



How Edge Computing Tackles Infrastructure Challenges in TV Broadcasting

ormuco

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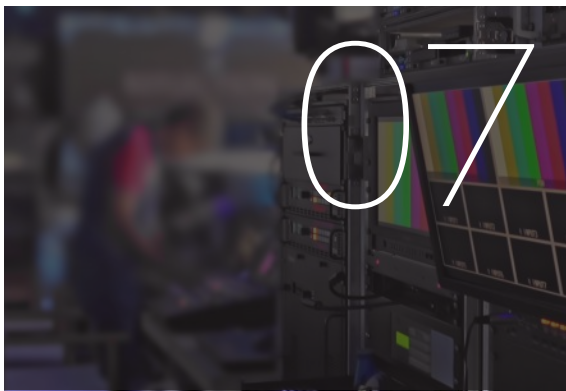
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Recapping Trends, Challenges, and Solutions in TV Broadcasting



Introduction

When it comes to upgrading IT infrastructure, TV broadcasters, networks, and video content providers face unique challenges.

The infrastructure requirements of the media and entertainment industry are stretched by new technologies and new content delivery models.

In this document, we take a look at what is disrupting TV broadcasting, the infrastructure challenges posed by these disruptions, and how edge computing can offer viable solutions.



What's New in TV Broadcasting?

What new media technologies and content delivery models are disrupting the media and entertainment industry? Media is being produced in **higher definition video formats** and being consumed across **a greater variety of device screen sizes**.

Trend 1:

Video Formats Approach Cinematic Resolutions

As 2020 nears, consumers expect to watch **ultra high-definition** (UHD) content that quadruples the resolution of high-definition (HD) content. Ultra high-definition formats include 4K UHD. 4K UHD is named as such because 4K displays at a resolution of 3840 by 2160 pixels, thus doubling both the horizontal and vertical resolutions of the current 1080p HD standard (1920 by 1080 pixels). The raw file size of 4K content is thus in total four times larger than HD content. Higher definition media formats stress the available bandwidth of TV broadcasters. Therefore, there is limited UHD adoption by networks despite the abundance of consumer electronics that support UHD¹.

¹ Berman, Jeff. "What's Holding Back Broadcast 4K?" *HomeTheaterReview.com*, 25 Mar. 2019.



Trend 2:

Video Content Is No Longer Exclusive to Television Sets

Television content such as TV shows, live events, and the news were traditionally broadcasted exclusively on one platform—the TV screen. Now, content is consumed from a plethora of devices. Smartphones, laptops, and tablets rival the TV for viewers' screen time. Modes of content delivery reflect these changes in consumer technology. New content delivery models include **over-the-top** (OTT) content that can be streamed on devices. Think providers like Netflix, Amazon Prime, and Hulu as well as the on-demand services of TV channels. Cisco predicts that by 2022, video streaming will make up 82% of all internet traffic, with live video accounting for 17% of total internet video traffic².

The two market trends affect how TV broadcasters do business. The business model of TV broadcasting depends on high viewership. Viewership is monetized through channel subscriptions from users combined with advertising revenue from commercials. Because of this business model, content providers are incentivized to place their content on as many platforms as possible. In order to reach the maximum amount of viewers, broadcasters must learn to adapt their content to bigger screens and more types of screens.

² "Cisco Visual Networking Index: Forecast and Trends, 2017–2022 White Paper." Cisco, 27 Feb. 2019.



What Infrastructure Challenges Do These Updates Pose?

In the previous section, we learned that the media and entertainment industry is facing both new video formats and more devices to play these video formats on.

The supply chain of the media and entertainment industry is characterized by **high volumes of data**, **resource-intensive workloads**, and **short lead times**.

Challenge 1:

TV Broadcasting Generates Unprecedented Volumes of Data

These high volumes of data will increase with the adoption of UHD formats. Every month, Americans spend 8 billion hours watching smart TVs³. Smart TVs such as Roku and Apple TV are connected to the internet and capable of playing streaming content in addition to linear content. Netflix recommends 25 Mbit/s to stream UHD, which is triple the bandwidth available to many US broadband households⁴.

Challenge 2:

Resource-Intensive Workloads Occur Along the Production Process

One such process is transcoding, which involves converting already-made content to display in different resolutions and different aspect ratios for different screen sizes. As well, converting broadcast video signals to video that can play over the internet requires expensive, specialized equipment.

