMI audio analysis; formally approved by Dolby Labs as a compliance test analyzer.

www.rohde-schwarz.com

Booth: SL6320

WIRELESS CAMERA

IMT Nucomm Connect

Live COFDM



SD/HD live-news system features a 5in, high-resolution, touch-LCD monitor designed to mount directly onto a range of small-format HD cameras; bonded 3G/4G links can be used to transport live HD video back to the station; in COFDM mode, unit covers entire BAS 2GHz band; unit is also available for the 5.8GHz non-licensed band; outfitted with a RJ45 Ethernet connector.

www.imt-broadcast.com

Booth: C6029, OE839

BROADCAST MANAGEMENT SYSTEM

MYERS ProTrack TV

Interconnects traffic, scheduling, sales, engineering and IT departments; scalable suite serves as the unifying element within the broadcast operation; integrates seamlessly with existing infrastructure to optimize workflow and preserve existing investments; designed to close the gaps between systems and departments.

www.myersinfosys.com

Booth: N6415

MPEG TS MONITOR

Volicon Observer Mobile

Designed to provide greater flexibility, unsurpassed portability and the added convenience of accessing live Observer streaming along with back-navigation of previously recorded content from both local and remote locations; can play, pause, search and create logged content on demand using smart devices; provides broadcasters with instant access to the final broadcast product.

www.volicon.com

Booth: SU8518

VIDEO EDITING SYSTEM

Matrox MXO2 LE MAX



Provides broadcast-quality input, output and monitoring for leading editing apps from Adobe, Apple and Avid; turbocharges H.264 encoding for deliveries to the web, mobile devices and Blu-ray; is also a capture solution for streaming live events from wherever they are happening using Telestream Wirecast and other streaming applications, all in a portable breakout box.

www.matrox.com

Booth: SL4616

CAPTIONING HTTP INTERFACE

EEG CCPlay FilePro

Provides users with remote triggering of encoding jobs, batch manipulation and the ability to check on the status of pending jobs; SOAP-compatible interface allows for easy integration, with sample clients provided in C#, Python, Perl, Java and C; has ability to perform caption encoding into high-res HD files at rates of 10X real-time or more

www.eegent.com

Booth: N824

ANALYZER

Phabrix Dolby E bit-stream analyzer

Option adds significant Dolby E analysis features to the Sx range, and is available on the SxA, SxD and SxE instruments; intelligent metadata viewer comes with color coding for legal, illegal and irrelevant values; has eight-channel audio metering, along with guard band analysis; features unique closed loop testing when linked to a generator.

www.phabrix.com

Booth: N4833

MONITOR STACKS

Mode-AL

Custom-built to suit users' exact requirements; can be modified or extended at a future date with little or no disruption to the existing installation; made from extruded aluminum; all wiring is contained within the uprights and horizontally within the cable trays, allowing for clean lines and easy maintenance.

www.mode-al.com

Booth: N4420



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Delivers high-performance I/O connectivity and lossless Ethernet support for improved iSCSI block storage access; supports OSX, Windows and Linux servers and workstations; single, dual-, quad-port SFP+ configurations make for flexible design; ideal for low-latency applications; works with existing twisted pair copper cabling.

www.attotech.com

Booth: SL7613

SOCIAL MEDIA EDITOR

Chyron SHOUT



Enables broadcasters to bring social media commentary into their live broadcasts quickly and easily; one or more users can monitor, select, adjust and route social media conversations to broadcast graphics systems either for on-air playback or for storage as data files for later use; multiple instances of SHOUT running across a facility can be used simultaneously by different staff members.

www.chyron.com

Booth: SL1010

MASK FILTER

Jampro Antennas RCEC

Designed to provide superior mask filter performance at an affordable price with 5kW of output power; cross coupling creates steep rejection skirts; its high-Q cavities provide low pass band insertion loss in a compact design.

www.jampro.com

Booth: C2607

GRAPHICAL SOFTWARE INTERFACE

Evertz VUE



Customizable graphical software interface unifies the control of various products in the broadcast chain; provides flexible and reliable control across all broadcast operations from content creation to distribution, thereby increasing productivity and reducing operating costs; designed for touch surfaces; moves operators from simple push-button panels to an interactive look and feel found in smartphones and tablets.

www.evertz.com

Booth: N1503

ROUTER CONTROL PANELS

Snell Luna series

1RU panels include four LED models and two LCD models; LED panels include a high-density version with 78 button keys, 72 of which can be configured as source or destination keys for increased flexibility; LCD panels include a rotary encoder control knob for user-friendly "paging"; compatible with all current Snell routers.

www.snellgroup.com

Booth: N1820

DUAL-CHANNEL H.264 ENCODER

Haivision Makito X2

Delivers 12 channels of high-profile HD 1080p60 with low encoding latency of 55ms, all within a single rack unit; with dual SDI, the unit addresses video over IP encoding anywhere on a resolution/bandwidth scale from CIF as low as 32kb/s to full HD at up to 25Mb/s; with four internal encoding cores, the unit can encode each input at up to four different bitrates and profiles for Multi Bit Rate streaming.

www.haivision.com

Booth: SL6605

MULTIFORMAT CMOS CAMERA

Ikegami HDK-77EC2



Economical docking-style portable multiformat HD camera uses CMOS imaging sensors for 1080i/720p HD format flexibility, lower power consumption and reduced operating temperature; quickly switches between fiber or triax cable use; features fine DTL function, six-vector color corrector plus two-axis custom color, and Super Knee.

www.ikegami.com

Booth: C5108

MULTIPLE ENCODER PLATFORM

ViewCast Niagara 9100 series

Can be configured for a variety of video and audio inputs, including component, Y/C, composite video with balanced or unbalanced audio; designed to offer high density, exceptional performance and enhanced efficiencies; is comprehensive and adaptable.

www.viewcast.com

Booth: SU7517

ONLINE VIDEO PLATFORM

Pilat Media OTTilus OVP

Enables end-to-end OTT deployments that encompass all workflow components from content acquisition to player applications; easy to deploy and compatible with all security, streaming, device and monetization options; can be deployed as a cloud service or to drive a local OTT headend.

www.pilatmedia.com

Booth: N6224

PICTURE-QUALITY ANALYZER

Tektronix PQA600A

Offers picture quality analysis on HDCP-encrypted content; also provides effective modeling of how equipment changes will impact picture quality through the network, across head-end facilities to the STB; 3D-SDI interface supports the 1080p fast progressive video format (1080p50/59) and real-time video format conversion.

www.tek.com

Booth: N609



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www.multidyne.com

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Litepanels Inca 12

Tungsten balanced fixture combines the performance of large Fresnel fixtures with the advantages of LED technology; designed to supply powerful and controllable illumination comparable to a 2K while using just a small fraction of the energy required by traditional tungsten or daylight Fresnel fixtures; emits even, collimated light that is easily controlled manually or via an integrated DMX module.

www.litepanels.com

Booth: C6425

CROSS-EQUIPMENT COMMUNICATION

TSL TallyMan

Ideal for studios, production vehicles and remote headends; provides a seamless communication path between equipment; configures hardware components to user-defined preferences; features easy mapping of Tallies, mnemonics and router paths, as well as simple drag-and-drop editing; interfaces with all known mixers, multiviewers and routers.

www.tsl.co.uk

Booth: N1124

FOUR-WINDOW VIDEO PROCESSOR

TV One C2-6104A



Has four DVI-U inputs to place up to four sizable windows on a single DVI-U output; a fifth DVI-U input is provided for background or cascading units; each window is powered by a CORIO 2 scaler providing full PIP flexibility; DVI-U resolutions up to 1920 x 1200@60Hz and 1080p are supported along with analog DVI-A (RGBHV/YUV/YPbPr via optional HD-15 adaptor) resolutions up to 2048 x 2048 at virtually any refresh rate.

www.tvone.com

Booth: SL9416

VIDEO EDITOR

EVS IPDirector



New, advanced Director's Cut feature in IPDirector suite of video production management applications is designed to accelerate the production chain by facilitating as-live studio productions from the main video switcher and all camera ISOs, and linking it with an EDL in native formats for the most popular NLE post-production editors.

www.evs.tv

Booth: SL2416

VIDEO QUALITY MONITOR

Video Clarity ClearView Extreme 4K



Designed for broadcast product manufacturers and original television program networks that need advanced 4K audio and video quality analysis; provides highly accurate reference-based objective, subjective and perceptual analysis, including fully interactive playback of two uncompressed recordings at 3840 x 2160 at 24Hz, 23.98Hz, 25Hz, 30Hz or 60Hz progressive frame rates.

www.videoclarity.com

Booth: SU11004

SERVER

Harris NEXIO Volt

Like its predecessor, the server offers a 1RU package with low operating costs and high levels of resilience and reliability; doubles the number of available record ports with four bi-directional HD channels (up to eight SD); designed to offer exceptional overall channel density for ingest and playout operations; its software-based codecs and software license keying provide flexibility.

www.broadcast.harris.com

Booth: N2502

HD PRODUCTION CAMERA

Hitachi Kokusai Electric America SK-HD1200

Portable, hand-held version of the SK-HD2200; images are acquired by three (R,G,B) 2.3 million pixel UAIT 1080-line progressive-scan CCDs; advanced digital processing technology assures low-noise, high-dynamic range pictures; features include fiber or digital triax cable operation, external auto set-up, advanced color correction, skin tone detail, prompter power, and two intercom and IFB channels.

www.hitachikokusai.us

Booth: C4309

MEDIA CREATION, CONNECTION AND MANAGEMENT

Avid Interplay Sphere

Provides connectivity for news, sports and video production; gives editors, reporters and videographers the ability to ingest, edit and move media freely between story site and production facility — whether working on a news story across town or a sporting event across the world; requires only a NewsCutter or Media Composer editor and an Internet connection to an Interplay Production workgroup.

www.avid.com

Booth: SU902

DSNG/CONTRIBUTION ENCODER/MODULATOR

Adtec Digital EN91P



Ultra-low delay HD unit combines high-efficiency AVC 4:2:2 compression with fast processing for flexible delivery of video for time-sensitive and bandwidth-limited applications; paired with the RD-70 IRD, the unit can deliver full frame 1080p HD video and 16 channels of phase aligned audio with an end-to-end latency of three frames; when passing PCM or Dolby E audio, the latency can be reduced to one frame.

www.adtecdigital.com

Booth: SU7602

LOUDNESS CORRECTION TOOL

NUGEN Audio LMB

Offline, file-based loudness analysis and correction program designed for rapid assessment and correction of files for loudness and true-peak content to ITU-R BS. 1770- and EBU R128-based specifications.

www.nugenaudio.com

Booth: SU8918

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The UTAH-100 family offers a wide selection of routers in all signal formats in sizes from 8x8 to 32x32 with standard built-in web control and options for built-in or remote control panels, third-party control interfaces, redundant power supplies.

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WIRELESS REMOTE CAMERA SYSTEM

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Designed for use in situations where a normal cable or fiber link would be intrusive or impractical; up to 96 cameras can be operated through a single data transmitter attached to a standard Camera Corps RCP remote control panel or joystick panel; waterproofed for use in all weather; antennas can be coupled via extension cables if required.

www.cameracorps.co.uk
Booth: C6032

HD ENCODER

Digital Rapids StreamZHD

New version of the software for the versatile multiformat, live and file-based encoding system; provides quality, flexibility, format support and efficient automation for transforming media for applications from post production and archive to live and on-demand multi-screen distribution.

www.digitalrapids.com
Booth: SL5624

TRANSCODER

Sencore TXS 8600



Offers high-density, multi-profile encoding and transcoding for real-time adaptive-bit-rate video-streaming; designed for delivering live events to OTT viewers and building virtual multichannel cable-tier offerings for OTT video services; supports all popular codecs, containers and adaptive-bit-rate protocols needed to move content to any display.

www.sencore.com
Booth: SU2616

WEB-BASED ARCHIVE PORTAL

SGL FlashBrowse

Web-based portal allows users to perform archive, search, browse and restore operations from any machine on network running a compatible Web browser; captures low-res proxy versions of clips as they are archived; includes a proxy viewer within the browser window so that the user can search for and view clips before restoring them.

www.sglbroadcast.com
Booth: N1520

CAMERA ACCESSORY

Vinten Vision bluebridge

Works with any of the pan-and-tilt heads in the Vision blue range to extend payloads, which can be perfectly balanced; works by shifting the payload range down and gives users a cost-effective option by extending the payload capabilities of their chosen blue system; this means operators effectively need one single tripod system for their shoots.

www.vinten.com
Booth: C6025

AUDIO MONITOR

Wohler AMP1-MAD1e



Ideal for sports productions and other live broadcasts; can be connected in series with a 56- or 64-channel MADI stream for individual volume adjustment and audible monitoring of any eight selected MADI channels at once; is an in-rack portable MADI unit with Ethernet control and configuration; simplifies rapid selection and monitoring of MADI signals in fast-paced, live-to-air production environments.

www.wohler.com
Booth: N3729

REAL-TIME CHROMA KEYER

Crystal Vision Safire 3

Features a touch-screen 3U controller, as well as built-in color correction and video delay; works with 3Gb/s, HD and SD sources; gives users the option of selecting one, five or 12 sample points on the backdrop to set the range of colors to key on, as well as up to four points on the foreground object to set areas where no chroma keying is required.

www.crystalvision.tv
Booth: N1523

WEATHER SYSTEM

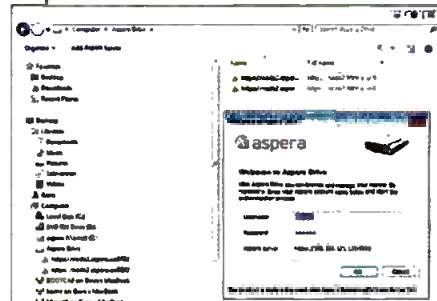
Baron Services VIPIR

Now available in an intuitive, easy to use touch-screen format; all the functionality for a VIPIR weather system — including its flexible 3D mapping, patented tornado detection and automated storm tracking — can be displayed directly from the weather wall using onscreen tools instead of a mouse.

www.baronservices.com
Booth: C8505

FILE-TRANSFER SOFTWARE

Aspera Drive



Features integrated desktop and mobile browsing of remote files, drag-and-drop high-speed upload and download from cloud storage, and background synchronization; also provides Faspex package-based sending and delivery with automatic download of extremely large files and data sets at global distances for secure distribution.

<http://asperasoft.com>
Booth: SL10315

TECHNICAL FURNITURE SYSTEMS

TBC Consoles IntelliTrac

Off-the-floor design is engineered to allow unprecedented leg room while increasing ventilation through the body of the console; front and rear device "Tracs" allow unlimited lateral positioning of critical monitors; rack bay turrets can be easily upgraded or relocated, allowing quick, user-friendly modifications.

www.tbconsoles.com
Booth: C8614

VIDEO DESCRIPTION SYSTEM

Softel Swift ADePT

Allows broadcasters to increase audience reach by providing access to content for visually impaired TV viewers; offers an efficient end-to-end approach for all formats of video description.

www.softelgroup.com
Booth: N2531



See TSL Professional Products Ltd
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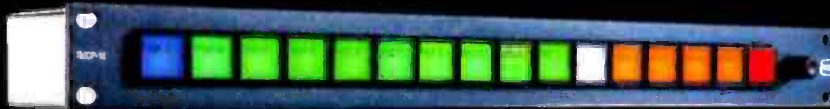
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- Configures hardware components to user-defined preferences
- Easy mapping of Tallies, mnemonics and router paths
- Simple drag & drop editing
- Interfaces with all known mixers, multi-viewers and routers



TMCP Control Panels

- A common workflow for engineering operators

The TallyMan Control Panel provides a common workflow to address virtually limitless numbers of routers and control units through a tactile, easy to install push button panel.



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www.tsl.co.uk/download/tallyman-tmcp-datasheet.pdf

NEW TallyMan Virtual Panel

- Universal Equipment Control for Frontline Operators

TallyMan Virtual Panel with touchscreen is designed to simplify control of multiple router I/Os. The intuitive user interface is engineered to be more in-tune with the needs of creative operators such as Directors, Producers, EVS Operators and Graphics positions.



- Removes the need to install individual hardware panels each time a router is added or upgraded
- Interfaces with ANY third-party router, vision mixer or multiviewer
- Heightened security available for positions with limited functionality
- Remote switch-off available

Audio Workflows, Tally Systems and Power Management solutions

All products available from stock in the USA. Email: prosales@bexel.com
Please contact our partner BEXEL for more information: Tel: 800-842-5111 or 818-565-4339

To speak to TSL direct, please contact us: TSL: +44 (0)1628 676 221

Email: products@tsl.co.uk Web: www.tsl.co.uk/products.aspx

www.americanradiohistory.com



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DTV MONITORING SYSTEM

Triveni Digital StreamScope RM-40

Provides comprehensive, configurable and cost-effective DTV transport stream monitoring for broadcast, cable, telco, satellite and IPTV networks at local and remote sites; a web-based, color-coded user interface displays drill-down dashboards, video and audio thumbnails, charts and graphs, and detailed current and historical reports; features advanced loudness functionalities.

www.TriveniDigital.com
Booth: SU5602

7IN VIEWFINDER/FIELD MONITOR

TVLogic SRM-074W

Viewfinder is a daylight-readable 1000cd/m²-max-brightness version of the popular 1024 x 600-resolution viewfinder; features lightweight (1.4lbs) yet durable magnesium alloy casing, two 3G/HD-SDI auto-sensing inputs, HDMI I/O, HDMI to HD-SDI conversion, waveform/vector scope, h/v flip, and focus assist.

www.tvlogicusa.com
Booth: SL1605

MEDIA ASSET MANAGEMENT SYSTEM

Nexidia Dialogue Search

Searches for any spoken word or phrase across workgroups or massive media libraries in seconds, reducing logging and transcription costs; uncovers valuable assets that traditional metadata could never find; integrates directly with media asset management systems and editing applications.

www.nexidia.tv
Booth: S117LMR

2-D/3-D CHARACTER/GRAPHICS GENERATOR

Chyron ChyronIP



Real-time character/graphics generator was specifically designed for the NewTek TriCaster; offers an integrated live production system with the power of a live network studio; system provides producers with up to two HD or SD full-motion channels of Chyron graphics that stream directly into the TriCaster over a network connection, without tying up any needed camera inputs.

www.chyron.com
Booth: SL1010

FILE-BASED MEDIA TOOLBOX

Emotion Systems eVe

Serves as both a player and an XML export tool that allows pre-processing and preparation of file-based media for multi-platform authoring.

www.emotion-systems.com
Booth: SU8603

AUTOMATED CAPTIONING SYSTEM

ENCO enCaption3

Features an enhanced speech recognition engine designed to deliver closed captions in real-time and with never before seen accuracy; allows broadcasters to serve hearing-impaired audience for a fraction of the cost of traditional captioning services; is always available for live and breaking news, weather and events.

www.enco.com
Booth: C1321

WEB-BASED WORKFLOW MANAGEMENT SYSTEM

Orad Hi-Tec Systems iFind

Provides the ability to manage the essential elements of a professional broadcast server, graphics and archive systems from a Web browser; search, workflow and management functionality is available, which can be tailored to a station's individual requirements to maintain a smooth day-to-day operation.

www.orad.tv
Booth: SL5709

AV MIXER

Panasonic AG-HMX100

Affordable, compact unit integrates an HD/SD video switcher, audio mixer, frame synchronizer and control panel; supports SD, HD and 3D formats; designed to be an affordable live switcher for use in 3D production.

www.panasonic.com/broadcast
Booth: C3607

WIRELESS ENG SYSTEM

Cobham MediaMesh

Uses wireless technology to enable a journalist in the field to establish quickly and simply all the technology required for a live broadcast; enables a broadcast-quality transmission path for live two-ways, the capability of controlling the camera remotely from the studio, file transfers and a high-capacity Internet connection, access to the base newsroom computer, and cell phone access.

www.cobham.com
Booth: C11126

ROUTER

Stagetec Nexus

Completely modular and networked via fiber optics, the digital audio network and routing system provides decentralized routing capacity while accepting almost every analog and digital signal format; other capabilities include A/D and D/A conversion, signal processing, audio format conversion, signal transmission, power amplifier control, plus intercom matrix and talkback functionality.

www.stagetec.com
Booth: C2050

MPEG-4 AVC

Path 1 PiXiE



HD encoder/decoder features a video interface with a single HD-SDI/SDI port that supports 1080i 29.97/25, 720p 59.94/50 formats; the embedded HD-SDI audio interface supports PCM formats; also features a tri-level sync/gunlock external reference and support for Gigabit Ethernet I/O; encodes, decodes and transmits video codecs at MPEG-4 AVC/H.264 - High Profile@L4, audio codecs at HE-AAC v1, and MPEG-DASH at ISO Base media live profile (up to 5 levels).

www.path1.com
Booth: SU10121

AUDIO/LOUDNESS MANAGER

Linear Acoustic AERO.2000



Up to 16 channels of AEROMAX loudness control and UPMAX upmixing/downmixing; standard AES and ADI I/O and compensating HD/SD-SDI video delay; ITU-R BS.1770 loudness metering and TCP/IP remote; optional Dolby encoding/decoding and Nielsen watermarking for all channels.

