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Q&A with Brad Price,
Audinate's Senior
Product Manager



USC DEPLOYS DANTE IN CAMPUS-WIDE PIVOT TO HYBRID LEARNING

Chapter 2 of 4 in the Networking Expert Series

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THE MISSING LINK: KEY QUESTIONS & ANSWERS ABOUT DANTE AUDIO NETWORKING

By **Michael Lawrence**

Networking in the pro audio world has arrived, with Audinate Dante leading the way. However, many colleagues I talk with still aren't overly familiar with it, and even though I've taken and passed all three levels of Dante certification training, I still had some questions as well. So I reached out to Brad Price, senior product manager for Audinate, to get answers that help clear some things up for me and hopefully for you as well.

Michael Lawrence: Let's say someone has an idea of what Dante is and what it does, but they are confused about how to get started. What are the basics they need to know?

Brad Price: Getting started with Dante is easy, in large part because there are so many Dante-enabled products on the market – over 1,700 from more than 400 manufacturers. All Dante products are completely interoperable, no matter which vendors you choose.

Once you've selected products, connecting them with Dante requires only a network switch, some ordinary Cat-5e/6 Ethernet cables, and a PC or Mac computer on which to run Dante Controller software. Any gigabit network switch will do for a simple network, as Dante requires no special settings under the vast majority of circumstances.

Dante Controller is used to set up and change Dante networks. Download and install the free software from Audinate, then connect your Dante devices and the computer to the same network switch. When Dante Controller is opened, all connected Dante devices will immediately appear, displaying all their transmit and receive channels on a grid.

To route audio, simply click at the intersection of desired transmit and receive channels in the Dante Controller grid and a subscription is created, showing a green checkmark. That's it, audio should now be flowing. To unsubscribe channels, just click again.



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Once you've set things up, you can close Dante Controller and even remove the computer if you choose. Dante devices store all connectivity information internally and will automatically restore subscriptions when power cycled or reconnected.

If you wish to use your PC or Mac computer as an audio device (e.g., multitrack recorder), purchase and install Dante Virtual Soundcard. This provides a standard audio interface for your sound applications, allowing you to record and play back up to 64 channels of audio directly to and from your Dante devices with no special settings or hardware.

ML: I'm familiar with Virtual Soundcard and its uses for virtual soundcheck, live multitrack, and the like. You have another software tool called Via. Can you explain a little bit about Via, how it differs from Virtual Soundcard, and what some of the applications might be?

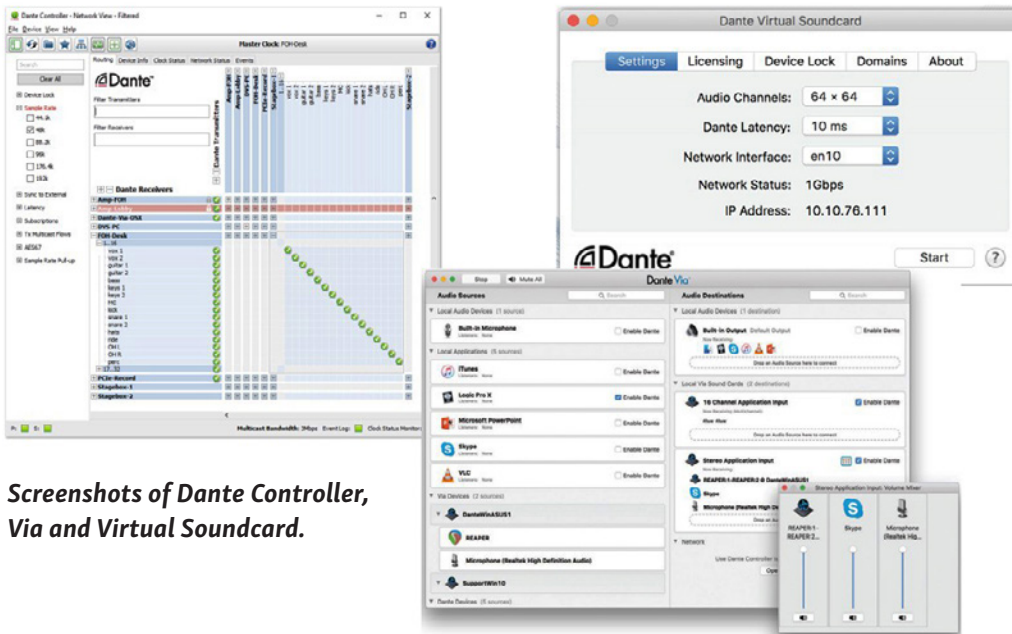
BP: Dante Virtual Soundcard (DVS) provides a standard audio interface for software products running on Windows or MacOS computers, allowing customers to connect their audio applications directly to networked Dante devices. All that's needed is a wired Ethernet connection from your computer to the network, and up to 64 x 64 channels of networked audio can be recorded, played back, or processed.

