Delivering Live

Solving live streaming challenges by improving backhaul delivery to digital distribution platforms

LTN Global Communications

Digital streaming of live television programming and live events

Introduction

The changing viewing habits of consumers has led nearly all media companies offer a digital streaming version of what was once only available as live linear content. Until recently, only stored content was readily available on digital platforms. Storable content is transferred as files to digital workflow sites, and then uploaded on to cached sites at CDN data centers. Consumers are able to access this cached content from the CDN's on demand, via either an Over-The-Top (OTT) platform (e.g., Netflix) or a direct-to-consumer (D2C) portal (e.g., HBO Now). The CDN architecture allows the cached content to be stored closer to the consumers to improve the consumer quality of experience primarily by playing the video out smoothly, rather than with frequent buffering.

More recently, OTT platforms like Hulu and D2C sites like ESPN+ have started offering live television programming and live sports and other events to digital consumers. With these live feeds, latency has become an important consideration for consumers. No sports fan wants to receive a text message or Tweet from a friend talking about something that has not yet occurred on the digital stream but has already happened on live television. Caching content is therefore not an option. CDN providers have made several architectural changes on their own networks to provide low latency distribution, including smarter internal routing between their data centers to avoid Internet-based BGP routing, creating special UDP or TCP-based protocols that speed up error recovery, and using new streaming formats like MPEG-DASH with smaller files to speed up delivery. All in an effort to improve latency and reliability for live streaming.

Digital Challenges

While CDNs still face substantial challenges in matching the latency, reliability, and quality of live linear television, these changes are an improvement. The issue, however, that still plagues the industry is how live content is delivered to the CDN's, whether internal or external. The performance and quality of the feed ingested into the CDN has a large impact on the eventual performance and quality experienced by the consumer, even from well-designed CDN's.

Low latency is critical in live event delivery, seconds of delay in a game can result in lost viewers

Reliability is key in delivering your fans the experience they desire without failure

"Most broadcast video distribution solutions neglect the first link of the video chain, content ingestion. Packet drops or outages cause drops in quality or total loss of feed. This crisis leaves operations teams scrambling to get the content back online as customers look for alternative sources for critical live matches or first-broadcast linear content," says Sam Rosen, Vice President at ABI Research, as quoted in an Akamai press release.

Limelight, another CDN provider, includes the following in its "best practices" advice on how to send them content: "Integrate proven high-performance providers in the delivery chain, and minimize reliance on the open Internet."

A high-end bakery can create a beautiful cake for a customer who demands both the highest quality and timely delivery. That bakery can then even hire the highest quality delivery service with the fastest delivery time. However, if the cake is handled by a clumsy assistant who bumps around the kitchen, delaying the delivery time and degrading the quality before the expensive delivery service ever gets the cake, the customer inevitably ends up disappointed.

Similarly, high value content that is delivered to CDN networks via streaming encoders over the raw Internet can undo all the great work done in content production and CDN optimization. Unmanaged Internet connections cannot guarantee both timely delivery and high quality, regardless of loss recovery technologies deployed by the streaming encoder. Internet routing has no notion of latency and aggregation or peering points frequently create long queues during rush hour. Consumers end up disappointed, and brand value and content monetization is negatively impacted.

LTN Solution

LTN's industry-leading fully-managed IP video transport service has been used over the last decade by some of the world's largest content owners, news and sports networks, and broadcasters to deliver high-value content to cable head-ends, stations, direct-to-home satellite sites,

99.999%
reliability & availability

TS latency under
200 msec

100% uptime
on LTN backbone network

and broadcast networks from live playout sites and event locations. LTN's service level agreement guarantees 99.999% reliability and latency of less than 200 msec, and customers rely on LTN to deliver hundreds of full-time channels and thousands of live events every week. Over the last several years, the LTN backbone network has achieved the unique milestone of zero downtime.

The LTN IP video transport network was built specifically to deliver live video with the lowest latency and highest reliability in the industry. LTN's fully managed service monitors every channel or event feed on an end-to-end basis, ensuring its timely delivery and reliable quality all the way to the CDN or digital workflow destination, automatically recovering lost packets and routing around Internet choke points for lossless delivery. The largest OTT providers, D2C platforms, content and sports rights holders, and CDN providers combat ingest problems by leveraging the LTN network.

Use Cases

Case 1 Delivering Live Station Feeds to OTT Platforms

One of the world's largest media companies uses LTN to pick up hundreds of affiliated off-air television station live feeds in very high quality (HD 20 Mbps MPEG-TS feeds). LTN transports these feeds to this customer's in-house central digital processing site via 10-gigabit connections, while meeting stringent reliability and latency requirements. This high-quality input is then processed internally with the appropriate ad insertion and other interstitials and delivered by our customer directly to OTT providers. The net result has been an improvement in the consumer experience, which is giving this customer an advantage over competitors who are streaming directly from the stations to the same OTT providers.

