How OTT service can match the Quality of Broadcast ?

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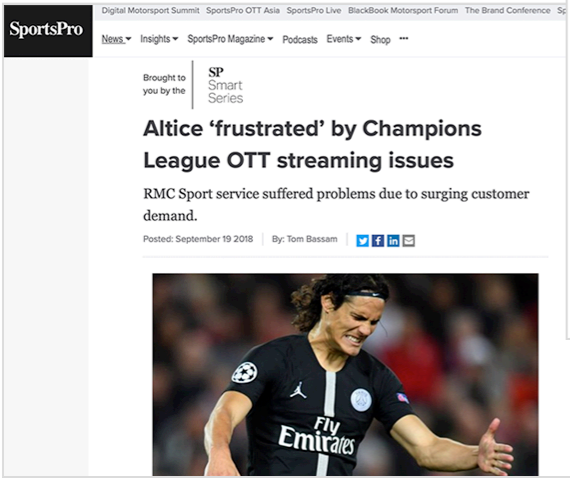
VP Video Strategy, Harmonic

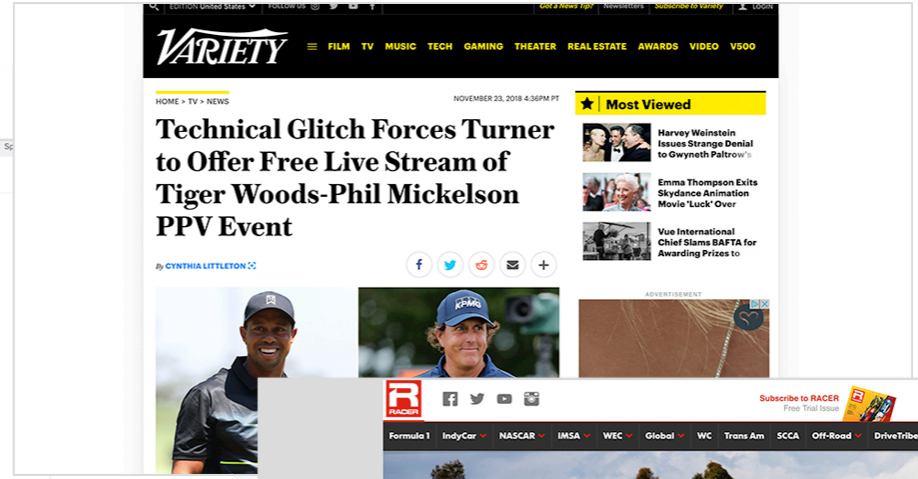
July 2019

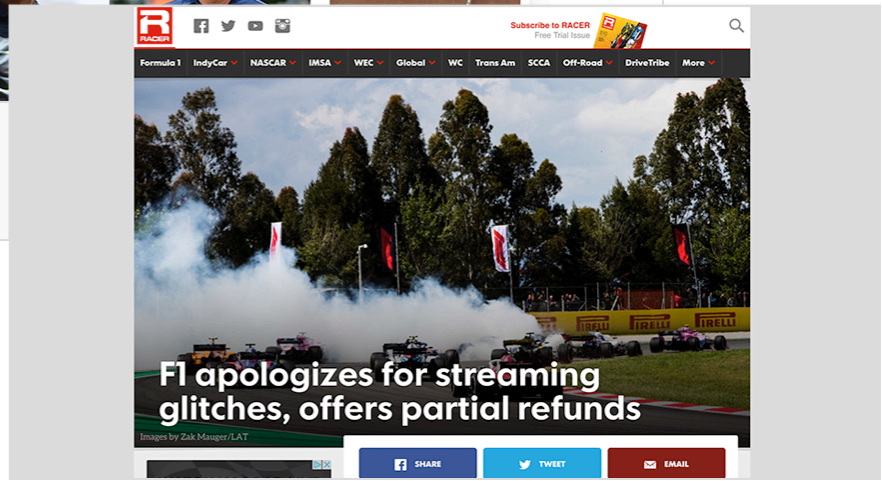
Agenda

- Introduction
- Content Aware Encoding
- Low Latency
- Cloud scaling
- Network Optimization
- Netflix benchmark
- Conclusion

Have You Heard Of These in 2018 ?

