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Multicast, DASH and 5G

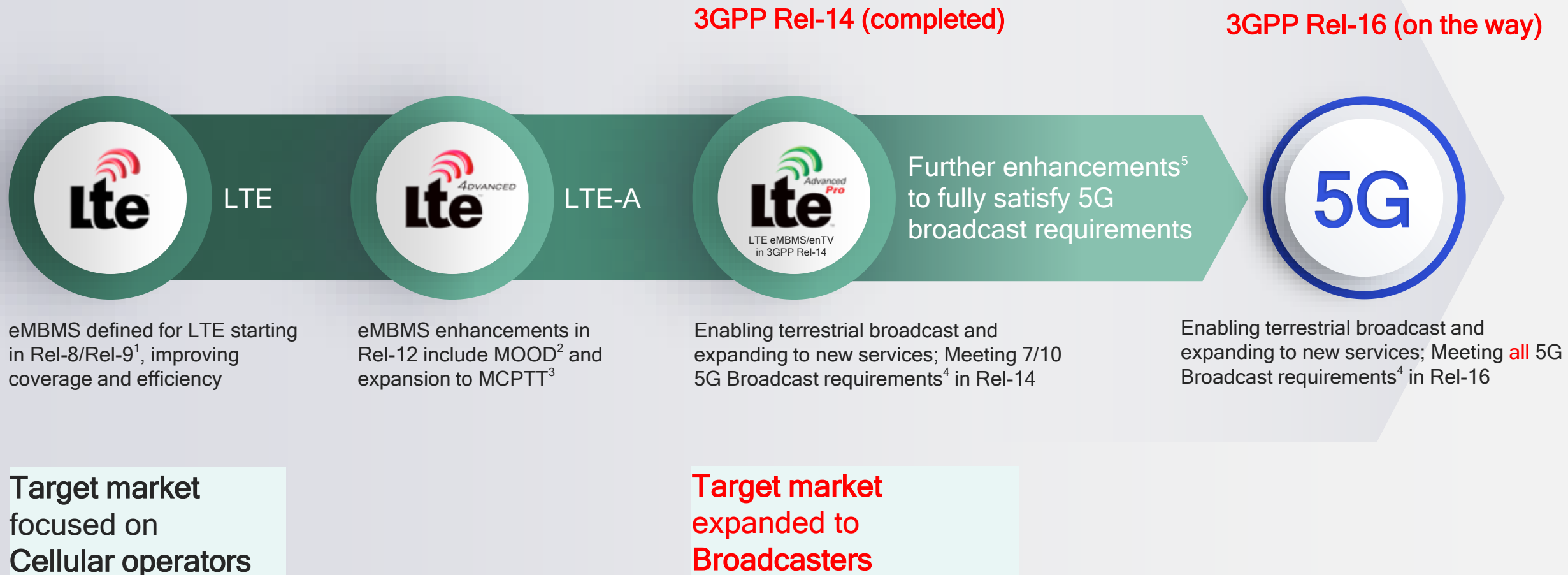
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MBMS/LTE eMBMS/enTV History

Building upon a strong 3GPP technology foundation



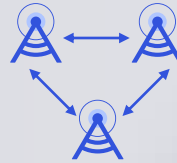
Terrestrial broadcast for next-gen digital TV delivery

enTV¹ – part of 3GPP Rel-16 – meets terrestrial TV broadcast requirements

Radio access enhancements

Longer range

New 1-symbol numerology with longer 200us CP² to support 15 km ISD³



More broadcast capacity

Supports dedicated broadcast network with 100% eMBMS carrier allocation



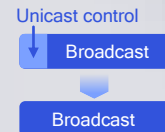
More deployment flexibility

Single network for mobile and fixed devices with enhanced support for rooftop reception



