Choosing the Right AV-Over-IP Technology—and Supplier

Smart AV integrators look for a provider with engineered solutions for various tiers of AV and IT complexity, not a "one-size-fits-all" approach.

INTRODUCTION

Although advances in new technology can make it tempting to do AV over IP with a "plug and play" approach, a certain level of knowledge is required to properly tailor the solution to each application. How should an AV integrator evaluate application needs and solutions, in order to choose the right AV/IP solution? A top solution provider will have engineered solutions for various tiers of AV and IT complexity, not a "one-size-fits-all" approach. AV integrators should also know from whom they are buying—is their supplier an industry leader or just a vendor who quickly pushed a product to market? Can the AV/IP supplier provide full support for the solution? Can the product integrate with all the other components and products required to create the end-to-end solution—switching, control, and more?

WHICH TECHNOLOGY SOLUTION, IN A WORLD OF ME-TOO AV/IP?

There was a time when AV over IP didn't pose a serious threat to the matrix switching approach to video distribution. Today, however, most AV integrators are aware of the benefits of standards-based AV over IP versus more labor-intensive matrix switches. AV over IP—which can be deployed up to three times faster than matrix switching solutions—is more often than not the solution of choice for distributing video content across organizations. By leveraging a standardized hardware and software platform for distributing AV over Ethernet, such as SDVoE (Software Defined Video over Ethernet), everyone from the AV provider to the end user's IT department can ensure quality of performance. But to do AV/IP right, AV integrators need to choose wisely: which AV-over-IP technology should you use, and with which technology provider should you work? Make the right choices, and your customers will benefit from affordable solutions that are easy to install, maintain, and expand. Make the wrong choices, and you could lock your customer into a system that's troublesome to service and expensive to expand. The AV integrator should not just seek "plug and play" solutions to address all application needs.

Recent developments in the field point to the challenges, and solutions, that smart AV integrators are seeing today.

"When the NFL comes into town for a Super Bowl, they take over hotels, convention halls, the stadium and other venues," says Steve Metzger, vice president of hardware and operations at ZeeVee, a global manufacturer of video and signal distribution technology for ProAV and IT markets. "They build their own data network on top of this virtual campus to distribute data, communications, and other traffic."

Would it make sense to build a separate IP network simply to distribute video? Obviously not, which is why WBL Services, the integrator charged with building and supporting this network for the NFL, uses a standards-based AV-over-IP technology.

> ## "It's critical to understand the 'triangle of tradeoffs' between latency, quality, and bandwidth."
>
> - Art Weeks, IP Product Manager, ZeeVee

And while you may think that creating a video distribution system for a Super Bowl venue would be a daunting and complex AV/IP challenge, this application is actually an example of a top "tier" installation that is manageable with today's solutions: creating an AV-over-IP network that can perform flawlessly for one day, with the low/no latency required for a live event—in this case, fans watching simultaneously, from a luxury box for example, both the live action on the field and the same action on a TV monitor.

THE HIDDEN COSTS OF THE MATRIX SWITCH

Even in resorts, hotels, and nightclubs where IP networks are created solely for Video over IP, integrators should avoid nonstandard technologies like HDBaseT that use matrix switchers between the video sources and players. These suffer several key disadvantages. The first of these is a symmetric I/O, which hinders deployments, and particularly upgrades. As Christian Brondbo, systems designer at Atea, the third largest infrastructure provider in Europe explains, "HDBaseT has fixed numbers of inputs and outputs in the matrix switch. If you start with six inputs, you might buy an 8x8 matrix switch. If you later need to add three more inputs, you have to pull out the existing matrix, and buy a larger one. With standards-based AV-over-IP products, you just buy a new off-the-shelf switch."

Brondbo also highlights the support issues relating to HDBaseT when he says, "Many organizations don't have AV staff but do have IP personnel who can easily manage and change a network switch. However, they typically can't program or otherwise maintain an HDBaseT matrix."

ZeeVee's Metzger points out a related disadvantage of switch-related technologies: complexity of installation. Specifically, he notes, "ports on a matrix switch have to be programmed, which takes a highly-trained installer. In contrast, some AV-over-IP use a beaconing protocol that simplifies syncing channels on system endpoints so that almost any technician can do it. If you're installing dozens or hundreds of displays, the cost differential can be significant."