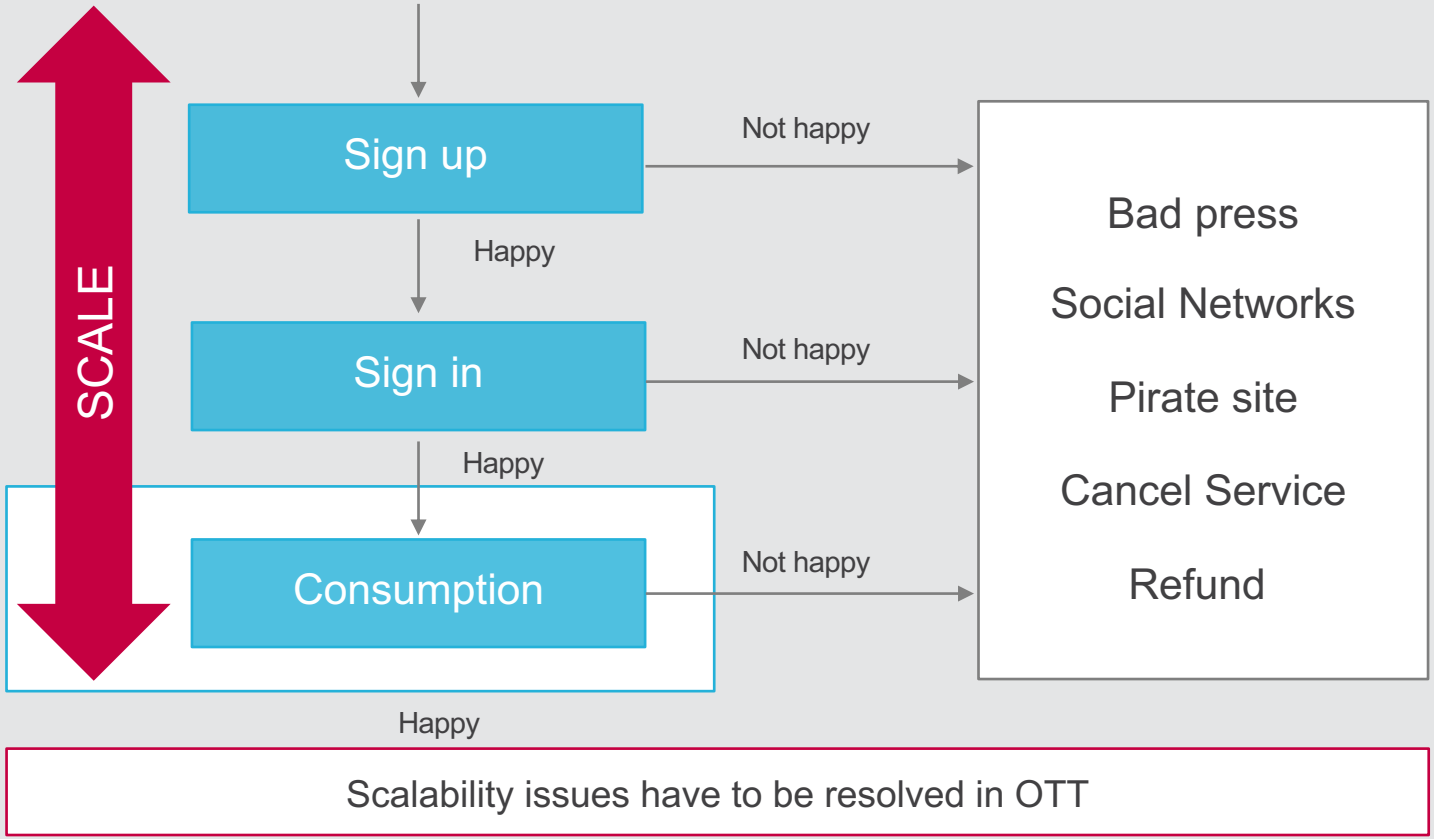






Serious damages

OTT Scalability Challenges



Scope Of The Presentation*

Looking at how OTT can scale

Broadcast is yesterday's reference

Netflix is today's reference

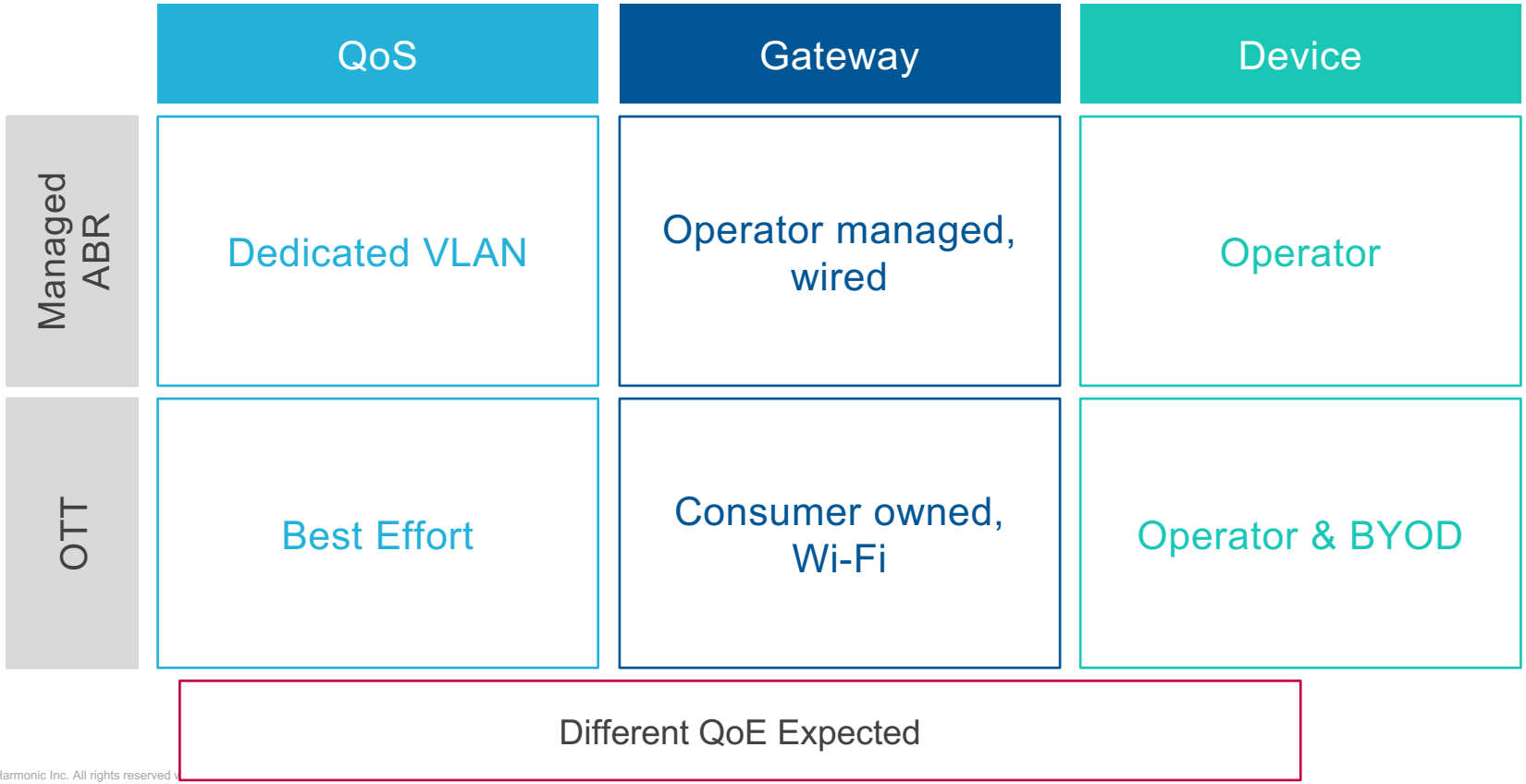
Is there a way Live OTT can match those ?

Focus on delivery/consumption

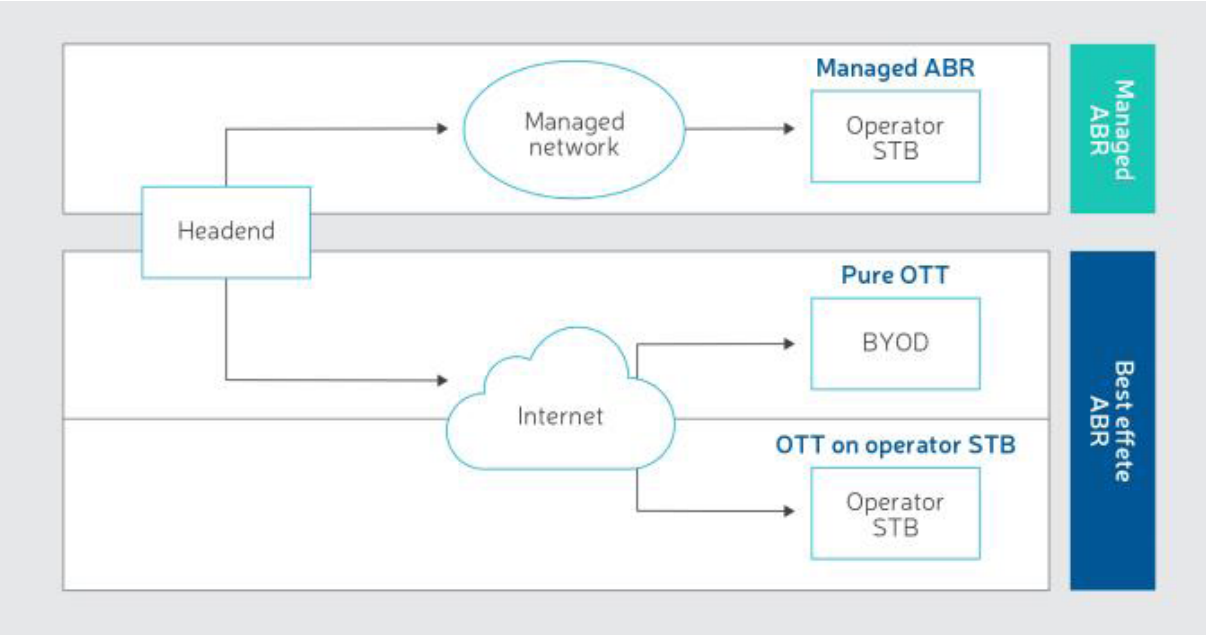
Does not address open caching, mABR, P2P