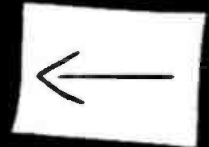
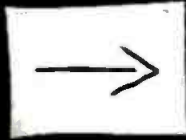
www.linearacoustic.com
Booth: N3438

Online/OTT

Broadcast

Mobile

Convergence Simplified



Simplify the convergence of your core television and multiscreen streaming operations. Building on our proven multi-format output flexibility and quality, the new **StreamZ Live™ 8000EX** integrated live encoder reduces your complexity and your costs.

- Simultaneous encoding for broadcast television and multiscreen streaming
- Robust adaptive streaming format support
- Easy, software-based upgradeability for new formats, technologies and features



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 **digital rapids®**

digitalrapids.com

905-946-9666 x212

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INSTANT REPLAY

NewTek 3Play 425

Delivers professional instant replay with network-quality production in native HD; features a six-channel live sports sweet spot; seamlessly mixes live video with assets from a media library; compact 2RU design fits perfectly in control rooms and production vehicles; includes control surface with premium T-bar, speed presets and jog wheel.

www.newtek.com

Booth: SL4610

SONY SIDE-MOUNT WIRELESS CAMERA TRANSMITTER

VISLINK LINK L9801



Allows HD and SD transmission from the same unit; this option provides the ability to mount the LINK L1500 transmitter to the side of the Sony HDC1500 camera without compromising the camera or transmitter functionality; helps in providing greater balance of the camera and allows easier use on steady cam rigs or in hand-held operation.

www.vislink.com

Booth: C6508

EXTERNAL ANTENNA

LiveU LU Xtender

Increases network reception, providing additional resiliency for live video transmission in extreme scenarios, such as heavily crowded locations; adds six additional network connections to the LU70 professional-grade backpack; covers all current 3G/4G LTE cellular network bands worldwide; the combined LU 70 and Xtender support up to 13 network connections.

www.liveu.tv

Booth: SU5511

AUDIO CONSOLE

Logitek Mosaic



Features OLED screens throughout, including screens that have been added to the Softkey module along with Selector functions; now has easier access to multicolor on/off and selection buttons and better illumination of controls; frame sizes are available for consoles ranging from four to 24 faders; consumes about one-third less power than the previous model.

www.logitekaudio.com

Booth: C1817

CAMERA CCU

Grass Valley XCU

Fully compliant with all Grass Valley 3G Transmission solutions; XCU concept will serve as the core design for all future Grass Valley base stations; pre-mounted and pre-wired cradle allows for easy sliding of the SCU as needed; cradle stores previous XCU settings and automatically reconfigures the incoming unit to requirements of the production environment; XCUs are hot-swappable, and each comes with one cradle.

www.grassvalley.com

Booth: SL 206

GRAPHICS PRODUCTION SYSTEM

Harris Inscribe G8

Built for high-end graphics creation, providing uncompressed imagery, as well as graphics, animation capabilities and clip playback scalability; offers real-time creation and execution of the high-caliber, complex 3D graphics and animations that today's live news, sports and special events demand.

www.broadcast.harris.com

Booth: N2502

INGEST, TRANSCODING AND QC SYSTEM

AmberFin iCR modules

New feature set called ORCA Activity Manager enables facilities to set up specific conditional types of transcode, ingest and QC operations; new modules include ingest and transcode to MXF AS11 and metadata support for the Digital Production Partnership; ingest and transcode to the most popular MPEG-2, XDCAM and IMX formats.

www.amberfin.com

Booth: SU8505

MODULAR LOGO KEYS

Crystal Vision MultiLogo V132



Provides three layers of keying from a variety of internal and external sources, including a 4GB or 8GB video store with DRAM and Flash memory which can hold up to 500 still or animated logos; up to four audio groups can now be embedded into its video outputs, and a voiceover sourced from either the internal audio stores or from an external AES.

www.crystalvision.tv

Booth: N1523

CONVERTER, FRAME SYNCHRONIZER

AJA Video Systems FS2

Delivers dual-channel conversion and frame synchronization in 1RU; with two independent video and audio processors, the unit can do the work of two separate devices or combine both processors together for maximum flexibility; provides 3G/HD/SD-SDI inputs and outputs, HDMI, component/composite analog, AES/EBU and analog audio I/O and direct fiber connections.

www.aja.com

Booth: SL3816

LIVE PRODUCTION SWITCHERS

Blackmagic Design ATEM range

Feature an SDI-based design and HDMI connections; ATEM 1 M/E has eight video inputs, three aux outputs, SDI, HDMI and analog program outputs, SDI and HDMI multiview outputs, USB 3.0, and downconverted SDI and composite outputs; 2 M/E model includes the same features, as well SuperSource, 16 inputs and six aux outputs.

www.blackmagicdesign.com

Booth: SL218



2K PERFORMANCE IN A BETTER LIGHT



350 WATTS IN, 2000 WATTS OUT.

BURNED FINGERS AND BLOWN BULBS ARE SO 20TH CENTURY. THE COOL RUNNING DAYLIGHT BALANCED SOLA 12 AND TUNGSTEN BALANCED INCA 12 LED FRESNELS DELIVER A FLATTERING WRAPAROUND QUALITY THAT WILL SHINE FOR YEARS. THEIR INNOVATIVE DESIGN ACHIEVES A POWERFUL 2K BEAM OF EVEN, COLLIMATED LIGHT FROM A MERE 350 WATTS.

SOLA 12 THE NEXT BIG THING IN LIGHTING

 Litepanels
A Vitec Group brand

www.litepanels.com/sola12

www.americanradiohistory.com

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LED MONITORS

Boland SE series



SE series, ranging from 9in to 72in, offers correct and accurate color pre-calibrated at the factory to SMPTE specs; featuring slim designs, the LEDs are energy efficient and quiet; SE versions have 3G SDI, a full set of built-in scopes and audio de-embedding.

www.bolandcom.com
Booth: SL5305

VIDEO SWITCHES

Fujitsu XG series

Offers high-performance and high-speed Layer 2 switching; features ultra-low latency, flexible interfaces and compact form factors; ideal for enterprise storage and video server applications, high-performance computing and the Internet SCSI and network-attached storage markets.

www.fujitsu.com/us
Booth: SU7911

MATRIX SWITCHERS

Gefen

Now include 8 x 8, 16 x 16 and 32 x 32 enclosures; all frames can contain a mix of both DVI and DisplayPort input boards combined with DVI, ELR and 1FO output boards; up to 32 inputs can be routed to any 32 outputs using DVI, HDBaseT or fiber-optic outputs; 8x ELR boards extend eight outputs up to 100m using one Cat 5 cable per display; 8x 1FO boards extend eight outputs up to 330m using one fiber-optic cable per display.

www.gefen.com
Booth: 3824

GRAPHICS PLAYOUT

Miranda iTX Render Service



Automates and manages rendering of Adobe After Effects projects into fully finished graphics, ready for playout from an iTX integrated playout platform on Miranda's Vertigo graphics processors; benefits include the removal of creative limitations within an Adobe After Effects authoring tool and the ability to publish those complex, rich graphics on multiple channels from a single source.

www.miranda.com
Booth: N2513

COME AND PLAY WITH US!

Come and play a hand of poker with us! While you play, watch your game Graphics updating in Real-Time. With wTVision, you are always a winner!



wTVision develops and markets software solutions for all On-Air Graphics and Playout Automation requirements and these solutions integrate with all major graphics engines on the market, touch devices, virtual solutions, data sources among many other external technologies.

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REMOTE-MOUNTED BEACON RECEIVER

Peak Communications RTR50



Designed to provide a cost-effective solution to tracking and measuring CW satellite beacon signals from commercial satellites; engineered for telemetry and control applications, including uplink power and antenna tracking control; features fast signal acquisition and locking (3 seconds).

www.peakcom.co.uk
Booth: SU6905

SCAN CONVERTERS

Ensemble Designs BrightEye Mitto

New high-resolution support for line of BrightEye Mitto high-performance scan converters; new software supports 1920 x 1920 pixel images; converters provide ultra high-quality conversion from computer video to SDI video; computer video is converted to serial digital SD, HD and 3Gb/s on BNC electrical or fiber-optic outputs.

www.ensembledesigns.com
Booth: N2524

LI-ION BATTERY

Anton/Bauer DIONIC HD



183Wh Li-ion battery delivers up to 10A; ideal for powering high-current digital cinema cameras; weighs 40 percent less than a NiCad or NiMH battery; has 25 percent more capacity and will run a 30W camera, monitors and multiple accessories for more than six hours; RealTime display incorporates readouts of hours, minutes and remaining capacity.

www.antonbauer.com
Booth: C6025

AUDIO I/O HARDWARE

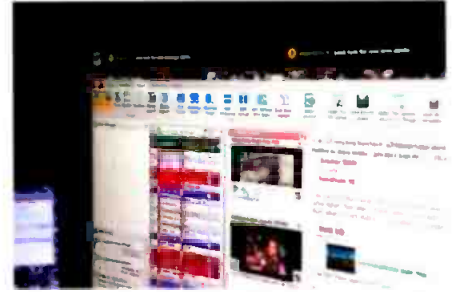
Yamaha Commercial Audio Systems Ri8-D and Ro8-D

Separate IRU hardware components use Dante audio network protocol; provide additional options for flexible system design and implementation, while maintaining high-quality sound; components are compatible with CL Series; create a 96kHz system using Dante-MY16-AUD card(s) with a Yamaha PM5D.

www.yamahaca.com
Booth: C2239

NEWSROOM PRODUCTION SOFTWARE

AP ENPS Version 7



New modern user interface gives users increased flexibility to configure the ENPS desktop for the tasks they do most often; enables users to create and publish for broadcast, online and social media within the same ENPS tool; new dashboard lets users create their own custom view of the day's latest information, all updated in real time; new detached Alert Bar keeps users on top of breaking news and incoming messages.

www.enps.com
Booth: SL9005

SATELLITE PLATFORM

Intelsat Epic

Next-generation high-performance satellite platform with a combination of C-, Ku- and Ka-bands, wide beams, spot beams, and frequency re-use; for broadcasters and media applications, this means content regionalization, customization, more throughput and backward compatibility.

www.intelsat.com
Booth: SU3111



Cinegy Archive

Cinegy Archive

The future of archive, media management and production

- Integrated, scalable archive, MAM and production solution
- From small to international enterprise solution
- Real-time local and remote web-based collaboration
- Asset lifecycle metadata accumulation
- Search, browse, log and edit during import / ingest
- Multi-proxy creation for medium or low res workflows
- Optional HSM data tape library management
- Fully customizable metadata model and workflows
- Integrated news production workflow
- 3rd party NLE integration (AVID, FCP, etc.)
- Automatic video import, transcoding, export
- Broadcast automation and traffic integration
- Cloud-ready! Can run in VMware, Hyper-V, etc.
- Open API for extensions and customization
- Turn-key solutions available through partners
- Extremely affordable - call for prices!

For more information go to www.cinegy.com or contact one of our offices below:
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Cinegy GmbH - Muellerstr.27, 80469 Munich, Germany - call: +49 -89-2388-5360

NABSHOW
Booth SL11112

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**CELLULAR INTERNET
NEWSGATHERING (iNG) RECEIVER**

VISLINK LiveGear LGR-1000
Receives AirStream IP transmissions via the Internet and provides an HD/SD-SDI output; up to six transmissions are simultaneously received by one unit; is a cost-effective means to receive "live" remote Internet newsgathering (iNG) content; can receive up to four bonded cellular network IP streams carrying a packetized segment of the video transmission from each remote AirStream transmitter.

www.vislink.com
Booth: C6508

ADR END-TO-END SOLUTION

**Solid State Logic
ScreenSound ADR**

Turnkey system that combines a suite of integrated software applications providing dialog spotting and session preparation, session control, and management and audio recording, with industrial-strength hardware platform; relies on SpotFire, which presents a dedicated session management and automated ADR interface; SSL's Soundscape AW is the underlying platform for recording, editing and mixing.

www.solidstatelogic.com
Booth: C2617

ROUTING SWITCHERS

Snell Sirius 800

Have been enhanced with the availability of frame synchronization on the units' Advanced Hybrid Processing input and output cards; the resulting router architecture enables independent processing of audio and video signals with no restrictions on signal formats, timing between signal types or number of audio channels.

www.snellgroup.com
Booth: N1820

THUNDERBOLT INTEGRATION

Small Tree ThunderNET
Combines the high performance I/O capabilities of Thunderbolt with the flexibility of PCIe; provides post-production professionals a system for integrating Thunderbolt-equipped platforms into high-performance storage and data networks; supports 1GigE or 10GigE connectivity to iMac, Mac Mini, MacBook Pro or MacBook Air computers, connecting seamlessly to GraniteSTOR TITANIUM or 10 GigE switches.

www.Small-Tree.com
Booth: SL6005

ARCHIVE SYSTEM

EditShare Ark Version 2.3
New enhancements include the ability to delete individual clips from Ark Disk nearline storage via FlowBrowse, and the ability to institute "migration" workflows where clips move down through different "tiers" of storage; Ark tape backup verification provides additional checks to ensure that Ark backup/archive jobs have been successfully written to LTO tapes.

www.editshare.com
Booth: SL9010

UP/CROSS/DOWNCONVERTER

BHV Broadcast Syntax
Based on advanced Super-Resolution Bandlet Technology; brings the performance advantages of motion-compensated processing without the associated disadvantages of high cost and occasionally severe artifacts; features include analog video inputs and audio facilities with noise reduction and ARC facilities.

www.bhvbroadcast.com
Booth: N921

ARCHIVE SYSTEM



Dalet MediaLife
Features the Galaxy interface; designed for the workflow requirements of program preparation and archiving; includes tools for mass ingest, pre-editing, storyboarding, subtitling, captioning, versioning and distribution — all accessible from the same user interface; integrates with third-party systems such as NLEs, automation device and archives.

www.dalet.com
Booth: SL4524

METADATA TAGGING TOOL

Primestream FORK Logger 1.0



Cross-platform module is part of FORK Production Suite 3.5; allows for logging live or pre-recorded video; tightly integrated and configurable user interface enables content loggers to tag video with defined metadata in to the FORK environment effortlessly, making assets easier to manage, automate and monetize.

www.primestream.com
Booth: SL6824

SGL

SOFTWARE GENERATION LIMITED

www.sglbroadcast.com

LTF5 is the new archive tape technology that is changing the landscape of file-based workflows for the broadcast industry.

SGL provides **native** support for LTF5 drives and libraries, allowing complete content portability between systems and streamlining workflows to increase the revenue that you generate from your content.

Visit us at NAB2013 to see how SGL & LTF5 can help revolutionize YOUR workflows

N1520

DIGITAL AUDIO COAXIAL PATCHBAY

Bittree Digital Audio

Coaxial Patchbay

Designed for discreet AES signals and offers significant cost savings over video patchbays otherwise used for this purpose; BNC rear interface is designed for fast and easy installation; developed in response to the rapid growth of digital audio content.

www.bittree.com

Booth: SU6521

MPEG-2 TO MPEG-4 CONVERSION

Globecomm

Solution set integrates to ASI and/or IP infrastructures for those broadcasters looking to capitalize on the cost savings and quality benefits of MPEG-4 technology; provides a large and rich set of tools for encoding, delivering broadcasters with improved coding efficiency, the ability to encode mixed media, high error resilience for robust transmission and interaction with various animated objects.

www.globecommsystems.com

Booth: SU6221

GRAPHICS

wTVision SportStats CG

Flexible sports software is compatible with all graphics engines; enables data collection, comparison and management, as well as transformation data into on-air graphics, all in real-time; features dedicated data scouting depending on the sport; can adapt to more than 40 different sports.

www.wtvision.com

Booth: SL14513

AUDIO/LOUDNESS PLATFORM

Linear Acoustic AERO.1000



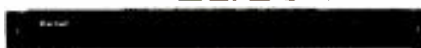
Up to 64 channels of AEROMAX loudness control with UPMAX upmixing/downmixing; standard AES and SDI I/O and compensating HD/SD-SDI video delay; ITU-R BS.1770 loudness metering and TCP/IP remote; optional Dolby encoding/decoding and Nielsen watermarking for all channels.

www.linearacoustic.com

Booth: N3438

VIDEO APPLIANCE

Net Insight Nimbra



Combines reliable UDP streaming with aware data recovery to enable broadcast-quality transport over unmanaged IP first-mile connections; incorporates content-aware FEC to reduce effective packet loss and selective retransmission that takes care of unrecoverable data loss; features dynamic rate control and clock synchronization.

www.netinsight.net

Booth: SU2324

HEADSETS

Shure BRH31M,
BRH440M, BRH441M



Each headset in the portfolio has a dynamic, cardioid microphone that delivers natural, highly intelligible vocal reproduction and frequency response in loud environments; BRH31M single-sided headset has an adjustable headband; BRH440M dual-sided headset is closed-back, circumaural piece built for long-wearing comfort; both the 440M and 441M include a flip-up mute function that deactivates the boom mic when raised vertically away from the mouth.

www.shure.com

Booth: C2627

1'X1' LIGHT PANEL

Photon-Beard lighting panel

Includes eight 5/8in-diameter fluorescent tubes that deliver illumination using Osram daylight or tungsten-balanced phosphors; provides predictable color results with fewer of the spikes and spectral variations typically associated with similar LED-based fixtures.

www.photonbeard.com

Booth: C11432

Cinegy Air

The future of broadcast automation and playout



Cinegy Air

- Reliable, scalable, affordable, future-proof playout solution
- Local and remote operation via TCP/IP network connection
- Output via SD/HD SDI and/or MPEG2 / H.264 streaming
- Scalable from local channel-in-a-box to enterprise playout control center with hundreds of channels
- Mix and match resolutions and codecs with WANC support
- Multi-channel audio support and subtitling
- Logo insertion and optional CG and channel branding
- Surround sound support (e.g. Dolby Digital or Dolby-E)
- Loudness normalization option
- BXF traffic integration and switcher control
- Uses commodity IT hardware from HP, IBM, etc.
- Supports SDI cards from AJA, BMD, etc.
- Play while record. Scheduled recording
- Cloud ready! Can run in VMware, Hyper-V, etc.
- Open API for extensions or custom controls
- Turn-key solutions available through partners
- Extremely affordable - call for prices!

For more information go to www.cinegy.com or contact one of our offices below:
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Cinegy GmbH - Muellerstr.27, 80469 Munich, Germany - call: +49 -89-2388 5360

NAB SHOW
Booth SL11112

Cinegy

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SYNC PULSE GENERATOR

Tektronix SPG8000

Offers sync signals, test signals and ANC data-generation capabilities for modern broadcast, production and post-production facilities; features extensive sync pulse generation and master clock reference generation capabilities in a single device, Tektronix's Stay Genlock capability, redundant power supplies, SNMP and Web UI support, and remote configuration and monitoring.

www.tek.com

Booth: N609

MOBILE APP

LiveU LU-Smart

Allows LiveU users to extend their live video coverage from the field using an iPhone or iPad; based on LiveU's fourth-generation bonded uplink technology; bonds internal WiFi and cellular connections, including 3G/4G LTE, to reach optimal video quality.

www.liveu.tv

Booth: SU5511

AUDIO CONTROL SURFACE

Wheatstone Dimension Two

Built on the proven Bridge Router platform; accepts analog, AES, MADI and HD/SDI input signals; provides the ability to send any source or console bus to any audio network destination; also offers up to 96 input channels on two pages (64 physical faders maximum), 16 dedicated mix-minus busses plus up to 64 channel bus-minus (N-1) outputs.

www.wheatstone.com

Booth: 3112

NEWS AUTOMATION

Playbox NewsRoomBox

Manages the news program for any media organization, as well as all data relating to the news before, during and after the news program — including new information for tickers, Teletext, web, mobile, connected TV, OTT, tablets, PC, etc.; complete system for newsroom management, story creation and studio control.

www.playbox.tv

Booth: N5435

NEWS CAPTURE FROM A PC OR SMART MOBILE DEVICE

TVU Networks TVU Anywhere



Enables iOS, Windows and Android mobile devices to transmit live video directly to a TVU receiver; is easy to use, transmitting video with just the push of a button with no in-field configuration required; users just download the app onto a support mobile device and use the device's wireless Internet connection to transmit live video on the go from practically any location.

www.tvupack.com

Booth: SU7105

25 Years of Powering High-Performance Workflows

For over 25 years ATTO has been a pioneering leader behind the capturing, editing, storing, managing and distribution of content for the leading broadcasters and post-production studios around the world.

