

GUIDELINES FOR IMPLIMENTING MULTICASTING ON HD RADIO SYSTEMS

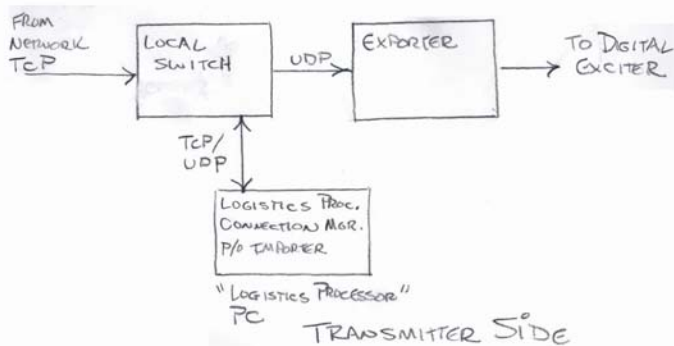
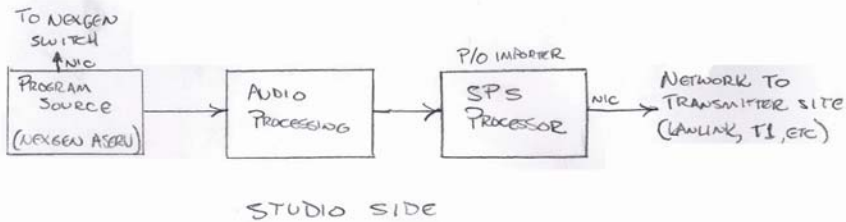
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At this point in time until the future Iqivity release of version 2.X software, it is highly recommended that a "split" configuration be used to implement SPS. That is, the importer at the studio end is configured to use TCP (instead of UDP) to communicate with an added processor at the transmitter end, which in turn sends UDP audio packets to the co-located exporter.

While we've referred to the added computer as a "buffer box" or "logistics processor", at Prophet's suggestion we'll refer to it as a "Remote Importer" which better describes its function.

The remote importer is also running the connection manager and MS SQL database programs, so it needs to be a fairly decent P4 computer, with ideally at least a 2 GHZ processor, 512 megs of memory and must be running Windows XP Pro.



2.

REQUISITE SOFTWARE

The lbquity software version required to run the “split” configuration described here is 1.1.2 and must be installed on all machines.

TESTING THE STUDIO TO TRANSMITTER DATA LINK

Whether using a Moseley LanLink, Intraplex or telco T1, it is important to know that the maximum packet loss across the data link can be no more than 10%, using the packet size that the system will be using. The actual packet size depends on the bandwidth allocated for the SPS service. At a recommended 48K SPS bandwidth, the packet size across the link will be close to 9100 bytes.

With the use of command switches, a standard ping test can be used to test the path from the importer to the logistics processor at the far end. Type the following in a command window on the studio-side importer: ping xxx.xxx.xxx.xxx -l 9100 -t , where the IP address is that of the Remote Importer at the transmitter site. Let the test run for an hour and terminate it by entering control-C. The percentage of lost packets will be displayed. 10% packet loss is the maximum that the system can tolerate. Here at KBCO-FM Denver, packet loss is averaging 5% to 7% on a Moseley Lanlink.

HARDWARE NOTES- Minimizing packet loss

During early testing of our SPS system, I found that several things can contribute to packet losses. High RF environments can cause packet loss due to RF pickup on network cabling. A 100 MHz data link can have issues in the field of a 100 MHz FM transmitting antenna. I recommend the use of shielded CAT5 cabling at the transmitter site, sometimes referred as CAT 6. Made by Black Box and other companies, available from Insight and other outlets. A quality, well-shielded switch is also important. I had much better results with a Cisco 2950 than with a 3Com “Office Connect” switch.

If using a managed switch like the Cisco 2900 series, lock each port down to the appropriate speeds and protocol instead of using auto-sense. For example, the Moseley Lanlink has a 10 MHz, half-duplex port, and the logistics processor and exporter are both 100 MHz, full duplex.

The switch and logistics computer both need to be on a UPS. Even a brief loss of the data connection between the connection manager in the remote importer computer and the exporter will cause an outright failure of the system, it will not self-recover!

There is anecdotal evidence that some of the 1-rack-space APC UPS units shipped by Harris and Nautel with their HD radio equipment have had reliability or glitching issues. Again, any interruption of power to the switch, remote importer or exporter will cause serious problems.

3.

NETWORK NOTES

If at all possible, assign IP addresses to the aserv, importer, remote importer, switch(s) and exporter all within the same subnet. If Using a Prophet audio server/importer combination box, then one will need to use an IP block from the NexGen subnet, all the way to the exporter. In the near future, Prophet importers may incorporate two NIC cards, one to allow the aserve portion to communicate with the NexGen network, the other for a separate network connection to the exporter and logistics box, should the need to communicate using a separate subnet arise.

Try to keep extraneous and broadcast traffic off of the network path to the transmitter site. Minimize the number of switches in the network path. Here at KBCO, I use a dedicated LanLink to transmit my SPS data to the mountaintop transmitter site. The studio LanLink unit is plugged directly into the NexGen switch, rather than to and through the office switches and network. Doing this incrementally improved packet losses due to data collisions and other traffic. The LanLink unit at the transmitter site directly plugs into a Cisco 2950 8-port switch and that port is locked to 10 MHz, half-duplex to match the LanLink. The ports to the logistics box and exporter are locked to 100 FDX.

As of this date, different individuals within CC engineering are working with Moseley in an effort to maximize LanLink packet throughput for the SPS application. There is also reportedly a firmware patch being offered by Harris to correct an issue with Intraplex. Please contact Harris for details on this as they evolve.