3 "The OTT Experience: Understanding Connected Living Room Audiences." Nielsen, 29 Nov. 2018.

4 *The Future of Cable TV: Industry Paper on Trends and Implications*. International Telecommunication Union, 2018.

Challenge 3:

Pressure for New and Live Content Results in Short Lead Times

A short media production lifecycle from filming to post-production to display is especially critical for live sporting events and concerts. However, the latency between a live event occurring and a viewer seeing the broadcast on their TV can be up to a few minutes⁵ due to compression. Viewers may also experience problems in video and audio quality.

In *Summary*

These conditions combined—**high volumes of data, resource-intensive workloads, and short lead times**—require infrastructure resources that are up for the task.

⁵ Nastic, Goran. "Lowering Streaming Latency." *CSI Magazine*, Sept. 2017.



Why Does TV Broadcasting Need Edge Computing?

So far, we know that technologies such as UHD video and portable consumer electronics have shaped TV broadcasting infrastructure. Content consumers want to watch high-definition and immersive media content that can be accessed on-demand and on many devices. As a result, content producers seek solutions to distribute adaptive content. This is where edge computing enters the TV broadcasting landscape.

Edge computing is a modern computing approach in which data is processed closer to its source of origin. Here at the "edge" of the network, data is treated locally without having to travel to a centralized datacenter. Virtualizing infrastructure resources is also integral to the concept of edge computing. Virtualizing hardware that performs compute, storage, and network functions makes the resources more scalable and cost-effective. The flexibility of virtualization is well-suited for the real-time data processing that occurs at the edge.

This is how edge computing upgrades TV broadcasting infrastructure.

Solution 1:

Software-Defined Infrastructure Accommodates Resource Fluctuations

Software-defined infrastructure (SDI) is scalable, which means more resource capacity can be added virtually when needed (and likewise decreased when not needed).

As networks transition from broadcasting HD to UHD content, software-defined infrastructure helps networks balance between broadcasting data-heavy content and content with lower resolutions.

Did You ***Know?***

Ormuco offers a software-defined storage platform that can be made available to the user in a variety of formats, such as object (common for archival storage), file, or volume, and with different performance levels, to mimic typical hard disk drive (HDD) or solid-state drive (SSD) performance.

Solution 2:

Edge Platforms Manage Resources without High Hardware Costs

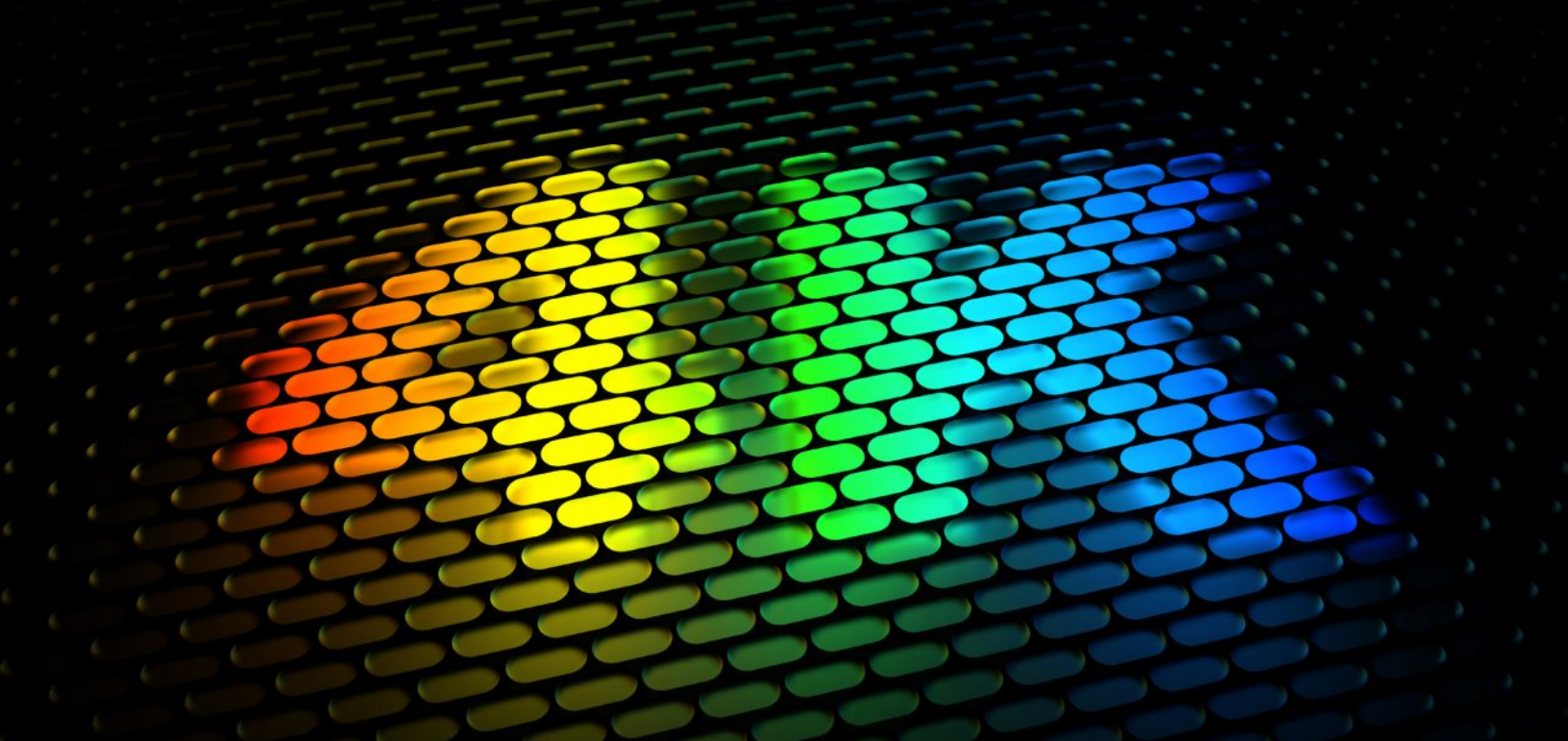
Remember how we mentioned earlier that converting broadcast to internet content required specialized hardware? Thanks to the flexibility of edge computing platforms, TV broadcasting companies are able to work with a modern infrastructure that decentralizes compute resources.

