

AV **over** **IP**

What it is — What it is Not
What A/V and IT Convergence
Can Do for Your Facility

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Change is inevitable. It's necessary. It's exciting. It can be painful. It can have a positive outcome on the way we interact, the way we do business and it can free us to do more and to do better. If we open our minds to new tools and technology, it enables us to work smarter and not harder. It's called innovation.

There have been many innovations in the A/V industry over the years. It is possible that the evolution from analog A/V to digital A/V is one of the most significant changes in the past decade. Digital devices run more efficiently because there is less heat and in turn have a longer shelf life. In many cases the devices are smaller. A significantly greater amounts of digital media can be stored and delivered. Many digital devices are able to deliver more power than their analog counterparts. The resolution and dimension of the digital medium seems to know no bounds. Finally, and most importantly, digital A/V can and in most cases should be integrated into the IT network.

IT folks are used to change. Bug fixes are downloaded on a daily basis, operating system are updated and change like the wind, licenses need to be kept up with, bandwidth is constantly being used. You're always updating switchers, installing security patches and answering help desk calls. These might actually seem like "old hat." Add on BYOD, heightened security issues, VoIP, the cloud, mobile devices, apps on top of apps and then there is — yes — tsunamis of digital audio and video data looking to clog up more T1/3's than you ever imagined.

Oh, but wait, who "owns" this new digital domain? Who owns the A/V asset management, deployment and maintenance once it is on the network? Who gets the help desk calls? Where does the RFP get generated?

We are in flux. I have interviewed directors at universities that shrugged at the idea of the AV/IT convergence being an "issue," because the A/V and IT departments have been one for over 15 years. On the other hand, I have interviewed directors at corporations who admit their departments are in a turf battle.

What has been clear is that the convergence of A/V and IT technologies has dramatically improved the way you can do business, deliver information, communicate and innovate in your business.

I'd love to hear from you about how the AV/IT convergence is going in your facility. Drop me a line.

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Translating binary code is more fun than the decoder ring found inside cereal boxes when I was a kid.



Just What Is A/V over IP?

How A/V and IP systems are merging
to create one powerful network.

Before A/V and IT systems started merging together into one overall network, organizations typically managed each system separately. Data signals were routed through IT's servers and sent out to end users over Category 5 cables, video traffic was contained within its own platform and ran over coaxial cable and phone calls transited a private branch exchange (PBX) system before being carried to the desktop via an old school Category 3 cable. The systems were usually managed by different groups, with no crossover in equipment or expertise.

But today, those disparate systems are gradually coming together, and a single cabling backbone is often the launch pad for companies interested in converging their A/V and IP networks. "I think what we're seeing now is that the A/V industry probably has a more structured cabling approach, which very much mirrors where folks who've been exclusively IT-, data-, or telephony-focused in the past have already gone," says Derek Joncas, manager of Product Marketing at Extron Electronics in Anaheim, Calif.

An Architectural Merge

An increasingly wide range of systems are being merged into the traditional IT network architecture, including Voice over IP telephony solutions, videoconferencing platforms and presentation systems. And because conventional data cabling is ubiquitous in most modern buildings, a shared backbone is attractive to many organizations, who can often save money by using existing cables to distribute A/V signals throughout their facilities.

Misconceptions abound about what AV-IT convergence really is, says Ken Colson, vice president of Sales and Engineering at Tucker, Ga.-based LMI Systems, Inc. "A lot of people assume when you say A/V over IP, you're simply running an audio/visual signal over a category cable, like Cat 5," he says.

While that may indeed be the limit to convergence in some situations, other organizations have progressed to the implementation of more holistic network architectures, which often share switching equipment and other components in addition to backbone cabling. In those increasingly converged environments, the distribution of an A/V signal frequently occurs in a way that directly mirrors more conventional IP-only networks.

"A/V over IP is the ability to take analog or high-definition audio/visual signals and inject them into a network — either the existing IP network or it could be a closed network (meaning



it's separate from telephony or data traffic) — and distribute it to multiple endpoints,” Colson explains.

With the evolution of A/V and IT technologies, Joncas says the line between the two disciplines is blurring. “There’s not a big difference between how you manage a computer or server versus how you would manage an A/V appliance,” he says. Those similarities are leading more organizations to merge their previously standalone A/V systems into their overall IP network architecture. “IT administrators may be a little more comfortable with the idea that you can have many more A/V appliances on your network nowadays, and have some confidence that you’re going to be able to manage them,” Colson says.

Addressing Delays

As A/V traffic increasingly moves from just sharing cables within the IT network to actually moving through some of the same switches and other hardware components, one potential issue administrators must be ready to address is network latency (or a delay in processing network data).

“When you think of an A/V network nowadays, a lot of the information that’s being exchanged is very, very high speed data that has a very low latency requirement,” Joncas says. “If you pair that with a traditional IT network, that latency requirement doesn’t disappear.”

He says something as innocuous as users browsing the Web could inject increased latency into the network, but adds that most of today’s A/V devices include the processing capabilities needed to help manage and overcome the potential latency and quality of service concerns that may crop up when layering A/V signals over an IP network.

