In a rapidly changing industry with a proliferation of bandwidth-intensive applications, service providers are looking at evolving their networks to address an exploding increase in bandwidth and number of devices.

To gain the flexibility to enable services efficiently and have the ability to adapt to new media-rich applications and over-the-top (OTT) content in a cost-efficient manner, a broadband network gateway (BNG) with an advanced residential edge is a key factor for generating these new revenue opportunities. With the last mile bandwidth explosion, aggregating the access layer will harmonize technologies such as passive optical network (PON), copper, and fiber as well as extend the lifetime of legacy technologies (DSL, CATV).

What it boils down to is always the same: Secure ROI targets and maintain profitability against increasing competition and expected price erosions. The need to automate the entire network and its service delivery process has never been more important.

The Challenge

Multicast is well understood for providing the most efficient means of IPTV distribution. However, it has been relegated primarily to “provisioned” and “private” networks that have very strict quality-of-service (QoS) policies with low latency and packet loss requirements. This can be an expensive proposition for deployment. When traditional IPTV, cable, and satellite providers turn to offering their services to devices, these efficient methods of transport via multicast are not available to them anymore.

Bringing IPTV to connected devices means traversing broadband networks in a constantly changing environment. Whether their own broadband footprint, LTE, Wi-Fi, satellite broadband, or someone else’s broadband footprint, the simple fact is these networks are “best effort,” meaning they are not provisioned and protected for reliable high-quality video delivery. This lack of reliability is a challenge for multicast, as historically multicast needs to be deployed on every router in the path, which often includes consumer purchased home Wi-Fi routers that likely do not support native multicast.

In light of this, the industry turns to a very inefficient model of unicast video delivery instead, using “adaptive bit rate” technologies to deal with the best-effort nature of the network, and an HTTP-based method to ensure reliability. The problem here is that TCP-based protocols give up quality for reliability. Followed to its natural conclusion, when many unicast streams begin to congest a network, the quality must come down for all. It is a classic case of “tragedy of the commons” for digital distribution. The more successful a service becomes in this model, the worse the quality gets.
The Juniper Networks Octoshape Infinite HD-M™ Federated Multicast Solution

Octoshape and Juniper have brought best-in-class technologies together to bring the scale, quality, and economics of traditional, efficient, IPTV deployments to the best-effort broadband networks. The solution solves for all of the historical barriers for deploying multicast in a way that allows service providers to deploy quickly, in a phased approach, without the need for full multicast rollout to the home.

Utilizing this system leverages routing infrastructure that is already deployed in the network efficiently, rather than having to make huge capital investments to roll out your over-the-top (OTT) IPTV service. On top of this, users will get the best quality video service available due to the use of the Octoshape throughput optimized UDP transport mechanism with patented resiliency technologies.

The best part is that the system fits transparently into your existing workflows and application development. It supports standard streaming formats such as MPEG-TS, HTTP Live Streaming (HLS), HTTP Dynamic Streaming (HDS), Real-Time Messaging Protocol (RTMP), as well as digital rights management (DRM) systems like Adobe Flash Access, Microsoft PlayReady, Verimatrix, and NAGRA.

Features and Benefits

- Enables broadcast TV quality, scale, and economics for OTT IPTV over broadband
- Leverages existing infrastructure, extending the life of deployed capital investments
- Relieves congested networks, allowing for more channels to be deployed to connected devices
- Allows for a phased approach to deployment, avoiding traditional “all or nothing” requirements
- Blends unicast and multicast sources with multi bit rate technologies seamlessly
- Extends global reach to achieve high-quality video for both “on” and “off” net services
Solution Brief

TV Quality, TV Scale, TV Economics with Broadband Multicast by Octoshape and Juniper Networks

Solution Components

This joint solution is comprised of the following components:

Octoshape Broadcaster: A small software component that sits on or near the video origin, the Octoshape broadcaster takes video segments that have been packed into an HTTP-based streaming format and possibly encrypted with DRM technology, then converts them into a throughput optimized UDP flow of video data. If the streams are encoded in multiple keyframe synchronized bit rates, the Octoshape broadcaster picks each individual bit rate up and prepares it for distribution.

Octoshape Video Distribution: These UDP flows are then transmitted into a cloud-based distribution infrastructure where a resilient coding scheme is integrated into the video flows in such a way that video can be distributed resiliently across a pool of distribution resources.

Juniper Networks® MX Series 3D Universal Edge Routers: The system transparently mixes in data flows from native and AMT multicast sources directly off of MX Series routers serving as an AMT relay. The consumer is unaware of the technology adapting and optimizing the experience for the video service delivered in HD quality.

Octoshape Client: Octoshape provides a software development kit (SDK) for Windows, OSX, Android, IOS, and Linux with ports for PC, MIPS, and ARM-based processors. The client side technology includes the AMT gateway, which is responsible for pulling the video stream resiliently out of the cloud from multiple sources and providing back some resiliency data. In this way, sources can be dynamically interchanged as network topologies change. This includes a seamless transition to local native and AMT resources available through the MX Series routers. The Octoshape SDK then transforms the data back to its original form. It simply looks to the native media player framework as a local HTTP media server, and facilitates delivering the high-quality video to the media framework back in its original format.

Summary—Bridging Broadcast TV to Broadband TV

Video viewing is shifting to broadband connected devices at a breakneck pace. Service providers are faced with a situation where the current economics of traditional broadband video distribution technologies are already upside down for fixed broadband. The negative economics are exponentially exacerbated for LTE.

When an industry is faced with such an obstacle, only innovation and disruption provide a path to a new ecosystem. Octoshape and Juniper have brought these best-in-class technologies and standards together to provide the very disruption necessary to bridge the transition between broadcast TV and broadband TV.

The best part is that everyone wins. The solution provides video distribution over broadband in a way that makes it not only affordable and scalable for the operator, but also delivers the higher quality of service for the end user.

Together, Juniper and Octoshape are transforming the economics and scale of broadband TV.

![Native and AMT Production Multicast Deployment](image-url)
Next Steps
For further information, a product demonstration, or proof of concept (POC) request, please visit www.octoshape.com/showcase/juniper-openlab-multicast/ or e-mail us at info@octoshape.com.


About Octoshape
Octoshape provides the enabling technology required for content owners to deliver online video over best-effort public networks to the largest audiences and with the highest quality viewing experience. The company is writing the next chapter of content delivery for IPTV.

About Juniper Networks
Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.