While the number of edge servers may be higher than the usual data center servers, these nodes do not require high-grade hardware to run.

Using commodity instead of specialized hardware plus virtualizing server resources saves a TV content aggregator/distributor up to 75% of their infrastructure costs.

Did You **Know?**

Ormuco underlies the infrastructure that supports transcoding applications. It can be installed on commodity instead of specialized hardware.



Solution 3:

Decentralized Computing Improves Video Quality and Reduces Latency

In live TV broadcasting, decentralized computing reduces streaming delays by processing audiovisual data closer to its source of origin. Using distributed systems with full mesh networking, it is now possible to broadcast to viewers without having to send audio and video data to a central location far away first.

Did You **Know?**

Ormuko helps video and audio applications to operate at edge locations. Moreover, broadcast applications are dynamically provisioned based on the location that is closest to the production company or content provider. This process prevents the quality of media from degrading during transfers, as would be the case if workloads and data were to be hosted on a centralized data center.

Solution 4:

Containerization Optimizes Resource Usage and Accelerates Go-to-Market

The Ormuco platform uses containers to further cut lead time. With containers, software developers are able to deliver microservices, which allow for more agility in their processes. Compared to virtual machines that host operating systems, containers are lightweight, OS-agnostic alternatives used to execute programs.

They come in handy during periods of increased viewership such as prime time, live performances, and sports games. Through the containerization of TV broadcasting software, broadcasters benefit from the ability to customize their workload according to levels of demand for their content. Viewers, in turn, get to access content faster and in higher definition.



Recapping Trends, Challenges, and Solutions in TV Broadcasting

- ▶ As new media technologies emerge and distribution models change, consumers want to access high-definition content more quickly and across a greater variety of platforms.
- ▶ Multi-platform distribution and multi-screen delivery are trends that present unique infrastructure challenges. Technology needs of the media and entertainment industry are driven by high volumes of data, resource-intensive workloads, and short lead times.
- ▶ All steps of the production cycle—from filming to post-production, distribution, and archival—can benefit from more efficient processing. Software-defined infrastructure, automated infrastructure provisioning, decentralized computing, and containerization are some technologies set to transform TV broadcasting infrastructure.
- ▶ Ultimately, edge-based TV broadcasting software delivers intelligent resource management and faster lead times at reduced overhead costs.



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About Ormuco Inc.

Founded in 2008, Ormuco's mission is to be a leader in the deployment of edge computing as the preferred solution for data processing. The company enables the delivery of real-time solutions based on innovative technologies such as AI and machine learning to businesses and users worldwide.

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