Scenarios where users are consuming content without any reference to when the content was generated may have a greater tolerance for network latency, Joncas explains, but “when you’re dealing with live signals, latency is the most important factor.” He cautions that careful design of the network’s architecture is paramount to managing quality of service issues.

Proactively addressing network latency and bandwidth issues could involve adding or upgrading equipment or services on the existing IT network, Colson explains. “One of the challenges you have with the need to distribute A/V signals is some resistance from IT directors as far as putting what they consider to be a bandwidth hog on their network,” he says.

Moving from a data-only environment to a mixed environment may also require that IT groups increase their knowledge of how A/V really works, Colson says, adding that basics such as “understanding how resolution needs — whether it be standard definition or high definition — equates to bandwidth requirements to push A/V through that network” are crucial to designing a network that can successfully support bandwidth-intensive, low-latency applications.

Colson says that organizations that rely on older networks may find it necessary to upgrade their switches to manage video priority, or even add switches or change to a virtual LAN to achieve the sort of traffic separation their particular case requires.

The convergence of A/V and IT infrastructures will look different in every enterprise. Each organization must carefully evaluate its needs, the level of funds they can devote to either developing a single robust architecture or multiple standalone systems, and the expertise available to them to manage a wide range of components within a holistic network or to instead oversee the provisioning of each platform individually. Where those needs and resources come together will ultimately dictate where the various systems share resources and where they remain disparate. 

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**— Ken Colson,
VP Sales and Engineering
at LMI Systems**

A/V and IT Convergence at Work

One holistic environment does away with a bunch of disparate systems.

So what is the AV-IT convergence? “A/V really refers to three different types of systems, and AV-IT convergence is the fact that they’re converging into one method of transport,” says Jason Koehler, principal at TK Design Solutions, Inc., in Los Angeles, Calif. “The first system is audio, the second is video and the third is data and control.” Originally these systems relied on disparate cable infrastructures, equipment and software, but bringing the systems together into a converged framework means more of this information travels over IT’s

centralized data networks. Koehler says one side of convergence relates to infrastructure — the common cabling and switching equipment used to support the systems — and the other part is systems-based, “where now you have control units that can handle multiple types of inputs and understand the different things that are coming into them.” This is in contrast to the conventional architecture, where administrators manage each system separately.

At Hotel1000 in Seattle, a recent upgrade brought the facility to a new level of AV-IT convergence. Gary Fagerholm, the hotel’s manager of Information Technology, says the new infrastructure is based on Crestron hardware and Crestron-enabled applications. “It includes touchpanels on the walls, in the banquet rooms — things of that nature.” Before the convergence upgrade, Fagerholm says the environment was a “mixed bag,” with hardware that didn’t always work together efficiently and a lot of old cabling in the walls.

Managing Just One System Rather than Many

Legacy systems often rely on their own cabling infrastructure (coaxial wiring is a good example). Convergence gets rid of those different flavors of cabling, bringing everything onto the same



The Great Room meeting room at Hotel 1000 is completely high-tech. A wireless remote controls audio visual and lighting. Built-in video conferencing, mobile video conference capabilities and a drop down projection, and LCD reader boards see to all of the presentation needs.

wires used by the data network. “You’re managing only one system,” Koehler says. It’s a solution that allows for significantly greater flexibility and measurably lower costs. This shift to a single, holistic environment makes future growth and innovation more cost efficient and easier to implement on the infrastructure side. “You’re building network, not A/V systems,” Koehler says. Adding components is simplified, as is expanding the system to incorporate new facilities. Instead of relying on system-specific cabling that may not support the next generation of audio or video transmissions or new technologies, convergence enables greater flexibility.

The Hotel1000 team “pulled out a lot of old cable” as part of their upgrade, replacing outdated wiring with a more robust solution while they also “introduced some new IP switches that are a little more powerful,” Fagerholm says. These changes allowed them to bring more components into their converged system and get more efficient use out of their capital purchases.

The AV Technology Converged Environment

Wondering what a converged environment looks like? At Hotel1000, it’s all about interconnectivity. “We can control all the A/V, we can tune in to our TV channels, we can pull down our big screens, we can pull in the overhead music,” Fagerholm says. His team has also integrated new hardware components, such as iPod and iPad docking stations, to make the system more powerful and flexible for guests to use. “They can easily plug in their own content and get it streamed throughout the banquet rooms,” Fagerholm says.

Convergence also often addresses backend issue with legacy A/V equipment. In Fagerholm’s previous environment, “there were different types of switchers in place” that sent the signal to equipment such as projectors. “These switchers would get confused because they were different types of systems,” Fagerholm says. “Sometimes you wouldn’t get an image at all, sometimes you’d get an image for a certain period of time and then it would disappear and sometimes it would be an incorrect aspect ratio.” Converging the various A/V systems in use in the hotel addresses those disparities, allowing everything to be integrated for better results. “Every time you hit that button, it’s going to stream the proper content to your screen,” Fagerholm says.