See ATTO's leadership in action at NAB 2013 as it enables over 70 industry-leading partners' solutions.

attotech.com/NAB/BE

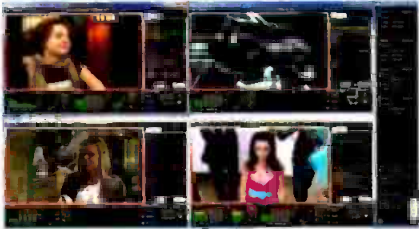


Powering the World's Networks and Storage



MULTIVIEWER

Vela Research ASI Quad
MultiViewer



Multi-input ASI configuration for broadcasters, satellite providers, programmers, IPTV and content creators, syndicators and distributors; provides a full set of 608 and 708 closed captioning, VANC and metadata capabilities, SDI and ASI interface options; provides full-fledged set of LKFS capabilities, measurements, alerting and logging features to allow operators to comply with CALM Act.

www.vela.com
Booth: C2330

MULTISCREEN ADVERTISING SYNCHRONIZATION TOOLS

never.no Sync

Toolkit for syncing ad content and creating robust two-way engagement between the first and second screens; enables broadcasters and advertisers to realize the potential of the second screen for expanding an ad's reach and power, opening the door for creative new ways to use advertising and giving broadcasters a concrete, measurable way to monetize their investment in social TV.

www.never.no
Booth: SL8827

CONSTANT IMPEDANCE FM BANDPASS COMBINER

Jampro Antennas RCCC-102-FM



Features a compact modular design, configurable to fit even the smallest transmitter rooms; allows an additional frequency to be easily added; uses temperature-compensated bandpass filters with integrated heat sink tops to keep filters cool and locked on their frequencies; various models are available for difference channel spacing.

www.jampro.com
Booth: C2607

DISTRIBUTION AMPLIFIER

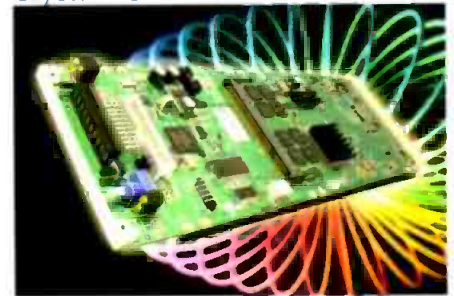
ESE ES-210

Provides four independent 1 x 6 frequency DAs in a single rack-mount enclosure; each DA has loop-thru inputs and six isolated outputs, which are all accessible via BNC connectors; uses screwdriver-adjustable Gain controls that are located on the front panel; gain controls provide an overall signal level adjustment of -1.5 to +3.4 db.

www.es-web.com
Booth: C6043

VARIABLE VIDEO DELAY

Crystal Vision ViViD 3G



Available in four versions to suit a variety of applications; up to 12 video delays fit in a 2U frame; new features include 3Gb/s support, integrated fiber I/O, video proc amp and signal timing; 'S' versions feature a framestore synchronizer that makes it possible to apply a long delay to a video path and lock the signal to a station reference using a single board.

www.crystalvision.tv
Booth: N1523

LED LIGHT KIT

Frezzi Highly Portable Studio
Quality Lighting

Features quick-switchable high-power solid-state LED module chip technology for super performance of HMI-type output in a compact package; complete multi-light kit comes in lightweight portable travel case.

www.frezzi.com
Booth: C7936



Cinegy Multiviewer

The future-proof monitoring and analysis solution

- Monitoring and analysis of SDI and IP streams
- Local and remote operation via local controls or web
- Output to local screen(s) or as MPEG2 / H.264 stream
- Full frame rate output - live video - not just a slideshow
- Scalable from local production multiviewer to enterprise playout control center with hundreds of channels
- Stream and content analysis - e.g. AV levels, freeze frame, CC presence, mono, stereo or 5.1 audio, etc.
- VANC and CC display, up to 16 VU-meters per channel
- Surround sound support (e.g. Dolby Digital)
- Alarm output on-screen, via SNMP, email, etc.
- Switchable layouts - WYSIWYG editor included
- Uses commodity IT-hardware from HP, DELL, etc.
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- Cloud-ready! Can run in VMware, Hyper-V, etc.
- Customization via HTML5 based widgets
- Turn-key solutions available through partners
- Extremely affordable - call for prices!

For more information go to www.cinegy.com or contact one of our offices below:
Cinegy LLC - 1101 Pennsylvania Ave, Washington, DC 20004, USA - call: +1 202-621-2350
Cinegy GmbH - Muellerstr.27, 80469 Munich, Germany - call: +49 -89-2388 5360

NABSHOW
Booth SL11112

cinegy

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CABLING ASSEMBLIES

BTX Technologies Neutrik opticalCON Certification Received designation by Neutrik as a Certified Assembler fiber house for its opticalCON line of fiber-optic connection systems; new fiber capabilities complement long list of copper assemblies and custom plates and panel systems.

www.btx.com
Booth: C7319

RECEIVER/DECODER

Sencore MRD 4400 Capable of being upgraded to HD via a software license; supports decoding of H.264 and MPEG-2 video to broadcast-quality outputs via SDI and composite interfaces; up to four audio services allow distributors to meet upcoming descriptive-video requirements while still supporting surround or alternate-language services.

www.sencore.com
Booth: SU2616

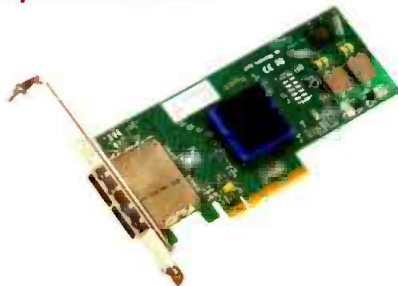
VOIP JPEG 2000 CODEC

intoPix JPEG 2000 Video Over IP Ultra-dense compression IP-cores and new reference applications for small 28nm FPGA devices offer visually lossless compression; new video over IP reference application on the Altera Cyclone V GX board; low latency; standardized interface connects to Altera VIP suite.

www.intopix.com
Booth: C4742

SAS/SATA AND RAID ADAPTERS

ATTO Technology
ExpressSAS series



Provides high-performance data protection to direct attached SAS and SATA JBOD storage; available in a wide variety of port configurations and RAID levels.

www.attotech.com
Booth: SL7613

ANYTHING IN/ANYTHING OUT MATRIX SWITCHER

TV One C3-340 CORIO matrix



Is based on CORIO 2 technology and offers high-quality modular video matrix switching using CORIO softswitch, which provides a firmware-based video routing, switching and video conversion platform; 16 AV universal module slots are available; automatically recognizes the modules inserted as an input or output module; offers up-, down- and crossconversion on the outputs.

www.tvone.com
Booth: SL9416

CONTRIBUTION RECEIVER DECODER

Thomson Video Networks RD6000



Latest generation of integrated receiver decoder; developed for MPEG contribution applications; supports highest quality contribution video feeds and provides full MPEG-2, MPEG-4, 4:2:0, 4:2:2, 8-bit, and 10-bit decoding in a single 1RU chassis.

www.thomson-networks.com
Booth: SU2611

SUPPORT SOFTWARE

Molden Media Viz Secure Designed to monitor, maintain and remedy broadcast IT infrastructures in order to help improve on-air reliability; features a new UI layout, as well as advanced analyses and reporting aspects; digs deep to capture and monitor critical data; translates raw data into visuals, charts and graphs for easy understanding; users can define parameters for alerts or warnings; allows for trend identification and analysis of event sequences to better optimize infrastructure performance.

www.moldenmedia.com
Booth: SL6830



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**GRASS VALLEY CAMERA
INTEGRATION**
Riedel Communications
MediorNet MN-GV-2



Allows users to network Grass Valley 3G camera systems and base station, including the LDK and new LDX series, via MediorNet; provides a solution for routing bi-directional camera signals, including all embedded audio and telemetry control data, through the MediorNet fiber infrastructure; network approach allows the free assignment of cameras to any base station/CCU within the network.

www.riedel.net
Booth: C4937

NEWSROOM COMPUTER SYSTEM
OCTOPUS Newsroom OCTOPUS7

Runs on Windows, Mac OS X and Linux platforms; new features are focused on assignment experience, story central workflow and event-based actions; includes plug-in for Final Cut Pro integration, as well as editorial tools such as spell check, rundown buddy and rundown stopwatch.

www.octopus-news.com
Booth: SU10107

**AUTOMATED PRODUCTION
CONTROL SYSTEM**

Ross Video OverDrive V14
Re-engineered newsroom plug-in streamlines the preparation process, allowing productions to get to air faster and with less effort and fewer mistakes; new features include trailing audio support, color coding to easily identify incoming MOS elements and automated multiplatform publishing.

www.rossvideo.com
Booth: N3808

WORKFLOW PLATFORM
Digital Rapids Kayak



Enables customers, systems integrators and software developers to design, deploy and manage customized workflows; component-based architecture and open ecosystem provide ease in integrating new technologies; intelligent automation and deployment model maximize processing efficiency, optimize resources, minimize management effort and reduce costs.

www.digitalrapids.com
Booth: SL5624

Dear sound engineers,
Sadly, the next page
is not for you.



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PATCH PANEL

Optical Cable Corporation
 Procyon Copper Panel
 Designed for high-density copper connectivity and to be interchangeable with fiber panels for maximum flexibility; each copper module provides 48 CAT-6A shielded ports in 1RU; mates with 12 preterminated high-density copper cable assemblies, each providing cabling for four RJ-45 ports.

www.occfiber.com
 Booth: C10145

SLOW-MOTION VIDEO SERVER

Orad Hi-Tec Systems PlayMaker
 SD/HD slow-motion video server for live sports productions; new Smart Events engine is a tagging and sorting tool that tags clips with descriptive metadata; provides up eight I/O channels of high-quality ingest in multiple video formats, including DVCPRO, DNxHD and JPEG-2000, with synchronized slow-motion replay and editing tools.

www.orad.tv
 Booth: SL5709

CODEC

Fraunhofer Digital Cinema Alliance
 Low Complexity Coding
 Allows mezzanine compression for switching from SDI-based interfaces to IP-based (Ethernet) interfaces for the transmission of video with the highest possible dynamic range and resolution, regardless of bandwidth limitations.

www.dcinema.fraunhofer.de
 Booth: C7843

VIDEO DISTRIBUTION OVER IP

Matrox MaeveX



Delivers one-to-one unicast or one-to-many multicast of full-HD quality video extension and playback over standard TCP/IP networks; encoders and decoders capture, stream and decode video from a variety of sources and allow for software-based decoding on non-MaeveX devices; PowerStream software offers user-defined management features enabling administrators to control the MaeveX network, streams and devices.

www.matrox.com
 Booth: SL4616

500W TRANSMITTER

Linear Industries AT71-500-11

4RU x 19in x 26in drawer size reduces installation footprint; nine temperature-controlled cooling fans provide optimal performance and longer life for critical components; features include scheduler software to run corrections/measurements at scheduled times, internal GPS receiver, selectable timebase reference and proprietary bandwidth reduction technology.

www.linear-tv.com
 Booth: SU6717

CAMERA

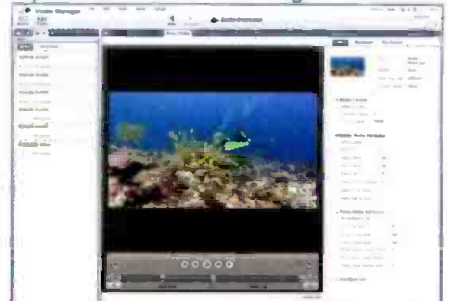
Ikegami HDK-97C

Camera employs 2.5-megapixel 2/3in CMOS image sensors for superior quality HDTV video with horizontal resolution of 1000TVL, SNR of 60dB or more and sensitivity of F11; supports a number of native HDTV formats including 1080i/59.94, 1080i/50, 720p/59.94, 720p/50, 1080p/29.97, 1080p/23.98 and 1080p/25 (some formats are optional); supports 3G formats including 1080p/59.94 4:2:2, 1080p/50 4:2:2, 1080i/59.94 4:4:4 and 1080i/50 4:4:4.

www.ikegami.com
 Booth: C5108

DIGITAL ASSET MANAGEMENT

OpenText Media Management



Provides secure, audited and accelerated transfer of large files; manages and organizes all users' digital media assets; provides integrated tools for digital asset management of video, audio, images and all the enterprise's digital media files; provides faceted search, flexible metadata and taxonomy schemes, and open APIs.

www.opentext.com
 Booth: SL15814

Intelligent Broadcast Workflow

Keeping up with the pace of changing metadata can be complex on multiple levels. That's why **ProTrack** exists - for a more simplified, seamless flow of assets, from acquisition to broadcast. It's time you've experienced intelligent broadcast workflow.

Software designed for the way you work.

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LOUDNESS METER

Linear Acoustic LQ-1



Features full Dolby decoding and Dolby Dialogue Intelligence; AES, Toslink Optical, HD/SD-SDI and analog I/O; optional DVB-ASI input, redundant PSU and SNMP.

www.linearacoustic.com

Booth: N3438

ULTRA-MOTION SYSTEM

I-MOVIX X10

Delivers a continuous real-time output of up to 300fps at native HD resolution and image quality; gives production teams continuous access to instant replays at up to 10 times the normal frame rate; used with EVS XT3 production server under LSM control, provides a familiar user interface and controls that any broadcast crew can use immediately without any special training.

www.i-movix.com

Booth: C4742

PORTABLE PTZ PRODUCTION SYSTEM

RUSHWORKS REMO 22



Designed for single-operator, multicamera production using a touchscreen and PTZ cameras, so no camera operators are required; supports four or eight HD/SD-SDI ins; features two clip players, multilayer DSK, full-motion overlays, transitions and effects, PIP and chroma key; streams and records in multiple formats; REMO system comes in ruggedized, portable case.

www.rushworks.tv

Booth: C5640

ENTERPRISE RESOURCE MANAGEMENT SOFTWARE

ScheduALL 5

Automates previously labor-intensive functions such as slack capacity optimization, media system integration and third-party connectivity; new version adds smart technology for a new level of auto-managed work orders.

www.scheduall.com

Booth: SU3421

CONTENT MANAGEMENT STANDALONE TOOLS

Aveco SAS Solutions

Released to complement the ASTRA Suite of Tools; standalone versions of some of the ASTRA Suite of Tools — including media asset management, archive, ingest, browse and playout — are available; key feature is that they can run with any vendor's automation system or MAM system.

www.aveco.com

Booth: N2138



Dear video engineers,
Happily, for you it is.

Yep, you read it right. After over 40 years' innovation in the field of professional audio technology, the time has come for Lawo to take a look at professional video equipment. And introduce a totally new concept: The V__pro8 is a high-performance video processor that can be installed in next to no time. Requiring minimal space, it allows 8 video channels to be used freely with 384 audio channels. And does so using modern protocols like 3G-SDI, MADI and RAVENNA, and easy touch operation. In addition, the V__pro8 offers cross-format conversion, color correction and many other features to make the day-to-day work of the video engineer a joy. The V__pro8 is the perfect bridge-builder in the world of broadcasting — at an unbelievable price. Why not ask your colleagues in Sound what it's like working with Lawo? www.lawo.de

Visit Lawo at NAB 2013 in Las Vegas, April 8 – 11, Central Hall, Booth C1311



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CAMERA-MOUNTED FIBER TRANSPORT

MultiDyne SilverBACK-II with JUICE



Capable of transmitting any camera signal — including HD-SDI video, audio, control data, GPIOs, tally and power — over a single hybrid fiber and copper cable without relying on local power or batteries; provides users with a cost-effective, light-weight, remote powering system that can be seamlessly integrated onto any camera; ideal for news, sports, ENG, D-SNG, OB and multicamera studio applications.

www.multidyne.com
Booth: C10339

IP MONITORING SYSTEM

DVEO True Check IP Analyzer



DTV transport and IP stream monitoring system designed for verifying the quality of MPEG-2/H.264 audio and video services delivered over IP networks; built for 24-hour remote operation; includes detailed analysis and error monitoring of DTV MPEG transport stream layers; provides detailed IP layer measurement and analysis on Ethernet inputs.

www.dveo.com
Booth: SU6505

INTEGRATED, WIRELESS CAMERA LINK

Broadcast Sports, Inc. (BSI) Real Freedom System



Features a simplified user interface and set-up; family of components is designed to offer users the highest resolution and video quality available in a wireless camera system with 1080p/60 and 10-bit, 4:2:2 sampling; features H.264 encoding and DVB-T2 modulation.

www.BroadcastSportsInc.com
Booth: C12049

We're Turning Camera Robotics

Upside Down!

Telemetrics' new TeleGlide® Track Systems and Televator® EP5 Elevating Pedestals provide unsurpassed performance and versatility with the unique ability to be floor or ceiling mounted. Add our P/T heads, control software and controllers to implement the right camera robotics solution at the right price. With over 23 years of industry proven camera track experience in our 37 year history, Telemetrics continues to turn the world of camera robotics systems upside down.

CPS Studio Software controls P/T/Z/F, Track, Elevation, CCU and peripherals with virtually unlimited show files that can each control up to 50 cameras with 51,000 presets.

Telemetrics
Camera Control Systems

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PLAYOUT SERVER

Cinegy Air 9.5



Offers added support for direct playout of the new Cinegy Desktop sequences with all the enhancements to sound and vision intact; users can finish applying an advanced color correction to an hour package with a 5.1 audio mix; move it to the server, and start playout to viewers in just a couple of seconds; also features added options for per-item and per-engine audio matrixing and a new AVCI100 mode for proxies.

www.cinegy.com
Booth: SL11112

HIGH-DEFINITION IRD

Adtec Digital RD-70



1080p multi-CODEC ultra-low, low and normal delay MPEG-2 and MPEG-4 AVC/H.264 IRD is interoperable with other encoders, making it ideal for mission-critical trunking, ad-hoc OB, DSNG and teleport applications; the ultra-delay mode requires the use of the EN91P 1080p encoder and delivers picture-to-picture services in 100ms.

www.adtecdigital.com
Booth: SU7602

VIDEO PROCESSING CARD

Cobalt Digital Fusion3G

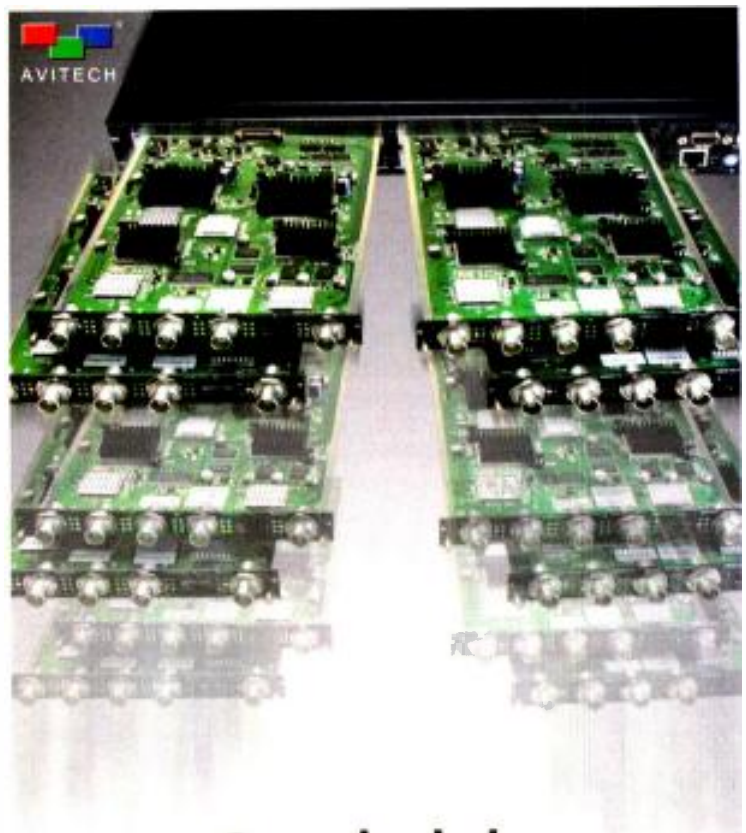
Now offers higher performance with Dolby DD+ with simultaneous 5.1 and 2.0, in addition to an array of processing features that include format conversion, frame sync, wings insertion, keying, color correction, advanced audio processing, full analog I/O, audio/video delay, audio embed/de-embed/cross-point and up/down mixing.

www.cobaltdigital.com
Booth: N4624

INTERNET SUBTITLING

Screen Subtitling Systems OTT subtitling Method for served web video playback ensures subtitles are always displayed in the style intended regardless of the player; producer has full creative control over style and position; text is clear; allows viewers to select language or turn captions off; uses standard subtitle file formats; can automatically adjust broadcast version for the Web via EDL.

www.screensystems.tv
Booth: N5821



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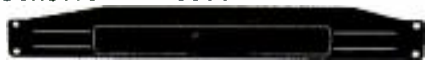
<http://avitechvideo.com>

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MODULAR RECEIVER/DECODER

Sencore MRD 5800



Provides H.264, MPEG-2, 4:2:2, 4:2:0, 10-bit and 8-bit decoding with automatic detection and configuration; features field-upgradable software licensing; offers up to eight PIDs of audio decoding to deal with the multichannel, multilingual environment of live-event coverage; provides ASI, satellite, RF and IP input options.

www.sencore.com
Booth: SU2616

CAMERA SHADER PANEL

Telemetrics CSP



Designed to offer a convenient and flexible solution for remotely matching multiple automated cameras; features intuitive controls and a touch-screen interface; can be controlled by single operators, groups or locations; supports control for iris, master pedestal and shading, as well as CCU functions of major camera brands including master gain, white gain, black level, gamma knee, masking and test bars.

www.telemetricsinc.com
Booth: C9532

GPU-ACCELERATED TRANSCODER

Telestream Cable/IPTV transcoder GPU-accelerated video transcoder developed specifically to automate content preparation and delivery for cable VOD and IPTV workflows; offers sophisticated control over transport stream multiplexing and metadata; full 16-bit video processing and the use of the x264 (H.264) codec.

www.telestream.net
Booth: SL2605

CONVERTER

Opticom-EMCORE Optiva Designed to quickly and easily convert, scale and send secure HD video over fiber; converts DVI to VGA/RGB/RB-GHV/YPbPr, and VGA/RGB/RBGHV/YPbPr to DVI and then instantly scales it to the native resolution of any display up to 1920 x 1200; supports USB KVM, as well as graphic resolutions up to 2560 x 1600/60Hz and video resolutions up to 1080p/60Hz.

www.opticom.com
Booth: N3422

SECOND-SCREEN AND SOCIAL TV GATEWAY

Chyron ENGAGE Allows broadcasters to easily add viewer interaction such as votes, polls and tweet battles into their live news and sports programming, along with rich call-to-action graphics and infographics; integrates with popular second-screen and social data partners, eliminating the need for custom integration while maintaining routine production workflows.

www.chyron.com
Booth: SL1010

CAMERA ACCESSORY

The Padcaster



Provides an easy way for users to create professional videos on their iPad, from storyboarding and shooting to editing and sharing; threaded holes at the edges of the frame allow filmmakers to attach external mics, lights and other accessories; a standard 1/4-20 screw thread and locking-pin design centered on the bottom of the Padcaster lets users connect it to a professional tripod, monopod or shoulder mount.

www.thepadcaster.com
Booth: C-ST16

CLOUD ARCHIVE SOFTWARE

Levels Beyond Reach Engine Provides streamlined media management, distribution, optimization and monetization capabilities for video; now has a hybrid cloud solution; integrates cloud-based library management, file processing, approval workflows and distribution services with Reach Engine Studio; can upload proxy content and metadata.

www.levelsbeyond.com
Booth: SL10711



Only Digimetrics Aurora file-based QC has seamless integration with PC & SDI playback, allowing for test & review to occur up to **8 times faster** than manual processes. Cut out the hide & seek to find a QC artifact...get there now with Hydra Player, and approve or edit the QC report right from the player.

