

SATELLITE & OTT: A GOOD MATCH

HOW SATELLITE CAN HELP IMPROVE
QoE AND EXPAND YOUR FOOTPRINT FOR
BOTH LIVE AND SVOD

Trends in Video Consumption

Rise in Subscriptions

The rise and growth of streamed video has completely revolutionized how we watch TV and consume content. During 2020, this has been magnified as people on every continent have dealt with the effects of the COVID-19 lockdown, faced with months of isolation. The go-to entertainment solution has been streaming services and this has been reflected in a sharp rise in subscriptions.

All of Hollywood's major studios are scrambling to respond to the COVID-19 pandemic by radically changing release strategy for their blockbuster movies. A very recent example of this new approach is Warner Bros' "The Matrix 4," which will be released to movie theaters and streamed on HBO Max the same day, under the assumption that most theaters in the U.S. will likely operate at reduced capacity throughout 2021.

On top of (smart) TV displays, more and more content is consumed on mobile devices such as smart phones and tablets, whether they are connected via a cellular or Wi-Fi network.

Video Streaming

According to Grand View Research, the global video streaming market size was valued at USD 42.60 billion in 2019 and is projected to grow at a compound annual growth rate (CAGR) of 20.4% from 2020 to 2027. In some parts of the world OTT has overtaken traditional pay TV.

It's a meteoric rise, but with demand burgeoning in every region, how do telcos and service providers ensure they can satisfy demand by reaching new subscribers and deliver a high quality of experience (QoE)? Furthermore, in addition to OTT as an entertainment tool, what other purposes can video streaming be used for?

There is no one-size-fits-all solution for OTT delivery, and it will involve an ecosystem of connectivity mediums to create a smooth experience. One of these delivery methods is satellite, which has been overlooked for far too long in terms of OTT distribution.



Satellite for OTT Video Content Distribution

Satellite has always been associated with Direct-to-Home TV delivery, as well as primary distribution to remote Points-of-Presence (PoPs) such as Digital Terrestrial Towers (DTT). Traditional TV as we have always known it is in decline, and therefore it's now time to look at ways in which satellite technology can cost-effectively and reliably benefit providers of video streaming services.

The advantages satellite offers for video transport are applicable to various satellite markets, beyond Media & Broadcast, including Enterprise, Government and Defense, In-Flight Entertainment (IFE), Maritime and Land Mobile, and of course Cellular Backhaul & IP Trunking.

In a 2020 survey conducted by Access Intelligence on behalf of ST Engineering iDirect, we posed the question to a group of telcos, Mobile Network Operators (MNOs) and service providers: What are the primary ways that MNOs plan to leverage satellite as part of a converged network? Out of the respondents, 34.5% said that they would use satellite to provide OTT video content distribution. The appetite to utilize satellite is very evident as it offers capabilities that no other form of connectivity can.

So, what makes satellite so unique in the case of OTT delivery?

Benefits of OTT Video Distribution over Satellite

UNLIMITED SCALING

Satellite can scale rapidly and cost effectively

While smart devices require streamed content to be delivered in unicast format, transport over the distribution backbone is best performed in multicast format. This allows specific content to be distributed once instead of ramping up required bandwidth linearly with subscribing consumers, a phenomenon internet-based distribution suffers from. Unicast distribution only needs to be supported for transport over “the last mile.” In practice, this conversion may happen in a consumer’s house on a Set-Top Box (STB) as well as on professional infrastructure (cellular tower).

The beauty of satellite is its ability to reach anywhere on the planet. A satellite’s footprint covers a vast geographical area and therefore allows service providers to deliver multicast content to many more subscribers in ever more remote locations. For viewers in areas where there is no terrestrial access, this opens up a new world of entertainment and access to other important content such as governmental broadcasts and educational programming.

This ability to reach anywhere also translates into mobile access for those who have no terrestrial connectivity or where connectivity is patchy and unreliable, such as cars, trains and planes. Satellite’s ability to reach a growing population of receivers in a cost-effective way makes it the perfect choice for OTT on the move.

However, scalability does not relate simply to geography alone. Satellite can address scalability in terms of receivers. A network of receivers can increase rapidly and dramatically, yet satellite will not struggle to reach each receiver due to its ability to multicast.

When an operator decides to increase both its footprint into more isolated regions and with additional receivers, satellite can support this new coverage with ease.