Where separate systems are often insular, converged environments rely on shared communication pathways and switching equipment. Koehler says one benefit of a converged environment is “that you’re using centralized controls and monitoring.” Ports are managed across the entire network instead of within individual systems, giving administrators greater control and typically taking less time for each action. One thing to remember is that convergence more effectively enables users to leverage robust audio and visual capabilities, but to get the best use out of such a powerful system, a highly usable interface is a must. “The more complex the systems are that you have, the more you need to have software and control systems to help you make it simple for the users,” Koehler says. 



Jason Koehler, principal at TK Design Solutions, Inc., in Los Angeles

Hotel 1000 has a fully converged IP infrastructure.



Top 3 Areas A/V over IP Can Have an Immediate Impact at Your Company

The scalability, flexibility and diversity of running A/V over IP can benefit your users and make things easier for you.

Are you thinking of making the shift to A/V over IP, but you aren't quite sure where your investment will have the best payoff? Industry experts say that there are three system-wide areas where A/V over IP can have an immediate, positive impact, and they aren't limited to any one platform: scalability, flexibility, and diversity. As you evaluate your organization's needs and available resources, consider the advantages you could gain in these three areas to ensure you haven't underestimated the potential rewards.

Scalability

Today's requirements are important, but don't overlook what tomorrow might bring. "It helps to have enough sufficient bandwidth long-term to accomplish not only what you want initially, but the demands that are forthcoming," says Michael Schwartz, principal consultant at Deliberative Designs Consulting in Colorado Springs, Colorado. "There are more demands being dumped on the network all the time." Many legacy applications have less sensitive requirements when it comes to delivery times, but supporting real-time distribution of A/V content requires a more robust network. When your infrastructure must meet increasingly demanding mission critical needs, an IP solution scales more efficiently than traditional configurations. "You're sending out drops to IP addresses over the network in different buildings or different cities...but it's absolutely critical that the signal arrives within a certain latency window," Schwartz explains. "It really helps to have an IT group within a corporation that can appreciate what those demands are beyond the typical office IT demands."

An IP network's scalability refers not only to how much A/V content it can support — it's also an important factor when it becomes necessary to add locations, either to increase the density of access points within a static environment or to branch out to new sites. "Because IP networks have become so commonplace throughout many facilities, it enables users, and of course installers, the ability to leverage existing infrastructure to transport audio and video," says Paul Krizan, product manager, network media products at Richardson, Texas-based AMX. Rather than investing in all the components needed to expand a classic A/V solution, an IP environment

"Because IP networks have become so commonplace throughout many facilities, it enables users, and of course installers, the ability to leverage existing infrastructure to transport audio and video. Rather than investing in all the components needed to expand a classic A/V solution, an IP environment allows administrators to consolidate equipment purchases and take advantage of shared cabling, networking equipment, and other hardware."

— Paul Krizan, product manager, network media products at AMX

“It’s possible for IT administrators to support whichever technologies end users need, because, IP networks can transport audio, video, and multimedia content from multiple sources to a range of endpoints that might include remote locations and even mobile devices. And as employees travel more widely and frequently, the ability to access A/V solutions through the corporate network helps to maximize efficiency.” — Paul Krizan, product manager, network media products at AMX

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Flexibility

The ubiquitous nature of IP networks means that installers and system administrators are able to leverage existing infrastructure to support their audio and video needs, but the flexibility doesn’t stop there. “For users, it also creates the ability to store and retrieve content on-demand, and the ability to access A/V content on mobile devices, purchase, and displays,” Krizan says. Remote management of A/V sources and content is enabled once everything is hooked into the wider network, and “as more A/V projects, especially in commercial environments, are brought under management of IT departments, it allows IT managers to view and manage A/V devices alongside printers or other IT devices,” Krizan says.

As user needs evolve and grow, the flexibility of an IP network means that the right level of support will continue to be available, and organizations don’t need to feel limited when it comes to adding new technologies. “They may start out with video distribution,” Schwartz says, which he explains can easily operate alongside solutions that are added later, such as the delivery of real-time audio. And even though each platform may have specific requirements for “quality of service, timing issues, and packet throughput,” new components can be incorporated into the network as needed.

Diversity

One network, multiple platforms. Advances in technology have produced a wide array of options to meet end user needs, and Schwartz believes that today’s A/V demands are no longer limited to just one medium. “I would say video over IP is becoming the single largest for me,” Schwartz says, “but I know that VoIP totally eclipses that.” Because companies can use their network infrastructure to support a much larger range of A/V technologies than in the past, it’s possible to leverage as many different systems as your team needs.

It’s possible for IT administrators to support whichever technologies end users need, because, as Krizan says, IP networks can “transport audio, video, and multimedia content” from multiple sources to a range of endpoints that might include remote locations and even mobile devices. And as employees travel more widely and frequently, the ability to access A/V solutions through the corporate network helps to maximize efficiency. “If a user can make the content available on-demand, they can make the content available at a time and place convenient for them and their staffers,” Krizan says. 



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