

Bank Hapoalim in Israel is at the forefront of digital banking and its Innovation Center features a dynamic working space and AV facilities utilising AV over IP

Mind the gap

The industry's gradual drift towards interoperability is making it easier to design futureproofed networks, but increasing levels of traffic and ongoing convergence with IT mean that it's hardly without challenge, writes **David Davies**

It can be interesting to chart the development of editorial coverage about AV networks, and in particular the way in which the overwhelming 'why' or 'if' of 10 years ago has been gradually supplanted by 'how' and 'when'. The desirability of implementing comprehensive networks in any manner of professional install environments – from conference centres to concert halls – has been established to the point where the discussion has invariably shifted towards topics such as (re)configuration, future expansion and network maintenance.

But it is arguable that we are now heading into another period of change as AV and IT networks are more frequently converged, and as talk of 1Gb networks begins to be replaced by anticipation of 10Gb or even 40Gb networks in order to offer the necessary bandwidth and 'futureproofing'. The advantages of placing AV on IT networks can be significant in terms of cost and streamlining network operations, but video brings with it its own (potentially substantial) demands with regard to compression and latency. These are such that, in

many cases, the recommendation is still often to keep AV and IT networks separate.

Basic considerations

In terms of planning a network, the first question we should be asking is "what is the most appropriate method of deployment for this client and project – install a dedicated AV network or utilise the customer's corporate network," says QSC product manager for installed systems, Martin Barbour. "From an end-user perspective, they are investing millions of dollars in a site-wide network infrastructure that is modern, robust and designed to keep all their IT assets moving forward. Therefore, it can be frustrating when AV specialists recommend or advise the installation of a dedicated AV network, merely to simplify the install process. This has to be weighed against the potential challenges involved with implementing network configurations required to accommodate real-time AV-over-IP on a multi-purpose corporate network."

Discussions with IT professionals and AV

Key Points

- A number of manufacturers are taking a protocol-agnostic approach to give the customer greater choice
- As network infrastructures have become more complex, a key decision now is whether to opt for a 1Gb, 10Gb or 40Gb network
- In corporate environments security is crucial as anything connected to the network could potentially be hacked
- With greater convergence no longer about 'if' but 'when', the need for AV-IT network education is only going to grow

specialists can usually be more productive if the proposed AV solution is based on common IT networking standards and solutions such as PTP, RTP, UDP and/or TCP/IP, for example. It is also important for the AV specialist to articulate how the solution will interact with other data on a common IT network, and what special

considerations or configuration may be required to accommodate that solution on the network.

For Durai Ramachandiran – who is senior director, product line management for pro voice and audio video distribution at ClearOne – “it is always preferable to have both transport and control in the same network, and preferably in the existing network itself to reduce the installation and maintenance cost. Because of the matured TCP/IP protocols and the availability of advanced codec technologies, we can have both transport and control in the same network.”

At least one contributor to this article expressed regret that protocol selection is still such a recurrent topic, wishing instead that we had reached a point where protocols were effectively ‘transparent’ and we could move more firmly onto discussing the benefits of individual network solutions. But we are where we are, and it could be argued that the still considerable number of AV protocols hardly helps matters.

Ramachandiran offers a very succinct summary of the issues that continue to inform protocol selection: “The choice of protocol depends on various factors like bandwidth usage by each AV stream, the total number of AV streams required in a given installation, available

network bandwidth, video quality, end-to-end latency, and interoperability with other devices.”

Zach Snook, product manager at Biamp Systems, say that “what needs to be achieved” by the network is invariably integral to the question of which protocol should be selected. “If interoperability is key then certain platforms have more interoperability, and then there are some platforms that have more support [in terms of related products on the market],” says Snook. Ultimately, it comes down to “what are the components [on the network] and which protocol best makes it happen.”



‘The impact of IoT will be significant, but as far as business is concerned, I think the biggest issue is network security’
Martin Finlayson, avsnet

Like many vendors at the present time, Biamp has positioned itself on neutral ground – or as Snook puts it, “we live in the middle in that we try to be as supportive of as many protocols

as possible,” thereby giving the customer the greatest leeway to implement the network solution of their choice.