Our ongoing commitment to speed and accuracy of file-based QC means that our customers are able to **turn a profit on their file-based workflows faster.**



Digimetrics

File-Based Test & Measurement Solutions

Get a **higher level of performance in file-based QC...contact Digimetrics.**

www.digi-metrics.com
NAB Booth N3833

TOUCH CONTROL SYSTEM

Shotoku Broadcast Systems
Gemini Pan Bar Control System
Stagebox integration



Combined system allows remote control of multiple cameras over standard communication networks at live productions; Stagebox unit transforms all the audio, video, timing and remote control signals to and from a camera into packet-based IP networks to streamline field production logistics and workflows.

www.shotoku.tv
Booth: C9032

CONDITIONAL ACCESS SYSTEM

Broadpeak C-CAS

Enables pay TV operators to support adaptive streaming protocols while simultaneously remaining compliant with conditional access systems on subscribers' existing STBs; using adaptive streaming technologies, unifies video user experience across next-generation and existing STBs.

www.broadpeak.tv
Booth: SU6914

BROADCAST WORKFLOW MANAGEMENT

Primestream FORK
Xchange Suite 2.0



Gives broadcasters instant Web access to content on their FORK Production servers from any Windows, Mac or tablet device; is an add-on to the FORK software platform for managing and automating broadcast workflows; contains new capabilities for creating subclips and markers.

www.primestream.com
Booth: SL6824

CAPTION MONITOR

EEG iCap Video

Captioners can now monitor the presence and location of captions via an encrypted low-res video feed matching the encoder output; improved real-time visual feedback provides extra source of confidence monitoring and ensures captioners are aware of graphics and crawls affecting the optimal positioning of caption displays.

www.eegent.com
Booth: N824

DECODER

Vela Research CineWaveHD
Continuum



Enables high-performance, continuous decoding with high-quality video at extremely low bit rates; designed to operate in plug-and-play, nonstop operation mode; real-time decoding of HD or SD H.264 (AVC), HD or SD MPEG-2 Main Profile @ Main Level and @ High Level, VC1 and MPEG-4 Part 2; supports PAL, NTSC and cinema television formats.

www.vela.com
Booth: C2330

MONITOR

Video Clarity Auto RTM

New addition to the RTM product line that provides a key application to the user for automating simultaneous audio and video performance test routines in a real-time monitoring session; makes IP or file delivery network AV quality testing easy to set up and allows the user to quickly create single or multiple test sessions.

www.videoclarity.com
Booth: SU11004

AVITECH

<http://avitechvideo.com>

Extender

Seneca X-HDUTP / RP

Modular HDBaseT HDMI/VGA/HID/IR extender with PoE

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ATSC SIGNAL ANALYZER
PROMAX TV EXPLORER HD ATSC



Analyzes MPEG-2, MPEG-4 H.264 video decoding, MPEG-1, MPEG-2 and AAC audio decoding; compatible with SD and HD resolutions, including 1080i, 720p and 576i; works with 8VSB, DVB-S2, DVB-S, DSS and QAM A/B modulations; digital measurements include power, CBER, VBER, MER, C/N, link margin and noise margin.

www.promaxelectronics.com
Booth: SU10702

WIRELESS INTERCOM
Eartec COMSTAR



Full duplex system allows crews to converse simultaneously just like on a regular telephone; to operate, simply turn the system on and talk; is not voice-activated, and there are no transmit buttons; up to eight can converse at the same time; includes discreet Cyber headsets and COMSTAR beltplacks that weigh just 2.5oz.

www.eartec.com
Booth: C11229

ARCHIVE SYSTEM

EditShare Geevs 5.3
 New enhancements include support for capture and playout of QuickTime-Wrapped XDCAM-EX and XDCAM-HD, as well as updates to Studio Multicam and Geevs live user interfaces.

www.editshare.com
Booth: SL9010

26V MANGANESE BATTERIES

BoxxTV 26V Battery



Use a manganese compound to provide the high level of current needed to run cameras such as the ARRI ALEXA and Phantom digital cameras; using 26V instead of 16V batteries produces less heat in the battery and the wiring of the camera.

www.boxx.tv
Booth: C7706

ON-AIR AUTOMATION SYSTEM

Florical Remote AirBoss
 Is an option within the SMART Central suite of products; can run from any workstation with access to the user's secure network; includes LowRes Viewer, which accepts WMV9 feeds for on-screen confidence feeds; can display and gang-roll two channels.

www.florical.com
Booth: N4429

HDR CAMERA

Fraunhofer Digital Cinema Alliance HDR Camera



HDR camera based on single shot and non-regular sensor masking; technique allows the capture of an image with the same resolution and amount of detail as the use of a traditional sensor, but with a much higher dynamic range.

www.dcinema.fraunhofer.de
Booth: C7843

DIGITAL MIXING CONSOLE

Lawo mc²56



Now available in five frame sizes in order to meet needs ranging from mobile to studio; latest features include permanent metering of the 16 central faders and nine individually assignable user buttons; snapshot operation is improved with more directly accessible buttons; also has an integrated RTW goniometer or user panel in the overbridge.

www.lawo.ca
Booth: C1311

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Serve Your Hearing Impaired Audience For A Fraction Of The Cost Of Traditional Captioning Services!



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 COME SEE US AT NAB BOOTH C1321 !

DTT/DIGITAL UPGRADES

Globecomm

Upgrades range from transmission gear to entire broadcast facilities; enhanced pre-engineered DTT system is a highly modular, flexible solution that enables analog-based terrestrial operators to migrate to a digital platform quickly and cost-effectively; the system supports live streams and VOD with program acquisition, compression and transmission subsystems, and full life-cycle support.

www.globecommsystems.com

Booth: SU6221

TRANSMITTER

Harris Platinum VAX

Compact Class

Built on the company's PowerSmart architecture to minimize footprint and lower costs; covers VHF transmissions from 10W to 100W in 2RU units; ideal for low-power stations and gap filler applications to cover specific regions in widespread markets or difficult terrains; integrates Harris Broadcast Apex M2X exciters to enable simple modulation changes and analog-to-digital upgrades.

www.broadcast.harris.com

Booth: N2502

ETHERNET AGGREGATOR/ TRANSCEIVER

Artel Video Systems DLC205



Integrates seamlessly within the company's DigiLink video transport platform; aggregates Ethernet traffic across a single optical or electrical connection; capable of aggregating nine channels — five external and four internal — of 10/100/1000 Ethernet traffic for transport across electrical or optical networks; fully nonblocking module features capacity of 18Gb of Ethernet traffic.

www.artel.com

Booth: SU6318

WIRELESS INTERCOM

JK Audio Interloop



Offers improved voice bandwidth using Bluetooth HD Voice wireless technology; supports 300Hz-3.4kHz standard voice bandwidth and 120Hz-7kHz HD voice bandwidth; features 2.4GHz encrypted digital wireless; includes 3-pin XLR male and female intercom jacks; powered with 9V battery backup; has send and receive volume controls.

www.jkaudio.com

Booth: C3249

FRAME RATE CONVERTERS

Snell KudosPro MC500

Available at a low price point; provides up, down and crossconversion from any broadcast standard (50Hz or 59Hz) to any other broadcast standard, with optional composite and fiber connectivity; a wide range of audio options is available, including embedded, AES, analog and Dolby E, as well as extensive utilities such as ProcAmp, enhancer and closed caption handling.

www.snellgroup.com

Booth: N1820

PROCESSING SOFTWARE

NVerzion NCompass



Newest version of software platform streamlines the processing and playout of file-based content, which now includes enhanced licensing flexibility; new licensing configuration provides a bundled package for the broadcaster's most commonly used content delivery services (up to five).

www.nverzion.com

Booth: N4325

AVITECH

Genlock SDI
HDMI
Audio delay
CVBS
YPbPr
DVI
VGA


Converter

Seneca C-A
All-in-one Converter box with scaler



NABSHOW

April 8-11 • Las Vegas, Nevada
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<http://avitechvideo.com>

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VIDEO BOX PRODUCTION TOOL

Orad Hi-Tec Systems TD Control
Streamlines video box production workflows by consolidating video sources and graphics, delivering a single composited image to the switcher; provides ability to switch, while on-air, from six video sources to six completely different video sources with one click of a button.

www.orad.tv
Booth: SL5709

HEVC DECODER

Ittiam Systems HEVC Decoder
Targets full conformance to HEVC Main Profile and all resolutions up to Ultra HD; efficient multicore design scales well from one to four cores (x86 and ARM); integrated into Android Stagefright; suitable for most tablets, smartphones and OTT devices.

www.ittiam.com
Booth: SU11414

BROADCAST FIELD-DECK RECORDER

VITEC Focus FS-T2001



Designed for XDCAM workflow; incorporates the complete range of Sony professional formats, including HD422 50Mb/s and XDCAM EX/HD; supports removable professional media: SxSPro/SxS-1 and SDHC cards, as well as 250GB of internal storage for either clip recording or management/storage over a GigE connection.

www.vitecmm.com
Booth: SL6305

ROUTING SWITCHER

Utah Scientific UTAH-100/UDS



New series provides support for the new 4K (6Gb/s) signal format. Routers in this range from 32x32 to 144x144 and offer the same control options as the UDS routers introduced in 2012; a new 4K signal-processing module will provide multiplexing and demultiplexing of 1.5Gb/s and 3Gb/s streams to and from the 6Gb/s signal.

www.utahscientific.com
Booth: N4607

MULTICHANNEL HD/SD ENCODER

Thomson Video Networks ViBE EM4000



Developed for satellite, terrestrial, cable and IPTV applications; designed to provide optimized compression performance, greater flexibility and density, and, with its capacity for four channels within a single 1RU chassis, a consumption of only 70W of energy for each channel.

www.thomson-networks.com
Booth: SU2611

TRIAx CABLING

Fischer Connectors 1051 Triax HD Pro+

Worked with Draka to develop a new integrated Triax HD connector/cable system featuring 30 percent longer transmission distance; HD/SD signal-compliant system features significantly lower cost of ownership than SMPTE 304 system; also features fast and easy cable assembly.

www.fischerconnectors.com
Booth: C11746



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Fax: **416•421•7603**

email: info@closedcaptioning.com

BROADBAND UHF PANEL ANTENNA

Jampro Antenas JUHD



Radome-enclosed antenna, designed for either side or top mounting, is based on a modular design; can be configured to provide a variety of azimuth and elevation patterns; offers optional beam tilt and null fill to ensure maximum coverage; horizontally polarized antenna can be configured to include varying levels of vertical polarization.

www.jampro.com
Booth: C2607

CAMERA PACKAGES

Adorama camera packages
Camera packages on display will include Blackmagic Cinema Camera, Canon EOS C100 series, Canon EOS C300 series, Sony PMW-F5 and Sony PMW-200 camcorder.

www.adorama.com
Booth: C7412

FOUR-WINDOW 3G-SDI PROCESSOR

TV One C2-6204

Has four 3G-SDI inputs and a DVI-I input (for cascade or background use) to place up to four sizable windows on a single DVI-I/3G SDI output; each window is powered by a CORIO 2 scaler providing full flexibility; 3G-SDI resolutions up to 1080p60 are supported; high-performance de-interlacing with motion-adaptive noise reduction are available for interlaced SDI and YPbPr sources.

www.tvone.com
Booth: SL9416

PORTABLE HD VIDEO-OVER-CELLULAR

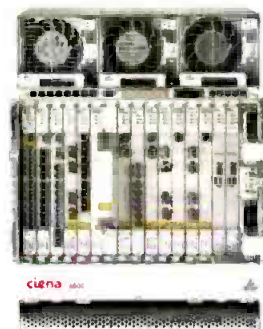
LiveU LU70 backpack

Offers a cellular-based live video uplink solution for global broadcasters with its second-generation proprietary internal and external antenna arrays; offers satellite-like resiliency on-the-move and in heavily crowded locations; bonds up to 14 3G/4G LTE, WiMAX and Wi-Fi modems simultaneously; features include One-Touch-Live mode, point to multi-point distribution and increased throughput up to 10Mb/s.

www.liveu.tv
Booth: SU5511

PACKET OPTICAL TRANSPORT

Ciena 6500



Platforms automatically adapt to a wide range of existing fiber plants, making 40G and 100G as easy to deploy as 10G; leverages common management and control plane interoperability so network can scale to meet growing capacity needs; multiport, multiprotocol transponders with per-port application selectivity offer increased versatility and flexibility.

www.ciena.com
Booth: SU13512

ULTRA-MOTION REAL-TIME DEFICKERING SYSTEM

I-MOVIX Real-time

De-Flickering System

Real-time turnkey system solves flickering problem encountered by any high-speed camera user; designed for use with SprintCam Vvs HD and X10 systems.

www.i-movix.com
Booth: C4742



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PROMPTER AND ON-AIR SYSTEM

Autoscript E.P.I.C



Combines a bright 17in LED prompting screen with an integrated 17in full HD-SDI on-air monitor; weighs 7lbs less than a system made of separate components (saving 7lbs of counterbalance) and uses 20 percent less power; uses High-Bright LED prompting screens with 1600nits of brightness, a 1000:1 contrast ratio and a lifetime in excess of 70,000 hours.

www.autoscript.tv
Booth: C6425

MICROWAVE LINK

Screen Service Broadcast
OMNI LINK

1W RMS, COFDM DVB-T2 based, microwave link capable of non-line-of sight alignment conditions; inputs can be analog audio/video (optional encoder), ASI or IP with automatic redundancy switch; receiver can be either ASI, ASI over IP or analog output; RF head is frequency agile within frequency sub-bands in the 2GHz-11GHz range.

www.screen.it
Booth: SU4306

MANAGEMENT MODULE

TMD Mediaflex CI

Provides ability to design workflows and business analytics; uses analytics to make intelligent decisions based on business rules developed by the organization; harvests metadata from many different content formats; features drag-and-drop graphical user interface for process creation and modification; combines multiple decision filters and business rules in a single task.

www.tmd.tv
Booth: N3425

MULTIFORMAT LCD MONITOR

TVLogic LVM-091W-3G



Combines a low-latency (<5ms), 960 x 540 LCD with multiformat support of 3G HD/SD-SDI, Composite, Component, YC and HDCP-compliant DVI; additional features include waveform/vector scope, focus assist, flip mode, built-in monitor speakers and V-mount, and a durable die-cast housing.

www.tvlogicusa.com
Booth: SL1605

VIDEO PLATFORM

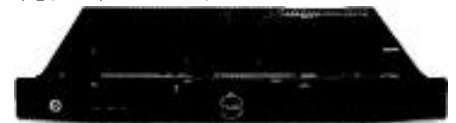
Vimond Vimond Platform

Features new single-source, multiformat streaming and DRM capabilities; new capabilities allow streaming from a single source to formats including Adobe Flash, Microsoft Smooth Streaming, Apple HLS and mobile devices; cross-platform video-streaming technology dynamically remuxes video streams to different platforms.

www.vimond.com
Booth: SL10310

TS SERVER

VSI PacketTV Mobile



Simplifies the delivery of live and file-based content to connected devices, including mobile phones, tablets and set-top boxes; built on an entirely server-based design; can be cost-effectively deployed on public or private networks where HTTP access is allowed; can be and scaled as needed to provide streaming video content to users.

www.vsicam.com
Booth: SU6021

VIDEO PROCESSING CARDS

Cobalt Digital terminal gear cards

New series of terminal gear cards feature a DCDA down converter/distribution amplifier; this line's release will be followed by DCDA-3G and DCDA-3G2 dual down converters with 3G, frame sync and AES outputs; further units to be added include uDC-SDI-SD12, full single and dual up/down/cross converters, respectively.

www.cobaltdigital.com
Booth: N4624

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BROADCAST SERVER

TeiVue B1000 HyperCaster

New options include SD/HD-SDI baseband output, or composite/component/HDMI, in addition to IP; bridges the gap between IP networks and legacy baseband video requirements; each decoded channel supports automatic up/downconversion, seamless format switching on the fly, MPEG-2 and H.264, and SD and HD up to 1080p.

www.telvue.com
Booth: N623

AUTOMATED CLOSED-CAPTIONING SYSTEM

Nexidia CC Director

Automatically repurposes on-air closed captioning for broadcast and IP distribution in order to satisfy broadcast requirements for the 21st-Century Communications and Video Accessibility Act (CVAA); reuses live and file-based caption information to re-caption clips and programs for delivery to the Web, tablets and other Internet-connected devices.

www.nexidia.tv
Booth: S117LMR

BROADCAST MONITOR FIELD PACKAGE

Flanders Scientific LM-2140W

21.5in monitor features 3G/HD/SD-SDI, component, composite and DVI-I inputs, as well as full 12-bit video processing and an 8-bit panel capable of reproducing more than 16.7 million colors; includes a power-efficient LED backlight; comes bundled with carrying bag with integrated hood for LM-2140W (CBH21), clear protective screen cover for LCD panel (CPC21), and VESA to light stand mount (MM20).

www.ShopFSI.com
Booth: SL11127

ASI MONITORING/SWITCHING MODULE

dB Broadcast IQASI82

Retains all of the features of the Hawkeye B082S module, but integrates with the Snell IQ Modular frames and RollCall monitoring and control system; can be remotely monitored and controlled via the Snell SNMP interface; features a near-seamless 2x2 switch that provides independent TS monitoring of two input streams and user-configurable automatic switch operation.

www.dbbroadcast.co.uk
Booth: N1820

SOCIAL MEDIA INTEGRATOR

Aveco Social Media Integration

Gives broadcasters the ability to promote on-air and upcoming programming automatically to both Twitter and Facebook; programming information from a channel playlist or rundown can be fed to the broadcaster's Twitter and/or Facebook account; broadcasters can promote programming or news segments as they air, or promote what will be coming up using a look-ahead feature.