Via performs a similar function but extends Dante networking to any locally connected audio device, such as a USB interface, a Thunderbolt mixer or even the built-in headphones and speakers. With Via, any audio device connected to your computer can be "Dante-enabled" and will appear on the network as properly labeled channels of I/O, allowing you to use non-networked audio devices with your AV-over-IP system.

Via also connects audio applications to a Dante network, but in a different fashion. DVS presents a single audio interface to applications (just like a physical sound-card) and displays only numbered channels in Dante Controller; any user or device on the network cannot "see" what audio applications are being used with DVS, only the channels.

With Via, applications can be specifically Dante-enabled, and those applications will appear as labeled channels on the Dante network. This makes it easy to expose several applications simultaneously, and each will have their own independent networked audio channels.

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Screenshots of Dante Controller, Via and Virtual Soundcard.

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In addition, Via allows users to route audio internally on a computer. Anyone wishing to send audio from “application A” to “application B” will find it very difficult if not impossible to do using operating system tools. With Dante Controller, one simply drags a source application to a destination for instant connectivity.

DVS is usually the best choice for multi-channel recording of Dante networked audio, while Via is a more flexible tool for users who wish to extend audio networking to non-networked devices, and who need to “break out” separate audio applications from one computer onto a Dante network. A good example is media playback in public spaces – with Via, one can set an application to supply background music, knowing that any other system audio will not be passed to the network.

ML: In your view, what are some of the advantages of a Dante system over a standard analog system?

BP: Where to begin? The first advantage is an obvious one – Dante is all-digital transport, immune to analog noise, hum and grounding issues. Since nearly all new audio products are digitally-based, maximum fidelity is maintained by keeping everything in the digital realm during transport and processing, only converting to analog at a final endpoint, such as a loudspeaker. Many first-time users are surprised by the low noise of Dante systems; it can be a dramatic difference.



Dante AVIO adapters allow use of legacy audio gear with Dante-connected systems.

Network transport overcomes the distance and weight problems of analog. Those two items may not at first appear related, but in analog systems an awful lot of copper is devoted to single-purpose cables carrying microphone and line-level signals. Anyone who has dealt with multi-channel snakes from stage boxes knows well how heavy and difficult to manage those cables can be, and that weight really adds up in larger systems.

Further, analog cables introduce losses and noise that worsen with distance, limiting deployment options and scale. In contrast, a Dante AV-over-IP network can span miles of distance, carrying hundreds of bit-perfect audio channels over a single lightweight Ethernet cable or fiber with absolutely no degradation. Expensive snakes are replaced by Cat-5E cable for pennies per foot.

Next up is a somewhat less obvious advantage: the replacement of point-to-point connections with networked connections. In analog systems, audio always goes from device to device, usually using devoted cables to chain one device to another. This means that the system design cannot be altered without moving cables and changing device settings – a problem that can prove daunting when the cables are buried in walls and ceilings.