HONING YOUR DECISION

Art Weeks, ZeeVee's IP product manager, points out that there's no "one-size-fits-all" AV-over-IP product or technology. "It's critical to understand the 'triangle of tradeoffs' between latency, quality, and bandwidth," he says.

"Uncompressed 4K," Weeks says, "delivers flawless quality with almost zero latency, which is essential for displays at live events or similar applications where delays are noticeable, or where quality is critical, as in a surgical environment in a hospital. The trade-off? You'll need a 10GB network to carry the stream."

At the other end of the spectrum are geographically distributed events, or similar applications where slight delays are acceptable, raw quality isn't paramount, and distribution over a 1GB network is fine. In these applications, Weeks advises that AV integrators should not be overly concerned about latency or quality loss due to compression. "Compression-related latency is typically less than a second," he says, "and most providers use the same compression technologies as satellite, cable, and Internet providers, and give customers full control over quality. Your quality should equal or exceed your highest quality satellite or cable TV channels."

On the other hand, even when distributing compressed streams, ZeeVee's Metzger advises that integrators shouldn't minimize potential network-related issues. "Most

network traffic is bursty," he says, "and stresses the network for short periods of time. In contrast, video traffic is usually intense and sustained. Integrators need to understand the load video will add to the network before recommending deployment without infrastructure upgrades."

Integrators should also understand and anticipate their customers' needs and requirements. For example, not all AV-over-IP technologies support multiple-panel video walls or multi-view displays that enable picture-in-picture and similar displays. Even if they're not required for the initial customer buildout, these features often arise as upgrade requests, so smart integrators should anticipate the inclusion of these features from the start.

Similarly, while many AV-over-IP solutions support 4K input, not all support full resolution (4096x2160) 4K 60 at full 4:4:4 quality, which is rapidly becoming the standard. While all solutions work with CatX cable that supports up to 100-meter cable runs, not all support fiber, which can support up to 30-mile distances. Focusing on these details during the initial proposal can mean the difference between a smooth upgrade and having to start from scratch to meet the

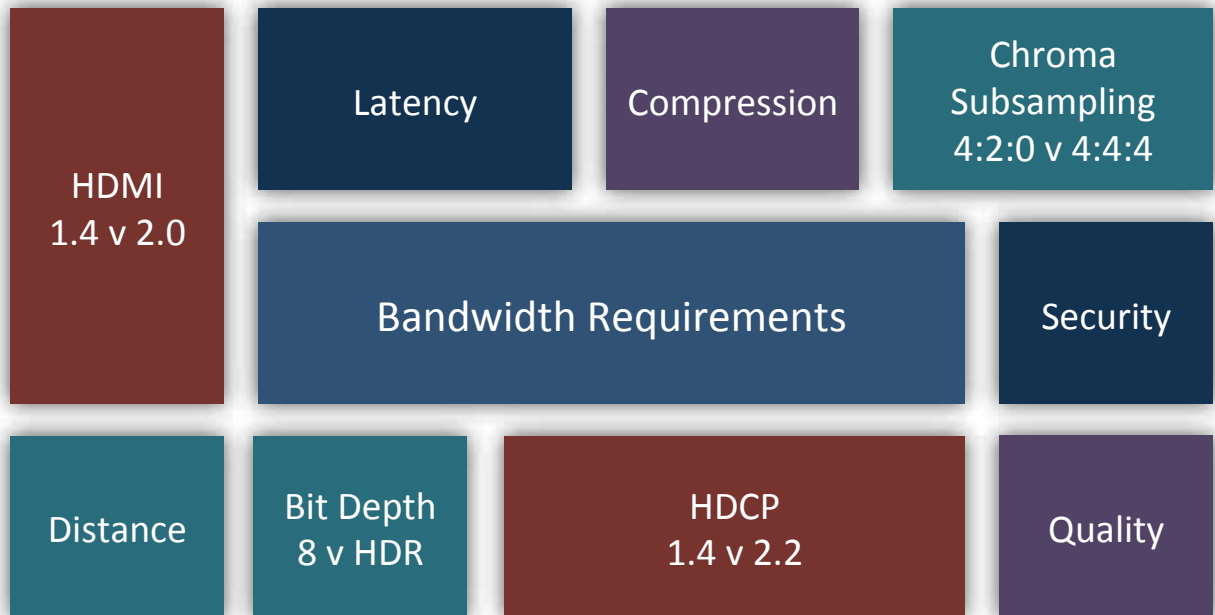customer's updated requirements.