NO MORE BUFFERING

Satellite has the ability to reduce buffering by feeding the Content Delivery Network (CDN) more efficiently and effectively than terrestrial backbones

As growing traffic presents a fundamental challenge to telcos and CDN streamers, bandwidth must be used efficiently, and traffic minimized while offering the best possible QoE to consumers. At peak times especially, terrestrial networks can experience severe congestion, resulting in buffering (“buffer rage”). To retain the viewers’ attention, maintaining a high QoE even under the heaviest conditions (e.g. live mass events, sports) is paramount, helping to reduce churn for the service provider.

Satellite may be used to significantly reduce distribution backbone traffic and ensure efficient use of bandwidth. By distributing content spatially relative to end users, with a finer granularity of remote PoPs, the CDN achieves high performance, thus reducing buffering. This is especially significant for live events such as sports where downtime can’t be tolerated.

Furthermore, as telcos work to expand their reach to more remote areas, satellite enables them to offer high-quality video streaming to isolated communities that would not have previously had access due to its geographical reach.





PROVIDING CRITICAL EDUCATIONAL LINKS WITH OTT

Broadcast distribution with OTT format

With schools around the world being fully or partially closed due to the COVID-19 pandemic, educational content must be distributed to children at home. The impact of the lockdown has had a detrimental impact on children around the world, but for those in emerging regions especially, the lack of access to education has hit them hard. In order to combat this challenge and to provide education for all children, the academic sector has been using video to enhance at-home learning and schools are creating multimedia content to deliver information in the form of presentations. This makes the learning process much more effective and also gives children the incentive to learn as they are being taught by their teacher, and not by a parent. And because many households do not have access to an internet connection but they do have a TV set. Using a specially adapted, yet cost-effective STB, OTT content can be pushed to these households using satellite. The content may be viewed either on a TV or mobile device such as a tablet. Satellite's ability to reach even the most remote places on the planet means that no child needs to forego their education and can even enjoy interactive classes through bi-directional satellite links.

NO GEOGRAPHICAL RESTRAINTS FOR MOBILITY

Satellite can serve vehicles, trains, vessels and aircraft

In addition to distance learning, satellite can also be utilized to push video content to moving vehicles. Terrestrial networks are simply not available in the middle of the ocean or at high altitude, yet passengers and crew expectations of their video experience are the same as if they were at home. Streamed content can be cost-effectively distributed via satellite and can provide entertainment as well as informational services to passengers and crew.

The Satellite Return Path

Can an operation run successfully without CDN Analytics and a Centralized (Cloud) Digital Rights Management (DRM)? Of course. But by utilizing analytics, operators can gain valuable insight into what is going on in each part of the delivery chain, providing valuable feedback for the marketing, operations and support departments. Decentralizing the DRM is possible but leads to greater complexity, and cost, of the Customer Premise Equipment (CPE) and is less secure. Content protection and subscriber management are cornerstones of successful OTT business models, as well as being a priority for content rights owners.

A return path satisfies all these concerns. In addition to supporting live linear and live event propositions, smart prepositioning of content at the edge not only enables low buffering and start-up delay, but also enables on-demand business models such as Subscription Video On-Demand (SVOD), a model which, for example, Netflix deploys.

If terrestrial connectivity is not available to all or part of the installed base, a satellite return channel can significantly improve a service provider's KPI for departments ranging from marketing to operations and support.

The Topology of a Satellite-enhanced OTT Solution

Enabling OTT Video transport on our Dialog® and Evolution® platform is straightforward by adding functionality at the playout as well as at the reception sites.

Playout

A standard OTT playout (either on-premise or cloud-based) needs to be completed with a component enabling unicast-to-multicast conversion. Why? Because a standard OTT Video playout outputs Adapted Bitrate Streaming (ABR) content formatted in unicast, which is what smart consumption devices (e.g. smart phones, tablets, laptops, smart TV display) require. However, unicasting content does not allow scaling: a million devices requiring the same content would generate a million streams. Hence conversion to multicast allows ultra-efficient transport over satellite.

Remote PoP

At the Remote PoPs, whether this is a consumer home or professional infrastructure such as installed at a cellular tower, on cruise ships, Wi-Fi hotspots etc., an application running on a range of standard COTS devices converts all content from multicast to unicast and communicates with smart devices, local storage, etc.