** Part of a paper to be presented he NAB on "How OTT Services Can Match the Quality of Broadcast"*

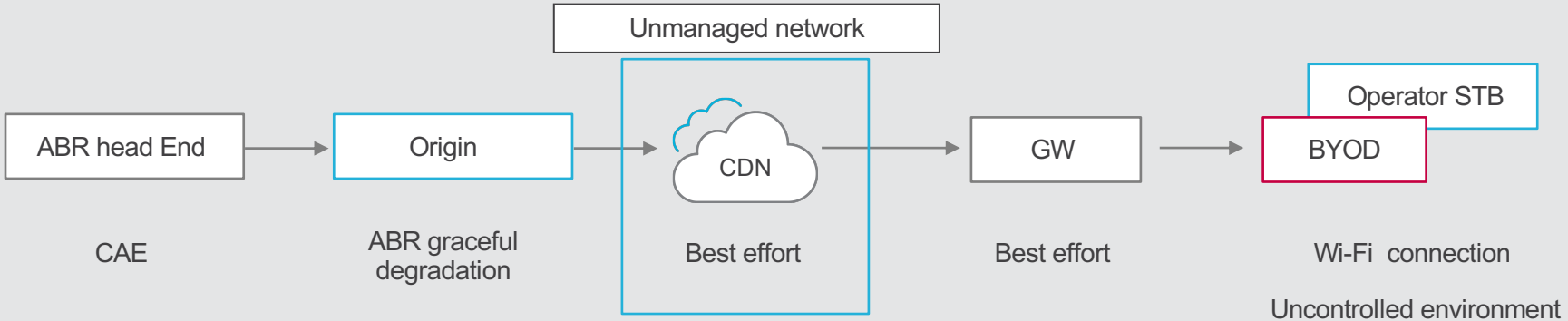
Some Definitions



Network Topology

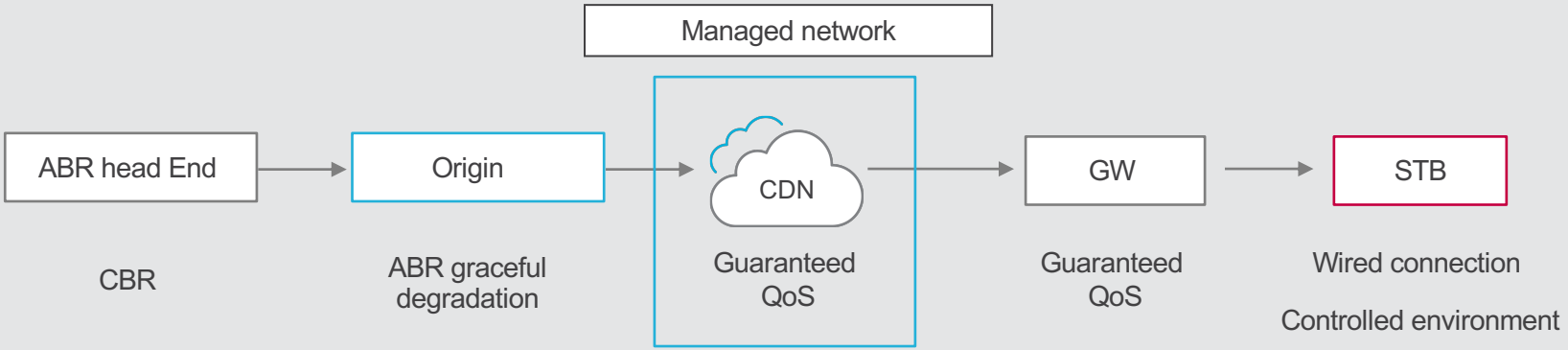


OTT



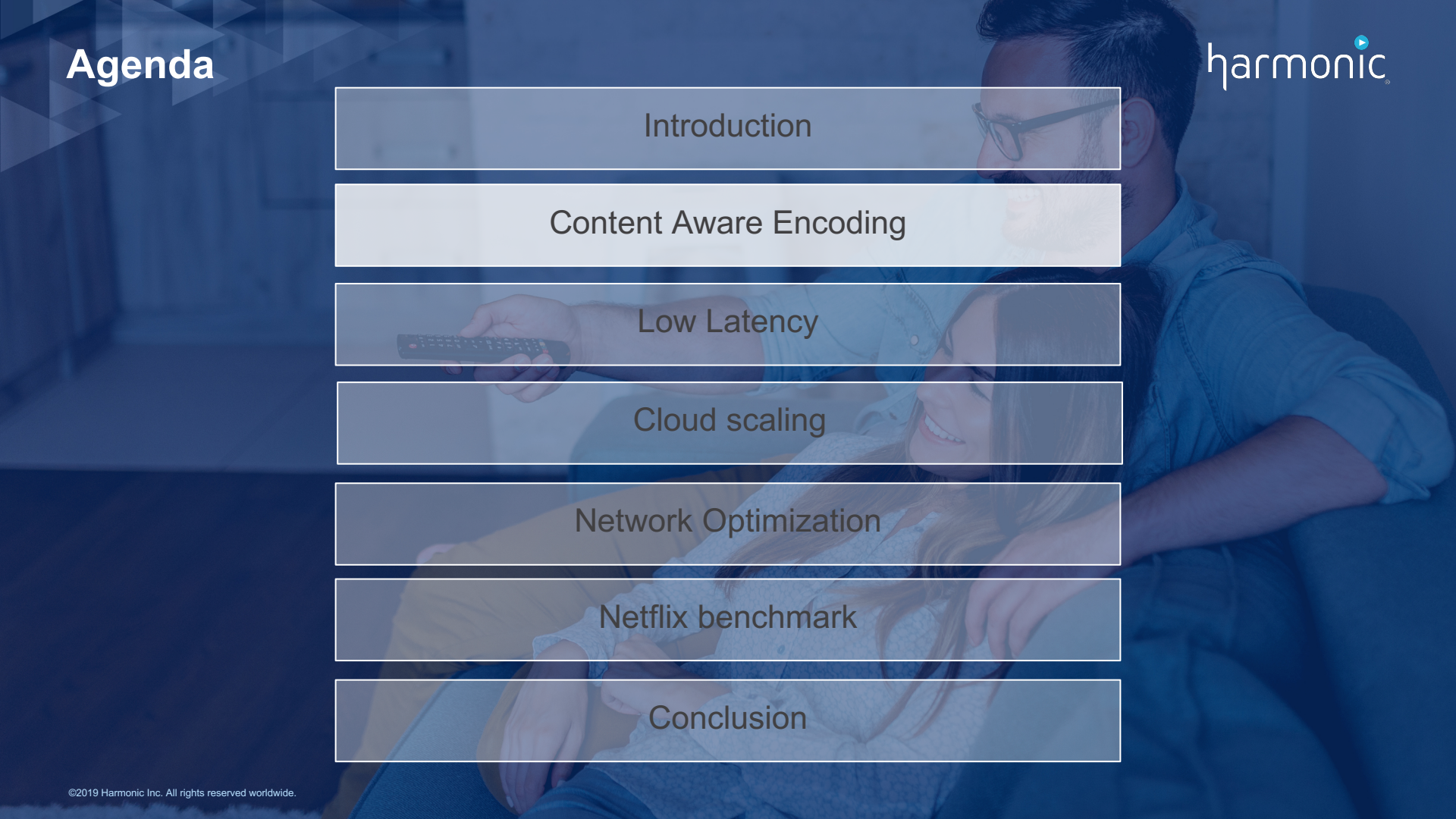
Some potential challenges

IPTV 2.0



Measured 300% KPI increase vs OTT

Agenda



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Check Your Competitors

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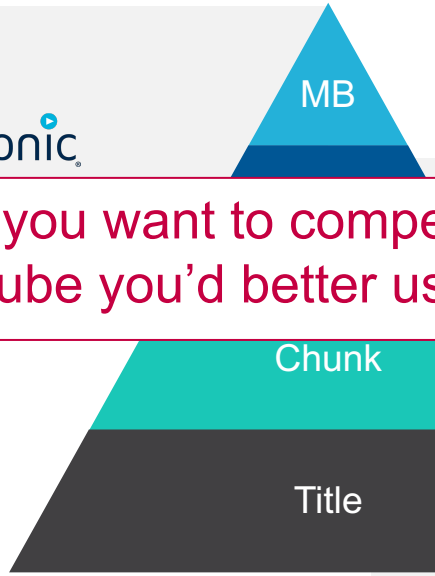
ON AIR

Video On Demand

Optimized for run time

Leverages cloud architecture



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NETFLIX

YouTube

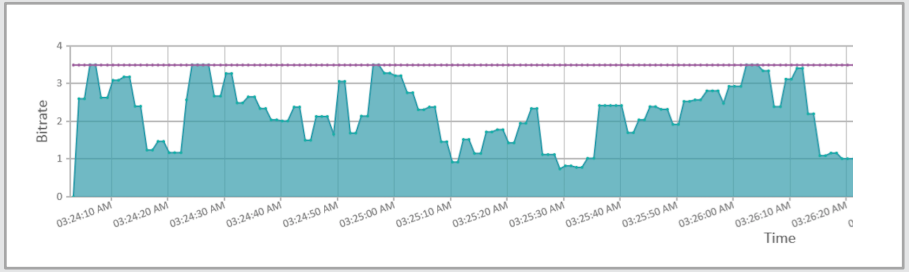
If you want to compete with Netflix and YouTube you'd better use the same weapons!

Open loop VBR | In loop psycho visual model | Machine learning

