

The Edge: Delivering the Quality of Experience of Digital Content

by Conviva for EdgeConneX

CONVIVA[®]

Today's TV consumer uses the Internet more and more to access their entertainment. Not only does Conviva data find 28% of households use multiple devices during prime time, but audiences have migrated from linear television to VOD services.

As consumers make this transition, the stress placed upon the Internet is growing exponentially. Never truly designed for the transport of video, the underlying infrastructure requires a new kind of thinking before it is strained beyond its limits.

Edge co-location services bring content closer to the consumer, introducing solutions that circumvent the distance, capacity constraints, multiple network hops, and centralized processing load that exist in the traditional Internet architecture. EdgeConneX and Conviva have been measuring the impact of these co-location solutions on the quality of experience delivered to viewers.

Conviva found a 12-20% improvement in the time video spent rebuffering when a content provider was "localized" in an EdgeConneX facility and directly linked to the ISP. This in turn results in significant increases in viewer engagement and customer satisfaction.

In this white paper we identify the challenges of using existing Internet infrastructure to deliver video content at scale; report the impact of adding a local co-location element to an ISP service; and make recommendations for content publishers seeking to attract and retain viewers by provisioning a superior viewer experience.



The Internet Wasn't Built For This

The Internet was initially conceived as an offshoot of ARPANET, a closed network intended to connect academics and the military. At its heart was the idea of creating a mammoth, connected network through which data could be shared – at the time, data that was largely assumed to be textual. And the asynchronous nature of Internet delivery was deemed sufficient for textual content. Packets containing the content of the page could load at an inconsistent speed because there was generally no impact on the outcome if the last paragraph loaded more quickly or slowly than the first.

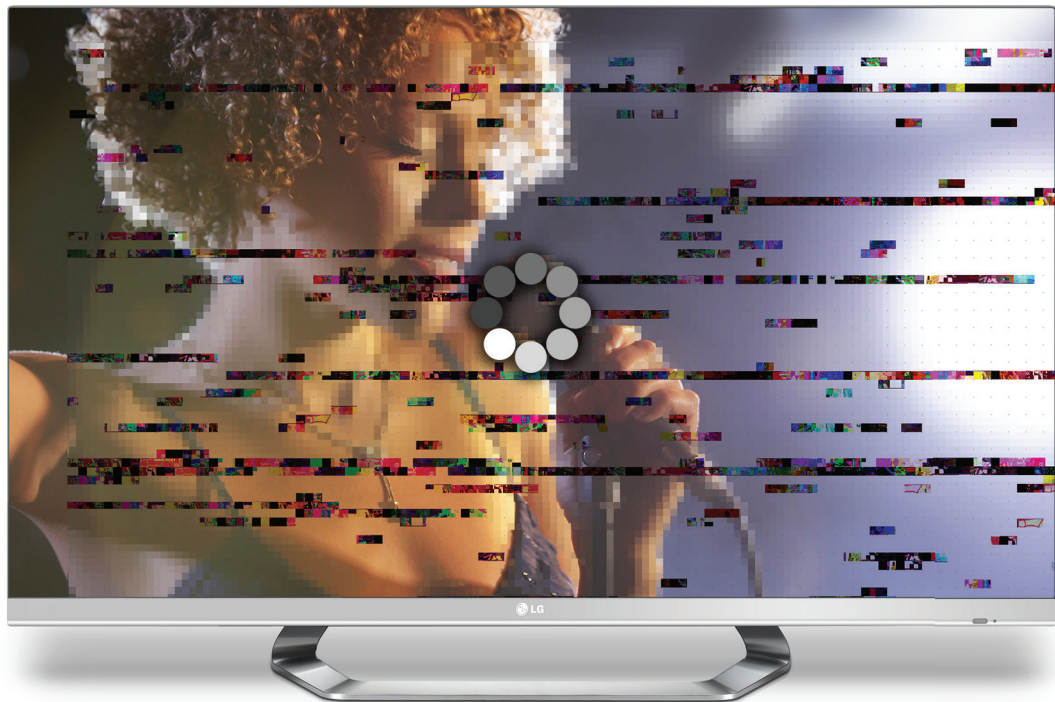
When Tim Berners-Lee invented the World Wide Web in 1989, the Internet opened up to the public, and swiftly expanded from text to all manner of multimedia. While the speed at which a picture loaded was largely immaterial to user satisfaction, consistency became vital once the Internet needed to support the delivery of video content. A video stream that stops every few seconds to load more data is inherently unsatisfying.

One could argue that video was largely a parlor trick online until 2005, when three ex-PayPal employees founded a company called YouTube. Although primarily used to share user-generated content (UGC), YouTube educated a video-hungry public to expect to be able to view video content through their computer. Not long after, premium video stepped into the frame. Netflix streaming was born in 2007, live sporting events became available through MLB At Bat in 2009, and the rest is history.

