

CAN UHD OTT BE COMPLEMENTARY TO **TERRESTRIAL UHD BROADCAST?**

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April 2020



Scope

Hybrid UHD/OTT

Delivery architectures

Test case France UHD 2024

Cost comparison

mABR option

Conclusion

Not all channels available in UHD during simulcast

Investigate a full UHD OTT scenario

Test case France UHD 2024

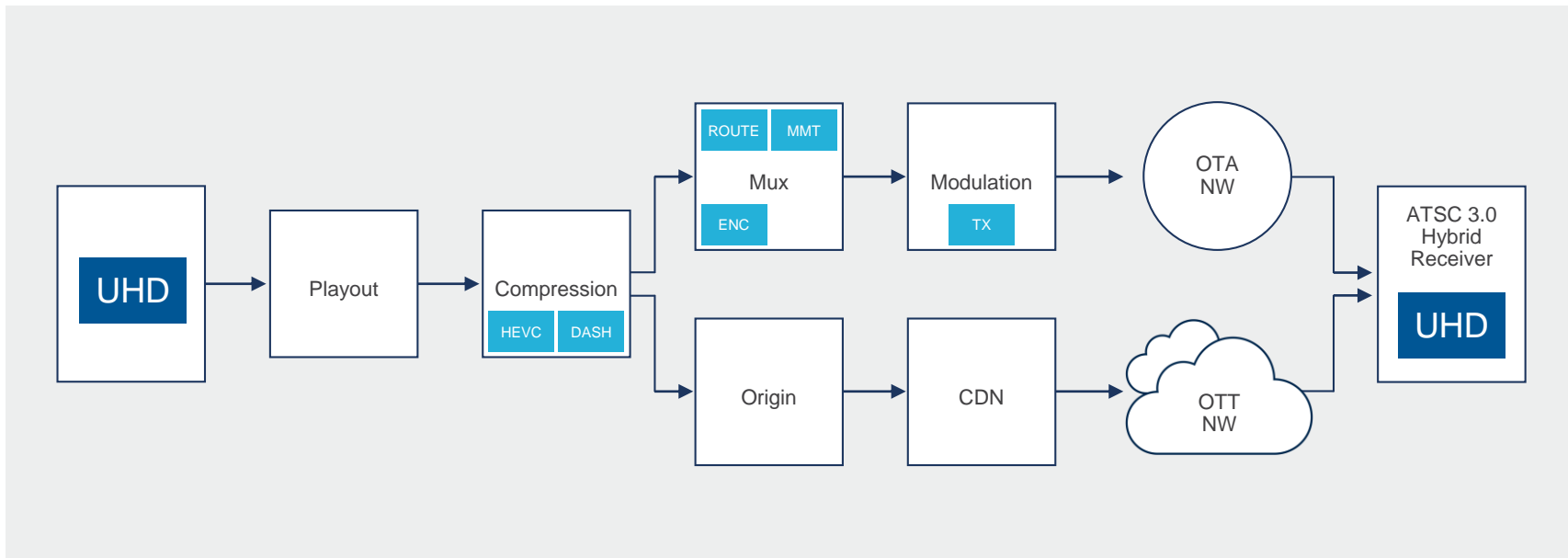
Focus on Delivery technology capability