Networked AV is fundamentally different. On a network, all devices are equally present and connectable at all times, not subject to the analog “daisy chain.” Changes to signal routes and system design can be made in seconds with a few mouse clicks, sending channels wherever they need to go. This allows for entirely new thinking about AV installations, and gives end users a vastly improved experience.

Dante uses exactly the same networking technology as any other computer network – they’re identical, and completely compatible. This in turn means that the Windows and MacOS computers now used in modern audio production and recording can easily connect directly to any Dante system using their existing network ports – no other hardware or conversion is required. Dante-connected laptops are now a common sight at shows and in recording studios.

“COMPUTERS NOW USED IN MODERN AUDIO PRODUCTION AND RECORDING CAN EASILY CONNECT DIRECTLY TO ANY DANTE SYSTEM USING THEIR EXISTING NETWORK PORTS – NO OTHER HARDWARE OR CONVERSION IS REQUIRED.”

Dante is part of the long, ongoing transition from analog to digital that began decades ago with the introduction of PCM recording and the CD. With Dante, an AV system is digital from edge to edge.

ML: Can you give us an example or two of a practical setup/application of a Dante network? Maybe one from an install situation, and one from a live/touring situation.

BP: Let's start with a large installation, in this case, the Columbus Zoo in Powell, OH. It covers 580 acres and previously used a mix of more than 900 unintegrated analog endpoints with no central management to support a variety of background music and public address systems. This system had grown organically over the years as different contractors added complexity, which meant that many changes required days to execute, with employees going from device to device.

Dante was selected as the foundation upon which to build a new AV system, and hundreds of Dante-enabled products were purchased from more than 10 different vendors. This immediately solved problems of reconfiguration, which could now be done from a desk in minutes.

The system was further refined with the inclusion of Dante Domain Manager – a server-based tool that enhances Dante by allowing an administrator to subdivide the system into individually managed groups, or domains. Each of the domains corresponds to functional parts of the zoo compound, making it easy to adjust audio in one area without affecting others. Domain Manager also supports mandatory user authentication, which means that only qualified people can make changes to any domain.

At the Columbus Zoo, a sprawling, unmanageable, and suboptimal system was replaced with one that's easy to use, easy to understand, easy to expand, easy to secure and offering higher performance for patrons.

Audio networking is a natural fit for live tours and events. Large, heavy snakes are eliminated, and multichannel cable runs are replaced with a single, skinny length of Cat-5e. Dante's low latency – typically 1 millisecond – is ideal for live performance requirements.

Rat Sound Systems (Camarillo, CA) uses Dante to deliver sound at the Coachella Valley Music and Arts Festival in Indio, CA. With outdoor systems

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covering large physical areas, over 21 delay positions are required. Using Dante-enabled loudspeaker processors and mixers, these towers could be set up in a single day, freeing time for other setup activities. Yamaha DSPs are used employing Dante network redundancy to ensure a great audience experience even if there are equipment failures on the primary system.

Dante's high channel count capabilities make it easy for front of house and monitor mixers to share as many channels as needed between one another, simplifying the deployment of IEM systems. Live sound was the first area of the AV market to fully embrace Dante AV-over-IP. There are hundreds of Dante-enabled products available for this segment, from mixers and power amplifiers to DSPs and wireless microphone systems.

Michael Lawrence is an independent front of house engineer and system tech, and he's also an application support specialist with Rational Acoustics. In addition, he serves as the technical editor of various pro audio publications. Send him your thoughts at michael@precisionaudioservices.com.



Photos by Imran Tallman

UNIVERSITY OF SOUTHERN CALIFORNIA DEPLOYS DANTE IN CAMPUS-WIDE PIVOT TO HYBRID DISTANCE/ON CAMPUS LEARNING

Globally-respected educational institution redesigns AV systems in nearly 250 learning environments to facilitate changes wrought by the pandemic; New AV infrastructure yields higher quality content for distance, online programs now commensurate with the elite programs that are synonymous with USC.