Harmonic's EyeQ Content Aware Encoding

PURE COMPRESSION ENGINE™

Compressed Video



EyeQ

VQ measurement and intelligence

EyeQ leverages the Human Visual System to focus bits where they matter most for the viewer

- → **Up to 50% bitrate savings**
- → **Constant VQ vs constant Bitrate**
- → **100% standard compliant (incl iOS11)**
- → **Up to UHD HEVC**

WINNER Technological Innovation Award 2017 "Best Digital Processing Solution"

2017 Diamond Technology Reviews · BTR Broadband Technology Report

Readers' Choice Awards 2017 Streaming Media Magazine

Cablefax Tech Awards Honoring Tech Innovation

Content Aware Encoding QoE Impact

50% BW decrease brings drastic increase in QoE

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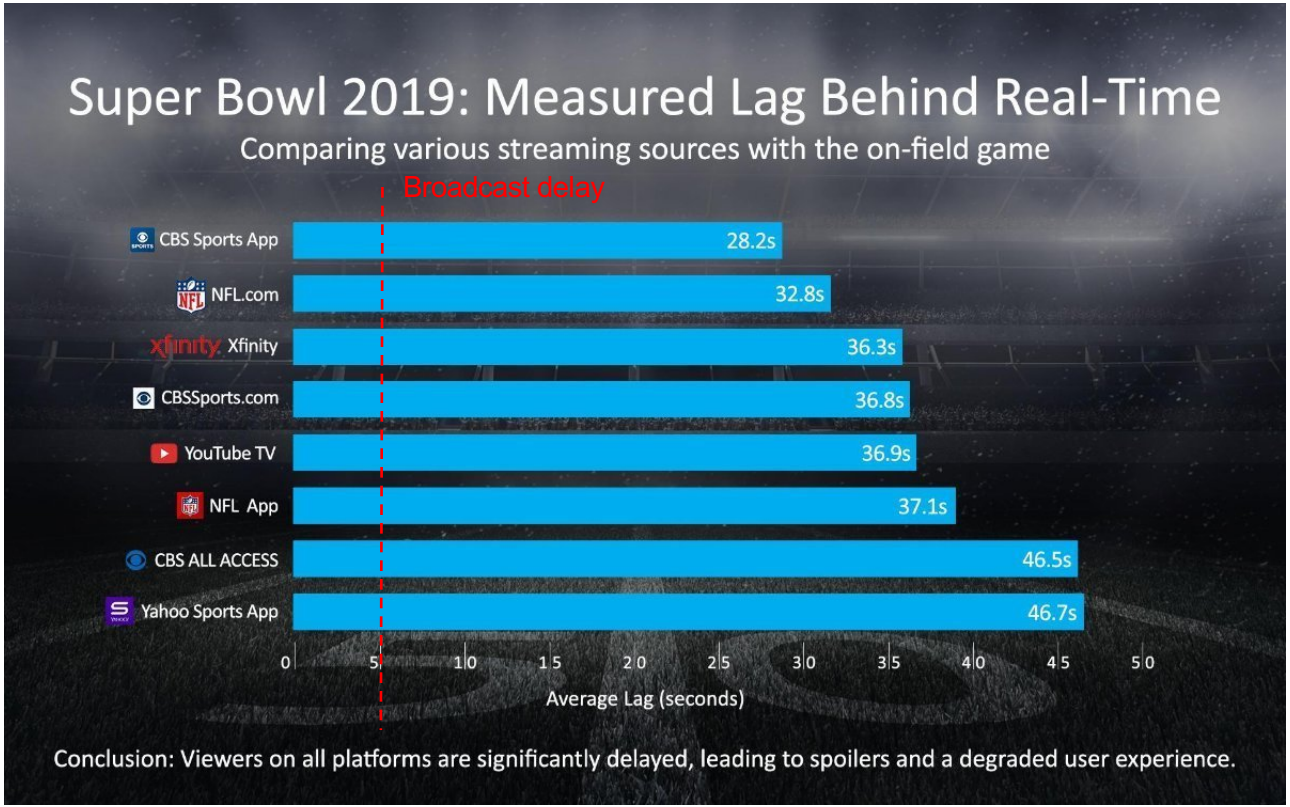
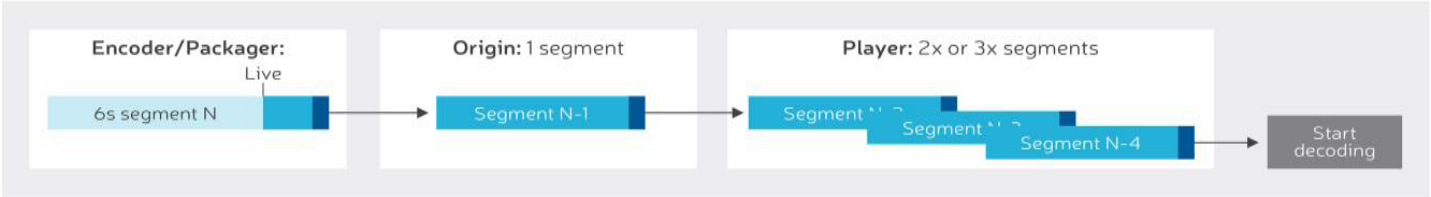
You All Have Seen That Game & Chart ?