Consumers fell in love with video delivered over the Internet not least because they could watch what they wanted, when they wanted, and on whatever device they preferred. Meanwhile, the Internet – designed to asynchronously share small packets of information – strained to deliver mammoth video files to more capable devices at increasingly higher resolutions (i.e., image fidelity).



Consumers, delighted with the idea of streaming through phones and Roku boxes, were often left disappointed. Video streams would come in at low quality, with frequent interruptions, and not be the TV-replacement they expected.



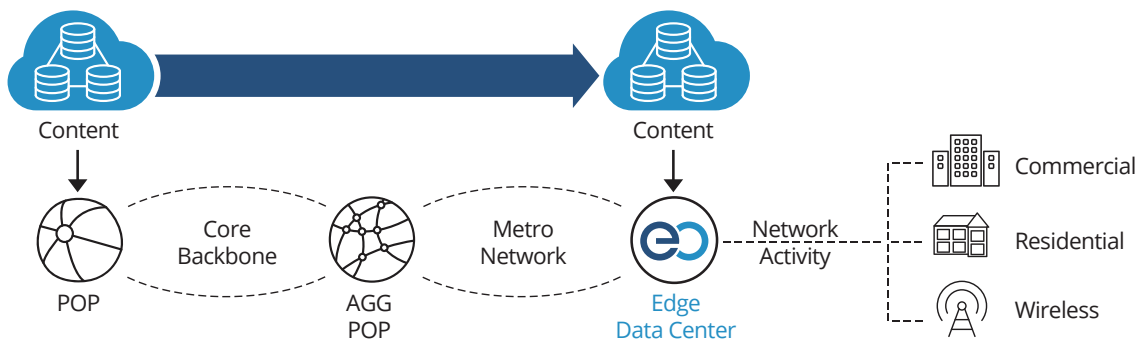
Answering this challenge was an existential need for the nascent Over The Top (OTT) market. Two core solutions have evolved:

- **Using a Content Delivery Network (CDN)** – A third-party service provider sets up its own distributed network, with which the video provider shares its content. When a viewer requests a file, rather than having it travel from a central location to the viewer, the stream is served from a nearby CDN, reducing the transit time and permitting the CDN to perform load-balancing procedures that eliminate some of the impact of congestion.
- **Building a bespoke CDN** – Netflix in particular has essentially built out its own 'sub-network', in which it places its own equipment within ISP networks. This allows the company to fully manage its delivery process, while providing the ability to distribute content for efficient delivery, albeit at a high cost.

CDNs are the most popular solution, and there are a number of large companies offering these services. Each, of course, is liable to its own set of challenges (i.e. when a node or set of nodes becomes busy, it suffers the same delivery problems the underlying Internet does), and many TV providers now balance their delivery across two or more CDNs. By contrast, most content providers have not opted to build out their own CDN across the Internet, for a combination of financial and competitive reasons.

A New Solution

EdgeConneX was born to solve a critical, logistical problem of the Internet: how to delivery large quantities of data for a real-time experience.



With EdgeConneX, Content moved to the Edge

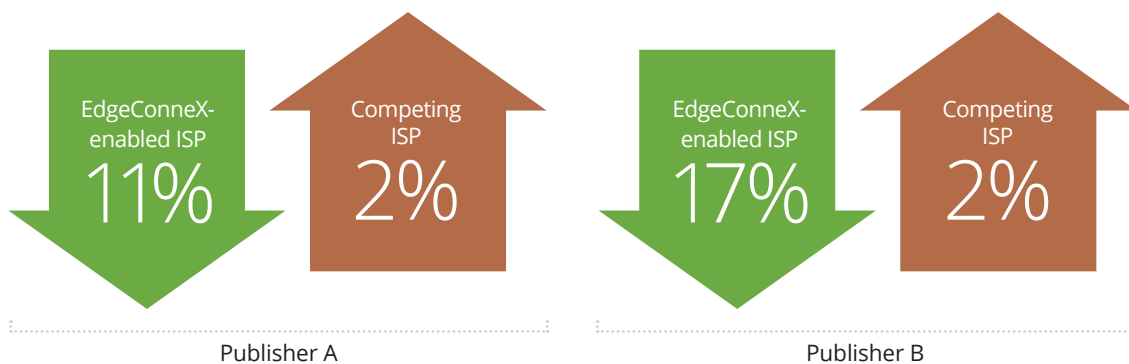
The EdgeConneX solution enables the “localization” of content in close proximity with the networks serving viewers in neutral co-location facilities. These locations are currently underserved by existing infrastructure. In effect, the problem of latency is solved by caching content at the local ISP, which reduces the amount of long-haul traffic. This in turn improves the efficiency of the Internet by avoiding having to use long-haul highways, as well as improving the user experience by bringing the content closer to home, and connecting directly with networks serving the end user.