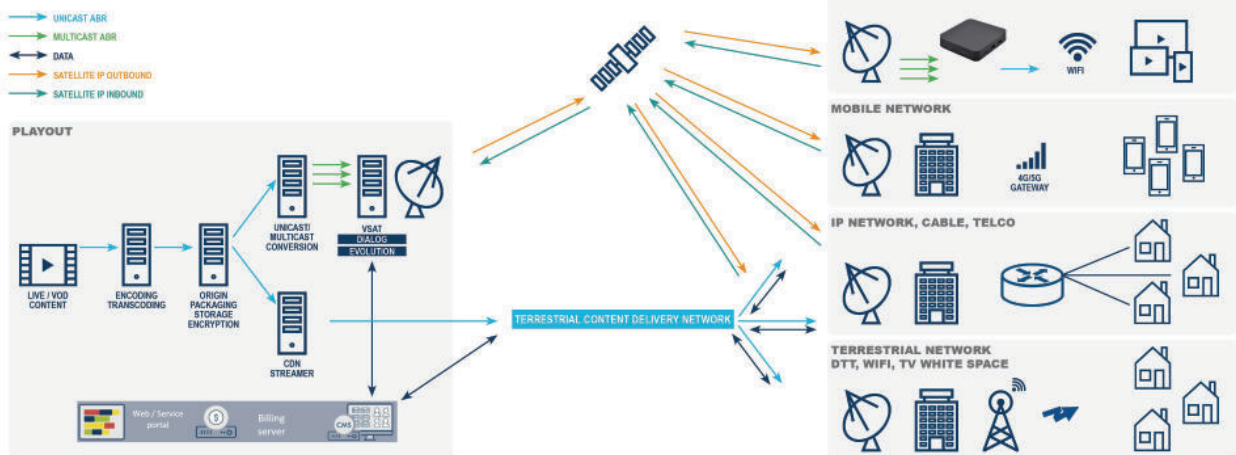
Hybrid Networks

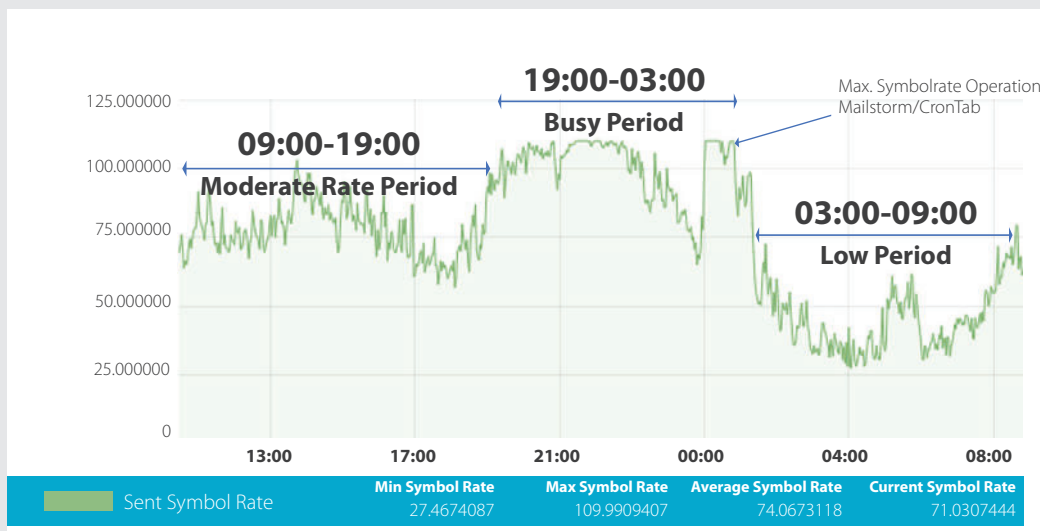
The delivery network can be hybrid satellite/terrestrial, where some remotes are connected:

- Bi-directionally via a terrestrial backbone
- Bi-directionally via satellite
- Uni-directionally via satellite and bi-directionally via a terrestrial backbone
- Uni-directionally via satellite

The latter case enables DTH 2.0 business models where focus is on delivery of OTT Video, both for linear and on-demand content, to cost-effective STBs that can address both traditional as well as smart consumer devices in the home, all without the need to double or increase space segment. This mode of operation allows a breadth of remote PoPs to be connected and business models and applications to be addressed, cross-vertically

OTT DELIVERY TOPOLOGY





Busy Period

Including mailstorm

- Little free space, little dip
- Ca. 19:00 - 03:00

Low Period

- Ca. 60Msps
- 03:00 - 09:00 (6 hr)

Moderate Rate Period

- Ca. 25Msps
- 09:00-19:00 (10hr)

Total Average

- $190-74 = 36\text{Msps}$
(~traditional DTHTXP)
- 583GB

Monetizing “Free Bandwidth” on VSAT Networks for OTT Video Delivery

VSAT networks are built for peak throughput, leaving a lot of unused bandwidth during the less busy hours. This excess bandwidth can be used to transport non-linear content such as movies, series episodes or distance learning content for on-demand OTT video applications, offline course attendance, homework, self-training etc.

