REAL-TIME IP SERVICES

VoIP / STREAMING VIDEO / IPTV / VoD / MULTICASTING

ANUE SYSTEMS

MAUI

ETHERNET

Delay & Impairment Emulator

- Simulate real-world network conditions in a laboratory environment
- Full-duplex support for:
  - ✓ 10/100 Megabit & Gigabit Ethernet
  - ✓ 10 Gigabit Ethernet
- Precise, accurate, and repeatable
- Emulate:
  - ✓ Network delay/latency
  - ✓ Packet loss
  - ✓ Packet jitter
  - ✓ Packet reorder
  - ✓ Bit errors
  - ✓ Traffic congestion
  - ✓ Limited bandwidth
  - ✓ And many other impairments
- Dynamically modify impairment profiles on-the-fly without halting system operation or losing data
- Simultaneous emulation of multiple impairments
- Specify different impairment profiles for up to 32 independent traffic flows
- Precision in-line test instrument for Layer 1 and Layer 3+ impairment emulation
- Supports any size Ethernet frame and always operates at full line rate regardless of frame size

All networks have impairments and delays. Network emulators from ANUE SYSTEMS provide emulation of these network conditions. ANUE's MAUI is ideally suited for the comprehensive testing of real-time IP services in the laboratory for:

- Product development
- Pre-deployment system testing
- Proof of concept
- Characterization of Quality of Service (QoS) and Quality of Experience (QoE)

Network Delay/Latency

Delay or latency in a network can cause serious application problems. This is especially true for real-time applications such as voice and video services over IP. Voice calls with beyond-acceptable latency levels will experience intolerable pauses and delays between responses of the two calling parties. Video applications will experience freezed frames and corrupted images.

To measure acceptable levels of latency, use ANUE's MAUI to inject delays up to 250 msec with increments as low as 16 nsec.

Increase delay in the system to see where applications start to perform at unacceptable levels of service, and to see where applications start to fail altogether.

Packet Loss

Packet loss in a network due to noise, software bugs, hardware failures, and even congestion is harmful for real-time applications. Even in low levels, packet loss can result in unacceptable degradation of voice and video service. Higher levels can garble voice traffic and cause graininess and dropouts in a video signal. Eventually, phone calls gets dropped and video reception abruptly ends.

Use the MAUI to specify packet loss up to 100% in 0.01% increments.

Packet Jitter

Use the MAUI to emulate packet jitter in network traffic. In addition to specifying the percentage of packets

that will experience jitter, set the maximum and minimum delay values and create different distributions of jitter with precise control.

Bit Errors

Excessive errors on the network will cause the TCP window size to shrink, adversely affecting application throughput. The MAUI has sophisticated bit error injection capabilities for emulating such behavior. Inject bit errors in the 10-bit domain at rates from 10^{-12} to 10^{-2}. For each error event, specify the range of bits that are to be corrupted. You can specify the number of times the bit error event to occur before bit error injection ends, or have the bit error injection continue indefinitely at the specified rate.

After bit error injection, you can opt to have the CRC corrected automatically.

Traffic Congestion

The MAUI can emulate network traffic congestion with its Throttle feature. In this way, you can determine how much bandwidth your application needs. Specify the output bandwidth available from 0% to 100% in 0.005% increments. Additionally, specify the buffer threshold where data starts to drop due to traffic congestion.

Other Impairments

In addition to the above impairments, use the feature-rich ANUE MAUI Network Emulator to:

- Emulate Loss of Signal
- Corrupt CRC
- Reorder packets
- Duplicate packets
- Rotate Ethernet code word alignment

Selective Impairments

You can select specific packets for impairment or modification based on IP stream or any piece of data in the Ethernet frame.

Statistics

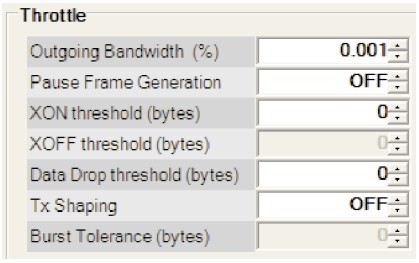
The MAUI provides:

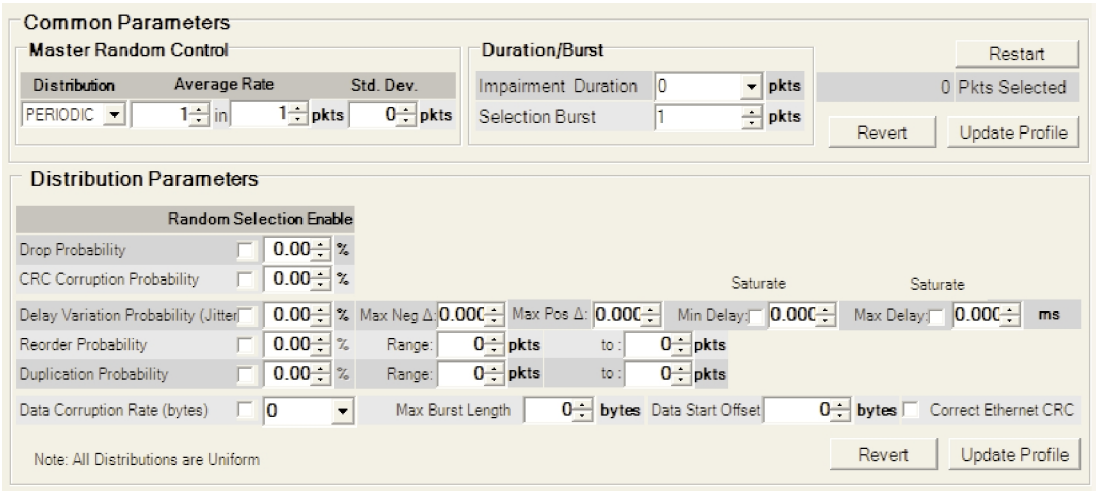
- Real-time statistics on the input such as running disparity errors, IPG errors, idle errors, FCS errors, bandwidth statistics, and more.
- Impairment statistics introduced at the output port such as dropped, corrupted, duplicated, and reordered packets, output bandwidth, and more.

Specifications, availability, and features subject to change without notice.

You cannot afford to deploy a real-time service without first testing in the lab with impairments and latency. ANUE SYSTEMS products help you define minimum SLAs and characterize performance over a range of impairments. with Anue Emulators, you will know what to expect. Our products reflect our experience, and our philosophy dictates that every instrument we make be clearly the best in its class.

For more info, please contact ANUE SYSTEMS at +1 (512) 527-0453. We will be happy to help you with your application testing requirements.





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