Ensuring QoS for Broadcasters Transitioning to IP Networks

Throughout the broadcast industry many are in the process of, or thinking about, transitioning from the use of legacy Serial Digital Interface (SDI) baseband to using an IP baseband for the delivery of their media. The reasons for this migration are the multiple benefits IP networks can bring such as:

- futureproof and scalable technology
- flexibility, control and speed
- compatibility with emerging formats
- financial savings through a broad choice of components/vendors

The challenge in making the switch to IP

Despite the benefits IP networks can deliver they are also unpredictable and can offer inconsistent performance due to a range of impairments that can occur. Ideally you want traffic to behave consistantly but when impairments such as jitter and packet loss occur you get 'bursty' traffic which adversely affects video transmission.

Society of Motion Picture and Television Engineers (SMPTE) Standard Framework

To address this challenge and mitigate risk to Quality of Service (QoS), SMPTE developed a standards framework to allow for easier transition. Two specific standards refer to the management of network traffic to support successful deployment.

ST 2110 series: Defines the ideal traffic model for broadcast over IP, as well as the performance of transmitters such as packet pacing, gaps and bursts.

ST 2022-7: Defines a method to achieve redundancy through the transmission of multiple streams of identical content over separate paths through the network.

Whilst these standards provide guidance, when designing a network that conforms to them, an understanding of the true performance and behaviour of the real system is still essential and therefore all elements need to be tested. An example ST 2110 deployment is:
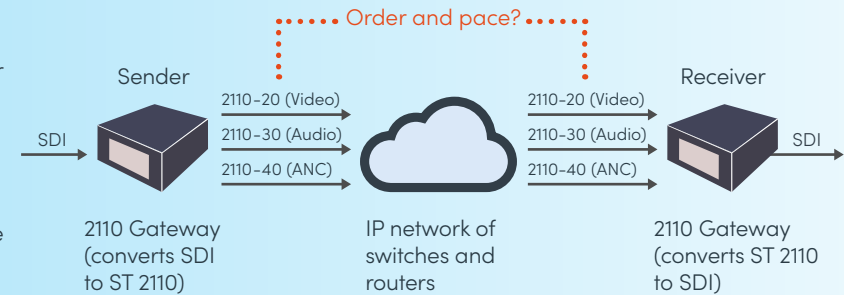

Testing with Spirent Network Emulator (SNE)

Network emulation allows you to mimic the characteristics of IP networks and introduce impairments such as delay, jitter or packet loss to understand their effects on your application in a controlled test environment.

Example ST 2110 test on the SNE GUI

Using the SNE you can test different SMPTE deployments to ensure they are compliant and working as expected well before any deployments are made on a live network.

All the streams will go through the map and each will be filtered based on the IP Address. Different impairments can be enabled individually in each stream.
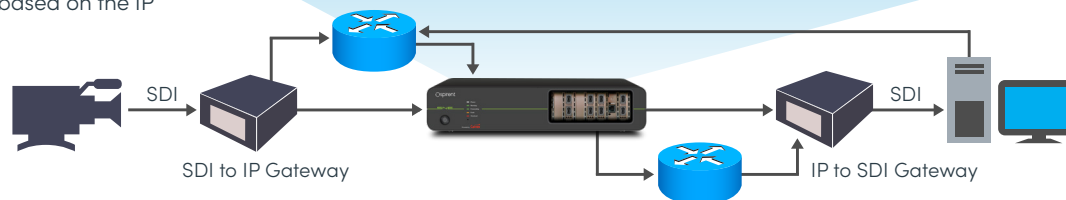
Key Highlights of the SNE

- 100GbE, 50GbE, 25GbE, 10GbE and 1GbE interfaces supported
- Web-based user interface
- RESTful API for easy remote control in your automation environment
- Multi-user
- Multi-port — best-in-class port density with up to 8 ports 100GbE/50GbE/25GbE, 16 Ports 10 GbE/1GbE
- Connect any-port to any-port without limitations

Over 55 impairments and tools

- Comprehensive list of dedicated impairments and filters
- AV specific tooling including:
  - MPEG corruption
  - Large buffer
  - Markov model packet loss

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