Figure 1

Contribution of Live Station Feeds for Network's OTT Platforms
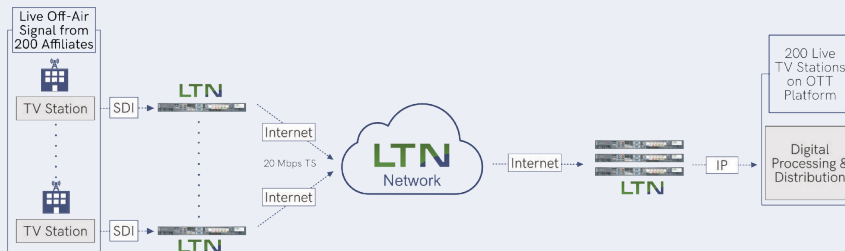
Case 2 Live Streaming of Sports Events

One of the world's largest sports networks uses LTN to transport live sports events from hundreds of venues around the world in very high quality (HD 20 Mbps MPEG-TS feeds). LTN transports these feeds to this customer's redundant data centers via gigabit connections. This customer processes these feeds internally into digital streams and distributes them to consumers via their own D2C portal sites. LTN's managed service guarantees delivery of a low-latency and high-quality ingested feed for high value sports events, improving the consumer experience and building loyalty to the digital brand.

Figure 2

Events Backhaul for Sports Networks Live Streaming
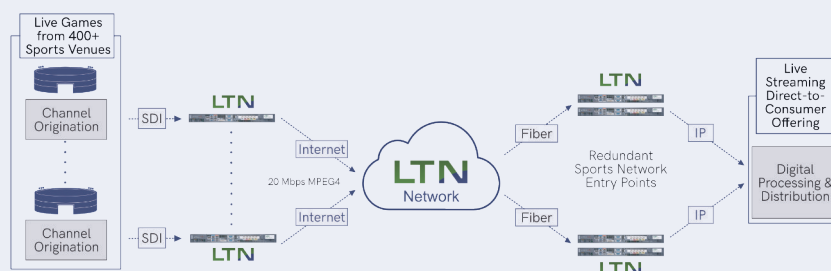
Case 3 Live television programming for TV Everywhere platform

One of the largest US cable companies uses LTN to ingest full-time channels from cable channel providers in very high quality (HD 20-50 Mbps MPEG-TS feeds). LTN transports these feeds to this customer's meet-me-room at a data center. This customer processes these feeds into digital streams and distributes them via their own TV Everywhere product to the consumer. Over the course of delivering several petabytes of content over the last two years, this customer has experienced better than 8 9's reliability and consistently low latency of <200 msec.

Figure 3

Channel Acquisition for Live MVPD TV Everywhere Streaming
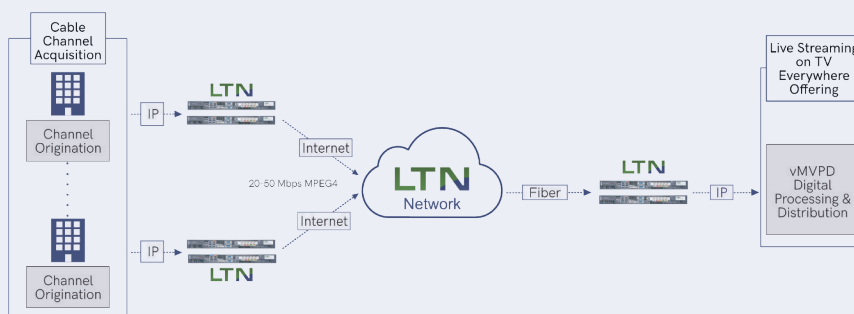
Case 4 Cloud Playout, Cloud Streaming, and Over-the-Air Distribution

   One of the largest station groups in the country fully produces their own programming channel in the Cloud. They use LTN to transmit the channel from the Cloud as an MPEG-TS stream at 15 Mbps. This channel gets delivered to dozens of stations ready to go to air. In addition, LTN also delivers the same signal to the customer's own digital workflow process, which lives in a different Cloud! This combination of Cloud playout, Cloud live streaming over CDN, and television stations over-the-air broadcast is a leading-edge example of the future, and would not have been possible without LTN's network.