The figure above represents a real-life throughput example for a single virtual carrier on a wideband transponder (110 Msps). It is evident a lot of bandwidth is unused.

This bandwidth can be used to preposition any content on edge CDN caches. Caches can be available on equipment ranging from consumer to high performant. But how much content is required from the localized CDN caches and how much can be prepositioned during, for example, a single day?

Calculations show that in order to have access to 400 movies, 600 series episodes, 400 kids or educational programs (all kept for 4 weeks) and 14 hours of catch up TV (kept for 1 week) on a localized CDN edge server, a storage capacity of 1TB and a daily throughput of under 45 GB is required. Less than one-tenth of the available unused bandwidth.

Access to 1,000 movies, 6,000 series episodes, 400 kids or educational programs (all kept for 4 weeks) and 14 hours of catch up TV (kept for 1 week) on a localized CDN edge server, a storage capacity of 5TB is required and a daily throughput of under 250 GB is required. This equates to less than half of the available unused bandwidth.

Conclusion

ARPU can easily be increased by monetizing the unused bandwidth by providing SVOD video at a high QoE, while at the same completing the triple- or quadruple-play bundle for residential or professional customers, allowing a satellite operator to compete with terrestrial alternatives.

References

Our partner, Isotropic Networks, deploys our Evolution® hub. Exact implementation and operation information is not available for disclosure, but please review our panel discussion featuring Isotropic Networks and other panelists on the same topic in our [webinar](#) or visit our website.

Isotropic Networks

Isotropic enables Netflix Content across Satellite IP Network by leveraging iDirect technology

Isotropic Networks, has launched their VSAT Video™, the first satellite IP Multicast entertainment solution that pre-loads selected Netflix content and offers a buffer-free HD experience. Leveraging the multicast capabilities of ST Engineering iDirect, Isotropic has simplified the complexities of HD Netflix content across a satellite delivered IP network, making VSAT Video a first gen end-to-end solution for streaming Netflix across the VSAT network

Isotropic and Aterlo Create Multicast Satellite OTT Solution

Satellite communications provider Isotropic Networks and Aterlo Networks, an Over-The-Top (OTT) streaming video specialist, have collaborated to deliver High Definition (HD) video using satellite IP multicast. According to the companies, multi-casting greatly reduces bandwidth strain and costs that Internet Service Providers (ISP) experience when delivering video.

Netflix Satellite Internet Solution

VSAT Video is the first satellite entertainment solution utilizing IP Multicast, delivering a picture-perfect HD Netflix Experience, no matter where you are.

<https://isotropic.network/netflix-satellite-internet/>

ARK Multicasting

ARK Multicasting Demonstrates first end-to-end 5G Broadcast Network

ARK Multicasting, Inc., demonstrated the first end-to-end delivery of IP streaming video content in collaboration with its key technology partners. The testing was successful utilizing the next generation ATSC 3.0 broadcast standard from studio origination to the consumer edge. This is an important benchmark in proving the ability to deliver IP video streaming services nationwide over the ARK™ broadcast network.

<https://arkmulticasting.com/end-to-end-5g-broadcast/>

Pushing Innovation in OTT

ST Engineering iDirect is constantly innovating and developing strong technological partnerships that enable us to spearhead satellite's place in the OTT ecosystem. With our heritage in video and IP and our leading position in the Media & Broadcast market, we continue to forge the path to the future of OTT, enabling providers to deliver content anywhere and for a multitude of use cases. As we move into a more converged era with new and emerging technology and a need to take connectivity to people everywhere, satellite has a critical role to play in a wider OTT ecosystem. Realistic business models exist for OTT Video distribution over satellite, increasing ARPU without unnecessarily inflating satellite Opex nor terminal Capex, for service providers.

