Enhancing viewer experience with next-generation digital television multicast
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Executive summary

In response to booming demand for high-quality and interactive content, Indian cable providers have begun to embrace a technology called Layer 2 Multicast (L2M). The reason? Existing cable infrastructure is not suited for delivering high quality video to multiple locations – especially in densely-populated urban areas or remote regions. L2M technology has been developed to address this gap.

L2M distributes broadcast feeds using a ‘tree structure’ delivered over a ring type architecture, which enables very efficient transmission of high definition content to multiple end points from a single source. This helps the cable operator deliver higher grade services over a greater distance and to more people.

The technology also offers the ability to track usage and tailor bandwidth allocation to expand reach and provide interaction capabilities. Players can now differentiate themselves and increase customer loyalty through bespoke bouquets and services.

Introduction

Remember the days of the rooftop antenna? Transmission would fail with monotonous regularity, signalling the departure of someone to the top of the house. The rooftop warrior would spend several minutes adjusting antenna direction and orientation, to shouts of ‘is it clear now?’ and ‘not yet’. Imagine the tension when the whole country was tuning in to an Epic series - literally.

Broadcast technology has come a long way since then: having migrated to cable, currently, over half of the population has a television and 475 million people view TV daily, according to the Broadcast Audience Research Council. The launch of Digital TV in the early 2010s drove viewership further. Today Internet TV (or IPTV) is available in the form of Netflix and Amazon Prime.

However, the TV experience is only as powerful as the telecom infrastructure behind it. India’s legacy cable TV distribution infrastructure may limit the number of viewers, number of channels as well as the extent of interactivity (delivered via the internet) possible. Broadcasters and cable operators have to identify new technologies to keep pace with consumer expectation.

The Indian context

India’s cable industry is unique and complex. A plethora of operators at the regional, state, city and even locality level deliver cable TV and internet services. While state-run Doordarshan has a monopoly on terrestrial telecast, numerous channels deliver content via satellite. This is received by giant satellite dishes at regional hubs and then distributed through a network of cables.

In 2014, the introduction of digital set-top boxes sparked a massive expansion of regional and local channels providing niche content, as they were able to access greater bandwidth. Leading to a significant growth in user numbers as well.
This has left cable operators struggling to transmit content effectively to their customers. Older networks are getting overloaded and proving unequal to the task of handling huge volumes without delay or degradation, leading to customer dissatisfaction and complaints.

There is always the danger of newer entrants with faster networks and more modern infrastructure capturing market share with quality of service-based offerings. But the most disruptive threat that has emerged is actually internet TV or IPTV. IPTV bypasses the cable setup entirely, reaching customers’ TVs via the internet. IPTV and high-definition content on channels such as YouTube have considerably impacted cable TV revenues in overseas markets.

In order to stay relevant, cable operators need an accessible way to up their game and deliver more content, reliably. But this is hard to do. Laying a new cable network is staggeringly expensive. Installing new satellite dish hubs in every locality comes at an even steeper price, with real estate costs, satellite dish costs, the laying of new local ring networks, software, ongoing maintenance and upgrade costs all adding to the tab.

The Netflix threat

Netflix and Amazon Prime Video have launched in India. They pose a major threat as they not only circumvent the cable TV network, but also have an arsenal of international hit shows like Game of Thrones and West Wing.

Both companies have signalled their intent to become dominant players in India by investing in programming tailored to local audiences. The series ‘Brown Nation’ is an example.

Cable providers must act immediately to enhance their own propositions and protect market share.

While new players bring proven business models and wide selection of world class programming, they are hampered by being reliant on public internet infrastructure which does not yet support the required delivery standards for HD programming. Watching a film or an hour of HD video programming uses 2 – 4 GB of data. A multi-screen household uses much more bandwidth resulting in poor viewing quality.

By migrating to top grade modern infrastructure designed specifically to handle high-definition content, cable companies can cement their positions.

https://www.broadbandchoices.co.uk/guides/broadband/guide-to-internet-data-usage
Limitations of existing network infrastructure

Legacy infrastructure is holding back many cable companies from meeting the expectations of today’s on-demand consumer.

The way older networks propagate traffic means that as usage per cable increases, each user’s experience deteriorates. Therefore existing legacy infrastructure is simply incapable of supporting extremely high levels of viewership without loss of broadcast quality. As networks become overloaded, image and sound quality suffer. User experience is compromised, leading to customer erosion and lost revenues.

Cable operators cannot just migrate to the public internet either. This is because most consumer internet infrastructure is created to transport small ‘packets’ of data to allow people to access email, shop online and browse text and image-led websites. It reaches homes through a central exchange point, which ‘splits the signal’ and distributes it to all locations in the area. Just as a road becomes crowded and traffic moves slower as the number of vehicles increases, as more people using the network, the less bandwidth each person gets and the slower connection speeds are.

Clearly, there is a need for a custom-built cable infrastructure designed for high-bandwidth services such as video.

Layer 2 Multicast: next-gen infrastructure for next-gen TV

Globally, a new technology known as Layer 2 Multicast (L2M), is being launched to support high quality, bandwidth-optimised distribution of huge streams of multimedia content to vast numbers of users. L2M is now available in India.