Better efficiency

New subframe design reduces overhead in dedicated broadcast transmissions



System layer enhancements

Receive only mode

Delivery of free-to-air content to devices without SIM/service subscription



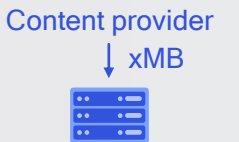
Transport only service

TV broadcasters can deliver content in native format without transcoding



Standardized interface

Content providers can deliver media over LTE with a unified framework



Shared broadcast

Multiple operators can serve users on a common broadcast carrier



Rel-16 adds in addition

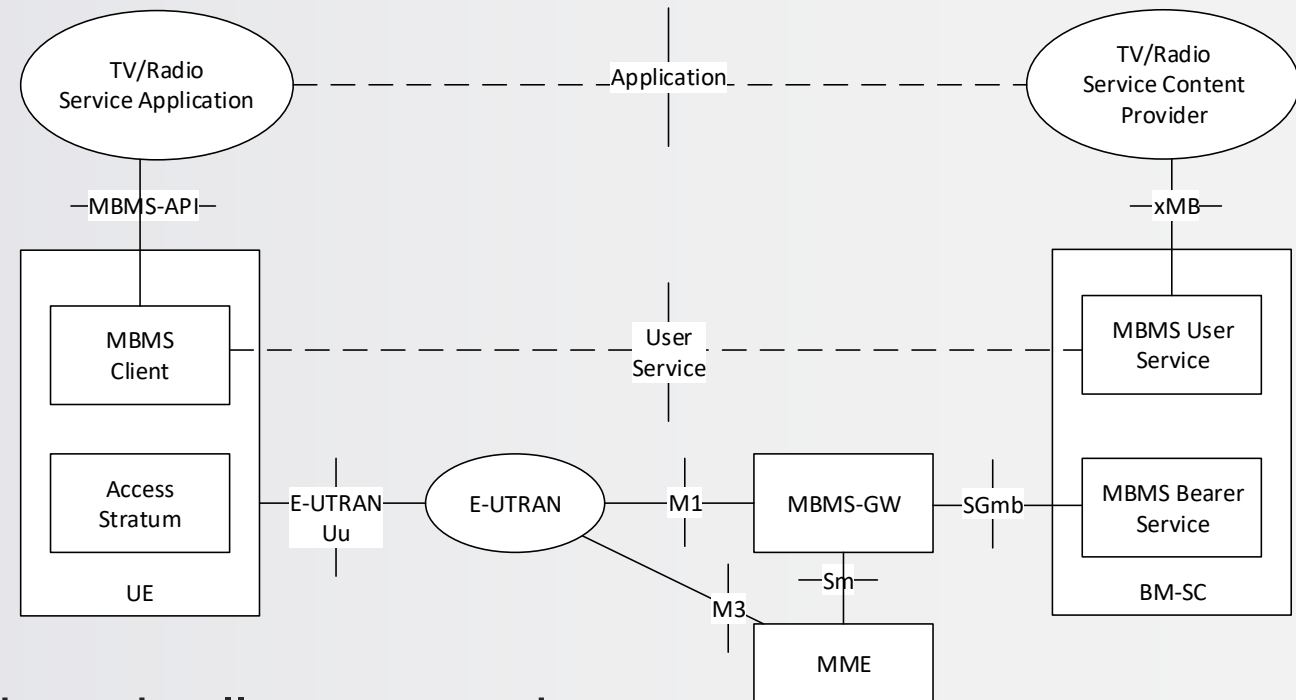
- ~15km ISD (optimized for higher speeds, e.g. audio)
- 50km ISD+ (rooftop reception, limited outdoor depending on Tx power)
- 250km ISD (TBC)

ETSI JTC Broadcast

Target: Broadcasters and Regulators - Get Broadcast Stamp

ETSI TS 103 720: 5G Broadcast **System** for linear TV and radio services

- A single overview and system specification that profiles and restricts existing 3GPP specifications in the context of 5G in order to enable the deployment of linear TV and radio services.
- The work item is aligned with ongoing 3GPP standardization work, in particular the "LTE-based 5G terrestrial broadcast
- Main features
 - radio network comprising only MBMS-dedicated cells as transmitters;
 - Receive-Only-Mode (ROM) devices and UEs supporting FeMBMS [x23.246] as receivers;
 - A down-stripped EPS dedicated to TV and Radio Services with E-UTRAN;
 - A down-stripped MBMS User Service [x26.346] dedicated to TV and Radio Services;
 - A set of MBMS-APIs [x26.347] that permits to use third-party service layers.