Figure 4

Backhaul from Live Cloud Playout To Linear Distribution & Cloud Streaming
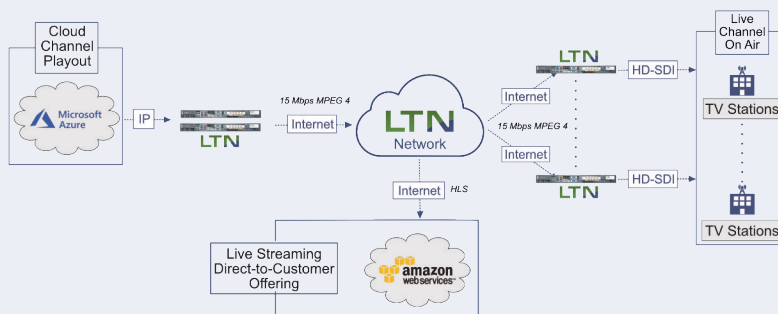
Case 5 Live Esports Delivery

   In the booming world of esports, the creator of some of the world's most popular gaming products holds multiple tournaments around the globe that are some of the most attended esports events. This customer uses LTN mobile flypacks to pick up events at various global locations. LTN encodes them as HD 1080p60 high-quality TS feeds at the event sites, and transports them to transcoding sites inside the LTN network, where they are transformed into HLS feeds. LTN then transmits these feeds to any number of gaming and social media platforms, including Twitch, Sony PS+, Facebook, Twitter, and many others. Esports customers are now asking LTN to add linear delivery of the same game feeds to traditional sports broadcasts over television, leveraging LTN's extensive network to further monetize this exciting content.

Figure 5

Mobile Flypack Delivery to Esports Platforms and Broadcast Networks
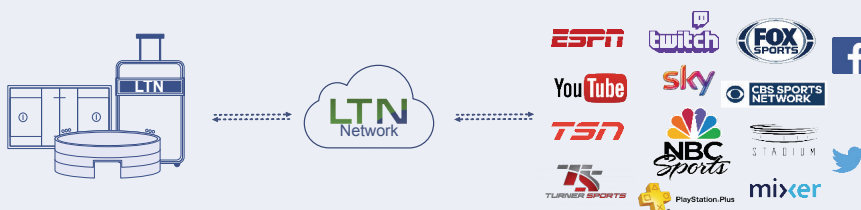
Summary

As these examples illustrate, LTN provides a high reliability and high-performance solution to the vexing problem of poor quality ingested feeds into the digital processing and distribution workflow. Regardless of how optimized or well-architected the digital distribution process, if the ingested feed is of poor quality, consumer experience will be negatively impacted. LTN is the perfect way to ensure that the ingested feed is always the highest quality possible. LTN's fully managed IP video transport service is the only IP transport solution that matches or exceeds the performance and reliability of satellite or fiber connectivity, and it's fully managed with a 24-hour network operations center that tracks, monitors, diagnoses, and fixes in real-time any issues that may affect a customer's individual feed.

2,000

Reach over 2,000 connected sites on the LTN network including

- Broadcasters
- Networks
- MVPDs
- Stations
- Studios
- Sports Venues

LTN's highly connected network and its reliability and performance are solving an important quality-of-consumer-experience problem for our customers' digital streaming products. With over a thousand sports venues, stations, and studios, sites from which LTN can easily and quickly pick up live programming and events, high-speed and secure connectivity to nearly all major networks and broadcasters, direct 10 gig connections to some of the world's largest digital workflow companies and direct connection to hubs, satellite downlink locations, and content switching sites, you can send or receive live content from anywhere to anywhere.