Info based on real market data

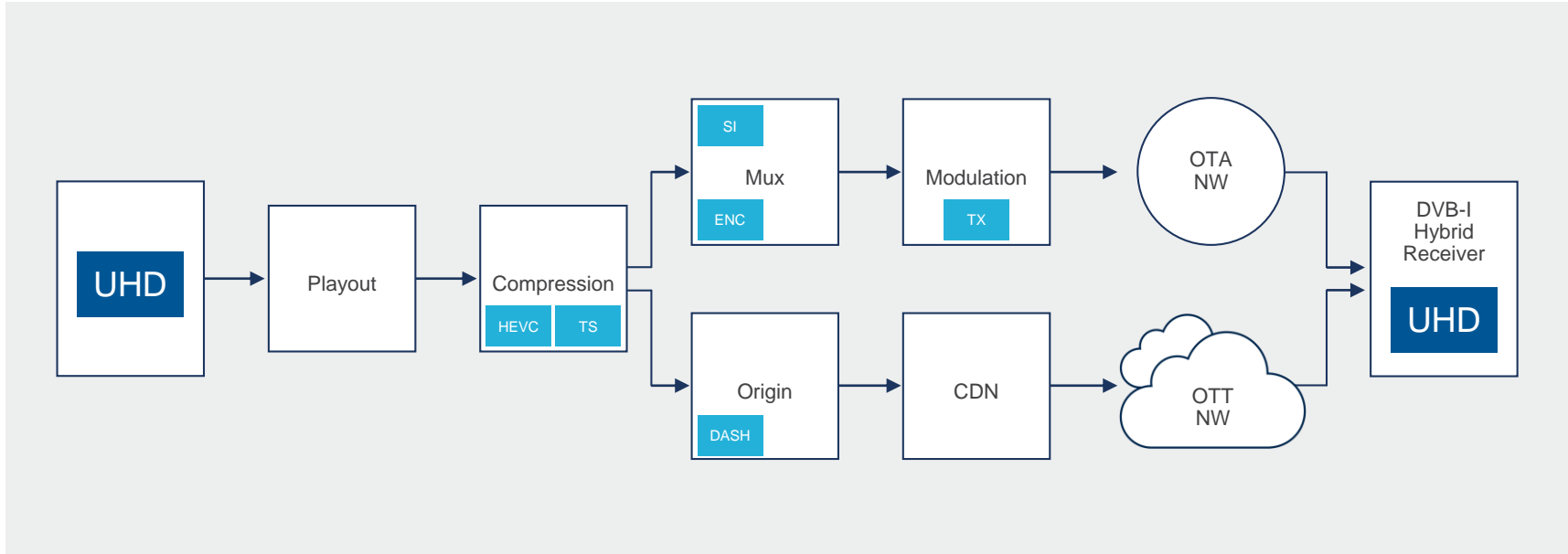
UHD DEFINITION

FORMAT	RESOLUTION	FRAME RATE	COLOR SPACE	HDR
4K SDR	2160p	P50/60	BT.709	No
1080p HDR	1080p	P50/60/120	BT.2100	Yes
4K HDR	2160p	P50/60	BT.2100	Yes
1080i SDR	1080i	P50/60	BT.709	No

ARCHITECTURE HYBRID SYSTEM (ATSC 3.0)



ARCHITECTURE HYBRID SYSTEM (DVB)



Hybrid Service in OTA : ATSC 3.0 native IP

DVB-I Specification (OTT bolt on)