Rel-17 Multicast Broadcast Considerations

LTE MBMS

Initial Service Targeted

- Video Content and Streaming

Focus on one type of service

- Joint Transport/Service Layer

Service independent of unicast

- Separate core network

Service oriented architecture

- Functionality at the core network
- Reliability, unicast/Broadcast decision
- Security also on application layer

Service oriented architecture

- Flow identified by TMGI (service)
- Maps to MBMS bearer

5G Mixed Mode

Multiple Services Targeted

- C2VX, public safety, I-IoT, IP Multicast

Multiple Services with different characteristics

- Common Transport/Separate Service Layer

Service have unicast and broadcast components

- Transport integrated with 5GS unicast

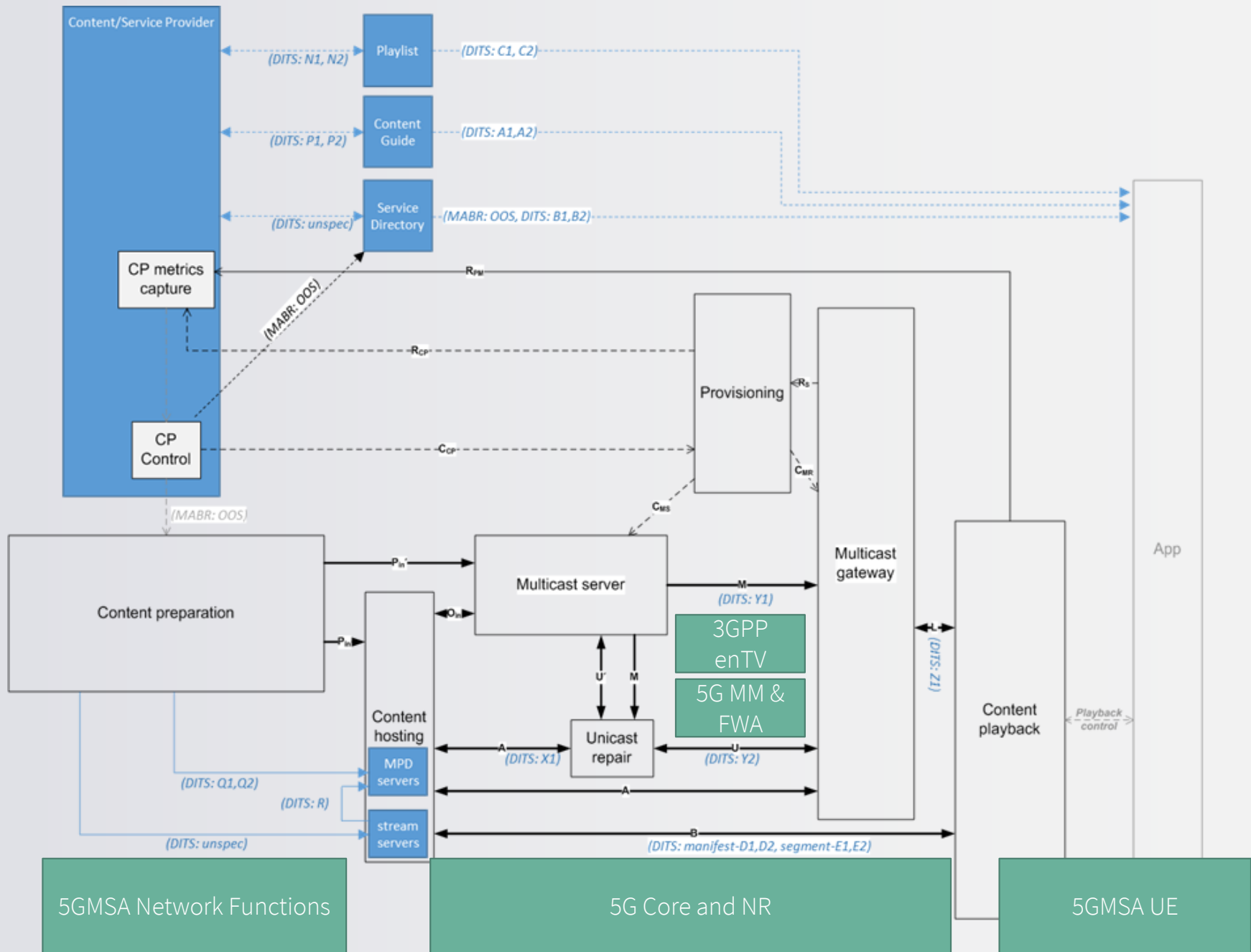
Enable high reliability + low latency

- Functionality provided at the transport
- RAN Reliability, unicast/Broadcast decision
- Security: encryption at either RAN or UPF