Barbour (QSC) is aware that there is “no silver bullet that solves all problems for all users” and that each networked AV solution “has its own place. Different solutions may suit different markets and applications, and like many things in life there are often multiple suitable options for the task at hand.” Therefore, technology that supports as many options as possible is preferred.

Network ‘pain points’

At the present time – and not surprisingly given the recent expansion in the complexity of, and demands upon, network infrastructures – one of the major decision points constitutes whether to implement a 1Gb, 10Gb or even 40Gb network. Increasingly, in order to support uncompressed network traffic, a 10Gb network is being favoured, particularly for new-build or substantial redevelopment projects.

Rob Muddiman, EMEA sales director of AV over IP solutions provider ZeeVee, observes that “if you are talking about a new building then most people would be advised to put in a 10Gb network as the simple fact is that you will never need less bandwidth! No one is going to say

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‘thank goodness I put in that 1Gb network’ in a few years’ time.”

Given that “the cost of bandwidth (i.e network switches) is continuing to reduce in cost,” then it can make even more sense to opt for a more generous network capability.

Mark Rogers, product manager of videowall controller, software and hardware company Datapath, notes that video networking can be problematic on a 1Gb network, remarking that “the JPEG-2000 algorithm can be quite difficult and power-hungry. Given that the costs of fibre are coming down, and the price of switches is not what it once was, there can be a strong argument for [opting to implement 10Gb].”

All of this is not to say, however, that a careful discussion of “application and budget” should not inform the decision. After all, if you are primarily seeking to run a digital signage network, in which latency is less of an issue, then a 1Gb deployment could well be perfectly sufficient. But if instead it is large volumes of uncompressed video that needs to be put onto a network then a 10Gb network “will give you the scope that you need [as well as] the headroom for future bandwidth requirements”.

With a simple single dedicated switch network for video, bandwidth will never be an issue and everything can be switched everywhere. However, within a facility there may be several switches, in which case the network video requirements need to be well-defined in order to keep costs down. In reality requirements may be very different in one area of a building to another, so one of the questions that should be asked is “do you need ‘everything everywhere?’” says Muddiman. “You might need the capacity to share everything on the floors that house the meeting rooms, but you might not need it on other floors.”



“It is always preferable to have both transport and control in the same network”
Durai Ramachandiran,
ClearOne

Accordingly, Muddiman says there is considerable scope to save on “network costs and complexity” if the actual requirements are defined well in advance.

Invited to identify the primary pain points for AV networks Ramachandiran identifies “network switch selection, network switch configuration, and the AV devices’ configuration for a given project based on user requirements.” But, he believes, “all of these can be reasonably mitigated by following through best-practices guidelines and training.”

QSC’s brief history lesson on AV and IT networks...

“In the past, AV dealt very little with IT,” says Barbour. “They understood the advantages IT networking offers, but didn’t want to get too involved in corporate negotiations with IT departments. So, we threw everything onto a dedicated switch that we could easily manage ourselves. This approach makes things easier as configuration requirements are generally small, which allowed the job to move quicker.

“Yet over time, AV systems have grown larger with more audio, and now video traversing the network. This has increased network costs and driven requirement of specialist with network configuration skills. Now the benefit of using a dedicated AV network managed by the AV team, over the potential to leverage professional IT services and a corporate network starts to fade.

“But AV was not the only industry to experience this growth in network connected devices. With limited IT support capabilities in-house, suddenly IT is called upon to support not only its core network, but also an AV

network, perhaps a PoS (point of sale) network, and many other separate networks too.

“As we begin to work more closely with IT, we need to think about AV in the context of the broader IT world. That includes having conversations with IT at the beginning of a project so that AV-specific requirements can be discussed and factored in to early network design decisions. Then we need to continue to work with IT to verify that AV on a shared corporate network actually makes good business sense for the end-user. This will of course vary by industry and application, but is a good practice for our industry to adopt. While AV over IP solutions often have specific latency and jitter performance requirements from the network infrastructure, it’s important to understand that AV over IP solutions are just data networks and it’s from that perspective that we can help IT understand the needs of a real-time AV system to ultimately produce a seamless system implementation.”