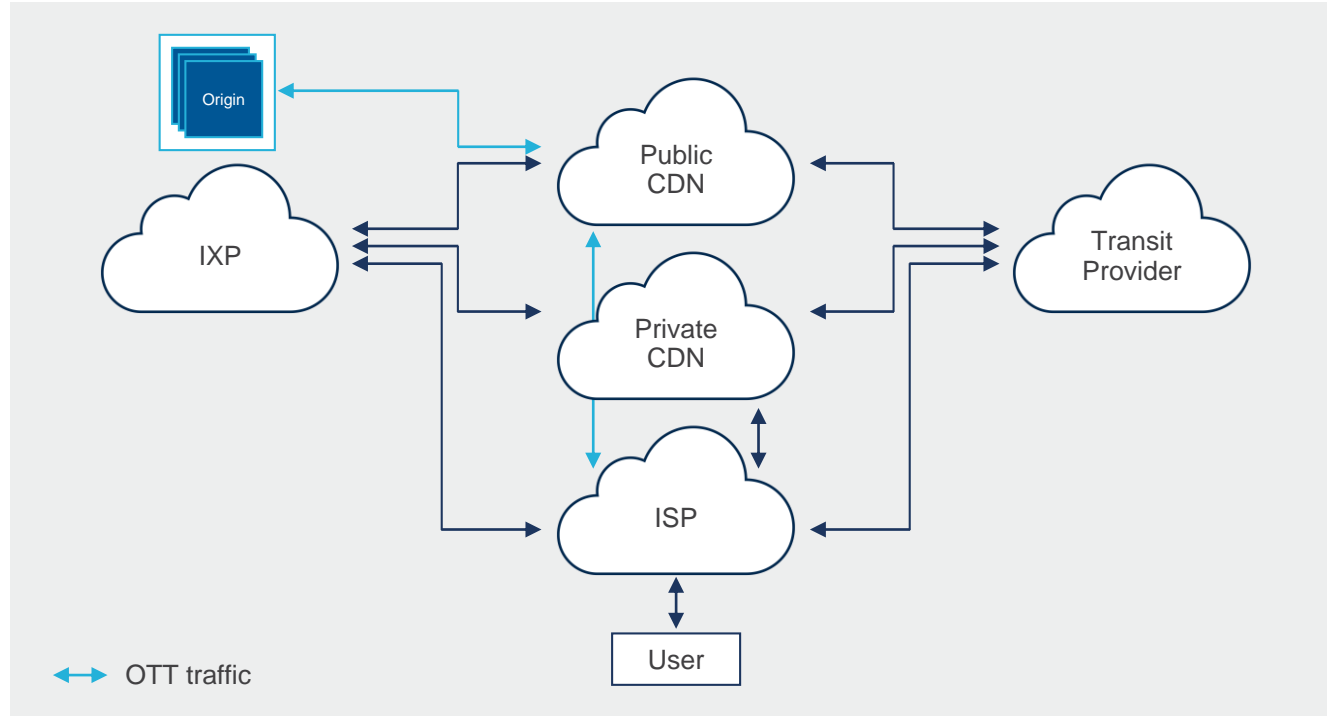
Low Latency for Hybrid

HEVC codec efficiency

CDN as a Service

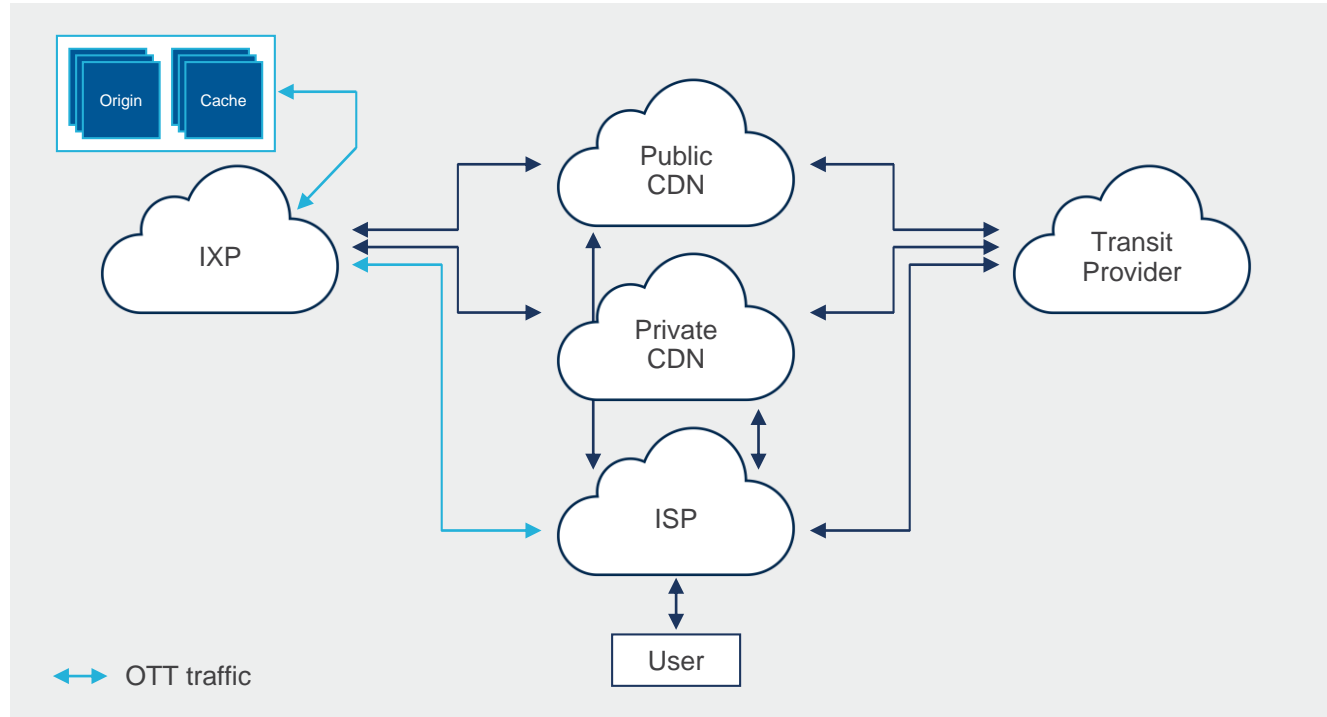
mABR option