In order to illustrate the benefits of this solution to TV providers, EdgeConneX engaged Conviva to track, monitor, analyze and summarize the outcome of a real-world implementation.

Study Basis, Methodology and Results

EdgeConneX deployed its co-location services for a major ISP in the San Diego Metro Area. Next, EdgeConneX contracted Conviva to monitor the Quality of Experience (QoE) for end users, both before and after the ISP and several Content Providers switched traffic to leverage the EdgeConneX facility. Conviva was selected due to its Global Intelligence Network, capturing millions of data streams across multiple CDNs, ISPs, regions and devices. Specifically, Conviva can analyze QoE metrics in the data streams – including those served by EdgeConneX-enabled ISPs and those which are not – to assess the performance of the respective traffic.

In order to provide a rational head-to-head comparison, Conviva identified two major publishers for whom extensive data was available (in excess of 120,000 plays across the EdgeConneX-enabled ISP and a competing ISP). Conviva then measured the interruption rate – measured as percentage of play time spent in re-buffering – for the two publishers across the two networks, before and after traffic was switched.



Conviva found that while traffic on the competing ISP experienced neutral to slightly elevated interruption rates, the EdgeConneX-enabled ISP saw markedly lower interruptions, as noted in Figure 1. Specifically, for Publisher A, interruption rates dropped by 11%; and for Publisher B, interruption rates dropped by 17%.

Big Picture Implications

Per Conviva's 2015 Viewer Experience Report (VXR), a 1% increase in interruptions resulted in a 14 minute reduction in engagement per viewing session. The EdgeConneX-enabled ISP shifted the gap between itself and its competitor, resulting in a lead of 0.25%; therefore, it should on aggregate be able to deliver an average of 3 ½ minutes higher engagement per viewing session.

Data tell us that viewers who perceive sub-par experiences will abandon in less than four minutes. With an interruption rate nearly 30% lower than their competitor, the EdgeConneX-enabled ISP should expect substantially lower abandonment. In addition, as 86% of viewers are a churn risk after even a single low-quality experience, the EdgeConneX-enabled ISP total aggregate churn risk associated with Publisher A would be 0.5% versus their competitor's risk of 0.62% – a 24% advantage; and 0.59% versus 0.71% on Publisher B – a 17% advantage.

In summary, by leveraging co-location services from EdgeConneX, the EdgeConneX-enabled ISP delivered a superior viewing experience to its customers and provided better partnership opportunities with publishers than its competitor.

Takeaways

Because the Internet is a sprawling network, with many ecosystem participants managing their components independently, understanding relative quality requires a view that crosses multiple publishers, ISPs and regions. Understanding the value of co-location solutions is only possible when statistics are used to compare between those that have leveraged the opportunity against those that have not. And different publishers must be studied, as their own underlying systems and processes make their results variable, accounting for the different ranges across the publishers.

The reduction in a key quality metric – interruptions – clearly demonstrates the value of the co-location solution. Through simple extrapolation, re-captured viewing time can be calculated, placing a clear and measurable return on the investment.



"The EdgeConneX value proposition continues to resonate with our customers and end users alike. Conviva's analysis, examining EdgeConneX-enabled streams on its Global Intelligence Network, serves to quantify the improvement from localization. It validates that the improvement in network delivery occurs across a metro area regardless of the publisher, type of content or CDN. Our Edge Data Centers - together with Internet eco-system partners - can effectively improve the delivery of high volume, mission-critical content such as IP-delivered video."

Randy Brouckman
CEO
EdgeConneX

About EdgeConneX®

EdgeConneX® is a global data center provider specializing in hosting content at the edge of the network. They provide Space, Power & Connectivity for content, network, CDNs and service providers, as well as wireless carriers, telecommunications companies, and commercial property owners. EdgeConneX has created a new Edge for traditional networks offering superior performance and economics. Their purpose-built Meet You Points® optimize delivery of data at network-critical locations closest to the end user. For more information, please visit the EdgeConneX Internet of Everywhere at edgeconnex.com.

About Conviva®

Conviva partners with top-tier media companies and premium OTT video broadcasters and operators like HBO, ESPN, and Sony to deliver optimized viewing experiences that maximize customer engagement. The Conviva Intelligent Control Platform helps providers meet and exceed ever-changing audience expectations for video experience, across a multi-screen viewing environment. Using a unique real-time map of the Internet video delivery ecosystem, the platform provides 360-degree visibility across all users, maximizes picture fidelity, and eliminates playback delays and interruptions. Multi-dimensional reports and analyses of the top-tier OTT market, based on Conviva's tracking of 50 billion streams annually, enable data-driven decisions, supporting successful development of market-leading services. Conviva is based in Silicon Valley, with offices in New York and London. Please visit www.conviva.com and follow us on Twitter @Conviva.