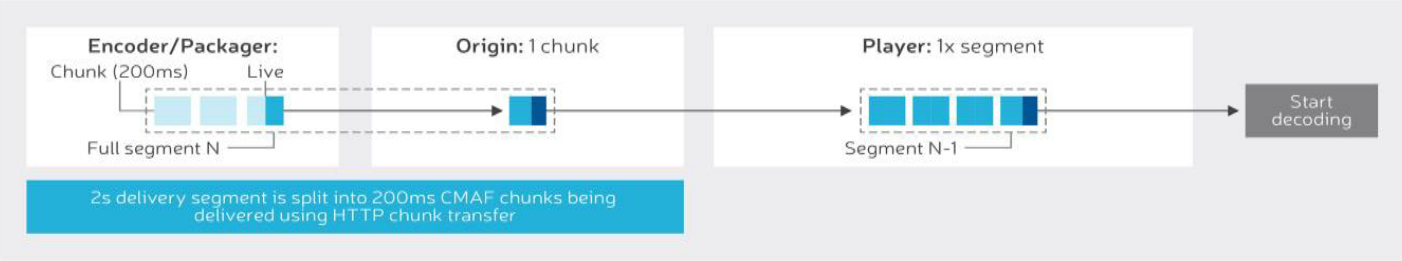


Source: https://phenixp2p.com/sports-latency.html

CMAF Low Latency Chunk



Legacy OTT distribution segment workflow (e.g., HLS)



CMAF LLC and HTTP chunk transfer

MPEG standard / cachable on ALL CDNs

Trial Results (CMAF/DASH) *

Test conditions	Type	CDN	Network	Device	Measured delay
Head-End On-premises	Unmanaged	Akamai	Wired	Wired	5.5s
			Wireless	Wireless	7.5s
Head End on Public cloud	Unmanaged	Akamai	Wired	Wired	7.0s
			Wireless	Wireless	9.5s

A 6-9x improvement vs deployed services

*https://blog.harmonicinc.com/cmaf-saving-grace-live-sports-streaming/

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Video SaaS Deployment for Mobile OTT Service: TELKOMSEL

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193 Million Mobile Subs in Indonesia