CHOOSING A TECHNOLOGY PARTNER

Once you've narrowed down your technology options, it's time to evaluate the technology providers themselves and pick the right partner. It's important to focus on three areas: the breadth of the product line, the maturity of the management and control software, and pre- and post-sale technical support.

When considering the product line, make sure your potential supplier carries a complete line of both RF and AV-over-IP products, including uncompressed and compressed, with support for multi-view, video walls, and other advanced features. Though greenfield hybrid installations are increasingly rare, there are some scenarios where combined RF and AV-over-IP systems make sense. When you work with a manufacturer that supplies both, you know they're selling you what's best for you and not what's best for them.

The manufacturer's management system is the key to successful installation and sustainable maintenance. Ask how systems are configured during installation and upgrade, and whether the same software is used over the complete product line in RF and AV-over-IP systems, large and small. Can a reasonably competent AV tech manage installation and upgrades, or will you need to hire a much more expensive IT expert?

Finally, check what kind of pre- and post-sale support the manufacturer offers. Products should have clear installation guides and solid documentation, with screencam videos for software installation and operation. Technical support hours should be extensive, and phones should be manned by qualified technicians, not hourly

IP Distribution Considerations

HDMI 1.4 v 2.0	Latency	Compression	Chroma Subsampling 4:2:0 v 4:4:4
	Bandwidth Requirements		Security
Distance	Bit Depth 8 v HDR	HDCP 1.4 v 2.2	Quality

To select the right AV-over-IP solution, it's important to understand and evaluate the key components of your bandwidth requirement.

employees working from a checklist. Finally, check whether tech support personnel work at the same facility as engineering and manufacturing, which can promote rapid resolution of problems.

CONCLUSION

AV integrators evaluating AV-over-IP solutions should choose a standards-based technology and avoid those deployed via a matrix switch. When advising a customer about AV-over-IP encoding technologies, you need to understand the tradeoffs between latency, quality, and data rate and choose the product that meets your customer's unique requirements. You should also look ahead and anticipate needs such as future support for video walls and multi-view.

When choosing a manufacturer, look for a vendor with an extensive range of RF and AV-over-IP products and mature management software that will simplify installation and ongoing maintenance. Check available documentation and other installation aids before buying, and prioritize vendors with tech support personnel who are close to both development and manufacturing facilities.

The AV integrator should avoid providers that offer "plug and play" solutions to address all application needs. Rather, a top solution provider will have engineered solutions for various "tiers" of AV and IT complexity.

THE ZEEVEE SOLUTION

ZeeVee is leading the way in AV over IP, developing video distribution platforms that ensure the highest quality video—on any display device—and that leverage existing or new cable infrastructure. ZeeVee engineers and manufactures innovative products that challenge the status quo and leverage industry standards to distribute everything from HD to Ultra-HD/4K video.

- Global manufacturer of video and signal distribution technology for ProAV and IT markets
- Leader in the distribution of AV utilizing any wired infrastructure
- Over 10 years of experience developing video encoding/decoding
- Installations on five continents, driving video to over 1,000,000 screens
- Fanatical about image quality
- Makes video distribution simple and easy, using standards-based components
- Founding member of the SDVoE Alliance
- On the third generation of IP-based products

AV over IP solutions: Multiple tiers of challenge.Four ZeeVee solutions

IP SOLUTION	NETWORK	QUALITY	APPLICATIONS
ZyPer4K	10Gb	4K Uncompressed	No compromise 4K, zero latency, full color replication
ZyPerUHD	1Gb	4K Compressed	4K switching with advanced audio and control options
ZyPerHD	1Gb	1080p Compressed	High definition switching with video wall support
ZyPerMX	100Mb	1080p (H.264)	Highly compressed, bulk video distribution

For more information:
Call: NA & International:
+1.347.851.7364
EMEA: +44 1494 956677
Email: sales@zeevee.com
emeasales@zeevee.com
Website:
https://www.zeevee.com