

# digital connect

MAGAZINE

www.digitalconnectmag.com • Making Convergence Happen

## [dig]IT PLATFORMS

BY MARIO MOREJON

### REVOLUTIONIZING DIGITAL MUSIC

NETSTREAMS' MESH ARCHITECTURE DELIVERS THE FUTURE IN WEB SERVICES-ENABLED APPLIANCES

■ NetStreams can very well become the next Dolby. What Dolby Labs has done for analog surround sound, NetStreams' StreamNet technology is now doing in the digital domain, and with a more sophisticated architecture. This technology is far ahead of anything *Digital Connect* Lab engineers have tested or have seen on the market, and we believe it is going to revolutionize the way music is distributed in homes and in commercial buildings.

StreamNet is a patent-pending algorithm that can automatically synchronize multiple rooms in a house in realtime by using NetStreams' DigiLinx TCP/IP-based mesh network to stream music. StreamNet is IP-based and self-contained, so that every remote audio source on a device manages itself. There is no need for a centralized con-

troller on a DigiLinx network.

What visionaries like Bill Gates touted as the future of Web services-enabled appliances, NetStreams has made a reality. NetStreams' mesh architecture uses Web services self-discovery methods to identify and distribute IP data streams. What's more, these Web services reside on a small Web server that also maintains its own UI configuration settings, allowing every DigiLinx keypad, touch panel and amplifier to operate independently of each other. Web services also are used to synchronize internal clocks when music is streamed between devices. The StreamNet kernel is small enough to reside on every DigiLinx device. Lab engineers believe that one day it might be embedded on every circuit that now executes Dolby's matrix encoder, allowing

every mainstream A/V unit and self-amplified speaker to morph into a true IP-based appliance.

Although NetStreams is not yet targeting the commercial market, this technology can be a boon for digital integrators interested in commercial audio distribution systems. Because of the system's self-contained and decentralized architecture, hotels and commercial buildings will be able to distribute highly targeted audio streams to any remote location without spending thousands of dollars on equipment. With this architecture, solutions don't require complex audio distribution and remote amplification gear, or expensive controllers. Cabling is also minimized because every DigiLinx keypad and touch panel is amplified and self-contained.

NetStreams guarantees that any two speakers will have a delay below 1 millisecond, making it impossible for the ear to detect. From our test results using two separate audio sources, we

NetStreams' DigiLinx devices can stream synchronized and uncompressed full bandwidth audio through TCP/IP with no noticeable loss of sound quality. All operate independently of each other.





were not able to detect any echoes that normally would arise from a delay between two speakers. All the songs that we synchronized between our test fixtures played dead on.

Because this technology is IP-based and requires large throughputs, *Digital Connect* engineers recommend putting highly experienced network architects on large installations to minimize future network bottlenecks. In homes, however, NetStreams' simple mesh architecture is more than adequate for the average digital integrator to install and configure. Since every device has a self-configuration capability, there's little heavy lifting digital integrators have to do.

NetStreams' pure IP-based architecture allows digital integrators to configure all DigiLinX devices before walking onto a job. For instance, once a keypad is configured, it passes that information via Web services to all other devices on its network. We recommend digital integrators configure these devices on workbenches at their shops. Every device on the workbench can be numbered for a room, so any installer can assemble it on the job site. This technique can save integrators money and give them a competitive advantage on future job bids.

Configuration information is never lost. Regardless of who initially installs a DigiLinX network, other integrators can recover information from any device. This is comforting to homeowners because they know that any DigiLinX installer can come and work on their systems. NetStreams is making DigiLinX certification courses available by the end of this year.

NetStreams' SwitchLinX SL220 24-port managed network switch serves as the music distribution backbone for StreamNet. The switch is

IGMP-enabled and arrives optimized for TCP/IP-based audio streaming and does not require configuration. Since all the network wires flow in and out of this switch, digital integrators should mount it on a rack or inside a large wall box.

NetStreams recommends using AudioCat Siamese Cat5e with 4 conductor speaker wire. This cable simplifies installations by combining a TCP/IP cable with two cables to power up NetStreams devices and two spare cables to distribute analog audio signals. The cable works with major control manufacturers, so it is ideal for home automation installations as well. Fortunately, the home-building industry is embracing this standard over the traditional TCP/IP cabling.

NetStreams also recommends a central power distribution arrangement. The company sells PowerLinX PL600 UPS to power up its keypads and amplifiers through Siamese cables.

PowerLinX has eight discreet output terminals that supply 28 VDC to every DigiLinX device, and should be placed close to a home-theater rack.

By placing PowerLinX and SwitchLinX close to each other, integrators can save money by running less wire throughout a home. This arrangement also minimizes wire gauge. PowerLinX uses independent protection circuits for all of its terminals. If a short occurs on a terminal, only that terminal is shut down without affecting the rest of the network.

On retrofit homes that do not have TCP/IP cables inside the walls, NetStreams suggests running Siamese Cat5e cable. Otherwise, by using Cat5 TCP/IP

cables, which are standard in today's new homes, power becomes an issue because separate 28 VDC transformers are needed to power keypads and amplifiers in each room.

In homes that are already wired with TCP/IP cables, it might be more cost-effective to place a power supply on every floor. While it might initially be more expensive for these homeowners to buy multiple PowerLinX UPSes, they can save money from quicker installations.

NetStreams has a wide array of keypads, touch panels and amplifiers, including MediaLinX MLA101, which streams uncompressed audio from non-IP based audio equipment. MediaLinX connects to any DVD and CD player through analog RCA jacks or S/PDIF inputs. This device can communicate with legacy audio appliances through IR or RS-232 and translate these signals into TCP/IP, so all DigiLinX keypads and touch panels on a network can control these appliances.

Its SpeakerLinX SL220 amplifier fits in a two-gang electrical box and can be placed anywhere near two ceiling-mounted speakers. Like all DigiLinX devices, SpeakerLinX is Ethernet-based and does not require a local keypad to control it. NetStreams' mesh architecture allows integrators to mount a single keypad in a room and control multiple amplifiers at the same time. To see and hear the whole system in action is to witness the future.



PHOTOS: JOSE TIGANI