www.aveco.com
Booth: N2138

VIDEO EDITING SYSTEM

Cinegy Desktop



Provides real-time access to media in the Cinegy Archive, along with logging and editing tools and the ability to import/export media to third-party nonlinear editing and automation systems; features include audio-model enhancements and added workflows for handling mono, stereo and surround audio tracks through the media lifecycle.

www.cinegy.com
Booth: SL11112

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HIGH-DENSITY SDI CAPTURE CARD

ViewCast Osprey 845e

Ideal for high-density applications with several input channels in a single device; includes SDI support for both SD and HD as well as embedded audio in the SDI; has four independent SDI channels; designed to suit different needs; capture up to four HD/SD or two 3G independent professional broadcast SDI video sources simultaneously.

www.viewcast.com
Booth: SU7517

REGIONALIZED AD INSERTION

Aveco Regional Ad Insertion

A simple and cost-effective solution for Hub and Spoke or Centralized architectures that can generate additional revenue by enabling higher priced ads to be sold that are specific to viewers in different regions; various configurations enable playlists to be controlled solely from the Hub or shared control with the regional stations.

www.aveco.com
Booth: N2138

EXTENDER

Avitech Seneca X-HDUTP/RP

Seneca Extender with PoE (power over Ethernet) allows transmission of HDMI and VGA signals while extending keyboard/mouse and IR over standard Cat 5e/6 Ethernet cables; PoE enables the transfer of DC power in conjunction with data signals over a single Ethernet cable up to a distance of 100m .

www.avitechvideo.com
Booth: SU8511

RECORDING SOFTWARE

Actus View fifth edition



Fifth-version release offers support for multiple audio tracks and multiple subtitles; loudness measurements combined with robust logging allow users to review status and provide continuous, exportable measurements for compliance proof, and to defend against loudness complaints; records Transport Stream, allowing users to record the stream "as is" from any input (MPEG-2, MPEG-4) and in the same resolution.

www.Actusdigital.com
Booth: SU9524

CAPTIONING SOFTWARE

Softel Swift Create

Allows users to prepare and repurpose closed captions; supports all formats of Open, Closed and DVD/Blu-ray files and converts from one format to another, while repurposing to optimize productivity; now offers localized user interfaces; allows the export of Web and IPTV streamer-format caption files.

www.softelgroup.com
Booth: N2531

XVOCAL MICROPHONE

DPA Microphones d:facto II

Offers high separation and extreme SPL handling; features new wired DPA handle and provides added benefit of a state-of-the-art adapter system that allows for seamless integration with many professional wireless systems; linear in frequency and phase, both on- and off-axis; designed to give superior gain before feedback.

www.dpamicrophones.com
Booth: C3036

LIVE VIDEO SWITCHER SOFTWARE

Livestream Studio

Software-only edition of the Studio HD500; allows users to build a live, multi-camera production switcher; works exclusively with any Blackmagic Design capture and playback device and runs on Microsoft Windows; features support for up to five live video inputs/outputs and HD live video output (analog, HDMI or HD-SDI) via connected BlackMagic Design devices.

new.livestream.com
Booth: SL10716

MEDIA ASSET MANAGEMENT SYSTEM

Nativ Mio v5.0

Available as a SaaS or enterprise solution; includes project workspaces with advanced social features for real-time global collaboration, remote working, and increased visibility of cost and resources on a per-project basis; browser-based, frame-accurate editing eliminates the cost and complexity of moving large assets in and out of the cloud for simple media manipulation.

www.nativ.tv
Booth: SU11621

PIXIE

MPEG-4 AVC HD Encoder/Decoder
with MPEG-DASH Technology



MULTIFORMAT PRODUCTION SWITCHER

Snell Kahuna Flare

Offers standard single-link 1080p support alongside SD and HD formats at no extra cost; versions range from 2 M/E to 4 M/E; offers four keyers per M/E and two channels of 3D DVE, all in a single 6RU frame; comes standard with 48 inputs and 24 outputs, with the option to upgrade to 60 inputs and 32 outputs.

www.snellgroup.com
Booth: N1820

BROADCAST AUTOMATION SYSTEM

RUSHWORKS A-LIST



Provides intuitive, single or multichannel SD/HD output for broadcast, PEG channels and Internet TV; features include DTMF and GPIO triggers, drag and drop scheduling, Auto-Loop, Auto-Fill, Auto-Bug, File Segmenting, multiformat playback, real-time upconvert from SD to HD and router control.

www.rushworks.tv
Booth: C5640

SUBTITLE TRANSCODER

Softel Swift vTX



Streamlines file-based media management workflow by enabling the automatic insertion, encoding and transcoding of subtitles and closed captions to and from broadcast media files; features direct interfaces with media server and MAM manufacturers — such as Dalet, Grass Valley, Harmonic/Omneon, Harris and XOR Media — allowing seamless integration into a wide variety of workflows.

www.softelgroup.com
Booth: N2531

BUSINESS PROCESS MANAGEMENT SYSTEM

Tedial Ficus

Includes business process management capabilities and features improved workflow creation capability using standard BPM notation and associated tools to create new workflows or to improve existing ones; new version makes it possible to access workflows across multiple sites.

www.tedial.com
Booth: N5833

VIDEO TRANSMISSION SYSTEM

TVU Networks TVUPack Mini SE

Designed for Sony XDCAM camcorders; small, lightweight video transmission system uses multiple 3G/4G/LTE/Wi-Fi connections to transmit live broadcast-quality video; with an untethered, integrated design, it mounts directly on support Sony cameras and does not require additional external cables to operate; displays the video transmission status in the camera's viewfinder.

www.tvupack.com
Booth: SU7105

REGIONAL INSERTION SYSTEMS

Starfish Technologies

Designed for TV channel regionalization and ad insertion for traditional broadcast and IPTV; enable broadcasters to add regional program content and advertising with minimal changes to their existing infrastructure.

www.starfish.tv
Booth: N3723

AUDIO MONITOR

NUGEN Audio LM-Correct

Available for the first time outside the Avid environment; offers automatic, faster-than-real-time loudness analysis and correction, providing an automatic method of rapidly conforming audio to current loudness standards.

www.nugenaudio.com
Booth: SU8918

OBSIDIAN 3G

NABSHOW

BOOTH #N4624

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KVM EXTENDER
Matrox Avio



Provides critical system performance for remote computing applications; a transmitter/receiver pair extends uncompressed dual-HD video, keyboard, mouse and stereo analog audio from the host system up to 13,123ft via a duplex LC-LC fiber-optic cable; creative professionals benefit from fast graphics and smooth HD, 2K and 4K video.

www.matrox.com
Booth: SL4616

DIGITAL MEDIA T&M
Digimetrics

File-based verifier for video, audio and metadata allows automated testing of nearly any format in existence; unique tests for artifacts in video and audio streams ensure that false positives are kept to a minimum; ideal for use in high volume ingest, VOD, tape conversion and archival operations.

www.digi-metrics.com
Booth: N3833

FRAME SYNC INPUT CARD
Miranda NVISION 8500 series



Contains eight input ports; allows easy synchronization of incoming wild feeds or signals moving between facilities; offers eight frame synchronizers on a single card, with 3Gb/s, HD and SD all supported on the same module.

www.miranda.com
Booth: N2513

CLIP ACCESS SYSTEM

Arvato Systems ClipJOCKEY Server

Provides direct video server access from the newsroom system for editorial purposes; uses an ActiveX component that ensures easy installation and seamless integration with all ClipJOCKEY workflows; available for Annova Systems OpenMedia, Avid iNEWS, AP ENPS, Octopus and many other newsroom systems.

www.arvato-systems.com
Booth: N4333

FIBER-OPTIC RECEIVER

LYNX Technik yellowbrik ORX 1900

The fiber to L-Band receiver accepts and restores RF signals from a single-mode fiber; accepts wide range of optical inputs from 1270nm to 1610nm; includes two RF outputs for signal distribution or monitoring; supports L-Band ranges from 700MHz to 2300MHz; used with OTX 1910 transmitter, makes robust, cost-effective RF delivery system for distances up to 6mi.

www.lynx-technik.com
Booth: N1120

VIDEO QUALITY MONITOR

Video clarity ClearView Extreme DP

ClearView Extreme with Display Port provides a new platform for the uncompressed display of 10-bit per color component RGB files at high resolutions; new system is capable of real-time comparative playback of two files at 2560 x 1600, 10-bit uncompressed RGB.

www.videoclarity.com
Booth: SU11004

LED FRESNEL

Litepanels Sola 12

Designed to offer a powerful output of daylight-balanced illumination approaching that of a traditional 2K incandescent Fresnel, but with the energy efficiencies and cost saving benefits of Litepanels LED technology; a 12in Fresnel lens emits an even collimated light source that can be focused and controlled for maximum flexibility.

www.litepanels.com
Booth: C6425

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ENCODER/TS SERVER BUNDLE

VSI AVN443/PackeTV Mobile integration

VSI will demonstrate integration between its AVN443 IPTV encoder and PackeTV Mobile media streaming system to simplify IP video delivery; prior to video delivery, the encoder transforms content from SDI (SD/HD/3G) or HDMI (DVI-D with optional adapter cable) sources into full-screen, full-resolution, IP digital video in real time; after content is encoded, the PackeTV Mobile converts transport streams into HTTP Live Streaming (HLS).

www.vsicam.com

Booth: SU6021

VIDEO ENCODER

Digital Rapids StreamZ Live 8000EX



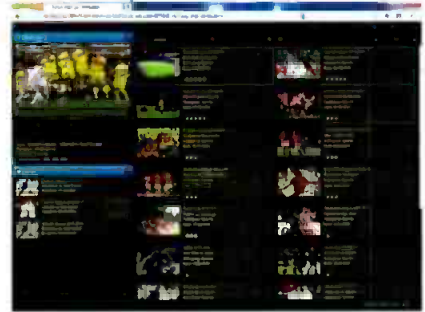
Combines multiformat output versatility and quality with features for unique demands of broadcast, cable, telco and satellite television; features simultaneous H.264 or MPEG-2 encoding for broadcast applications and multiformat encoding for multiscreen streaming on platforms including mobile phones, tablets, PCs, IPTV and OTT services.

www.digitalrapids.com

Booth: SL5624

MEDIA ASSET MANAGEMENT SYSTEM

Tedial Tarsys



Now includes specific features for cloud-based environments and service providers as well as multi-repository and multisite support; enhanced Web-based technology features unified UI for users to access content and workflow management from a single screen; supports multiple data models.

www.tedial.com

Booth: N5833

MULTIPURPOSE BROADCAST ANALYZER

Screen Service Broadcast SSBT Broadcast Analyzer

All around systems for measurement and monitoring; suitable for lab and field; available in three flavors; simultaneous monitoring of up to four signals; RF modules for DVB-T/ DVB-H, DVB-T2 and DVB-S/DVB-S2 (including support for 16 and 32 APSK); support for DVB, T2-MI, ATSC and ISDB-T/ISDB-TB specific TS characteristics; IP interface for TS and T2-.

www.screen.it

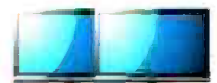
Booth: SU4306

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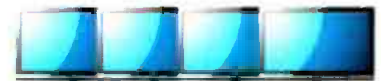


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LEX2600 (1-6 programs)



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COMPACT INTERCOM MATRIX FRAME
RTS ADAM-M

Compact 3RU matrix frame supports eight interface cards in addition to redundant master controllers; is fully compatible with all existing ADAM cards, including the MADI-16+; when combined with the MADI-16+, the ADAM-M can be configured with up to 256 ports; is capable of supporting 1000+ time slots for integration into full ADAM-based systems.

www.rtsintercoms.com
Booth: C6908

MOBILE APP

MediaSilo iPad App

App gives users access to media assets from anywhere; creative professionals and teams can use native iOS app to access the MediaSilo cloud library, locate desired content and download it for offline review; new enhancements include content annotation and approvals; now available for free on the Apple iTunes store.

www.mediasilo.com
Booth: SU10114

LOUONESS MONITOR

DaySequerra iLM8 Live

Simultaneously measures loudness for 5.1 surround and auxiliary stereo inputs using the industry-standard ITU-R BS.1770/1 algorithm; specially optimized for mixing, fast-paced live events with dual 350MHz digital signal processors measuring full 5.1 mix, while isolating the center channel loudness; also features fast-responding "Dual Field display," along with optional HD-SDI input.

www.daysequerra.com
Booth: N3839

TELEPHONE HYBRID

AVT MAGICHipPro

Available as ISDN, POTS and VoIP version for up to 16 callers with eight digital and two analog audio lines plus two handset/headset interfaces; needs 1RU of space and has possibility of extending ISDN/POTS versions to a voice-over-IP system with software upgrade; system can be shared between several studios; HD Voice Upgrade allows compatible HD-Voice compatible phones to receive calls in 7kHz quality.

www.avt-nbg.de
Booth: C8140

WORKFLOW INTEGRATION

Telestream Vantage workflow orchestration

New system integrations allow workflows to incorporate digital file transfer, commercial delivery, cameras, edit systems, quality control, audio correction, broadcast server monitoring and delivery, plus delivery to cable ad insertion servers; allows complete, multivendor orchestration of workflows from content ingest, through editing, QC and delivery.

www.telestream.net
Booth: SL2605

ARCHIVE SYSTEM

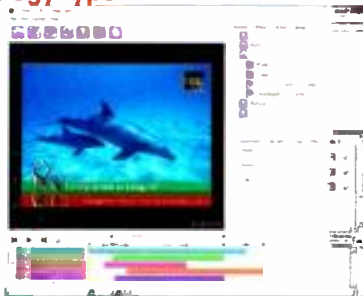
Dalet MediaLife

Features the Galaxy interface; designed for the workflow requirements of program preparation and archiving; includes tools for mass ingest, pre-editing, storyboarding, subtitling, captioning, versioning and distribution — all accessible from the same user interface; integrates with third-party systems such as NLEs, automation device and archives.

www.dalet.com
Booth: SL4524

CHARACTER GENERATOR

Cinegy Type



Integrated in Cinegy Desktop, Air, Studio and Convert; allows the addition of multiple layers of automation-controlled, template-based titles, logos and animated graphics; new version features performance improvements to real-time operations, particularly when embedding large-format videos into plates; also features more complex control of playback of video clips in plates.

www.cinegy.com
Booth: SL11112

PRODUCTION CONTROL SYSTEM

Hi Tech Systems AViTA

Ideal for news playout, automation backup, studio production and scheduled record; now offers multi-camera record and review; this provides a clear and easy way to control up to 16 record, or a mixture of record and play, server channels for studio production work; interfaces to any professional video server and integrates into production and post-production workflows.

www.hitechsys.com
Booth: N3733



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CAMERA

Ikegami HDK-55

Most affordable member of the Unicam HD camera series uses 1080i 2.3-megapixel AIT CCDs; new features include Quick EZ Focus and chromatic aberration correction; compact low-profile camera head with docking adaptors for fiber or triax cable use.

www.ikegami.com

Booth: C5108

SOFTWARE APPLICATION

LYNX Technik yelloGUI

Software application permits select yellobriks to be controlled and configured over USB using a PC; once the module is connected, a virtual image of the module is displayed showing the user all the switches, controls and module indicators; also displays status information such as the detected video form, HDMI output resolution and frequency, as well as audio signals.

www.lynx-technik.com

Booth: N1120

MULTI-PORT VIDEO I/O ACCESS

Artel Video Systems DLC055

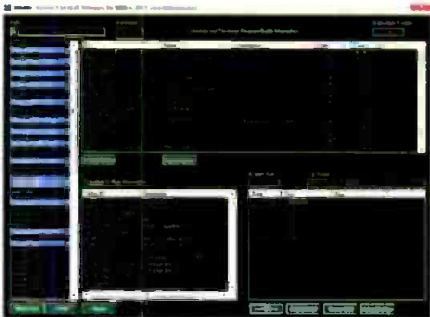
Provides distribution amp capability to the DL4360x chassis, as well as five independent video inputs and five internally routed outputs to or from function modules in a DL4360x chassis; each port supports standard video formats from 3G-SDI to ATSC; outputs are relocked to ensure video quality and integrity.

www.artel.com

Booth: SU6318

ELECTRONIC PROGRAM GUIDE SOFTWARE

NVerzion NGuide



Automation tool designed specifically for the EPG market leverages a pre-built schedule; allows the broadcaster to select multiple daily schedules to create a compatible text-formatted list; this list can then be published to the customer's EPG Web server to ensure accurate timing and advance scheduling for the viewers.

www.nverzion.com

Booth: N4325

WORKSTATION INTEGRATOR

Portalis pro-xi

Gives users ability to manage and monitor up to eight computer systems from a single, integrated workstation using one monitor, keyboard and mouse; helps improve decision-making process, increase efficiencies and reduce overhead; features incoming system card DVI-I, USB Type B and 3.5mm stereo ports.

www.portalislc.com

Booth: C-ST19

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www.matrox.com/avio/be
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www.frezzi.com
Booth: C7936

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AppearTV Multi-screen and OTT module

Capable of simultaneously preparing multiple signals from any input source in multiple formats for distribution to an HD TV in the home, a high-resolution computer screen, and lower-resolution Web- and mobile-based profiles; accommodates different bit rates for each destination device; modular chassis can accept Appear TV-designed DRM-key handling and conditional-access scrambling modules.

www.AppearTV.com
Booth: SU7605

ENCODER

Vela Research

UltraStreamHD Encoder

Enables high-performance, continuous encoding with high-quality video at extremely low bit rates; ideally suited for live events and streaming applications; uses a system-on-IC design to eliminate the need for a host PC; comes in a half-length PCIe x 1 form factor.

www.vela.com
Booth: C2330

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Sencore SMD 989

DVB-S/S2 modulator



Offers reliability for all types of satellite digital video delivery applications; intuitive user and remote interfaces ensure fast setup and quick field operation; supports ASI and IP inputs; the latest software release also adds TR 101 290 analysis and programmable failover capabilities for high-confidence integration into an always-on headend environment.

www.sencore.com
Booth: SU2616

SUBTITLE ENCODING SOFTWARE

Softel Swift ReSyncTiGo

Automatically assigns timecodes to subtitle and caption content, allowing the operator to focus on text manipulation; uses patented Nexidia audio analysis logic, as well as Softel's shot-change assessment system and reading speed algorithms, to create timecodes accurately in the same way that a human operator would.

www.softelgroup.com
Booth: N2531

NOTIFICATION SYSTEM

SGL Notification Service

Using a simple subscription setup, the Notification Service announces the arrival of new material to the controlling MAM system; pushes relevant data to the MAM describing material archived based on rules selected by the broadcaster.

www.sglbroadcast.com
Booth: N1520

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TV One C3-540 CORIO master



Designed to offer a new, more efficient approach to building video systems; combines edge blending, video wall processing, multiviewing and windowing with up-, down- and crossconversion in one 4RU device; a high-quality modular video matrix is built-in using CORIO softswitch.

www.tvone.com
Booth: SL9416

BROADCAST MANAGEMENT MODULE

MYERS ProTrack On-Demand

Module within ProTrack TV's broadcast management system enables media facilities to build, schedule, track and publish program and sales packages, as well as provide transcode requests for station-defined distribution platforms and needs such as mobile, Internet, cable and DVD.

www.myersinfosys.com
Booth: N6415

HYBRID UNIVERSAL TRANSCEIVER

MultiDyne SMPTE-HUT

Designed to increase the transmission distances of HD cameras that can be distance-limited by hybrid copper/fiber cabling; ideal for remote broadcasting, sports, shared control rooms, campus facilities, and arena and stadium applications; cost-effectively enables full camera operation in even the most rugged broadcasting environments.

www.multidyne.com
Booth: C10339

MAM PLATFORM

NETIA Content Management System (CMS)

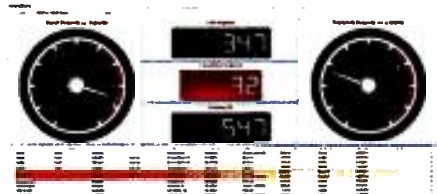


Allows users to manage all processes within the global production environment through one unique and straightforward interface; connects users with all of their partners and vendors within a single production ecosystem, simplifying the sharing and managing of media assets; a new recording feature lets users schedule specific recordings or continuous channel ingest.

www.netia.com
Booth: SU4911

BUSINESS MANAGEMENT SYSTEM

Pilat Media IBMS Omnicast



Stand-alone system for nonlinear operations such as VOD, OTT TV and catch-up TV; includes a service matrix for multi-platform delivery; this tool allows broadcasters to schedule content once at the top level, and have the system automatically create offers on each linked delivery outlet, applying appropriate rights checks based on the requirements of each platform.

www.pilatmedia.com
Booth: N6224

SOCIAL MEDIA MANAGEMENT

Ross Video Social Media Management V5

Allows users to take control of social media, providing a single tool to create, publish and incorporate content from Twitter, Facebook or the web into productions; new version adds a one-time search engine, which allows users to quickly identify relevant social content; polling support provides graph-based outputs of Twitter polls that can be brought to air using XPression graphics systems.

