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Building Bridges: IT and Audio



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And that's when we first met **Jonathan Sage** who joined Boston College as an audio engineer 15 years ago and is now Audio and Event Services Supervisor and Adjunct Faculty in the Communication Department, managing an in-house sound department responsible for 1,200 events a year. He is also Vice-Chair of the AES's Boston Section.

What made Jon particularly interesting and a contributor to that story is that he works in the IT department, and when last we spoke, he was on the cusp of installing a Dante-enabled sound system in the college's Silvio O. Conte Arena. This year, Dante will replace the Cobranet system in the school's 44,500 seat Alumni Stadium and link the arena and stadium into a unified network. When we wanted to explain the journey from audio snakes to Cat-6 cabling, we knew who to call.

Making the Connection

Shure Notes A few years ago, audio engineering and IT were two completely separate functions, but these days, they're connected. We're interested in how audio and tech engineers collaborate in places like BC. You've bridged the gap. How did you do it?

Jon Sage Understanding the value of what the IT engineers bring is essential. I'm really fortunate that here at BC, the IT engineers understand how valuable the audio people are. We all get it. They understand what we're trying to achieve and they're providing technology needed to support it.

For around 8 years, I've been part of the IT department, so people I work with every day are not audio people at all. What was important was learning their language. It's no different than working with musicians. You need to speak the language. At the same time I was learning networking speak, they were learning audio speak. That's the essential first part.

SN Do you have an example?

JS Sure. I've remained in audio for a lot of the digital transitions, so I understand that the analog language is different than digital. You have to be in the right domain. When you move into networking protocols, it's the same thing. You have to explain what Cobranet is, what Dante is, and what the IT world has to do to accommodate it.

If I talked about Cobranet or Dante, it didn't mean anything to them. It wasn't even that helpful if I said it was an audio transport protocol. But if I said it was a multi-cast packet bundle that moves across a Layer 2 (Cobranet) or a Layer 3 (Dante) network switch, that meant something to them. That's what I had to learn.

SN Do you think it would be different in a corporate or commercial environment? You're in the world of academia. And in Boston, a city that Oliver Wendell Holmes named "the hub of the universe." Does that make your IT colleagues more interested in what you're doing?

JS When we're looking at certain environments, there are specific protocols that have to be followed. I can only imagine what it would take to put a Dante stream on the same network as the email system at a military installation. That's probably never going to happen. Here at Boston College, we have a comparatively free, open environment. But the protocols remain the same across the IT Department. There's a kind of confirmation that we're all on the same team.

SN Let's talk about your dual roles.

JS My official title is Audio and Event Services Supervisor. When I arrived in 1999, my title was Audio Engineer. When I got to BC, I walked in the door to a ProTools 4 system and I was like, *what is this doing here? You don't have any speakers!* There were five SM58s®, four SM57s and a couple of large diaphragm mics and a very (non-Shure) antiquated VHF wireless system. They were only providing sound reinforcement for mostly small events and lectures...

SN Not music though?

JS Oh no! No music at all. So I was tasked with cleaning everything up and figuring out what to do. Now, we've created our own "in-house sound company" that does over 1,200 events a year for audiences of up to 5,000 people. In the arena and stadium, we can accommodate even more. We also handle a lot of production audio and are capable of handling high-level multitrack recording, mixing, and mastering, restoration, forensics and post.

An Education in Digital Audio Networking

SN When did digital networking enter the picture?

JS People have been putting audio on networking cables for a long time: phone cable and CAT-5 to push audio. But to actually be a digital networking standard, it was Cobranet. That was the first commercially viable protocol, and it's been around since the late '90s.

SN Where did you pick up the knowledge that you have now?

JS I came into digital at the right time. I learned on 2" tape and big analog consoles, but I also used Digidesign's Drumulator chips, Roland S-770 samplers, and Akai MPC's. I've used DAWs ever since the days of Sound Designer and Studio Vision Pro, but I learned everything analog. I've always been technology-minded and computer-centric. One of those Radio Shack kids, I've been on the Internet since you needed Trumpet Winsock and Mosaic.

I went to AES shows when they were talking about digital networking. I read all the literature like everyone else. Since then, I've used webinars, manufacturer training, LinkedIn groups, InfoComm University, online communities including Gear Slutz, ProSoundWeb, Pro Audio Space; and AES journals, textbooks, trade articles, white papers, operation and service manuals, classes, and of course, peers to gain information.

SN You have student employees. How do you approach digital networking from an educational perspective with them?

JS I break it down this way: Think about data packets as the equivalent of voltage. It's not voltage, obviously, but let's think about data packets as if it is voltage.

Then, let's think of the CAT-5 cable as if it's a multi-pair snake. We're trying to move the audio from point A to point B. Now, instead of a stage box and a fan out, it's switch A and switch B. Instead of it being a big multi-core copper wire, it's a CAT-6 cable. Instead of it being individual voltage signals, it's data packets. At the end of the day, it's the same thing.

When you look at a routing matrix in Dante controller, there's a transmitter and a receiver. Transmitter A goes to receiver C. It's the same thing as plugging in fan out 1 to stage box 1 or whatever. So that's how I explain it because most of the audio engineers just want to know that if they plug in the CAT-6 cable that stage box 1 is going to go to Input 1.



When an extra wireless mic is needed, a BLX4R with a WL185 Lavalier and SM58 handheld is brought to the event.

Digital Networking Challenges

SN Let's talk about networking challenges that are specific to audio engineers.

JS In most of our audio systems, the installation side of the house is a lot different than the front of the house monitors/live side

of the house. On the live side, we're not as concerned with being able to send channel 1 to any channel anywhere. For the most part, 1 goes to 1 and 2 goes to 2 and 3 goes to 3.