Unprecedented Four Weeks From Concept to Deployment

4M users & 550K Concurrent Viewers

Increased Bandwidth Efficiency with EyeQ™ Technology

accedo

castLabs

SaaS Live Sports Solution

harmonic

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Capture

Ingest

Transmit

Teleport as a Service

Live ingest

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VOS 360

Transcode

Package

Encrypt

Origin

Live

VOD

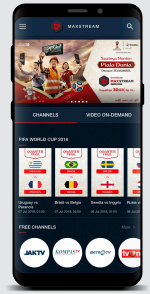
Video SaaS

Akamai

Content Delivery Network

accedo

castLabs

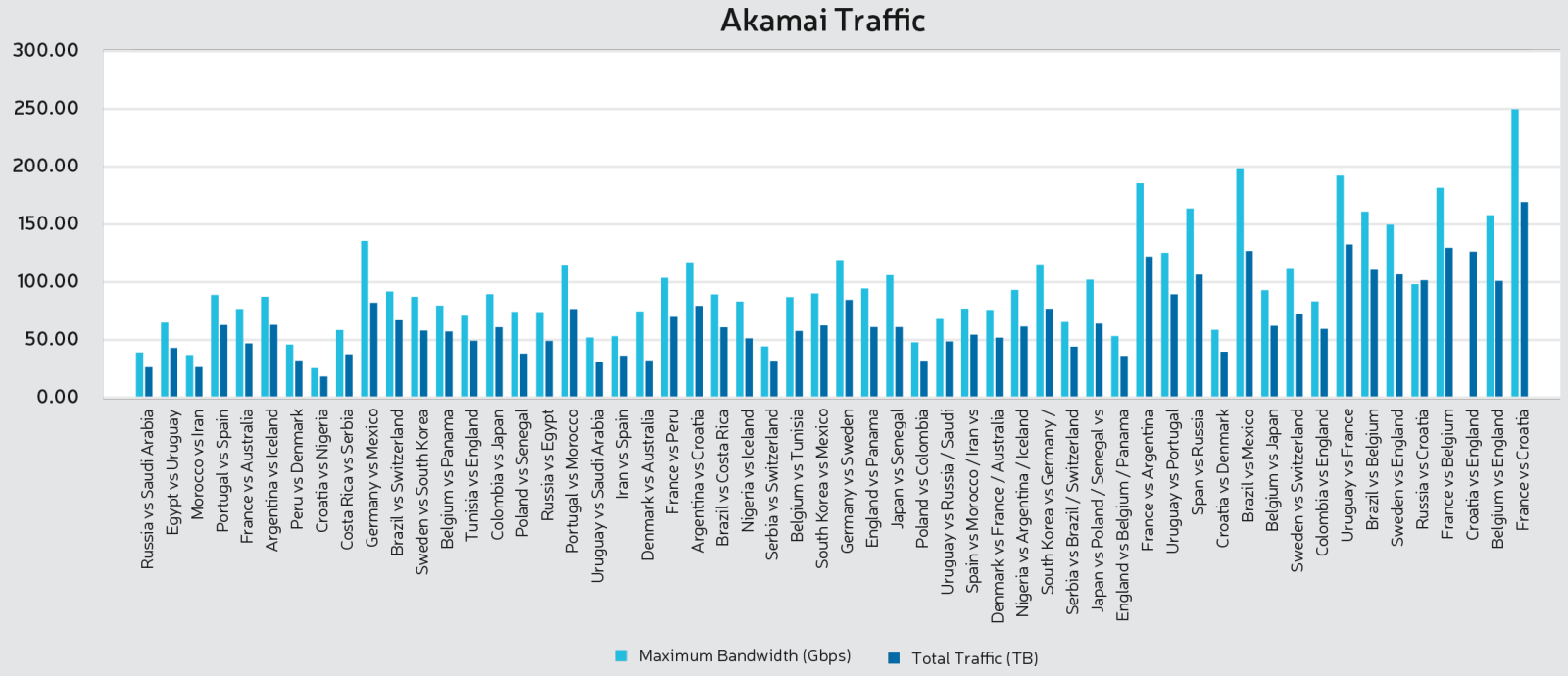


User Experience Management

TV Streaming

Integrated End-to-End SaaS Channel Origination Solution

Akamai Traffic



10x ratio between min/max matches' traffic

Take Away

6 weeks from set up to streaming to millions

MAXStream for the FIFA'18 WC was a huge success

Proven scalability with 4M subs

Pay as you grow model

Only Cloud can absorb such an unpredictable traffic

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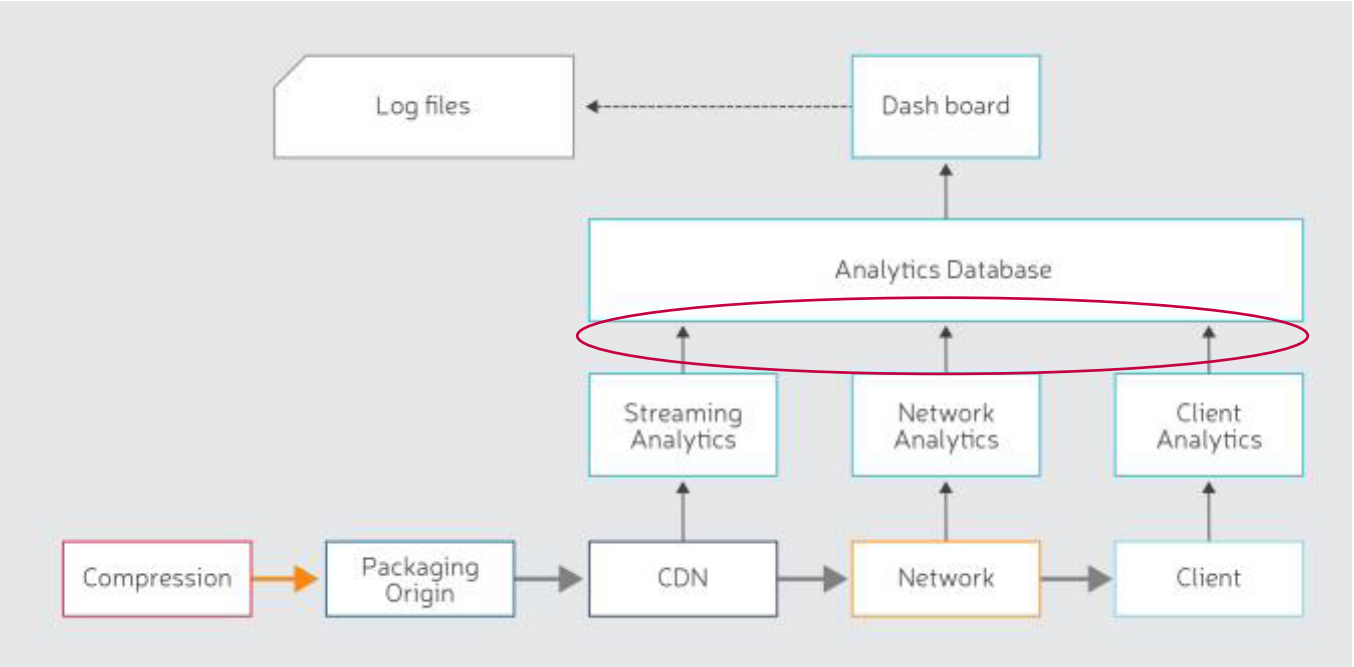
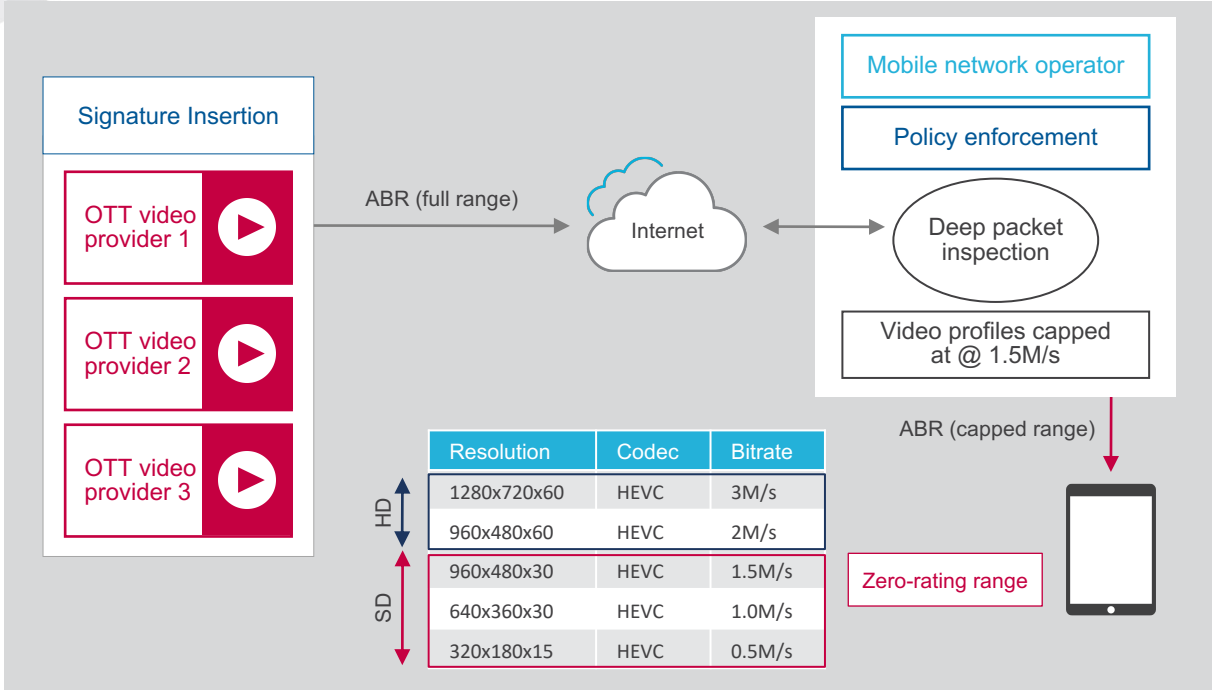
Generic Architecture



Spec?

A log file to nowhere!

Static Zero Rating*



Win-Win-Win scenario

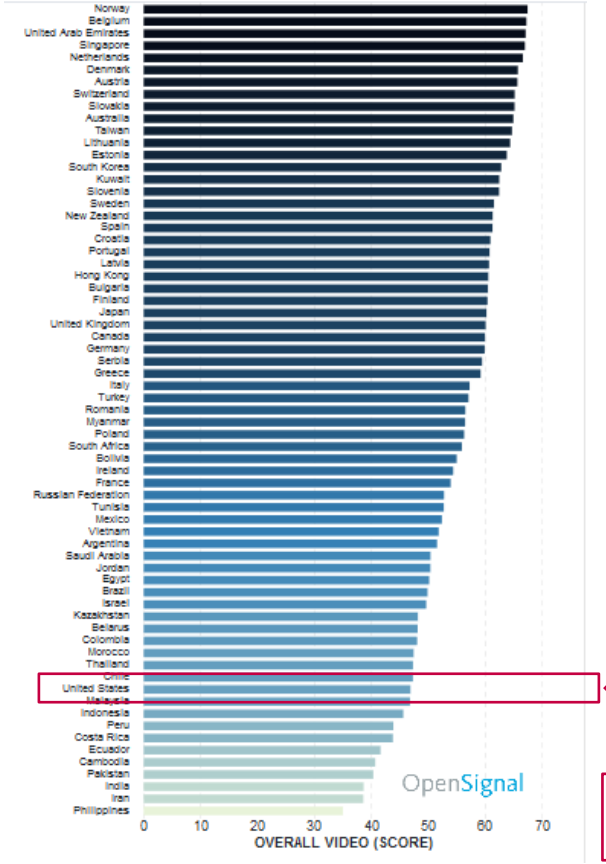
- More time spent on Mobile
- Doubled consumption
- Lower traffic