OTT DISTRIBUTION : PUBLIC CDN ARCHITECTURE



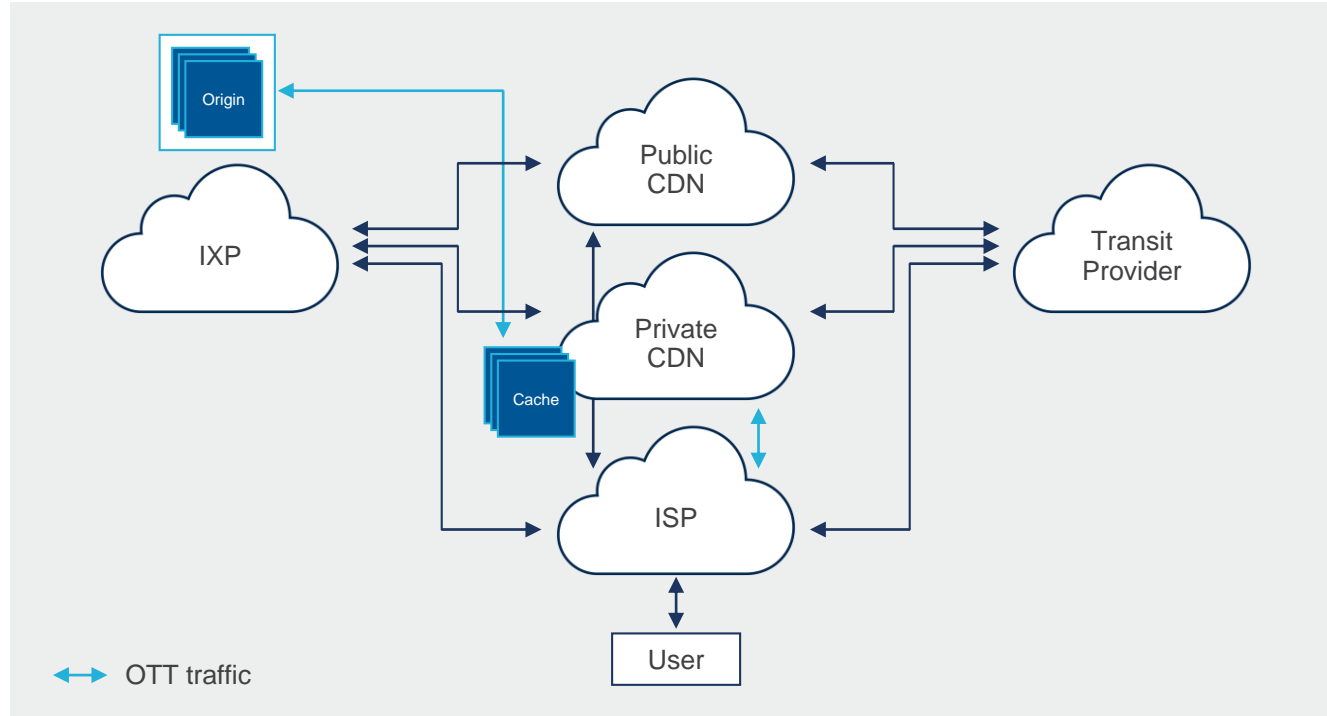
Standard Broadcast Delivery

OTT DISTRIBUTION : PRIVATE CENTRALIZED CDN ARCHITECTURE