www.rossvideo.com

Booth: N3808

MEDIA CONTENT EXCHANGE

Tedial Media Amigo

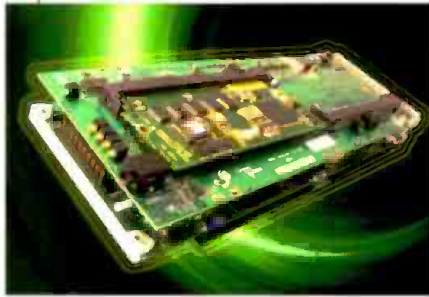
Cloud exchange platform facilitates interchange of content among users or systems located in different sites; once files become available, they are automatically delivered to subscribers in their own working format regardless of the native format of the originating media.

www.tedial.com

Booth: N5833

VIDEO SYNCHRONIZER

Crystal Vision SYNNER 310



Now includes Dolby E encoding; works with 3Gb/s, HD and SD sources; can embed and de-embed a mixture of up to four groups of AES and two groups of analog audio at the same time, with full audio routing, audio and video processing, Dolby E handling, integrated fiber connectivity and flexible delay compensation; can be fitted with a DBE-E Dolby encoder top board.

www.crystalvision.tv

Booth: N1523

PROGRAMMABLE AUDIO PATCHBAY

Bittree 969-S Series Programmable Audio Patchbay

Patented front-panel programmable design allows for quick and easy changes to the normal, and grounding for the entire patchbay or for individual circuits; switched ground design maximizes reliability by eliminating differences in ground potential; normals can be changed to full-normal, half-normal or non-normal, and grounding can be changed to switched or bussed.

www.bittree.com

Booth: SU6521

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www.stagetec.com

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www.ateme.com
Booth: SU7102

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DaySequerra MultiMerge2
Provides surround sound for HDTV viewers, as well as stereo sound for SDTV transmission whether the original content is stereo or discrete 5.1 surround; will up-mix stereo or encoded stereo content to surround sound using the DTS Neural Surround UpMix process, as well as rendering a Lt/Rt output of 5.1 discrete audio using the DTS Neural Surround Down-Mix process.

www.daysequerra.com
Booth: N3839

**FIBRE CHANNEL HOST
BUS ADAPTERS**

ATTO Technology Celerity series



Capable of data rates up to 16Gb/s and transfer rates up to 6400MB/s; connects via PCIe 3.0 bus; latency-management features include Advanced Data Streaming (ADS) Technology; ships with benchmarking utility so that performance can be verified.

www.attotech.com
Booth: SL7613

ULTRA-MOTION SYSTEM
I-MOVIX X10+

Extreme slow-motion mode operates at frame rates up to 2600fps in 1080i50 or up to 5600fps in 720p60 (100 times slower than live action) with instant replay for sports productions requiring higher frame rate levels; fully integrates ultra-slow-motion for live HD broadcast production.

www.i-movix.com
Booth: C4742

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Davis & Sanford Artisan
Tripod Series

Light, strong and compact; offers versatility for nature and sports shooters on the go; maximum working height of 60in; ideal for DSLR, mirrorless, point-and-shoot cameras; features include easy glide center post, three-section flip locks (model AR3C-60), four-section flip locks (Model AR4C-60), three independent angles, foam grip cushioned, insulated legs and rubber nonslip feet.

www.tiffen.com
Booth: C8818, C9015

VIDEO ENCODER/DECODER

Fujitsu IP encoders



New firmware release improves end-to-end latency for IP-9610, IP-900 and IP-920 HD/SD H.264 video encoders/decoders while delivering exceptional picture quality at reduced bit rates; ideal for HD satellite news-gathering, broadcasting and IP streaming applications; now capable of operating at less than 99ms back-to-back latency.

www.fujitsu.com/us
Booth: SU7911

**CLOUD-BASED
GRAPHICS CREATION**

Chyron Axis World

Enhanced to simplify, streamline and facilitate graphics creation, enabling artists, reporters, production assistants and news producers to create high-quality broadcast graphics; integrated system allows users to create templates in Chyron Lyric PRO 8.5 software, further streamlining integration within the broadcaster's existing workflow or within Chyron's BlueNet workflow.

www.chyron.com
Booth: SL1010

LED LIGHT

Lowel Prime LED 800

Available in dedicated daylight or tungsten high-CRI color versions; almost twice the output of the 400, with 126ft-candles at 9ft, spread over wide 50-degree beam angle; DMX and manually dimmable, with tweakable color for critical balancing; silent fanless air convection cooling; rugged all-metal housing and accessory light controls.

www.tiffen.com
Booth: C8818, C9015

PROCESSOR

Minnetonka AudioTools FOCUS

New platform is designed for automated, intelligent audio processing with easy operation; proven presets provide out-of-the-box functionality, and the simple user interface allows for customized DSP that fits unique client and workflow needs; provides complete loudness control that conforms to the CALM Act, ATSC A/85, and EBU R128.

www.minnetonkaaudio.com
Booth: SU8918

VIRTUAL TRACKING EFP HEAD

Shotoku Broadcast
Systems SX300VR



Tracking pan-and-tilt head is designed as the perfect companion for the TP200VR pedestal; features the company's reliable and accurate VR tracking technology; designed to offer a continuously adjustable perfect-counterbalance system; VIS-CAM ultimate fluid drag system ensures smooth, adjustable pan-and-tilt drag with enhanced torque.

www.shotoku.tv
Booth: C9032

LIVE STREAMING PRODUCTION

Matrox VS4



Quad HD capture and ISO recording card for Telestream Wirecast for Windows live streaming production software; provides in a single PCIe slot up to four independent HD inputs with up to eight embedded audio channels per source; not only sends video feeds to Wirecast for streaming, but also simultaneously provides ISO recording of all the original video and audio feeds to disk — ready for post-event editing.

www.matrox.com
Booth: SL4616

**TURNKEY VIDEO
STREAMING SYSTEM**
Telestream Wirecast
Turnkey Solution



Brings high-quality, multicamera live video production and broadcasting capabilities to live event producers; uses Matrox VS4 four-channel capture card; provides ISO recording of all video feeds for post-event editing and future archiving.

www.telestream.net
Booth: SL2605

GRAPHICS CONTROL

Molden Media M2Control
Modular, template-based, scalable control and playout application geared for real-time graphics systems; interfaces to data feeds and databases; integrates into the broadcast infrastructure and supports automatic failover; new features include Ventuz support, advanced playlist handling, extended user management and logging.

www.moldenmedia.com
Booth: SL6830

STREAMING VIDEO

Teradek VidiU
Miniature HDMI H.264 encoder can mount on top of a camera and offers a variety of network interface options, such as Ethernet, dual-band MIMO WiFi (2.4/5GHz) and support for 3G/4G USB modems; includes a built-in Li-Ion battery with up to two hours of run-time; features a unique Access Point mode that allows users to set up and monitor their live broadcast locally from an iOS device.

www.teradek.com
Booth: C9939

MPEG TS MONITOR

Volicon Observer 7.1
Newly enhanced to accommodate an even broader array of inputs, Observer line supports ASI, QAM, 8-VSB, DVB-T/T2 and DVB-T MPEG TS interfaces; available on all Observer TS systems — including Enterprise, Pro, and Scout systems — new interface simplifies deployment and configuration for receiving off-air channels.

www.volicon.com
Booth: SU8518

WIRELESS MIC

Sennheiser DIGITAL 9000
Easy to set up and operate; mic heads and lavalier mics available for the transmitters let users tailor the system to their application; features an eight-channel digital receiver covering the UHF spectrum from 470MHz to 798MHz; also incorporates handheld and bodypack transmitters, and a remote-controlled antenna booster.

www.sennheiserusa.com
Booth: C3217

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Minimizes contribution latency and optimizes bandwidth without compromising; less than one frame latency for the full encoding-decoding process without any visual loss of quality; ideal interface for SMPTE 2022 video over IP.

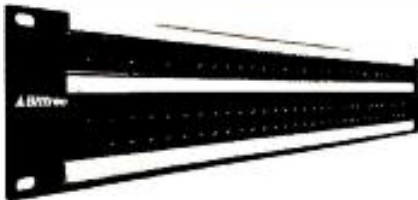
www.intopix.com

Booth: C4742

MONITOR PATCHBAY

Bittree 3 x 32 Mini-WECO

Monitor Patchbay



Innovative design that adds an additional monitor row to the traditional Mini-WECO patchbay without exceeding the 2RU panel height; since engineers can now use the third row as a test point, this design has enabled new applications for patching.

www.bittree.com

Booth: SU6521

CAMERA BAGS

Domke Next Generation series

Made of soft, fashionable canvas that molds to the body for a comfortable fit when on the go; interchangeable pocket inserts let shooters custom-tailor their bag to fit all the accessories they need, protecting gear and providing easy and convenient access to it in even the most action-packed situations.

www.tiffen.com

Booth: C8818, C9015

PORTABLE VIDEO SWITCHER

Livestream Studio HD 500

Provides live video mixing for multi-camera productions; features up to five HD/SD SDI inputs and five video outputs (HD/SD SDI, HDMI, component, composite and s-video); switcher is full field-rate multiview to allow users to preview their cameras in real time with audio levels; can perform live transitions and live audio mixing, as well as graphics overlay and titling.

new.livestream.com

Booth: SL10716

FIBER-OPTIC TRANSPORT SYSTEM

MultiDyne 4K-4000

Designed to address the tremendous data requirements involved with delivering 4K digital television; enables users to transport a 4K signal over one single-mode fiber; cost-effective unit is portable or rack-mountable; a card version is also available for the openGear platform with SNMP management and redundant power.

www.multidyne.com

Booth: C10339

SPORTS POST-PRODUCTION SYSTEM

Orad Hi-Tec Systems PowerPlay

Turnkey post-production system for managing live sports productions; capabilities include ingest and instant highlight editing integrated through a dedicated sports media asset management platform; provides complete system for large-scale sporting events, offering fast turnaround of content and advanced data management tools.

www.orad.tv

Booth: SL5709

SDI/HDMI DECODER

VSI D1000

Supports SDI (3G/HD/SD) and HDMI outputs, including full 1080p60; bridges the gap between expensive IRDs and consumer STBs; will fit into the same chassis systems (MPP1700 and MPP200) as all other VSI blade encoders.

www.vsicam.com

Booth: SU6021

VIDEO RECORDER

Sound Devices PIX 240 and 240i



Both the 240 and 240i now have the ability to record into Apple ProRes 4444; both have 12-bit, 4:4:4 capabilities and can record 330Mb/s Apple ProRes 4444 files that are perceptually indistinguishable from original source material; additional features in v3.0 update include time-code and recording status displays on SDI and HDMI outputs, and up to 500ms audio delay to compensate for multi-device picture.

www.sounddevices.com

Booth: C2849

LIVE SPORTS VIDEO PLATFORM

Vimond Live Sports Center

Enables spectators to watch live and on-demand sporting events in an extensive Silverlight player framework; gives the user the ability to switch camera angles or live streams, watch highlights from the game, chat with other viewers, publish comments to Facebook, review team statistics, and see match and team line-ups — all within the player, with tabs and overlaying information fields.

www.vimond.com

Booth: SL10310

SERVER

Minnetonka AudioTools Server 2.5

Latest version includes integrated failover protection and a new queue-monitoring application, as well as MP2, MP3 and AAC encoding; interoperates with Avid, Ericsson, IBM and Sony, among others; designed to be a complete solution for managing and processing Dolby E, Dolby Digital, Dolby Digital Plus and linear PCM content, as well as audio essence within MXF and QuickTime containers.

www.minnetonkaaudio.com

Booth: SU8918

PORTABLE HD VIDEO-OVER-CELLULAR

LiveU 40

Compact, lightweight device for high-quality live video transmission over multiple cellular networks; ideal for live newsgathering and online coverage of events; weighs less than 1.5lb (700g); designed for broadcasters and online media professionals on the move; features an internal antenna for additional resiliency in areas of poor cellular coverage, as well as new capabilities for live newsgathering.

www.liveu.tv

Booth: SU5511

ROUGH-CUT EDITOR

MediaSilo Paper Cut

New feature enables fast and easy creation of rough-cut video clips based on transcripts of video managed by MediaSilo; users can drag snippets from one or many videos to the Paper Cut pod to create a rough-cut edit; previews of the resulting clip can be exported as a Final Cut Pro sequence file and viewed in Adobe Premiere Pro, Final Cut Pro or Avid Media Composer.

www.mediasilo.com

Booth: SU10114

MODULAR STORAGE SYSTEM

DVS SpycerBox



Can improve workflow speed and efficiency; increases the performance of file-based workflows and gain flexibility when used as a NAS solution, a SAN configuration or a combination of both; data management software enables you to quickly organize, save and manage millions of frame sequences, projects and their corresponding metadata.

www.dvs.de
Booth: SL6316

AUDIO CONSOLE

Stagetec Crescendo

Freely configurable both in respect to the number of channels and the number of buses; configurations of up to 300 audio channels and 128 summing buses are supported; up to 96 aux or N-1 (mix-minus) buses can be defined; offers extensive snapshot and scene automation; has a control surface operating depth of 625mm.

www.stagetec.com
Booth: C2050

REAL-TIME IP CAPTION LINK

EEG 1260 iCap
Can transform any CC encoder into an iCap encoder; created for openGear frame; allows engineers to easily disem- bed audio from any HD/SD-SDI input and send it encrypted to remote caption- ers; outputs caption data over RS-232 or telnet to legacy EEG or non-EEG brand encoders; fully compatible with EEG 1250 ComCC openGear module for intelligent dial-up routing.

www.eegent.com
Booth: N824

VIRTUAL STUDIO POSITIONAL CALIBRATION

Shotoku Broadcast Systems SPI-Touch

Offers new way of positional calibration for virtual studios; designate two different points through SPI-Touch's viewfinder and press the button at each of the points, camera position will be instantly calibrated; eliminates the need to mark the studio floor and move the pedestal, making calibration easy and fast.

www.shotoku.tv
Booth: C9032

SECOND-SCREEN SYNCHRONIZATION SYSTEM

Softel MediaSphere Bridge

Delivers connectivity between the TV and smart TVs or second screens; offers in- broadcast triggers or Automatic Content Recognition (ACR) connectivity; can adapt to a variety of interactive ecosystems.

www.softelgroup.com
Booth: N2531

CLOUD-BASED TRANSCODING SERVICE

Harmonic ProMedia Carbon MP

Enables content creators, service providers and media professionals to convert broad- cast-quality video content quickly and cost-effectively to virtually any standard media format; allows users to transcode file-based video content in the cloud on an hourly basis; users can also access the application's transcoding engine via a fam- ilar XML API to deploy highly scalable, cloud-based transcoding workflows.

www.softelgroup.com
Booth: N2531

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Managing DIGITAL ASSETS

Archiving makes video accessible to all.

BY PHILIP STOREY AND SAM BOGOCH

The role of digital asset management systems in broadcast organizations has been a hot topic in recent years, and an increasing number of these systems are being implemented. A primary driver for this trend has been the shift to file-based media, which makes collaborative and “searchable” workflows possible; other factors are the growing pace of media production and the economic drive to improve efficiencies and cut costs. (See Figure 1.) As a result of these changes, media creation and archiving now have the potential to look more like private clouds of data, with widespread accessibility across the workforce, whereas in years past, video assets were not easily available to all who could make use of them.

Asset management solutions

Broadly speaking, asset management can be categorized as either digital asset management (DAM),

a term that covers enterprise asset management across a wide range of media types, including images and documents; media asset management (MAM), which covers systems that emphasize video and audio capabilities; and production asset management (PAM), a subset of MAM systems that targets work in progress rather than long-term archival capabilities. A wide range of solutions are available, with pricing ranging from close to \$1000, up through enterprise systems costing close to \$1 million. The systems at the low end of the scale tend to emphasize out-of-the-box capabilities and speed of installation, while the larger deployments often involve a high degree of customization for a specific site’s requirements.

Archive storage options

Turning to storing digital video assets, there are special requirements when compared with the data storage needs of a typical IT department. The main differences are the much larger

total volumes of data and larger file sizes. Often there is also a need to consider storage of video assets on a much longer timescale than is relevant for general IT. However, an important shared requirement is to have strong data protection, including a mechanism to recover assets in case of fire or other major disaster.

The main candidates for storing large volumes of video assets are disk drives, Linear Tape Open (LTO) cartridges and cloud storage, and there is a place for all three.

For work in progress, disk drives, typically in a RAID configuration, make a lot of sense, but for long-term storage of video assets the total cost of disk-only solutions becomes prohibitive when issues such as the cost of electricity, the cost of replacing disks and the typical need to have replica data in two different locations to provide adequate data protection are factored in.

Combining disk and LTO with intelligent management software provides an attractive option for storing



large volumes of high-resolution video assets for the long term. LTO cartridges have a 30-year lifetime in normal office conditions, provide high data transfer rates and a low cost per TB. Today's LTO-6 cartridges cost about \$100 each and provide a native capacity of 2.5TB, which means that a single LTO cartridge will hold more than 100 hours of HD recorded at 50Mb/s or more than 50 hours at 100Mb/s. At about \$40 per TB, the cost to produce a duplicate LTO cartridge for offsite retention is attractive.

Cloud storage is a service, and the service provider uses either disk or LTO to store the digital assets. It naturally provides global access to the assets, and the service model can reduce capital costs. Today's cost of bandwidth means that it is expensive for high-resolution assets but attractive for low-resolution proxies and metadata.

Implementation challenges

Across the board, there are a number of key challenges that tend to

recur when implementing an asset management solution. Among these are: 1) the need to accommodate legacy assets; 2) the need to fit with the existing infrastructure; and 3) the

need to adapt to (or change) existing workflow expectations.

We will now discuss each of these in turn, and try to summarize best practices for handling the challenges.

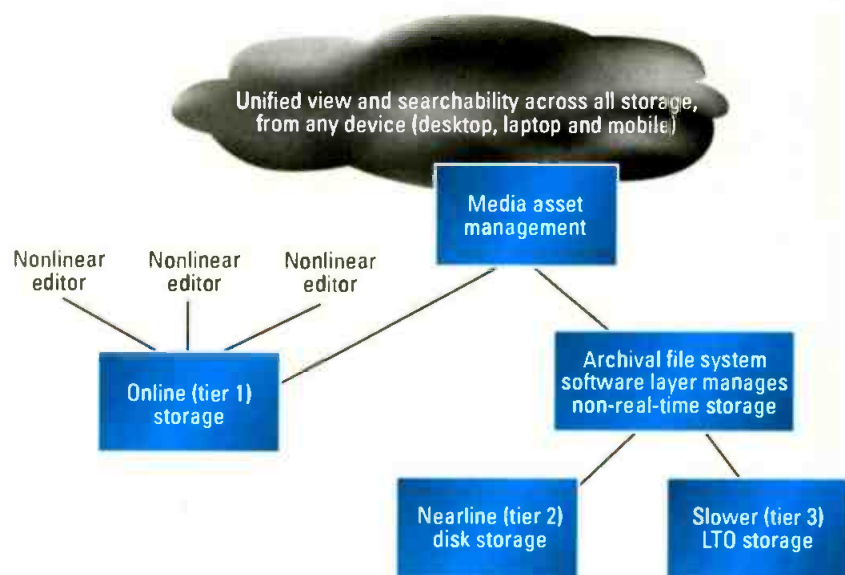


Figure 1. Media asset management systems are increasingly being implemented by organizations due to the accessibility and ability to search content across all storage, from any device (desktop, laptop and mobile).

Managing legacy non-file assets

There is a wide range of approaches for managing legacy non-file-based assets, such as those held on videotapes. These range from a simple switchover, with all assets after a certain date being file-based, to converting non-file assets on an as-needed basis, through to a major conversion project, turning all historical assets into files.

Most broadcasters and content producers will benefit from a simple cost-benefit analysis to this range of approaches. In many cases, a cut-off date combined with as-needed conversion of specific earlier assets will provide the best solution. However, there are clear examples, particularly in the case of organizations with large archives and rising

Supporting existing and future infrastructures

The need to fit with existing production infrastructure is often a key determinant of what system(s) will be chosen. A “forklift upgrade,” in which editing systems, storage hardware and networks are all upgraded, is rarely ideal, especially in these times when capital expenditures are under pressure. Most MAM and PAM software vendors acknowledge this, and offer ways to implement their systems in the context of hardware and software already in place.

Where possible, customers should seek to follow industry standards. A key consideration for the archive storage, whether disk, LTO or cloud-based, is the interface to the rest of the infrastructure. This is important because

User acceptance

Finally, as in so many change management scenarios, the biggest hurdle is often the people who will be asked to use and administer a media asset management system. Generally speaking, they will have developed their own ad-hoc workflows without the help of an asset management framework. Most often, these are based on standard folder structures and internal best practices for folder organization, rights and privileges, etc.