The problem that I run into is that a lot of the engineers don't have systems training. In addition to the simplicity of running the system, manufacturers need to provide training through webinars and video channels to help the general user have an understanding of the process and how it works. (Editor's note: See the Shure webinar links at the end of this article.)

For example, if you have a programmable layer three switch, you can program any port on that switch to do anything. And you can program any port on multiple switches to be a part of the same thing. So if I have a switch in amp room A and I have another switch in amp room B, and I want the first six ports in that to communicate the same IT data to the same location, then I can program amp room A switch and amp room B switch to have the same V-LAN on the first six ports so that regardless of the fact that they're in different switches that are getting information from different places, they still communicate to the same place in the same way. But what audio school is teaching that?

SN Are there any audio schools teaching digital networking?

JS A little, but not like they should. And here's why: microphones are fun. How to mic an orchestra, that's fun. How to post this action movie, that's fun, too. How to create V-LANs across switches, not fun unless that's what you enjoy and that's what you do. Some people feel that when you get too ingrained in the technology, you lose the soul of what you're doing. I don't think that's true at all. If I were running an audio school, I would add in a lot more of electrical engineering and IT systems.

SN Do you think it might go in the other direction? Do you think that more people who are classically trained in IT will gravitate to handle pure audio challenges?

JS I think that the future is trying to figure out how to integrate the necessary skills to be successful in either direction. I know that's kind of a cop out.

Most people don't have an IT department like I do. I ask them questions all the time. Seemingly, these are things that have nothing to do with audio. But they have everything to do with your ability to do audio.

SN What kind of staff do you have, and how experienced are they?

JS My personal staff is one full-time person aside from myself, and one full-time contractor. During the academic year, I have between seven and nine students. In the summer, I have two. Generally speaking, the students have no audio or IT experience. I teach them everything I know: every last bit of information that I have, from anything, anywhere.

Common Misconceptions

SN This gets back to one of my questions. When you're dealing with students in this milieu, what do you think are the most common misconceptions?

JS I think the biggest misconception is that when you're coming into an IT environment in an academic setting, you're going to see little mixers and little projectors on carts and dinky speakers and that kind of stuff. Workstudies come in here and see DSP-controlled amplified systems and everything networked and controlled by laptops and iPads. They're mystified.

I use that to my advantage because it's the world they live in. I put an iPad in their hands, and they can mix with it in five seconds because millennials use iPads every day. High visualization, lots of data. The first question that I ask in my class is, what's the difference between sound and audio? They think that sound is audio. They don't understand that sound is a natural phenomenon and audio is voltage.

The next question is, what's the difference between analog audio and digital audio? They'll say that analog audio is electronics and digital audio is binary code. They get that. When I asked that question 15 years ago, they didn't have a clue.

They know that Garage Band is digital audio. And they know that something is happening between them talking into a microphone and it being represented graphically on a computer screen. That's something that didn't happen 15 years ago. That was something that only high-level, career professionals understood.

SN One of the areas we wanted to explore in this article is where the systems-savvy audio engineers of the future will come from. The IT side? The audio side? Or some combination of the two?

JS The shift just happens generationally, and you'll get the same blend of people that you've always had. They'll always be

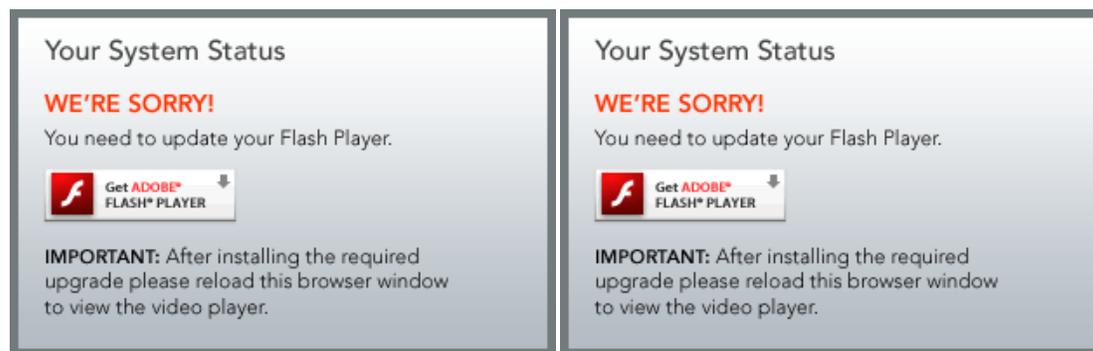
technically oriented people and vibe oriented people. Throughout the industry's history, there have been music producers who were very tech savvy and others who had no idea how to read music or use a mixer, but knew how to put great people together to create great music. Both groups knew how to lay down a great song. It's the same thing here.

There will be great technicians; system operators who are fantastic at developing complex networked audio systems through massive matrices and remote control. And there will be people who don't have a clue about that stuff, but can manipulate it to create great sound. There will be hybrids, and they'll all be valid. Just like they were 100 years ago, 50 years ago, 20 years ago, today, and in the future.

The opportunities are there, but often marketing is geared towards simplicity of connectivity, lighter truck packs, and sound quality comparisons. We're entering an industrial shift that requires a new operational mindset, so resources are needed to navigate the new landscape. The net effect is a broader acceptance of networking principles by audio professionals and a growing understanding of audio protocols by IT professionals.

Shure Learning Center Webinars

Need to get started on your audio networking journey? Here are two Shure webinars that can help:



-  BLX
-  Boston College
-  Dante
-  IT and Audio
-  Jonathan Sage
-  SCM820
-  ULX-D

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