Massively deployed in the US

*http://info.harmonicinc.com/Video-over-cellular-Strategies-for-Mobile-Operators

Source: Harmonic, Ovum

Overall Video Experience Comparison

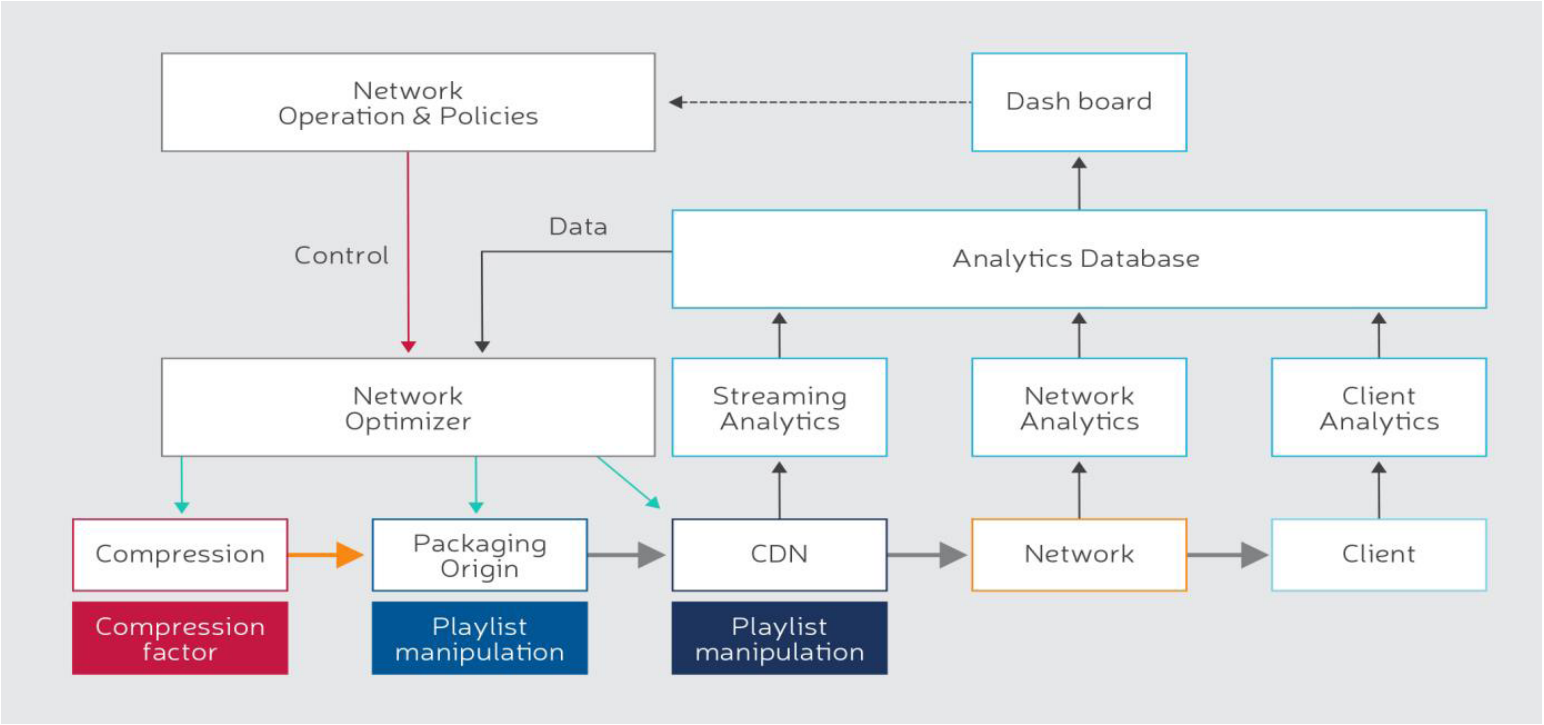


You are here!

Let us make America great again!

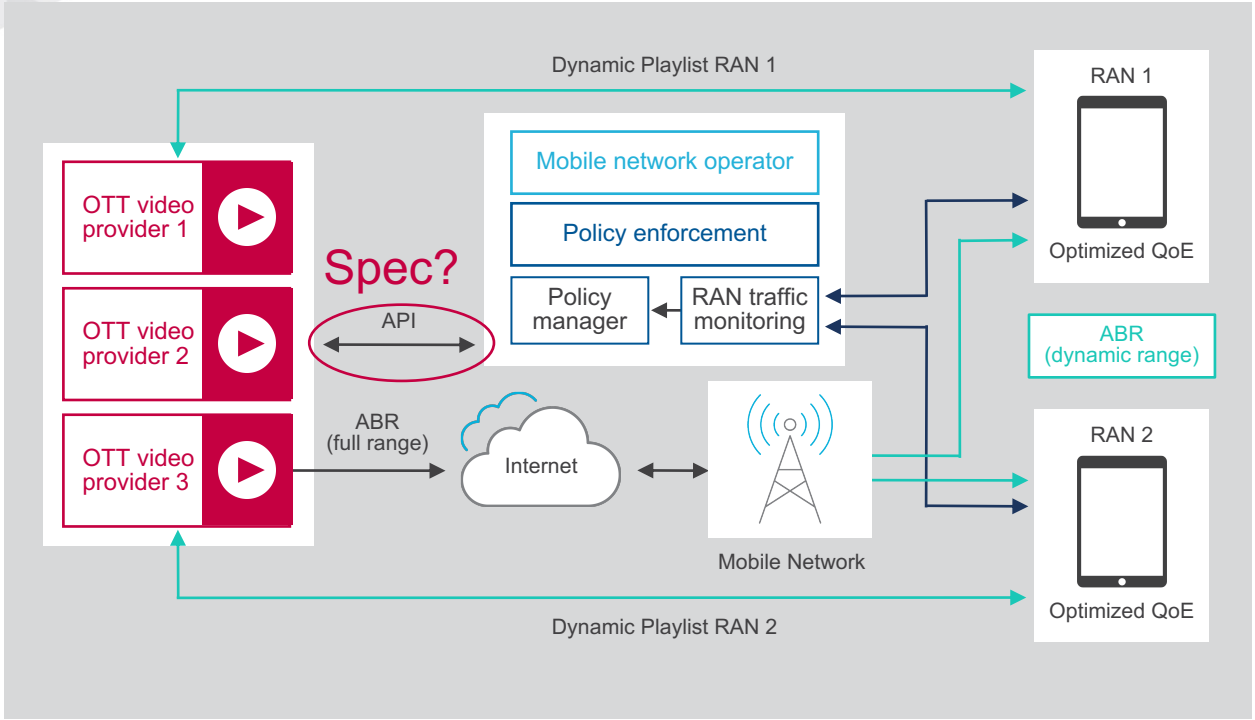
Source : https://opensignal.com/reports/2018/09/state-of-mobile-video#spectrum

Network Optimisation



Closing the Loop in RT (segment basis)

Dynamic Zero Rating



Best network optimisation

Mechanism
Collaborative approach
MNO reports congestion via API
MNO (NW) or OTT (client) manifest change
Room for standisation: ETSI/MEC/SVA?