Some MAM and PAM vendors provide approaches that attempt to streamline the transition from a folder-based workflow to a MAM/PAM. But perhaps the most effective way to handle this transition is to choose a system that allows the users to maintain their familiar views of, and access to, the assets being managed. When this can be achieved, the transition costs to MAM or PAM from folder-based workflows can be minimized.

Just as important as the cost savings are the increased likelihood of compliance. Although MAM and PAM systems can have a utopian appeal to management, the grassroots success or failure of such systems is often determined by the simple fact of whether users choose to “buy into” the system. If they ignore it, the capital investment — whether small or large — will mostly be wasted. **BE**

Sam Bogoch is CEO of Axle Video, and Dr. Philip Storey is CEO of XenData.

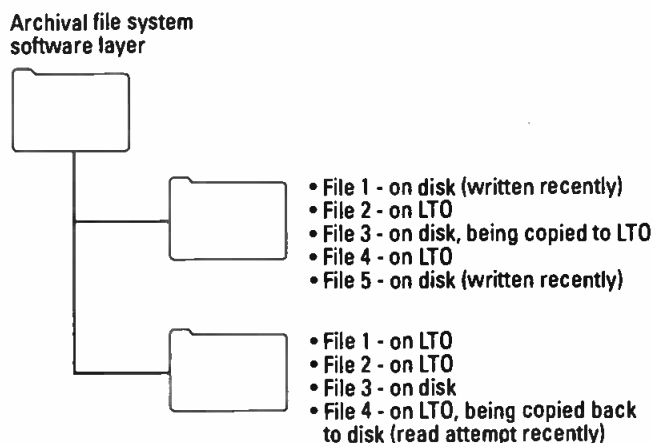


Figure 2. The preferred approach in implementing a MAM is to use a file-folder structure, such as the one shown above, accessible via a standard network protocol — rather than a proprietary interface between the storage repositories and the asset management system.

costs and risks associated with potential data loss, where the approach of a major conversion makes the most sense.

For a major conversion to file-based assets, the process should be streamlined as much as possible to minimize costs. Where possible, the high-resolution assets should be stored on the final archive storage media, such as disk or LTO, in the required format as early as possible in the migration process to avoid unnecessary further processing by the asset management system.

within the lifetime of the video assets, often measured in decades, there will likely be a need to change the asset management system or even migrate the entire contents of the archive.

The preferred approach is to use a file-folder structure accessible via a standard network protocol such as CIFS or FTP rather than a proprietary interface between the storage repositories and the asset management system. This allows access to the asset repository which is independent of the asset management system and maximizes the options for future upgrades.

ADDITIONAL RESOURCES

The following are available on the Broadcast Engineering website:

- Goodbye spinning disks
- Tape archive technology, Part I
- Tape archive technology, Part II
- Archiving: Tape rises from the dead – Part 1

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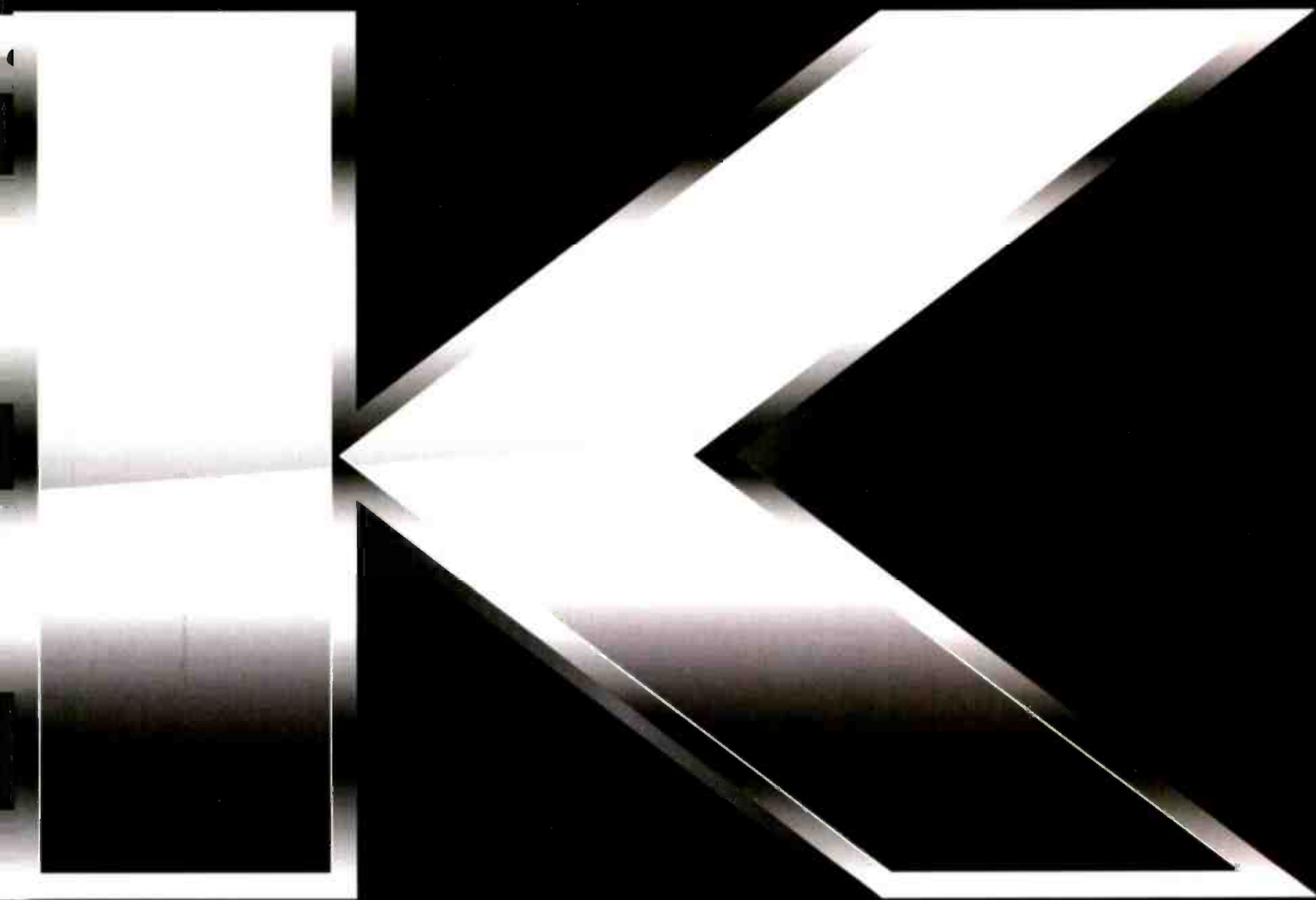
Consumer expectations have broadcasters in limbo.

BY STAN MOOTE

With the consumer-set manufacturers pushing hard on 4K, we broadcasters really need to have a serious look. When I

first speak with industry people about 4K, the subject is frequently dismissed with a rather negative refrain: "4K is just another 3-D." Let's consider that lament more carefully.

First, 3-D, from a plant infrastructure point-of-view, isn't really that painful to deal with. On the production side, for those not too serious about quality, it's a matter of simply encoding 3-D camera feeds directly into a frame-compatible, side-by-side format and pushing it through standard HD production and editing techniques. On the playout side, with



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a few tweaks to graphics — such as logos and branding — 3-D is complete.

For those more concerned with quality, however, left and right channels

have been kept separate until the final transmission. As an equipment manufacturer, we added in 3-D modes to help keep the two channels tied to-

gether for processing, routing, distribution and playout operations. Doing this future-proofs equipment buys for “if and when” 3-D is required. To date, 3-D has had limited reach, which brings us back to the industry’s current concern: Will the same happen with 4K? To seek an answer, let’s look at 4K from two points of view — consumer and broadcaster.

**To date, 3-D has had limited reach.
Will the same happen with 4K?**

Consumers

On the consumer side, 4K is here to sell newer sets at higher margins because new technology makes 4K possible. It really is as simple as: We can do it, so why not? Looking deeper into various technical details about

questions: Who needs it, and who will pay for it? With the industry currently pinched trying to get to 100-percent full HD operations and scrambling to deal with multiscreen requests, it's hard to justify diverting energy toward 4K when ROIs aren't there. Also,

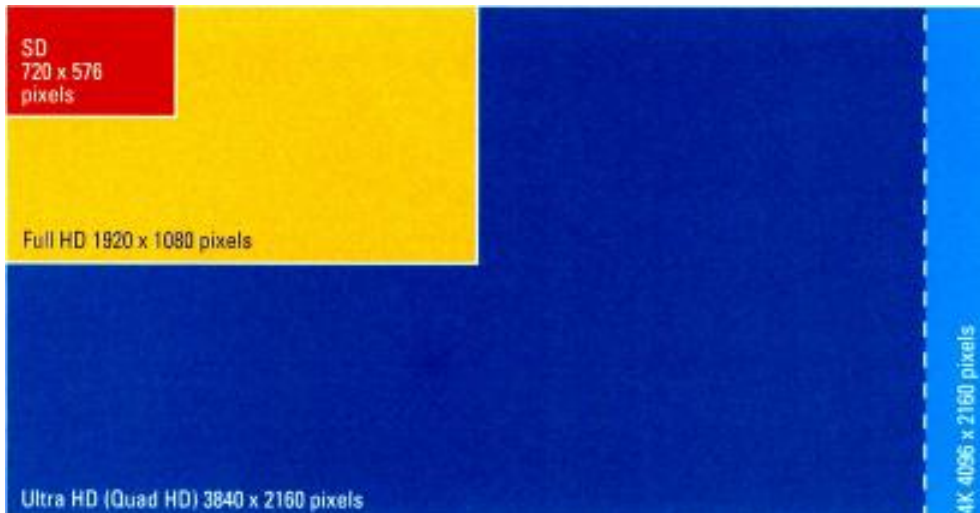


Figure 1. The consumer television industry is promoting Ultra HD, (3840 x 2160), as the replacement for HD. Broadcasters can support that level of quality, and may choose to do so, even if they never transmit a true 4K (4096 x 2160) image.

4K sets, the push is that the picture is 4X sharper than HD. While impressive on the surface, this simplistic approach ignores how 4K video gets into the set, as well as the practical numbers around set-size and viewing distance.

We cannot even see the difference between 720p and 1080p when viewing a 50in set at 10ft. In order to see the difference between 1080p and 4K, dozens of stats out there agree that you need a set larger than 70in. (Many say that larger than 85in is required.) As most living rooms don't have the space to support a practical viewing distance for 85in sets, this will be a hard sell for the masses. As for audio, 4K supports 22.2 sound. That said, can you imagine having 24 speakers in any room in your home?

Broadcasters

On the broadcast side, the idea of 4K transmissions is the primary concern. This goes well beyond the fact that new standards are required. The transmission concern is largely practical and expressed with a couple of

there is no frame-compatible mode for 4K. That said, even with a frame-compatible transmission mode, 3-D wasn't very successful.

So, do we just forget 4K? Certainly not. Looking well beyond the super high-end videophiles, boutique 4K channels and cinema usages, there is a clear home for 4K within a broadcast plant without ever putting a single 4k feed out to air. (See Figure 1.)

There clearly is no single standard format yet. We are seeing 4K at 30p being run. (Frankly, it looks great until the camera pans.) Given we are moving to 50p or 60p, why would anyone even consider less than this for any type of fast-moving event such as sports? Within a plant, this would mean that 8 x 1.5Gb/s paths would be required, or 4 x 3Gb/s ones. Even set manufacturers still need to figure out how not to require four HDMI cables. Clearly, fiber is the only way to go.

In the production environment, 4K is going to be great. Shooting at 4K and using your file-based editing systems is perfect. Zooms and pans can be produced in post more elegantly

Broadcasters can embrace 4K without ever putting it to air.

without a loss in resolution during the editing process. This is a true bonus, resulting in lower production costs and fewer reshoots. The statement "fix it in post" has a new meaning. In this environment, 4K streams never happen beyond the editing room. All is kept as files, so there is no need to worry about tying up so many SDI paths.

Other areas where 4K is useful are in MC and other monitoring settings that run SD and HD. The switch from dozens of CRTs to flat screens has created a dilemma: Users forget that putting 16 PIPs on an HD screen is not equal to having 16 HD monitors. The monitor's maximum resolution is divided by 16 for each PIP. As operators often sit very close to monitors, switching to 4K radically improves this quality. Those same factors make 4K useful in trucks and OB vans.

Summary

It's understandable that broadcasters have concerns about 4K coming on stream, requiring new plant systems and new distribution formats that consumers expect for free. On the consumer side, we will see the price of 4K flat screens coming down. More and more plant equipment will become future-proofed for 4K. There is no reason to be frightened over 4K because, without putting a single 4K feed out to air, broadcasters can embrace 4K technology to improve their build-outs and productions. **BE**

Stan Moote is VP business development, Harris Broadcast.

+ **ADDITIONAL RESOURCES** **+**

The following are available on the *Broadcast Engineering* website:

- 3-D is dead. Long live 4K!
- 4K Picture becomes clearer for broadcasters
- Will 4K cut it?

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Video and signal □ CONVERSION, PART 2

Converters are being used more now than ever before.

BY RENAUD LAVOIE

The topic of video conversion spans a lot of territory and can run as deep as one cares to study. Part one of this part-two series of articles appeared in the February issue of Broadcast Engineering and focused on types of video conversion and platforms. The article examined the principles behind electrical-to-optical conversion and introduced some basic D/A technology and implementations. In this concluding

part, we'll look at specific building blocks to carry out tasks, including graphic format conversion, VGA, DVI, HDMI and the oft-needed up/down/cross converter.

Graphic format converters

Graphical formats are used in every aspect and phase of video signal capture, production and playout, and in every type of facility. OB vans, post-production facilities,

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playout centers and broadcast studios all use graphics, and, therefore, computer formats.

In one early computer graphics application, automation systems provided the real-time play list, or program schedule, to the MC operator. This automation system ran on a computer, typically providing a graphics output in compliance with the VESA standard.

A VGA-to-SDI converter received the playlist, and converted it from an RGB 4:4:4 color space and computer frame rate into an YCrCb 4:2:2 color space and video frame rate. This signal could then be keyed over “on-air” and/or “preview” video signals that were seen on broadcast monitors used by the MC operator.

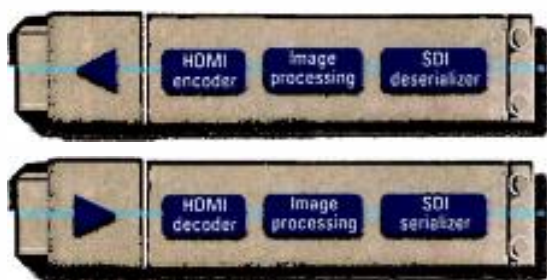


Figure 1. This shows an HDMI/DVI converter with SDI I/O. (Images courtesy of Embrionix.)

Today, the color-space-converter (CSC) is a well-known signal processing building block often used for this function. (See Figure 1.) It can convert both SD and HD color space, as defined in ITU-R BT.601 and BT.709, respectively.

The basic blocks are:

- **HDMI encoder:** This block takes a digital parallel signal (usually R,G, B or Y, Cb, Cr) and serializes it. This block is also responsible for reformatting the parallel signal (TMDS for HDMI, and 8b/10b for DisplayPort). This block could include the CSC.
- **Image processing:** This block can include functions such as audio embedding and de-embedding, frame buffering, video diagnostics and others.

HDCP is a data security key that the source and destination negotiate to establish a secure link between them.

- **SDI serializer:** The primary function of the serializer is to convert parallel data to serial data.
- **HDMI decoder:** This block receives data and de-formats it. It then deserializes the data, and, prior to conversion to parallel, can provide functionality such as audio de-embedding, simple picture scaling and color space conversion.
- **SDI deserializer:** This is the opposite of the serializer.

Two key aspects of graphics conversion are scaling and frame rate. Computers and mobile devices can output signals with vertical refresh rates (vertical sync, or frame rates) of 60Hz, 75Hz, 80Hz and more. SDI video does not support higher rates. It can output signals with many different resolutions: 640 x 480 up to 1600 x 1200, 1920 x 1200 and more. SDI video supports a comparatively small number of resolution sizes.

It is best to rate convert and re-scale the incoming stream. The number of different formats, analog signaling, sync signals and control signals is efficiently and effectively analyzed and managed right out of the graphics card, prior to any other operation or conversion that might need to occur later in the process.

The transition-to-digital formats occurred in the computer and consumer electronics industry in parallel with, and in some cases ahead of, the change in broadcast video. VGA evolved into DVI, then HDMI and now, perhaps, DisplayPort. The VGA converter is still being used, but now HDMI/DVI conversion is more popular. If you need to convert from an HDMI source to SDI, you need to know key information. HDCP is a data security key that the source and destination negotiate to establish a secure link between them. If the source is HDCP compliant (like Blu-ray DVD, setup box, PVR, etc.), and the destination is not, the signal is not transmitted. The user sees black.



The HDMI/DVI converter, with a latch connector, provides a locking mechanism for positive retention.

The converter for HDMI/DVI to SDI doesn't have the key because this would allow an unauthorized decode and possible copying of the content protected by the HDCP.

In the reverse processing path, if you have an SDI-to-HDMI converter without the key, you can connect it to your destination, even if the destination is HDCP-compliant.

There is good Internet documentation that explains the HDCP protection mechanism and when it is required. It is important to note that the selected SFP could support HDMI with HDCP-protected content.

Another point to consider when you are looking for a converter is the latch mechanism of the HDMI connector.

(Note that a DVI signal can be carried in an HDMI connector.) Some converters provide a screw as part of the connector to ensure it will not fall out or become loose. Other connectors provide a locking mechanism for positive retention, while still allowing the SFP DVI converter

Another point to consider when you are looking for a converter is the latch mechanism of the HDMI connector.

to fit in a standard SFP cage. This unique latch enables the SFP to be compliant with the SFP MSA standard and ensures positive retention.

Rapid evolution in the computer and consumer markets is pushing other types of converters. Things like DisplayPort-to-SDI, Thunderbolt-to-SDI and USB3.0-to-SDI are interesting. Again, these converters will enable your products, and therefore you, the broadcaster, to support these new standards without a major redesign of your core equipment.

Up/down/crossconverter

One important video converter is the up/down/cross-converter. (See Figure 2 on page 90.) Rather than convert between physical transport layers, or between computer graphics and video formats, this converter operates on video SDI signals. Upconversion refers to converting a lower-resolution signal to a higher-resolution signal at the same frame rate. One example is 525i to 1125i, (SD to HD). Another example would be 720p to 1080p.

Downconversion is the opposite. A higher-resolution signal is converted to a lower-resolution signal, at the same or different frame rate. Simply reverse the two examples given in this case. Both of these conversion types require special digital filters to prevent aliasing artifacts from degrading picture quality. This is especially true for video signals with embedded text graphics. The up/down/crossconverter is a more complex converter. The basic blocks here are:

- *Equalizer*: The goal of the equalizer is to eliminate the ISI and restore the DC level.
- *Conversion block*: This block takes the incoming video feed and converts it scale up, down or changes the frame rate.
- *Frame sync*: The frame synchronization is the process by

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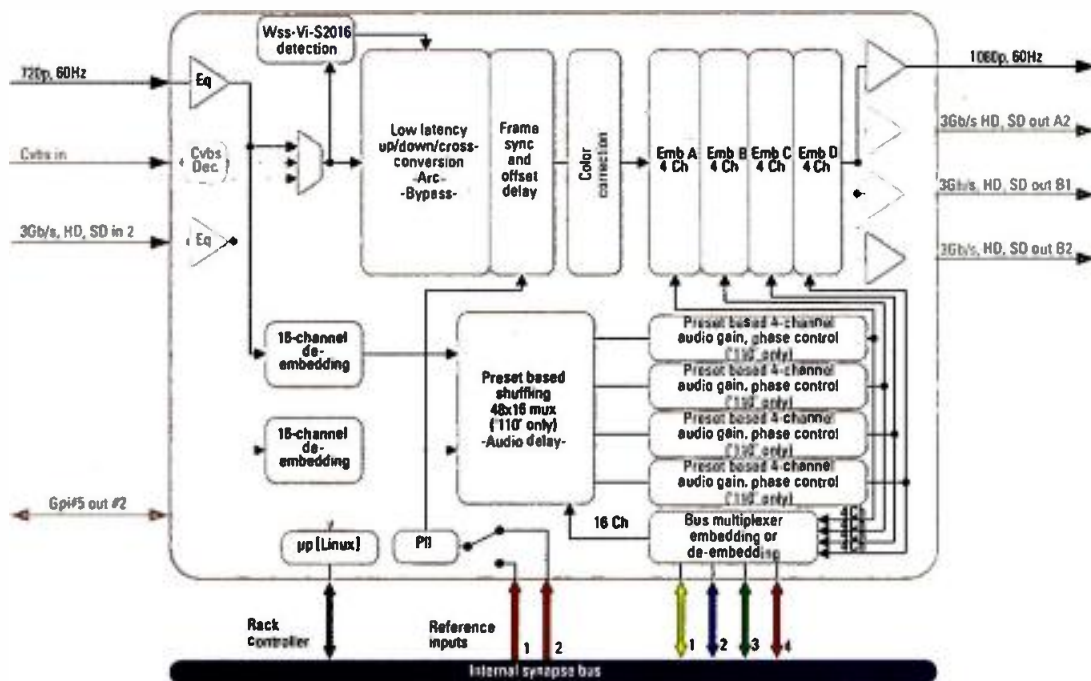


Figure 2. The up/down/crossconverter is important because rather than convert between physical transport layers, or between computer graphics and video formats, it operates on video SDI signals. (Image courtesy of Axon.)

which an incoming frame is aligned to the studio reference (usually a black signal).

