



Overview

Networks such as the Internet and some Intranets can be noisy and lossy environments. Streaming or time-sensitive traffic that must operate over unreliable networks suffering from packet loss often struggles with unsatisfactory throughput and latency using TCP and other protocols. These lossy networks can have a significant impact on traffic flows and data re-transmission. Systems exhibiting even minor packet loss in a TCP/IP environment can create significant back pressure and retransmission traffic. In a TCP/IP network, packet loss as low as 0.01% can drop the throughput of a link to less than 60% capacity compared to a lossless environment.

Solution: Durostream – FEC and WAN Optimization

Durostream provides a resilient, full-duplex, point-to-point survivable tunnel that dynamically adapts to network conditions to maximize throughput as well as minimize packet loss and latency. Forward Error Correction (FEC) technology along with header compression is employed to ensure that protocol overhead and latency due to retransmissions are minimized while retaining the ability to overcome sustained packet loss rates of 75%, with spikes up to 90%. Adding Durostream appliances to the data source and destination provides significant cost savings by allowing mission-critical links to use existing lossy network infrastructure.

Typical Users

- Government / DOD
- Broadcasters
- Enterprise

Common Applications

- Mission Critical WAN Links
- Streaming Video
- Live Event Broadcast
- VoIP over WAN
- Disaster Recovery
- Remote Backups

Key Features

- Reduces operational expense by using lower cost public and private network infrastructure
- Maximize data transfer rates of actual user data
- Minimize latency and packet retransmissions due to packet loss or errors
- Adaptive packet loss correction provides the proper amount of protection to maximize link throughput
- Seamlessly correct and reconstruct up to 75% packet loss
- Increase Quality of Experience (QoE) in video and voice applications
- Full-Duplex operation
- Header Compression for WAN optimization
- Seamless Integration

Durostream Maintains Video Quality at High Loss Rates

0.1% Packet Loss

1% Packet Loss

10% Packet Loss

Unprotected TCP/IP

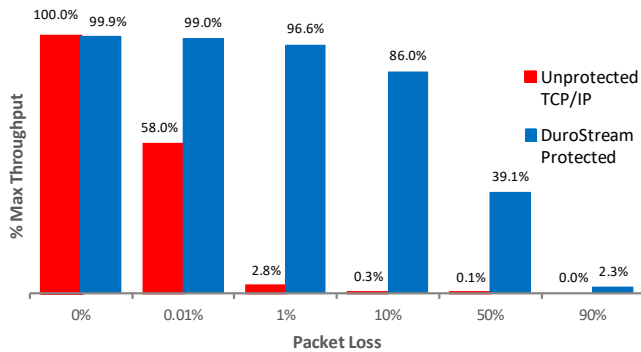


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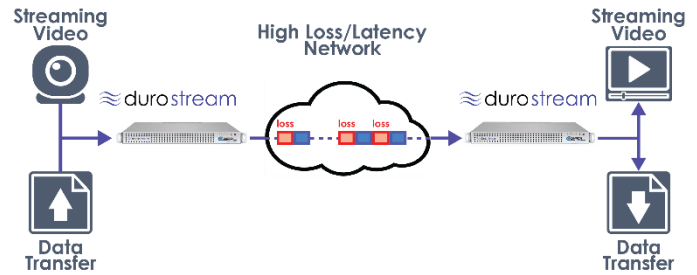
Effective Throughput

1 Gbps WAN Link, 10ms WAN Latency



Durostream increases throughput dramatically on networks with high loss using packet protection.

Typical Application



Durostream supports multiple types of data streams in simplex or full duplex modes.

Resiliency on Lossy Networks

Protocols such as TCP provide reliable data delivery when deployed on low-latency and lossless networks; however, even at low packet loss rates (<1%), TCP can choke network throughput and greatly impact network congestion. Excessively large WAN latencies and packet drops, seen in multi-hop networks or over wireless environments such as microwave and satellite links, exacerbate the problem.

Comtech EF Data's AHA Products Group has leveraged extensive experience in optimizing communication links with Forward Error Correction and Data Compression into a new solution for networks experiencing these issues. AHA's technology maximizes throughput over suboptimal networks, allowing existing connections to be used as an alternative to expensive dedicated links. Durostream keeps TCP connections active when the infrastructure cannot to ensure mission-critical connectivity remains intact.

Modes of Operation

Durostream has two (2) primary modes of operation, Reactive Mode and Proactive Mode. In Reactive Mode, Durostream monitors the link and will add FEC when it detects packets are in error or missing. The amount of FEC is automatically adjusted and determined by the amount of loss that Durostream detects. If the link shows an improvement in packet loss or packet error rate the FEC will be reduced or removed. This mode of operation is ideal for minimizing overhead on the link while dynamically adjusting when packet loss is detected.

In Proactive Mode, Durostream is programmed to automatically add a minimum level of FEC to compensate for a user definable amount of packet loss or packet error rate. This minimum amount of FEC is always available to the link and it is proactively correcting errors without requiring user data errors or loss to indicate more FEC protection is needed. If the link should suffer from more packet loss than the user programmed loss rate, Durostream will continue to increase FEC protection in the same manner it does in the Reactive Mode.

Specifications

Maximum Throughput	Line Rate up to full GbE interface Data Rate is loss dependent, see figure above	Reported Metrics	Latency Current Data Rate Packet Loss
Loss Protection	Resilient up to 75% packet loss with spikes of 90% up to line rate of the GbE Interface	Dimensions	Standard 1U 19" rack mount 17.2" x 1.7" x 16.9"
Protocols	IP Protocols (TCP, UDP, RTP, etc.)	Operating Temperature Range	50° to 95°F (10° to 35°C)
Network	Layer 3	Storage Temperature Range	-40° to 158°F (-40° to 70°C)
Connection	Point-to-point tunnel	Operating Humidity (Non-condensing)	8 to 90%
Interface	3 x RJ-45 10/100/1000Base-T Ethernet - LAN, WAN, & management port	Storage Humidity (Non-condensing)	5 to 95%
Compression	Header		
Power Consumption	100-240 VAC, 6.0-3.0A, 50/60 Hz power input (auto sensing). Dual (redundant) power supplies.		



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