LTN Advantage

LTN was founded in 2008 by three co-founders, who have been working in the IP and Internet world collectively for nearly a century. Malik Khan headed the division at Motorola that created the first commercially deployed cable modems and CMTS systems, which started the advent of residential broadband Internet access. Yousef Javadi was head of Sprint International and ran all of Sprint's Global entities outside the US, including IP networking, hosting, and other infrastructure. Professor Yair Amir was, until recently, the Chairman of the Computer Science Department at the Johns Hopkins University, and is recognized as one of the leading researchers in Large IP Systems Architecture. This founding team assembled a uniquely qualified research, development, operations, and customer solutions team to focus on creating the industry's first terrestrial IP network for live video and audio transport at a global scale.
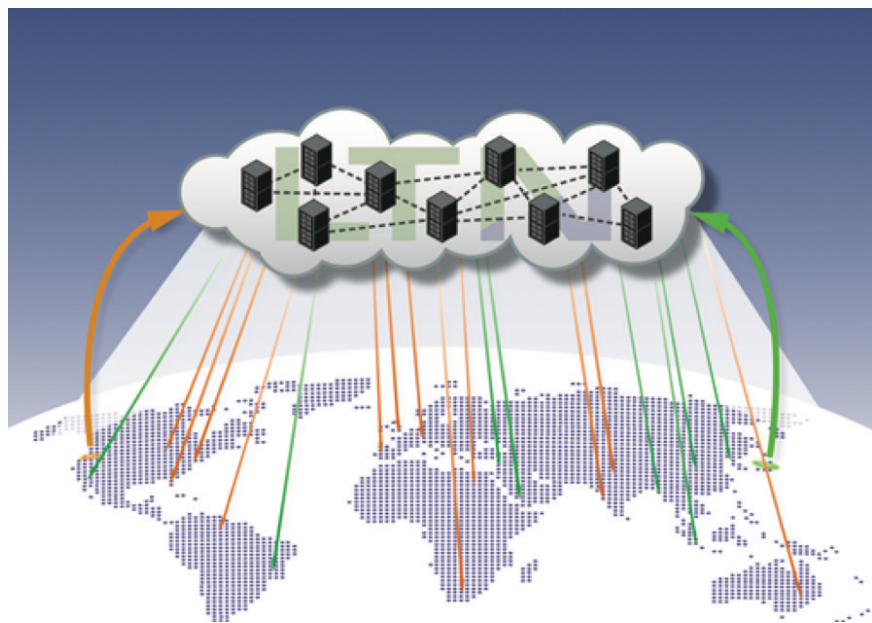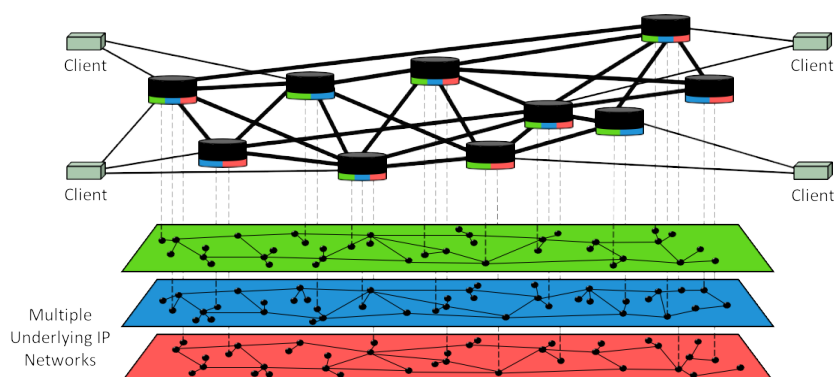

LTN was founded on a vision that the future of video content distribution would be over the Internet, and that technology would need to create an overlay network on top of the Internet through which high-quality content could be distributed anywhere in the world to any device a consumer wished to use, quickly, easily, consistently, reliably, and with high quality. LTN has created an innovative technology in this area and has patents granted in network architecture, algorithms for lossless traffic routing around Internet issues, and protocols to recover lost or out-of-order packets. LTN's innovation has created a network that achieves both extremely high reliability and very low delay to transport live and real-time audio and video traffic anywhere in the world. Importantly, LTN's

network treats each customer's program or event as an individual flow that is tracked, monitored, and managed end-to-end, allowing us to control the routing of that flow in real time. The planes in the diagram below illustrate how our backbone network is connected together in a full mesh architecture by multiple planes of carrier networks, and its ability to route between those planes without incurring any loss.

Multicast Distribution Network

LTN offers a managed service with service level agreements for reliability, availability, and delay. A 24-hour network operations center provides both a help desk for customers and full-time monitoring and management of customers' channels and events. The LTN network offers our operators a unique opportunity and test tools to examine every step of a specific flow end-to-end to isolate, diagnose, and fix any issues that are not automatically handled by the network. Our customers rely on LTN's managed service to find problems before they or their clients even realize these issues.

Fully Monitored and Managed Flows

Over the past decade, we have worked with some of the largest media companies in the world in news, sports, and entertainment program acquisition and distribution. Customers like Disney, ABC, ESPN, CBS, NBC, CNBC, MSNBC, Fox, Sinclair, Turner, CNN, AMC, and many others have taught us what features and functions are needed by them to transition to the future of live television programming and live event business models and distribution strategies. Since LTN's core strength is our research and operations capabilities, and since we own the technology with which we create our network and our fully managed service, we have been able to provide a bridge to the future to our customers.

We would welcome the opportunity to work with you and add you to our growing list of connected companies and sites. The network effect created by these connections creates great value for our customers, as illustrated in the examples above.

Contact Us

Technological innovation is driving growth and creating new opportunities for the broadcast and media industry. New competitors and technologies compete to capture viewers, leveraging new technologies in unique and creative ways.

If you are ready to begin exploring the opportunities to reach a greater global audience, connect to media partners around the world and enable new, more efficient and effective workflows, LTN is your guide. Connect with us at sales@ltnglobal.com, or call us at +1.301.363.1001.

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