L2M has been built on multicast technology that allows one source, or server, to communicate with a select group of destinations. It lies between the 1:1 communication model enabled by unicast and the 1:all model supported by broadcast.

L2M distributes content by copying the source feed to each destination, while retaining the quality of a one to one connection. The source of the communication generates only a single data stream, keeping the network load constant and performance efficient. The intelligence built into the network replicates the data stream as late as possible in the transmission and delivers it only to those who have asked for it. This keeps traffic from needlessly cluttering the network and overburdening the server.

Multicast differs from broadcast because it is delivered only to those destinations that request it. Bandwidth use and network congestion are reduced, optimising the experience for the network as well as the receiver. It differs from unicast in that only one data stream is generated from the sender regardless...
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of whether the transmission is to one person, a thousand or a million. Trying to serve a cricket match video to a million viewers using a unicast model would result in a server crash!

Using fibre and multicast technology for the transmission, apart from the last mile, makes signal delivery near instantaneous. It is compatible with existing network infrastructure to a great extent and works smoothly with digital set top boxes to receive and decode signals. It allows cable operators to place their own feeds on the network and piggyback on its bandwidth to transmit to other cities or regions: allowing live streaming of local events or the insertion of specific content on default channels.

This combination of quality and efficiency makes it possible for cable companies to offer more local programming to a greater number of people, without racking up huge bandwidth costs.

Plug-and-play for easy rollout

The cost of laying and managing a proprietary fibre optic network may seem a barrier for operators considering L2M. However there is a practical way around this: namely, to lease long-haul capacity from national fibre network providers, whose infrastructure spans the country, interconnecting major metros and thousands of towns and cities. Cable operators just need to receive the transmission at the hub, boost the signal, and place it on the network for transport. The signal is then delivered to the region, where the operator once again takes charge and delivers it locally.

By accessing satellite content at regional hubs and then connecting that hub through a high-speed fibre network to different towns, cities and municipalities, cable operators can simply continue to use existing infrastructure. Last mile delivery too can be structured using existing networks.

This approach is easy to adopt as it requires minimal additional capital expenditure on the operator’s side and no installation or upgrades at the consumer end. Using a high-speed network on a service basis avoids network rollout, management and maintenance expenses. Instead, by substituting these fixed costs with a fee that falls under operating expenses, capacity can be scaled up or down to match demand.

Scale as you need and pay as you go; that’s the route to a happy customer and a happy bottom line.

Benefits of L2MC

The advantages of L2M for cable transmissions are many. Speed, quality of transmission and optimal use of network bandwidth lead to better service, satisfied customers and more loyalty. Some key benefits are outlined below:

Enables high-definition TV: High-definition (HD) TV has been in the ascendant since the watershed HD broadcast of the 2010 New Delhi Commonwealth Games. Customers welcomed the vastly enhanced experience, leading to increased viewing time and
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greater advertising opportunities. Most major content providers have since focused on high definition output. L2M networks use bandwidth efficiently and can easily support the requirements of HD TV broadcast.

**Support more subscribers, as well as sudden spikes in subscribers:** Certain events or programmes capture the nation’s imagination, leading to dramatic spikes in network load, as millions try to tune in. Viewers prefer to pay for on demand services including offer limited-period access to specific content or packages: paying just to watch the Olympics, for example, instead of taking a monthly or yearly subscription to the relevant channel. Leasing L2M technology facilitates unheard levels of scalability to manage ad-hoc spikes in demand, impossible to achieve when using own networks. It also reduces the need to invest in specific end-to-end infrastructure. Once spikes are over, capacity can be reduced to normal levels, offering further cost savings.

**Allows access to more channels:** L2M networks support more channels thanks to the nature of the delivery mechanism. Data is delivered in a single stream for as long as possible and propagated only when close to the viewer. This increases network performance and usage tremendously. The propagation technique gives cable operators the flexibility to support or operate highly customised, hyperlocal channels, right down to selected towns or even neighbourhoods. Local tele-shopping channels, for instance, or telecasts of local festivals.

**Creates interactivity:** L2M technology is fully digital and supports interactive TV viewing. Using the remote, viewers can participate in operator generated polls, shop from local teleshopping channels or choose specific telecasts (like selecting which sport they watch in the Olympics).

**Better customer service:** Being digital, L2M networks incorporate advanced monitoring, reporting and analytics tools that yield deep-dive insights into usage, problems and more. Allowing providers to assess usage, monitor quality of service and troubleshoot much more easily than before. The insights from these tools will spur the development of customised TV packages for different target segments, based on viewing patterns. Thus cable companies can set themselves apart on the basis of quality and customer service and protect their customer-base from new entrants.

**Conclusion**

Consumer appetite for live events is insatiable: at the same time, we are seeing an explosion in very popular, local programming. With intense competition among cable companies, those providers who nail the viewer experience stand to grow significantly. With the technology now available to support more viewers, leasing fibre capacity operating on Layer 2 Multicast technology infrastructure is set to be one of the main drivers for growth in the industry.

Operators who already have a presence and strong customer base within India have a distinct advantage over Internet TV – their brand equity. With their deep knowledge of the consumer they can use new technology to offer engaging content, develop unique, sticky propositions based on usage data, expand the reach of customised programming, move existing customers to new services and expand their overall footprint.

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