Deployed at some broadcasters for VOD & Live

OTT DISTRIBUTION : PRIVATE DECENTRALIZED CDN ARCHITECTURE

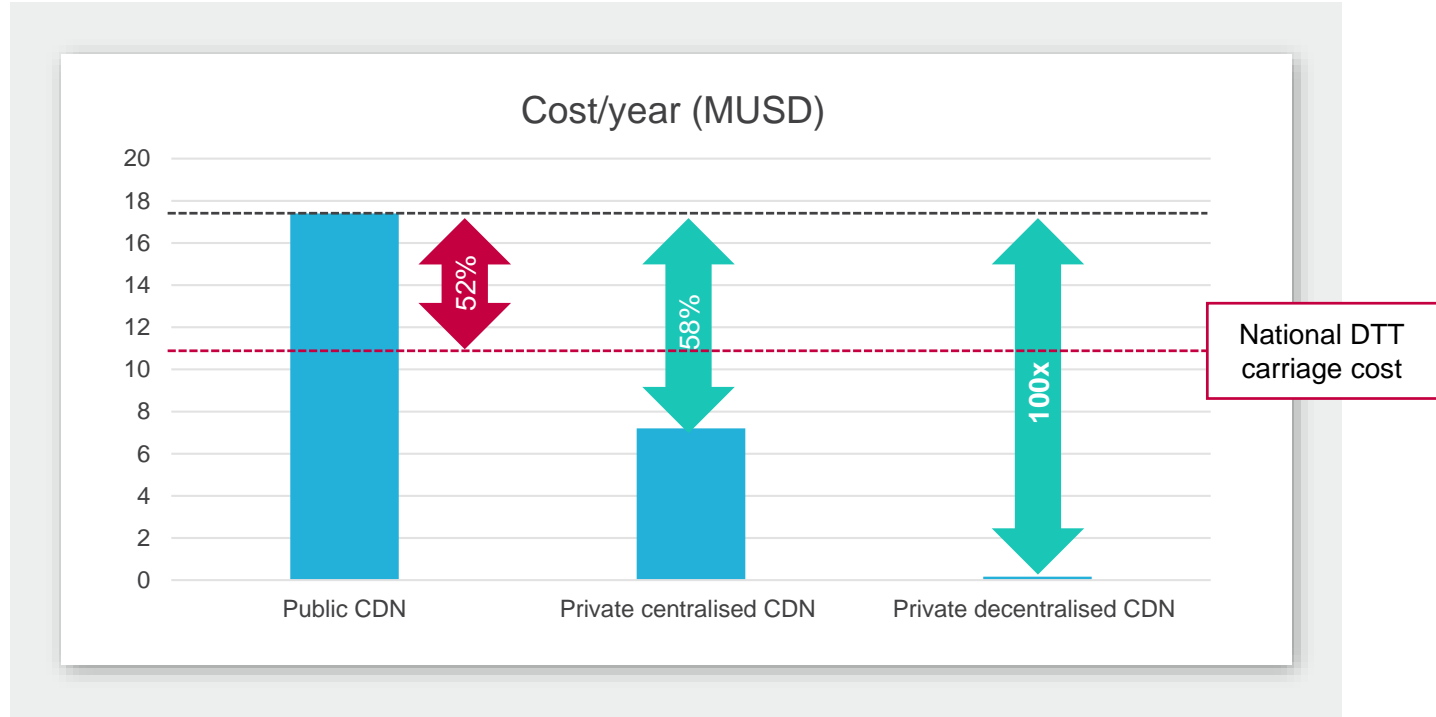


Deployed by Netflix (VOD)