Source: Harmonic, Ovum

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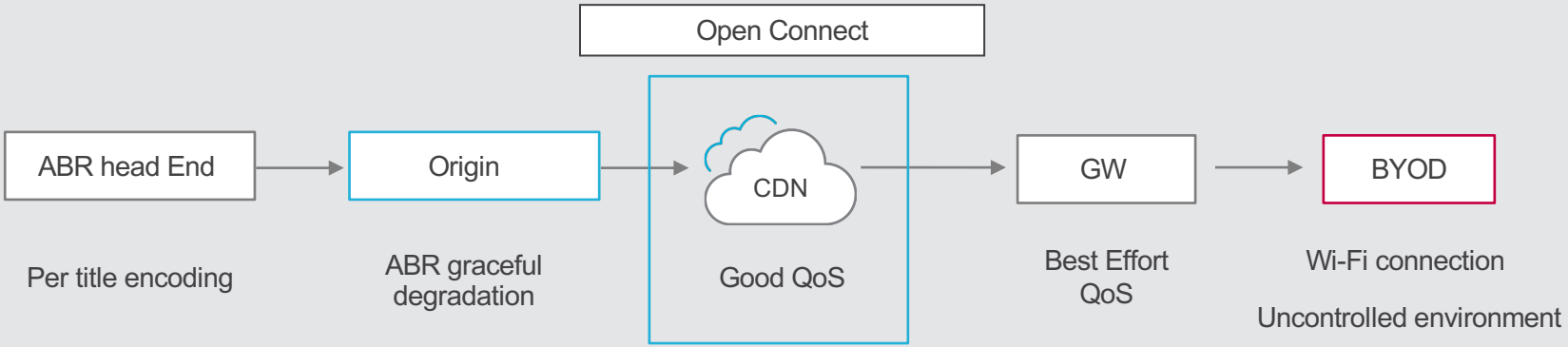
Netflix



Best OTT experience out there

Comparison Table

Technology	Category	Standard OTT services	Netflix	Advanced OTT services
CAE	Encoding	No	Yes	Yes
New codec (HEVC/AV1)	Encoding	Some	Yes	Yes
CMAF LLC	Packaging (Live)	Being deployed	NA	Yes
	CDN			
	Client			
Deep caching	CDN	Some	Yes	Yes
CDN switching	CDN	Yes	Not necessary	Not necessary on managed network
Traffic prioritization	Home network	Managed networks only	No	Managed networks only
Client acceleration	Client	Some	Yes	Yes
Network optimization	Monitoring	No	Unknown	Yes

Huge gaps/progression margin

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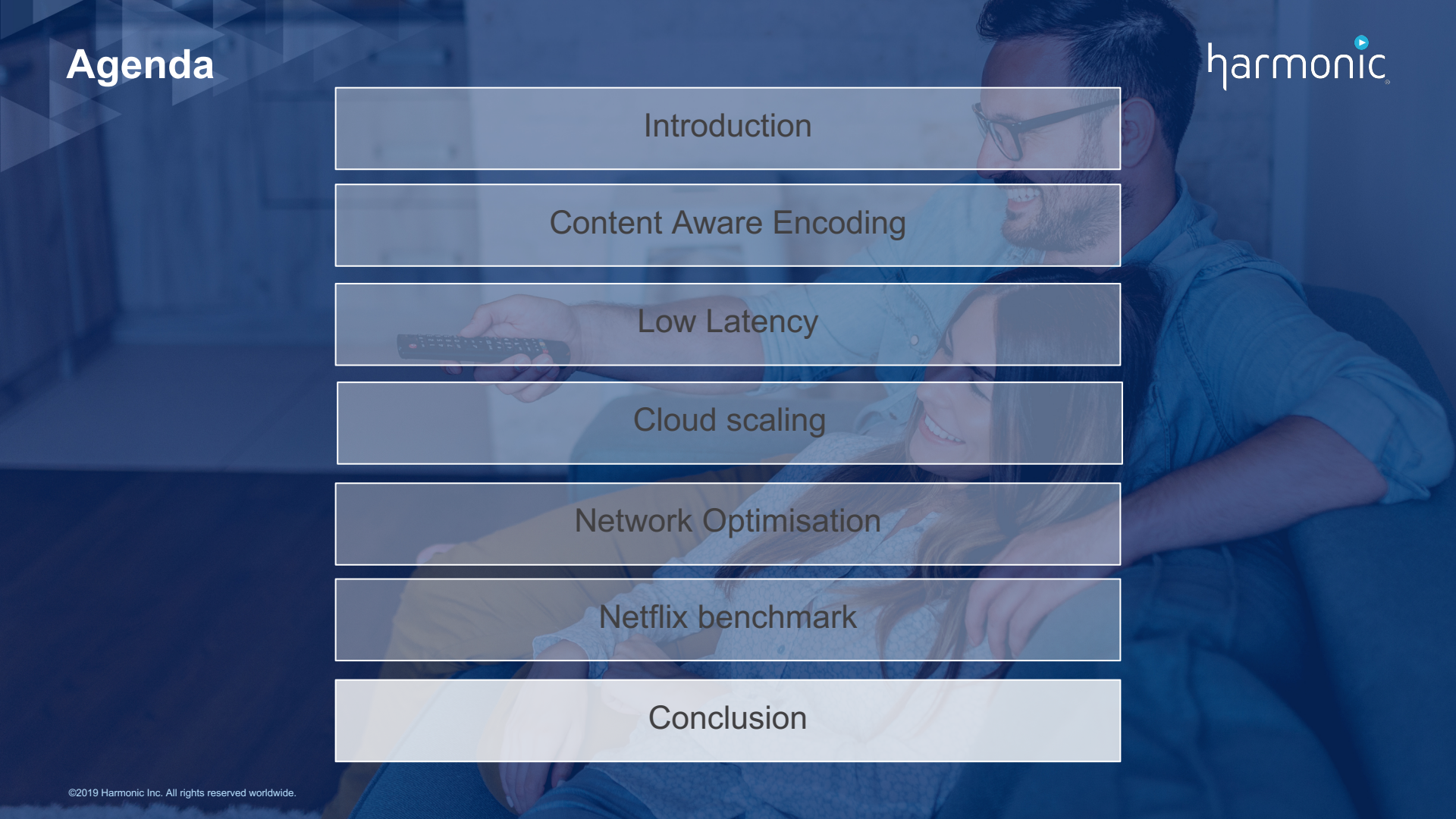

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Conclusions

OTT is still in infancy wrt to QoE

Difference between managed & unmanaged

QoE improved today with CAE & CMAF

Cloud great scaling tool

Network Optimisation is the holly grail

Need more industry collaboration

SVA best place to define a blueprint

Thank You

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