

Audio Networking

MARTIN COLLOMS ASSESSES THE SOUND QUALITY OF DIFFERENT NETWORK SWITCHES

I have run a wired network for local audio streaming for several years now, and have carried out a number of experiments and tests in carrying out upgrades to this installation. It is used typically 25 hours a week, both formally and informally. Music is piped into a Naim *NDS/555PS DR* running as a network audio player with an analogue output to a Townshend *Allegri* passive controller. Acting as a server to the *NDS* streamer is the venerable but still treasured Naim *UnitiServe*, which bravely rose to the recent challenge from the new *Uniti Core*. (Neither won the contest outright, as they begged to differ slightly from each other; just a matter of taste perhaps.) In fact I chose to retain the *UnitiServe*, at least for now (though the latter did have the possibly unfair advantage of a larger external linear DC power supply).

Small but incremental refinements have kept this system up to speed over several years now, beginning with locating the *UnitiServe* and *NAS* backup on a second ring mains supply that was filtered and isolated by an inexpensive Tacima 6-way strip. The mains isolation, such as it is, is required as the compact radio receiver, the control point for remote WiFi control signals from the iPad which carrying the Naim music App, is an Apple unit, this the locally attached Airport Express. In addition this has an inboard switch-mode power supply.

Likewise the QNAP four-bay backup NAS drive also has a sizeable switch mode supply. Each of these devices makes a small but detectable negative impression on sound quality and needs careful, measured installation. Remote locating also meant moving this lot to a partly ventilated cupboard on the other side of the room, connecting the *NDS* via 15m of selected Cat6e.

A direct Wi-Fi link to the *NDS* (such as when using the aerial option on its back) might have been convenient, but wasn't acceptable for me, as it slightly lowered the *NDS* sound quality. There seems to be a price to pay for the increased convenience offered by these facilities. Hard wiring seemed to be the optimum choice at this stage.

I did try a fast fibre link as an alternative substitute for the 15m wired CAT cable. This provided a small gain in some areas, with slightly less grain, but it also resulted in some loss in

drive and rhythm. That may have been due to the small switch-mode supply at the *NDS* end of the optical link, which is required to service this receiver. All of these steps were to try and reduce electrical noise.

This wired arrangement continued for a few years with great success until the fortuitous installation of the *Uniti Core* for review. On test this was tried both remotely, in competition with my remotely located *UnitiServe*, and also local to the streamer. It threw up the possibility that by controlling the fan noise from my auxiliary linear power supply, it and the *UnitiServe* could also be tried local to the *NDS*, perhaps showing the benefit of a shorter network cable path. Rounding out this connection, an inexpensive gigabit Netgear switch was added for local network housekeeping, here placed adjacent to the *NDS*. This switch sounded best in the system using an NOS (new old stock) transformer type plug top 12V supply, rather than the switch-mode supply included in the package.

The 15m CAT cable remained as the wired control line to the now close-coupled *UnitiServe* and *NDS*. The music-data link was now a short path, and all the better for it, both in definition, transparency and improved timing. I will continue to love the file accessibility of network control, but will also admit to a modest quality shortfall compared with the hard-wired alternative of real time S/PDIF drive to the *NDS*' DAC input terminal.

However, two recent events have served to alter my view on how to improve the system. One was the activity of German manufacturer AQvox in modifying switch boxes (see HIFICRITIC Vol12 No1), where improvement to the internals, including electrical and mechanical damping produced a positive review result. Moreover the company's costly 1m CAT cable proved additionally beneficial in this specific context. (Until very recently I had experienced only subtle differences between short links of CAT cable.)

This review result led me to reconsider the potential influence of the network on sound quality. This in turn led to a colleague suggesting an industrial grade network switch; one with an inboard supply (yes, a switch-mode PS, 13A mains cable connected, but with decent filtering on

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The Cisco Catalyst 2960 Series is an intelligent Ethernet switch: a fixed-configuration, standalone device, for fast Ethernet and Gigabit Ethernet connectivity. (A 13A 'kettle' socket is mounted on the back.)

board and full data management and re-clocking), as opposed to a basic switch which presumably pays rather less attention to clocks and isolation. The recommended unit was a Cisco 2960 which used to cost about £50 secondhand, but now costs more like £100, as increased demand seems to be increasing the price.

Somewhat to our surprise, the Cisco switch initially disappointed, with a loss of timing and a sense of disorganisation, combined with a jittery roughness. And it didn't improve when put on the low noise Naim part of the power feed system; nor did it benefit from mains filtering. But when we tried a few support foot options, we found that the sound character and quality could be transformed: clearly it was quite extraordinarily microphonic, as much as many a turntable. I had an assortment of classic Harmonix footers, oak cones, stainless steel domes, Michell points and felt discs to try.

It turned out that many aspects of this Cisco switch's sound, and its effects on my system, could be readily tuned, in this case while supported on a free glass shelf section of a Naim FRALM stand. A panoply of effects were evident, such as in bass timing and attack, mid grain and/or transparency, treble grain and, perhaps most surprisingly, also in dynamics, rhythm, image focus and depth.

Once optimised, I have to say that the gain in system performance was both substantial and satisfying over the long term. I have previously spent much more cash than this and ended up with less sonic benefit. This new arrangement is now able to reveal previously unsuspected quality differences between the short CAT cables used for various local connections, such as switch-to-NDS, switch-to-UniServe, switch-to-control line. Clearly there are more experiments to do here.

Recent evaluations, running Qobuz on Audirvana using a MacBook Air, I streamed CD and HD material from the internet, relaying via Airport Express to the remote wired network running and replaying through the NDS, all via the Cisco switch. Even on a high-end system, the internet sound quality was now only a little less than when these tracks were sourced directly

from the local UniServe. Many people with a less ambitious system might not even be able to tell the difference.

There may be other unsuspected managed network switches of this class which might also sound good in an audio linked network, perhaps also requiring some vibration and acoustic tuning for them to blossom. Even those simple small-box switches are moderately microphonic and respond to support tuning, but to nothing like the degree that the old (and unfortunately obsolete) Cisco 2960 demonstrated.

It is fascinating to discover new areas of possible improvement where it had seemed, at least temporarily, that digital audio command and data transfer was more or less cut and dried. However, the reliance on textbook dogma concerning the inviolability of data over a wired network, where all is error-proofed, data packets are handshaken and copied back, clocked in and clocked out, is clearly in doubt and (once again) called into question.

Previous ratings and comments on for example the sound quality and numeric performance of my reference Naim NDS/PS555DR streamer are therefore now rendered questionable, since the improvement in performance from introducing a different network switch now eclipses the short path loading of a USB stick file driving the front panel socket.

Previous class-leading performance was obtained via the hard-wired BNC connection of an S/PDIF source from a selected and well supported digital hard drive, whereas the present improvement in musical satisfaction places the NDS (just as it is about to be superseded) at the head of the DAC pack. (What effect the imminent arrival of an ND555 may have on the current NDS' prime position cannot be guessed right now.)

As I complete this report I remain astounded how fresh my (essentially re-mastered) ancient collection of classic CDs sound now, transcribed via the UniServe and replayed from it via the Cisco switch. Watch this space for future developments...