Internet of Things impact

Given the extraordinary excitement around the Internet of Things (IoT) then some consideration of its possible implications for professional network implementations seems only appropriate. Views on its impact – and the related timeframes thereof – do vary substantially, but virtually everyone is concerned about security.

“The impact of IoT will be significant and will come from various areas,” says Martin Finlayson, who is head of visual communications at avsnr. “But as far as business is concerned, I think the biggest issue is network security. The fact of the matter is that stuff is not always ‘buttoned down’ as much as we would wish it to be in the corporate environment. The home does not matter so much, but in the corporate environment it is crucial; [without sufficient safeguards] anything connected to a network could potentially be hacked and turned into a bot to do something else.”

Invited to consider whether the security of IoT-supporting devices will have to undergo a step-change, Finlayson agrees that the present situation “will have to change. If the market does not change then regulation [will have to come into play], but the problem is that regulation tends to lag behind the market.”

But by drawing on an example from the domestic realm, Finlayson amply illustrates the

carnage that could be created if IoT devices were allowed to disrupt professional network deployments. “Think about a thermostat being hacked that is found in a million homes around the country, and then if the heating is turned on at the very same time in all of those homes during a high use period in the grid then you would have brownouts,” he says. “The impact on energy supplies [of extensive hacking attempts] could be significant.”

Apart from security, the sheer number of potential extra devices to be connected through the network will have implications for management and monitoring. One upshot of this could be a new generation of integrated solutions that offer specific support for IoT devices.

As Ramachandiran observes, “all the devices that are connected through the IP network are going to be monitored, managed and controlled through a centralised system. With the continuous growth of IoT and smart buildings infrastructure, this will [give rise to] new integration solutions and services.”

Educational imperative

Whatever the desirability (or otherwise) of running AV over IT-oriented networks, there seems little doubt that greater convergence will continue to take place. And in those instances where AV networks are piggy-backing onto



Biamp supports as many protocols as possible so the customer can implement the network solution of their choice

existing IT networks – and then being managed by IT teams – the dialogue and exchange of information between AV and IT personnel will need to become evermore rigorous. All of which suggests that the clamour for combined AV-IT network education will only grow more acute.



'We live in the middle in that we try to be as supportive of as many protocols as possible'
Zach Snook, Biamp

Finlayson, for one, is concerned that there is currently “a big gap between AV and IT, and it's getting worse. So for example, IT doesn't understand the ramifications of running real-time video [over their networks], and AV is not always good at explaining what is going to happen. Assigning a separate VLAN isn't going to work – it's like reserving a lane on the motorway!”

ZeeVee is among the manufacturers to be investing in substantial educational efforts in the form of webinars and on-the-ground training.

“We take training related to the design and implementation of AV over IP products very seriously,” says Muddiman, who also highlights the importance of helping distributors to negotiate what is an increasingly complex product marketplace.

There may also be a need to reassure AV integrators “who perhaps tried an AV over IP solution in the past and it was not entirely successful, or the client was not completely happy.” Such scenarios can understandably lead to feelings of nervousness and a tendency “to stick to what you know” rather than taking advantage of all the benefits AV over IP can bring.

Mark Rogers agrees that there is a need for effective sharing of information and “communication in all sorts of areas”, not least because “each area of a deployment may have specific needs when it comes to streaming and transport protocols, centralised video management and global content security”.

Ramachandiran neatly summarises the primary crux of the matter here, given that “AV and IT are merging very fast and the new AV products that are being introduced in the market are supporting IP. AV practitioners need to be familiar with IT, and IT practitioners need to be familiar with AV.”

But like many other observers, Ramachandiran feels this could be great news for service providers and vendors, heralding as it may “interesting new opportunities for business growth, with new products that will address existing and new problems. In addition, such integrated solutions may collect a lot of data which will lead to big data analysis solutions.”

Without a doubt it is a singularly eventful time in the evolution of networked systems. The rate of adoption of networked AV from the smallest-scale deployments to the largest concert halls and conference centres has taken all but the most optimistic of observers by surprise. Now as AV and IT networks draw closer together, and as video greatly increases the volume of traffic, the greatest challenge will reside in ensuring that networks remain manageable and flexible – the two ‘base’ requirements that arguably instigated the growth of AV networking in the first place. **U**



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