WHITE PAPER

Haivision Path Redundancy

Hitless Failover for Resilient Streaming Over Unpredictable Networks

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INTRODUCING PATH REDUNDANCY

What is Path Redundancy?

Path Redundancy is a type of hitless protection switching technology that relies on more than one IP network path to prevent disruption to live video streams in the event of network congestion or outages by maintaining continuity of service.

Path Redundancy is a new feature from Haivision which is being rolled out across several of its video solutions to provide a mechanism for increasing the reliability and quality of live video streams over IP networks.

For broadcasters, Path Redundancy increases the reliability of their contribution, distribution, and edge to cloud workflows, allowing them to leverage multiple network paths to ensure that live event content is successfully transported even in the event of network interruption. Path Redundancy enables continual routing of live video streams even if one IP network path fails or experiences temporary issues such as packet delivery delays and sudden bandwidth constraints, ensuring high-quality feeds for must-not-fail event coverage.

Similar to SMPTE-2022-7 over managed networks, Path Redundancy adds seamless packet switching to Haivision solutions, and when combined with the already reliable nature of the Secure Reliable Transport (SRT) protocol, makes live video transport over the internet an extremely reliable and cost-effective option compared to using satellite or managed fiber.

THE KEY BENEFITS OF PATH REDUNDANCY

Uninterrupted Live Video Streaming

If one network disconnects or loses packets, then the second one can deliver in time, so you never miss a moment of high-quality live video.

Low Latency and Jitter Prevention

Path redundancy ensures low latency and prevents jitter by automatically selecting the first packet to arrive over either network link.

Enhanced Reliability

Path redundancy adds another layer of low latency video streaming reliability on top of SRT's packet loss recovery for unpredictable networks.

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ESSENTIAL FOR MISSION CRITICAL APPLICATIONS

Path Redundancy adds IP network path resiliency to a variety of video streaming applications. For broadcasters this can include uninterrupted live video contribution over the internet, using two or more ISPs or even mobile networks, from a venue to a live production facility. Path Redundancy can also be used to ensure Service Level Agreements with broadcast affiliates who rely on IP networks instead of dedicated fiber or satellite are met. For cloud-based workflows, redundant network paths can be used for ingress and egress to edge devices, including video encoders, gateways and decoders.

Other applications including ISR and mission critical defense applications, can leverage more than one datalink for streaming. Corporations and government entities can also make use of Path Redundancy for their must-not-fail live events such as keynotes and conferences.

HOW DOES HAIVISION PATH REDUNDANCY WORK?

Path Redundancy can route live SRT streams over two or more network paths in real-time. Each network path can use its own combination of IP address and port number, or IP socket. Ideally each network path should be sent over separate NICs (network interface cards). Haivision SRT Gateway appliances include 2 ethernet NICs, while the Makito X4 video encoder provides a second NIC via an SFP adaptor. Using separate NICs enables an SRT stream to be routed over separate IP networks, typically two different ISPs.

Haivision Path Redundancy provides a high level of live stream reliability required for broadcasting live events such as news and sports.

With Path Redundancy, two identical SRT streams are simultaneously sent over two or more network sockets via separate network interface cards (NIC) for network provider redundancy. The two active paths take different routes but are sent to the same receiver. The receiver (SRT listener) accepts the first packet to arrive, over either network.

