Testing Broadcast Applications with Impairments

Serial Digital Interface (SDI) has, until recently, been the preferred transport mechanism for broadcast transmission. Its main advantage is that it provides a consistent and predictable delivery of data which is ideal for audio/video transport. However, networks in the broadcast industry are now in a state of flux. Increasingly there is a shift away from single-purpose legacy systems like SDI, and a shift towards multi-purpose IP-based networks. The change has come about due a variety of reasons, including:

- Ubiquity of IP networks and infrastructure
- Wider expertise in general IP-focused networking, therefore less specialist training required
- Multi-purpose equipment can be redeployed or change of use
- Broader choice of components
- Smaller size of equipment reduces the hardware footprint in the data centre

While these are valid reasons for the move to IP, it's not without challenges. Foremost among these is that IP networks bring an unpredictability and inconsistency of performance. In real terms this means elements such as latency, jitter and packet loss now impact on data transmission in ways that were not experienced in the SDI world. Video is particularly sensitive to such conditions and risks Quality of Service (QoS) unless appropriate steps are taken.

Influence of SMPTE

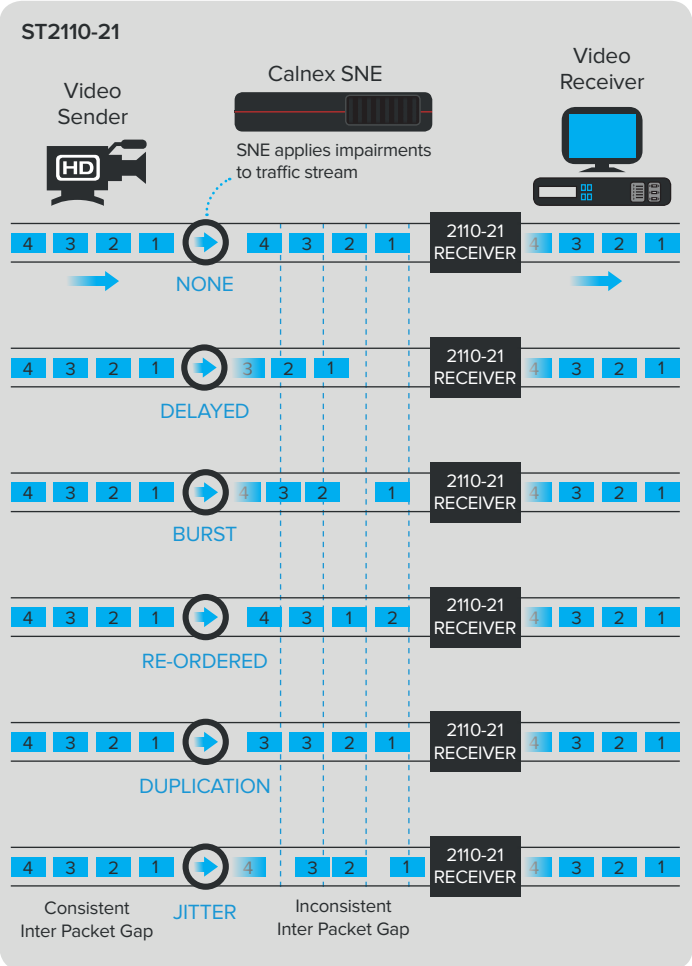
The Society of Motion Picture and Television Engineers (SMPTE) plays an active role in this regard. They continue to define new standards to allow for the increased adoption of IP-based networks for broadcast. The standards set out a framework of best practices that allow for successful deployments of new networks. The SMPTE are also more vocal in demanding conformance to the standards.

The need for thorough testing

A comprehensive test program is the most effective way to offset the risk of failure or reduced QoS in a broadcast network. WAN emulation, for example, should be an intrinsic part of any test program. WAN emulation is the process of segmenting a LAN connection in a lab and introducing real-world impairments such as latency and packet loss to represent conditions typically found in a WAN. With regards to the standards, WAN emulation helps to demonstrate conformance in a number of areas. For example:

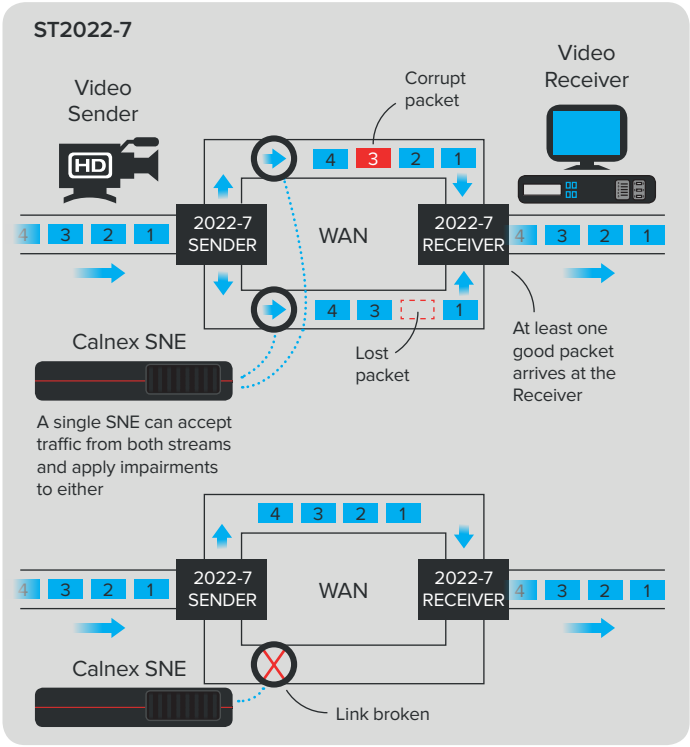
SMPTE 2110-21 – this defines the **ideal traffic model for broadcast** over IP, as well as performance of transmitters such as packet pacing, gaps and bursts. Testing for 2110-21 should assess resilience to:

- Delay
- Bursty conditions
- Re-ordered packets
- Packet duplication
- Jitter and packet delay variation (PDV)



SMPTE 2022-7 – focuses on **seamless protection switching** and path redundancy, and what happens if packets are lost, corrupted or an entire link goes down. Testing for 2022-7 should assess resilience to:

- Packet loss
- Packet corruption
- Link down



Calnex's SNE Network Emulator is a multi-port, multi-user test solution. It emulates WAN links, and simulates complex data center and telecom infrastructure. This makes it ideal for quick detection and resolution of issues in existing networks, and potential issues in new networks to be fixed prior to the network, service or equipment going live.

Broadcast SNE Bundle part no. NWEMULATOR-BCAST

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