In a demonstration of the versatility, robustness and high performance of Audinate Dante AV network technology, the University of Southern California (USC) deployed a vast AV network to over 248 learning environments that was foundational for a new hybrid distance/on campus educational program the school rolled out last fall. According to Joe Way, USC Director of Learning Environments, the Dante-powered systems enable faculty to simultaneously give lectures on campus, on-stream and also archive for future use.

Way says that the system also facilitates classroom overflow — a result of classroom occupancy levels being dropped by up to 70% to accommodate





Joe Way, USC Director of Learning Environments

social distancing. In this scenario, the faculty-member will be present in a classroom with a small group of students with additional small groups participating in the same lecture from adjacent rooms. The overflow rooms are equipped with cameras, microphones, displays/projectors, and networked sound systems to facilitate interaction.

The system also supports situations where the faculty-member is uncomfortable or unable to be on-campus. In this instance, the faculty-member will present from home to students in classrooms and those attending remotely.

“The system needs to be flexible to change at any time,” Way says, acknowledging the dynamic nature of the pandemic. “We are moving to all-network-based AV that will allow us to transmit any signal to any location. Dante is critical in our ability to lecture-capture and microphone-share.”

Way and his team developed a templated approach that can be modified to facilitate varying workflows depending on the subject, department and lecturer-preferences. The core of the system, however, is a Crestron Flex UC Engine (the B140-Z or C160-Z, where Z stands for Zoom). These allow users to take a Zoom Virtual Room and make it live – using all NVX352s to encode and decode Dante. Dante-enabled Shure networked mics – either MXA 910s or 710s – are used for lecture and student capture. Dante AVIO units are also widely used as encoders with some handheld mics and as output when the team needs to zone the room and cut the speakers near the microphone.

Dante Domain Manager network management software enables user authentication, role-based security, and audit capabilities for Dante networks while allowing seamless expansion of Dante systems over any network infrastructure.

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Way said the flexibility of the system is impressive – noting he expects to manage up to 1,100 nodes of Dante when the integration is complete.

“It’s critical that our system be as cloud-based and software-based as possible,” Way said. “By using Dante Domain Manager we’re able to ensure we have complete observability, control and security across the network. And we’re able to utilize it both with the scheduling system we have and with individual instructor preferences. For the most part, faculty will be able to walk in at their scheduled time and the room will be ready for the way they want to teach. With things like Dante’s audio routing at our fingertips, we can set it all up ahead of time.”

For students who are on-campus but constrained by isolation requirements, AV-over-IP provides high-quality access to lectures and content directly over the school network. For those who are taking classes off-campus, AV-over-IP helps school IT to implement robust streaming services, eliminating unnecessary hardware and complexity so that students can get to the content they need wherever they are.

Commenting on the deployment, Joshua Rush, Audinate Senior Vice President of Marketing and Product Management noted, “Elite institutions like USC have earned a reputation for excellence based on the quality of the education traditionally delivered in campus lecture halls. Now, as they seek deliver the same high-quality educational experience remotely, the AV network is what connects the faculty and student body. A stronger network means a better connection, a better experience and better education.”

For more information on Dante's applications in higher education, visit audinate.com/edu.

About Audinate

Audinate Group Limited (ASX:AD8) has a vision to pioneer the future of AV. Audinate’s award winning Dante AV over IP networking solution is the worldwide leader and used extensively in the professional live sound, commercial installation, broadcast, public address, and recording industries. Dante replaces traditional analogue cables by transmitting perfectly synchronized AV signals across large distances, to multiple locations at once, using nothing more than an Ethernet cable. Audinate is headquartered in Australia and has regional offices in the United States, United Kingdom and Hong Kong. Dante technology powers products available from hundreds of leading audio partners around the world. The company’s ordinary shares are traded on the Australian Securities Exchange (ASX) under the ticker code AD8.

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