The simple broadcast use case below illustrates how path redundancy can be used when sending content remotely from a live event to a broadcast facility. In this example, the Makito X4 video encoder is sending two identical streams (SRT 1 and 2) at the same time from the event to an SRT Gateway at the broadcast facility using two different network providers.
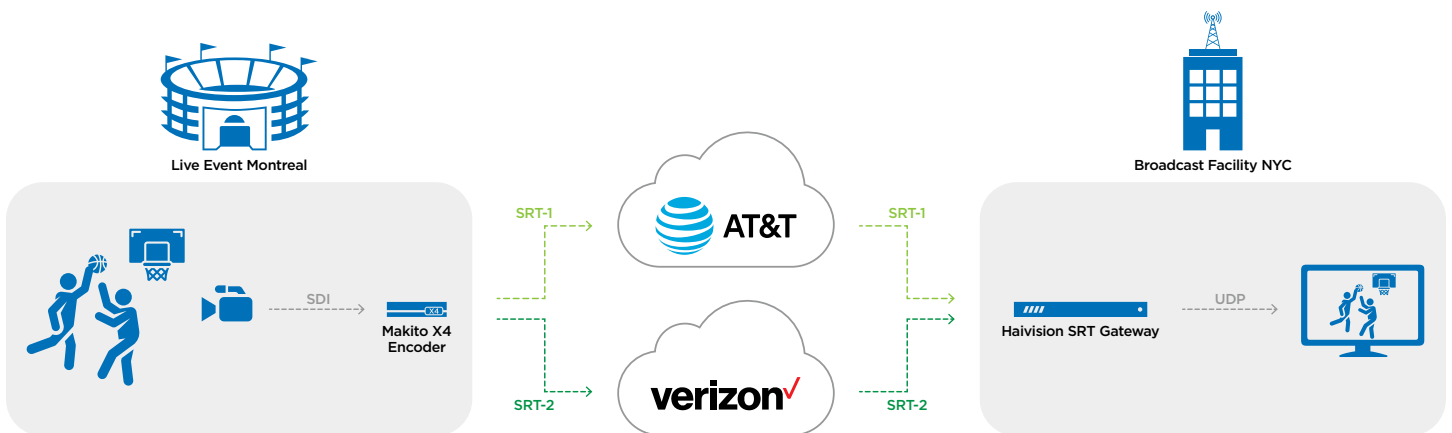
Figure 1 *Example live broadcast contribution workflow with Path Redundancy*

Each stream has its own network characteristics such as packet loss and round-trip time and the receiver, which in this case is the SRT Gateway, receives both streams simultaneously. The receiver decides on a packet-by-packet basis which one to use for output stream, based on the first to arrive, enabling very robust, hitless redundancy. This means if either of the networks fail at any point in time, the stream traffic is hitless, with no glitches.
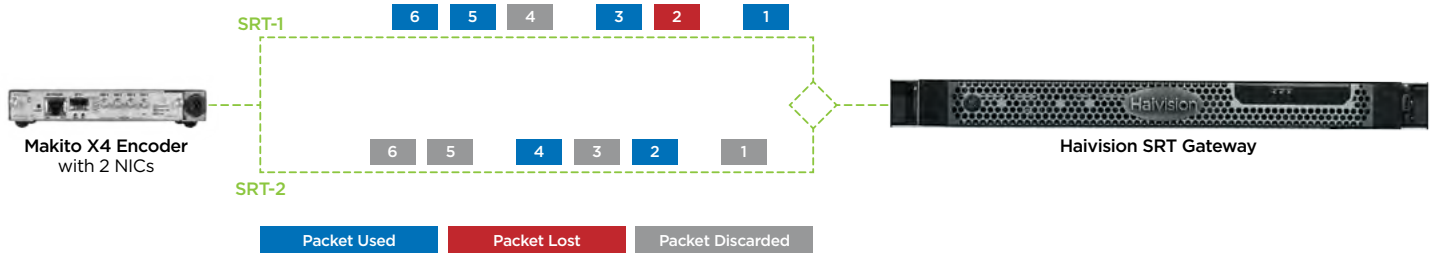

Figure 2 Path Redundancy

HOW TO CONFIGURE PATH REDUNDANCY

In this screenshot of the Haivision SRT Gateway User Interface (UI) route you can see that the destination stream is using redundant paths. You can see the two defined paths with separate IP addresses and ports being used.

Figure 3 SRT Gateway Route

Configuring Path Redundancy is similar to setting up a regular SRT stream; you choose the caller and listener and then select the Path Redundancy mode. You can then define your path by choosing a network interface and specify the destination IP address and a port number before starting your SRT connection.

Figure 4 *Path Redundancy user interface in SRT Gateway*

HAIVISION VIDEO SOLUTIONS THAT INCLUDE PATH REDUNDANCY

Haivision SRT Gateway
With the Path Redundancy feature for SRT Gateway 3.5, broadcasters can reliably route and transport live video streams across cloud, internet and local networks without interruption and at low latency.

Makito X4 Video Encoder
Encoded live video content can be sent with SRT over redundant network links, using the second NIC provided through an SFP adaptor, enabling very reliable broadcast contribution even over unpredictable internet services.

Makito X4 Rugged Video Encoder
Defense and ISR applications can stream mission critical video data with SRT over separate datalinks for reliable low latency delivery.

READY TO GET STARTED?

Contact us to speak with a video streaming expert.

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