USER REPORT

Zephyr Does Double Duty for Radio Skonto

Telos Xstream ISDN Codecs Provide Identical RTP/UDP Streams For Two Remote Studios, Each More Than 150 Miles Away

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RIGA, Latvia When Radio Skonto received licenses for transmitters in two other cities, management was pleased. But for me it posed a problem.

How would I get the signal from the studio in Riga to the distant cities of Rezekne and Liepaja, each about 155 miles away? Old-technology telco audio service was expensive. Installing my own STL radio system would be impractical due to the need for intermediate repeaters and towers — if I could get a license.

So I asked a local Internet Service Provider, Latnet, if it would be possible to use IP links to the two sites. Fortunately, the ISP was able to offer a guaranteed bandwidth service to the two sites at a cost much lower than the alternatives.

To avoid paying telco costs, Latnet installed a 26 GHz IP radio link with equipment made by Netro from the Radio Skonto studios to its point-of-presence in Riga. Radio Skonto contracted for 384 kbps from the Riga studio and 256 kbps at each of the remote sites, providing plenty of margin for packet overhead.

Livewire network

Radio Skonto decided to use **Telos Systems'** Zephyr Xstreams to provide MPEG compression and IP conversion. The station is a Livewire IP networked facility, so we wanted to input audio to the Zephyr at the main site via IP. The latest version of the Xstream hardware includes Livewire, so we plugged it in to a spare port on the Livewire Ethernet switch, and configured its input source to be from the main program Livewire channel.

A low-cost ($50) consumer IP router was used to connect the Latnet IP radio to another port on the Ethernet switch. This router was "locked down" to pass only the required audio signals and thus to isolate the Livewire network from any other traffic on the external network. The Xstream provides two (identical) RTP/UDP streams, one for each site.

Each remote site has a small studio setup for local programming. The Zephyr Xstream delivers its audio via analog connections to a console fader input. DSL lines provide the IP connection. Again, these are firewalled with a low-cost router inserted between the DSL line and the Zephyr. The routers have additional LAN ports that are connected to other PCs that are used for non-real-time audio transfer.

We were concerned about delay, wanting the lowest possible value so people listening to live telephone calls would not be confused (we do not use a profanity delay). So we initially set our Xstreams to the lowest buffer setting, 250 ms. We were not sure if such low a setting would work, but we decided that the best strategy would be to start with a minimum value and increase it in small steps until any audio drop-outs stopped.

It turned out that the minimum setting worked without problem. Fortunately, the

Bankovs (standing) and Assistant Engineer Karlis Malkavs use the Telos Xstream (not pictured).

IP network had very low jitter.

My assistant engineer, Karlis Malkavs, and I wondered if 128 kbps would provide sufficient quality and were ready to increase to a higher rate if we were to hear compression artifacts. But after a month of on-air operation, we decided to stay with this lower rate. MPEG AAC has been officially designated as "indistinguishable from the source" at 128 kbps by the European Broadcasting Union, so this was pretty much what Telos had told him to expect.

The system has been in operation for over nine months and is working well. There was a single outage at one of the sites, caused by a power failure affecting the ISP's equipment center. A UPS was supposed to provide backup, but a switch in the path was mistakenly not connected to the UPS. Fortunately, the folks at Latnet were serious about offering a high-reliability guaranteed connection and were willing to fix the problem by making sure the rest of the equipment was placed on the UPS.

Other than that, no problems. The ISP's promise of guaranteed bandwidth has been kept, and the IP option has proven to be a satisfactory studio-to-transmitter link.

The project was far easier than I had imagined. Basic IT skills were necessary. "Much easier than if we had attempted an RF STL. Even a single hop STL would have required considerable effort to obtain licenses, plus the work of installing the RF equipment," said Malkavs. Latnet even took care of the RF link so our involvement was minimal.

For more information, contact Telos Systems in Cleveland at (216) 241-7225 or visit www.telos-systems.com.