- **SDI serializer:** The primary function of the serializer is to convert the parallel data to serial data.

Crossconversion is used to convert between video formats of the same resolution — for example, 1080i30 to 720p30. This example requires a de-interlacing conversion to generate a progressive picture from an interlaced one, and is then followed by a change in resolution from 1080 lines to 720 lines. The horizontal pixel resolution is also changed from 1920 to 1280. The change from interlaced to progressive requires a different vertical filtering method as compared to simply changing the vertical resolution as in the case of up- or downconversion.



Today, converters like this one are found in a higher percentage of critical signal paths — more than ever before — and, this trend is increasing.

New generation of converters

In conclusion, we have quickly explored different types of converters: O2E, E2O, format, up, down, cross, A/D and D/A. All converters are important and mandatory to interconnecting equipment. One key aspect of integrated converters is the ability to configure them dynamically. Another key is the ability to get real-time diagnostics information such as signal presence, optical receive and transmit power, format type, CRC errors, data validity bits and flags, and more.

Today, converters are found in a higher percentage of critical signal paths than ever before, and this trend is increasing. Integrating signal analysis and monitoring in the converter provides the necessary information to ensure a facility is operating correctly, for every critical path, with the least cost. And, by using a technology such as SFP, the ability to monitor conversion and signal integrity at the edge of your network is economical and easily upgradable, on a path-by-path basis. Since standards and formats will always be changing, the SFP integrated approach to conversion should prove to provide an excellent return on investment.

Renaud Lavoie is president and CEO of Embrionix.

BE

+ **ADDITIONAL RESOURCES** **+**

The following are available on the *Broadcast Engineering* website:

- Video and signal conversion, part 1
- The evolution of the pluggable module
- Multiviewers

Atomos' Samurai

Samurai solid-state SDI/HD recorders help capture the "Marie" show.

BY MICHAEL GROTTICELLI

Sometimes the most complex problems require simple solutions. That was the practical thinking of John Ross, chief engineer at Los Angeles-based production company Associated Television International (ATI), when he needed to record multiple simultaneous camera feeds of the new "Marie" show (hosted by Marie Osmond), a live-to-tape production, in the most cost-effective way.

Ross came up with an innovative and highly compact fly pack setup that is easy to move around the set. It features two Atomos Samurai solid-state SDI/HD recorders for each of the six Sony HDC-1500 studio cameras, and two additional recorders capture the program feed.

The Samurai is a portable 10-bit HD recorder, monitor, playback and playout device. It captures video direct from the camera via HD/SD-SDI and encodes in real-time to either Apple ProRes or Avid DNxHD (requires AtomOS 4.0 software) onto low-cost, removable 2½-inch hard disks or solid-state drives.

"When I put together my fly pack, the most expensive part was the ISO recording devices," Ross said. "Other recorders can run you \$25,000 a piece. It didn't seem to be the most cost-effective use of our funds. All I'm trying to do is record the ISO feeds."

A highly portable control room

The kit, which serves as a virtual control room, also includes a Miranda Technologies audio embedder and time code generator, all fed into a Panasonic AV-HS450 16-input production switcher with built-in multiviewer software. This allows Ross to shade the cameras and start each

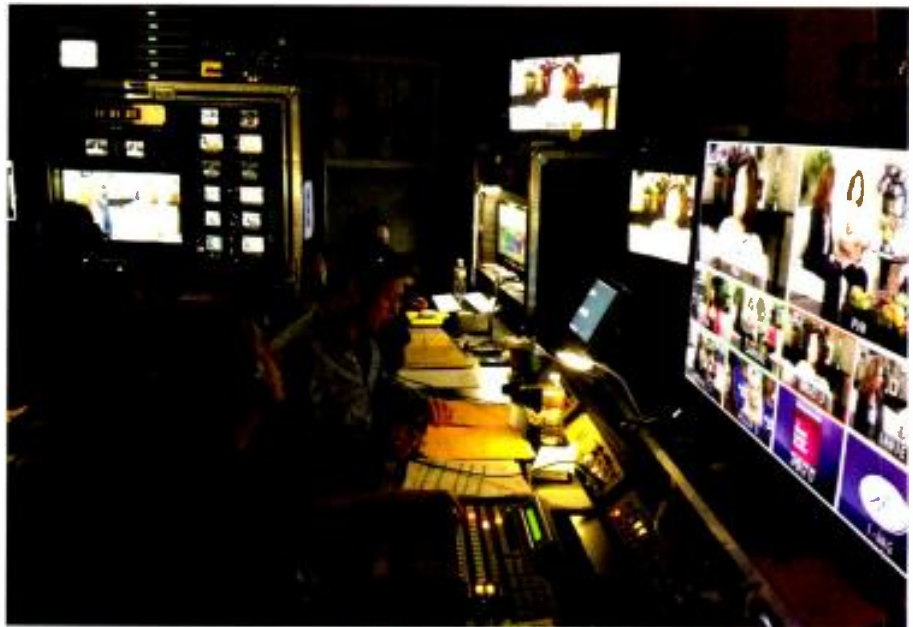
recorder in sync with each other at the beginning of each production. Each Samurai is loaded with a 320MB drive, which offers enough capacity to tape two full one-hour shows in 1080p HD, including all of the b-roll they need.

During its rigorous taping season, ATI tapes two one-hour episodes of the show in Los Angeles, each day for three days. Thus far, it has produced 41 shows. (The show started airing last fall, five days a week, on the Hallmark Channel at 9 a.m. ET.)

software. Because the Samurai can record to the .MOV format, the production crew could actually edit directly from the removable drive if a faster turnaround is required.

Two recorders are better than one

For each camera or live video source, the flyaway kit includes a second recorder to ensure against failure. Ross said when you're taping a live show, anything can happen, and he can't afford to miss it. The show



ATI tapes two one-hour episodes of the "Marie" show in Los Angeles each day for three days. Thus far, it has produced 41 shows.

After each taping, the shows are stored on larger external drives. The recordings are edited in a Final Cut Pro editing suite. (The Samurai natively records ProRes 422 .MOV and other compressed files, so import and file recognition is fast and easy. There is no transcoding or copying of files.) Audio mixing and sweetening is done on a Digidesign Pro Tools HD system with Control 24

uses six Sony HDC-1500 cameras (in studio and handheld configurations). Each camera has a dedicated and backup recorder. Two additional recorders capture the program line feed. The result is 14 recorders, all mounted in only 3RU of space.

The show's workflow is fast and efficient. HD-SDI signals coming directly from the camera are fed into a Miranda audio embedder. This

combined signal is then output from the Samurai and into an Apple Final Cut Pro edit suite for editing.



The Samurai natively records ProRes 422 .MOV and other compressed files, so import and file recognition is fast and easy. There is no transcoding or copying of files.

Program audio is sent to all of the recorders to synchronize the audio tracks from the various on-set and on-camera microphones. This allows

the editors to identify and compare the same audio timing on every feed. In addition, it makes it really easy to synch things up when finishing a program.

Ensuring against failure

ATI looked at both hard drive recorders and other types of record/play decks before settling on the Samurai. The LCD monitor screens and the removable storage drives are two reasons they were selected. Other key features include touchscreen operation for record trigger via start/stop flag or timecode and focus/exposure monitoring assist.

The recorder's latest software includes a feature that protects against losing footage if the camera's battery runs out or the camera is shut off for any reason. The recorder stops recording a file when power is lost

and then resumes in the exact spot where the taping ended. This ensures the crew never misses anything happening on set.

The ATI crew continues to find new uses for the recorders. For instance, the recorders can be mounted on the back of a handheld Sony XDCAM camera and used for on-set interviews.

"We're always looking for new and efficient ways to produce shows in the most cost effective way," Ross said. "I think the Atomos recorder offers a lot of possibilities for the money. It's simple to set up and easy to use and is exactly what we were looking for. I don't often say that about technology." **BE**

Michael Grotticelli covers the professional video and broadcast technology industry.

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New protocols enable flexibility
in simulcast services.

BY DAVID SPRINGALL

"That diagram is upside down!" a broadcast engineer exclaimed as I was explaining how a personalized advertising-insertion solution worked for multi-screen simulcast.

I looked at the diagram that I had drawn, and I had put the client devices at the top. I realized the broadcast engineer would have drawn the video source and encoding components at the top.

This is not just pedantry. Web engineers tend to think user-/device-centric, whereas broadcast engineers tend to think more headend-centric. It's called broadcast for a reason! However, these worlds are colliding, and — thanks to advances in online video delivery protocols, multi-screen encoding systems and cloud-based distribution services — it is now possible to perform advertising insertion or content replacement, and to tailor it to individual users. This article explains how this is possible.

HTTP-based streaming

Until recently, simulcast streaming to connected devices was performed using protocols like RTMP, RTSP and MMS. In 2009, when the iPhone 3GS was launched, iOS 3.0 included a new streaming protocol called HTTP Live Streaming (HLS), part of a new class of video delivery protocol.

HLS differed from its predecessors by relying only upon HTTP to carry video and flow control data to the device. It made the protocol far more firewall-friendly and easier to scale, as it required no specialist streaming server technology distributed throughout the Internet to deliver streams to end users. The regular HTTP caching proxies that serve as the backbone of all content delivery

networks (CDNs) would suffice.

Apple was not alone in making this paradigm switch. Microsoft and Adobe also introduced their own protocols — SmoothStreaming and HDS, respectively. Today, work is ongoing to standardize these approaches into a single unified protocol, under a framework known as MPEG-DASH.

What is significant about all these is that they separate the control aspects of the protocol from the video data. They share the general concept that video data is encoded into chunks and placed onto an origin server or a CDN. To start a streaming session, client devices load a *manifest* file from that server that tells them what chunks to load and in what order. The infrastructure that serves the manifest can be completely separate from the infrastructure that serves the chunks.

The separation of these concerns provides a basis for dynamic content replacement, as it is possible to dynamically manipulate the manifest file to point the client device at an alternative sequence of video chunks that have been pre-encoded and placed on the CDN. The ability to swap chunks out in this way relies on the encoding

workflow generating video chunks whose boundaries match possible replacement events.

Stream conditioning and ESAM

Multi-screen encoding workflows must deal with encoding the video, as well as packaging it for delivery into the protocols required by devices. Stream conditioning for dynamic content replacement is about ensuring that the encoding workflow knows when events at which replacement *could* occur, and ensuring that the video is processed correctly. It is important to emphasize that the replacement does not happen at this point: It is done closer to the end user.

When the encoder is informed about a splice point, it starts a new group of pictures (GOP), and when this GOP is encountered downstream by the packager, a new video chunk is created, as shown in Figure 1. Broadcasters should be wary of how their encoder and packager handle edge cases, such as when a splice point comes just before or after where a natural GOP and video chunk boundary would have been, so that extremely small video chunks and GOPs are avoided.

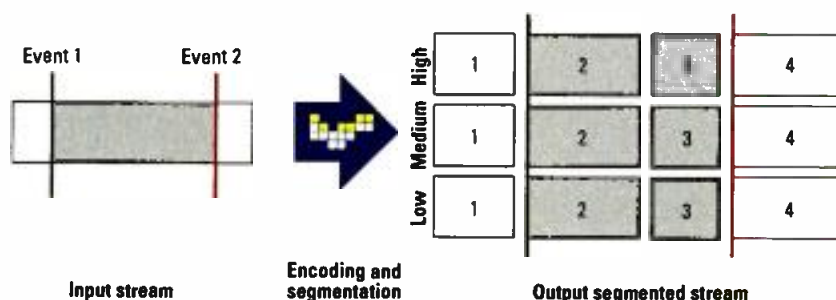


Figure 1. When the encoder is informed about a splice point, it starts a new group of pictures (GOP), and when this GOP is encountered downstream by the packager, a new video chunk is created. However, broadcasters should be careful to avoid the creation of very small video chunks/GOPs.

Splice points can be signaled to the encoding workflow in-band or out-of-band. More and more multi-screen encoders are capable of handling SCTE-35 messages within an input MPEG TS to determine splice points. Most multi-screen encoders that support SCTE-35 handling also have either a proprietary HTTP-based API or support SCTE-104 for out-of-band splice-point signalling.

There has been a clear need to standardize stream conditioning workflows to allow interoperability between systems deployed for that purpose.

The Event Signaling and Management (ESAM) API specification — a new specification that emerged from the CableLabs Alternate Content working group — describes the relationship and messages that can be passed between a Placement Opportunity Information Server (POIS) and an encoder or

automation system to instruct the encoder and packager. ESAM also permits hybrid workflows where the splice points are signaled in-band with SCTE-35 and then decorated with additional properties (including their duration) by the POIS server from out-of-band data sources.

The ESAM specification is relatively speaking brand new, but it is gathering support from encoder/packager vendors. Broadcasters building multi-screen encoding workflows today, even if dynamic content replacement is required initially, should ensure that an upgrade path to ESAM is available in their chosen vendor's roadmap to ensure future-proofing.

User-centric ad insertion at the edge

On the output side of the encoding workflow, video chunks are placed onto the CDN, and a cloud-based

This can be performed efficiently on such a scale as to permit decisions to be made for each individual user accessing the live stream. By performing the content replacement in the network, the client simply follows the video segments laid out to it by the content replacement service, and the transitions between live and replacement content are completely seamless. That makes it a broadcast experience — a seamless succession of content, advertising, promos and so on, with no freezes, blacks or buffering — but with the potential for user-centric addressability.

Of course, the content replacement policy and user tracking through the integration of this content replacement service lies with the broadcaster's choice of ad servers and rights management servers. SCTE-130 defines a series of interfaces which include the necessary interface between a content replacement service and an Ad Decision Service (ADS). In the Web world, Video Ad Serving Template (VAST) and Video Player Ad Interface Definition (VPAID) have emerged as generally analogous specifications.

The ability to tailor content down to the individual, by replacing material in stream, in simulcast, while retaining the broadcast-quality experience of seamless content, is a totally new concept. The commercial ecosystem that generates the need for focused ad targeting must now catch up with the technology that supports it. (See Figure 2.) And broadcasters should be prepared to turn the diagram the other way round.

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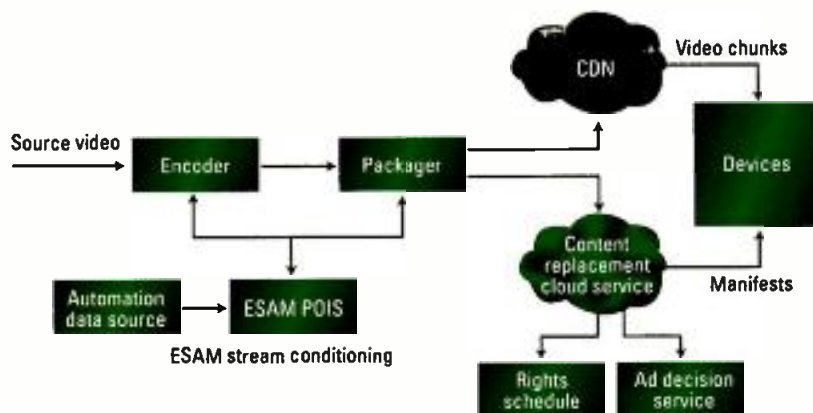


Figure 2. Today, video takes many paths to end-users' devices. The overview above shows some of the technology that allows broadcasters to tailor their video content to their users. One method is content replacement.

packager. The POIS is responsible for identifying and managing the splice points, using the ESAM API supported by the encoder and packager to direct their operations.

The specification defines how both encoder and packager should converse with the POIS, but not how the POIS operates or how it decides on when the splice points should appear. This is considered implementation-specific, but could, for example, use live data from the broadcast

service responsible for performing dynamic content replacement receives the manifest file. This means that the actual replacement of content — whether it is ad insertion or content occlusion for rights purposes — is performed, in network topology terms, close to the client device.

The mechanism, as described earlier, relies on the relatively lightweight manipulation of the part of the video delivery protocol that tells the client where to fetch the video chunks.

David Springall is CTO of Yospace.

+ ADDITIONAL RESOURCES +

The following are available on the *Broadcast Engineering* website:

- MPEG DASH almost ready to roll
- OMVC issues a primer on transmitting on-demand mobile content
- Closing the loop of online video delivery

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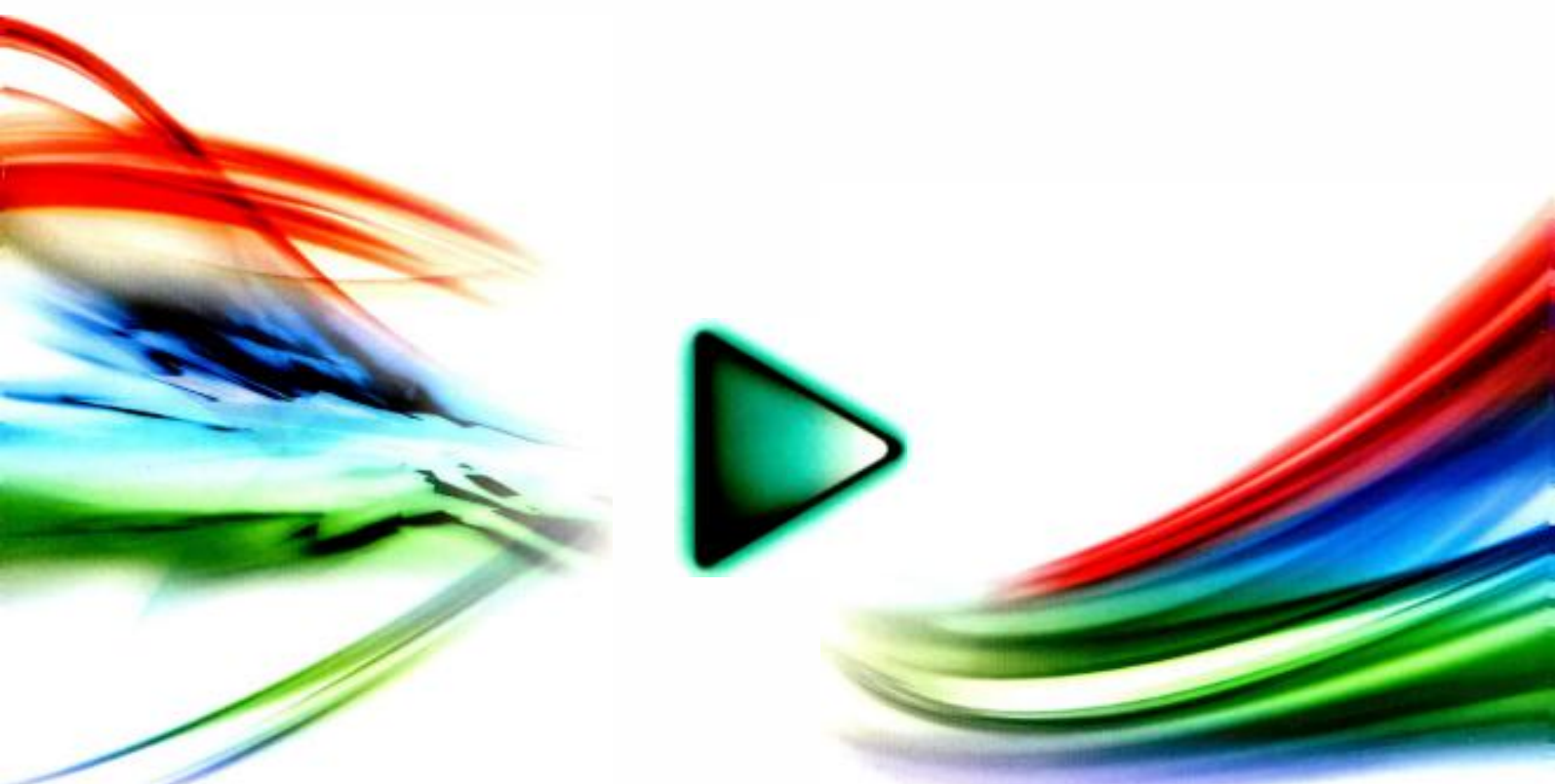
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