SPECIFICATION	VALUE	NOTE
Users	15 million	OTA households
Concurrency peak	5.7 million	OTA households watching TV
Formats	CMAF	CENC
Resolution	2160p	
Codec	HEVC	
UHD average VBR bitrate	8.5 Mbps	(1)
ABR aggregated bitrate	25.5 Mbps	
# of channels	30	
# of PoPs	30	

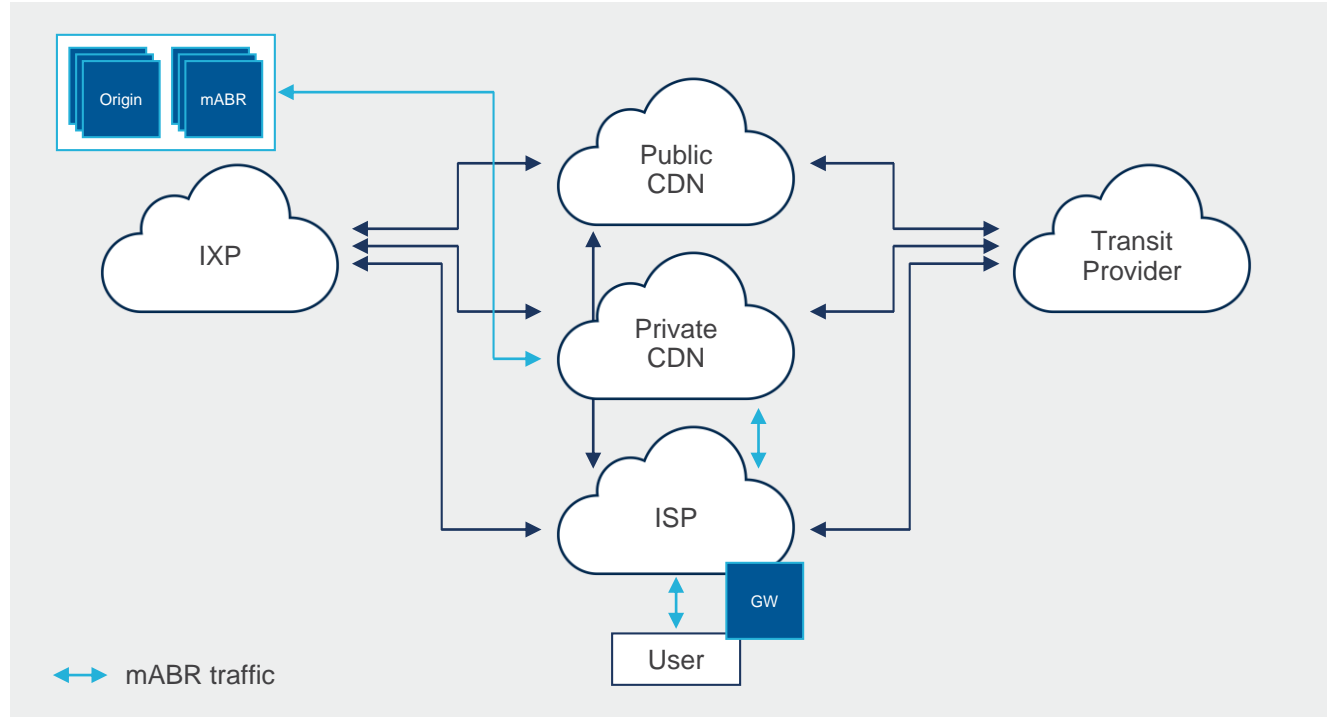
(1) : Bitrates derived from French CSA, 11M/s UHD in 2019

STREAMING COSTS COMPARISON



Private decentralized solution best solution

ALTERNATIVE SCENARIO: MULTICAST ABR



Complex and unproven

Full UHD OTT delivery possible

CDN more expensive than DTT

Private centralized CDN lower marginal cost

Private decentralized CDN lower and attractive cost

UHD OTT feasible and economical in 2024

THANK YOU