Transport oriented architecture

- Flow identified by MB-QoS flow ID
- Maps to Radio Bearer in RAN

5G Study Mission Report Scenarios



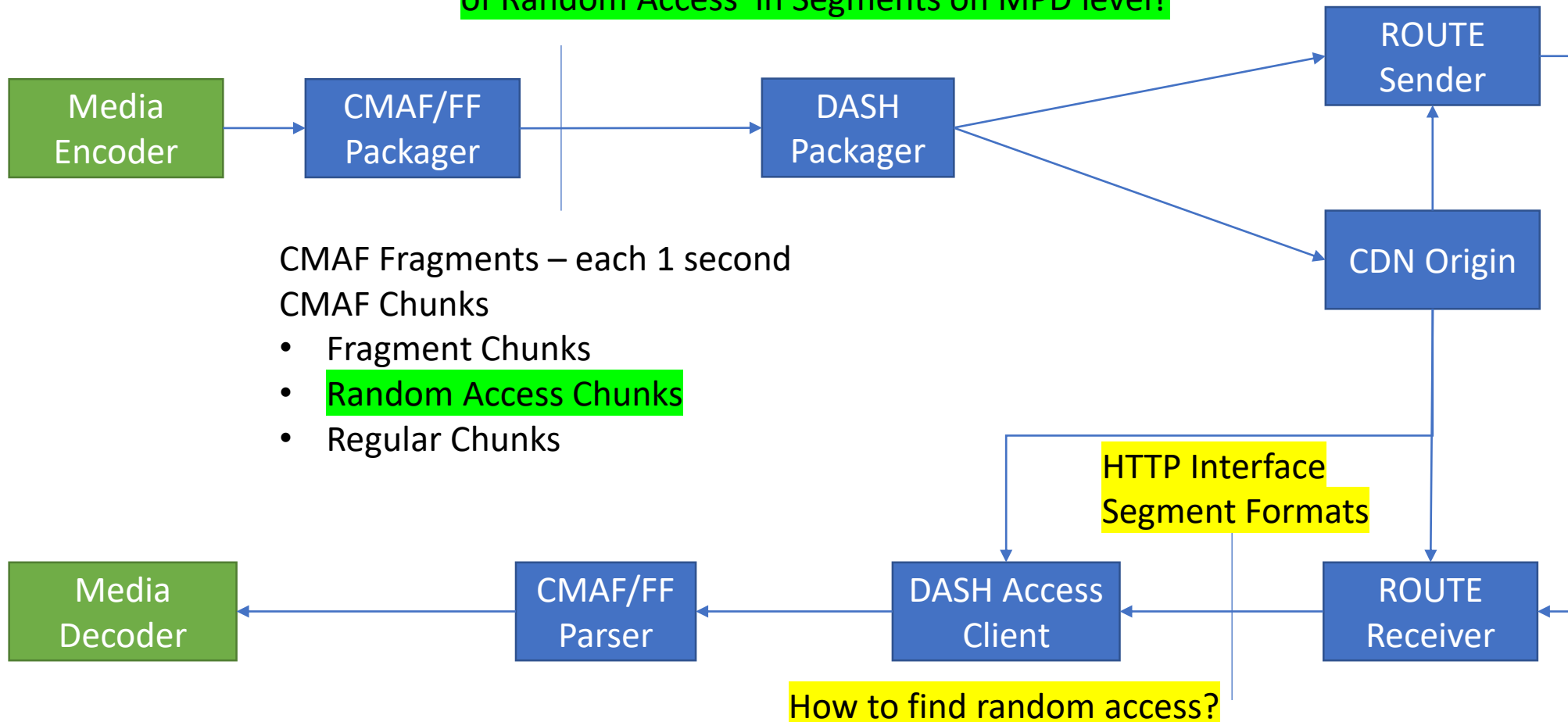
Low-Latency and Multicast

Low-Latency DASH output

- CMAF Chunks are aggregated into Segments
- How to signal presence and position of Random Access in Segments on MPD level?

How to map this to ROUTE Sending?

- Fragments start a new object
- Random Access Chunks may be signalled on ROUTE level



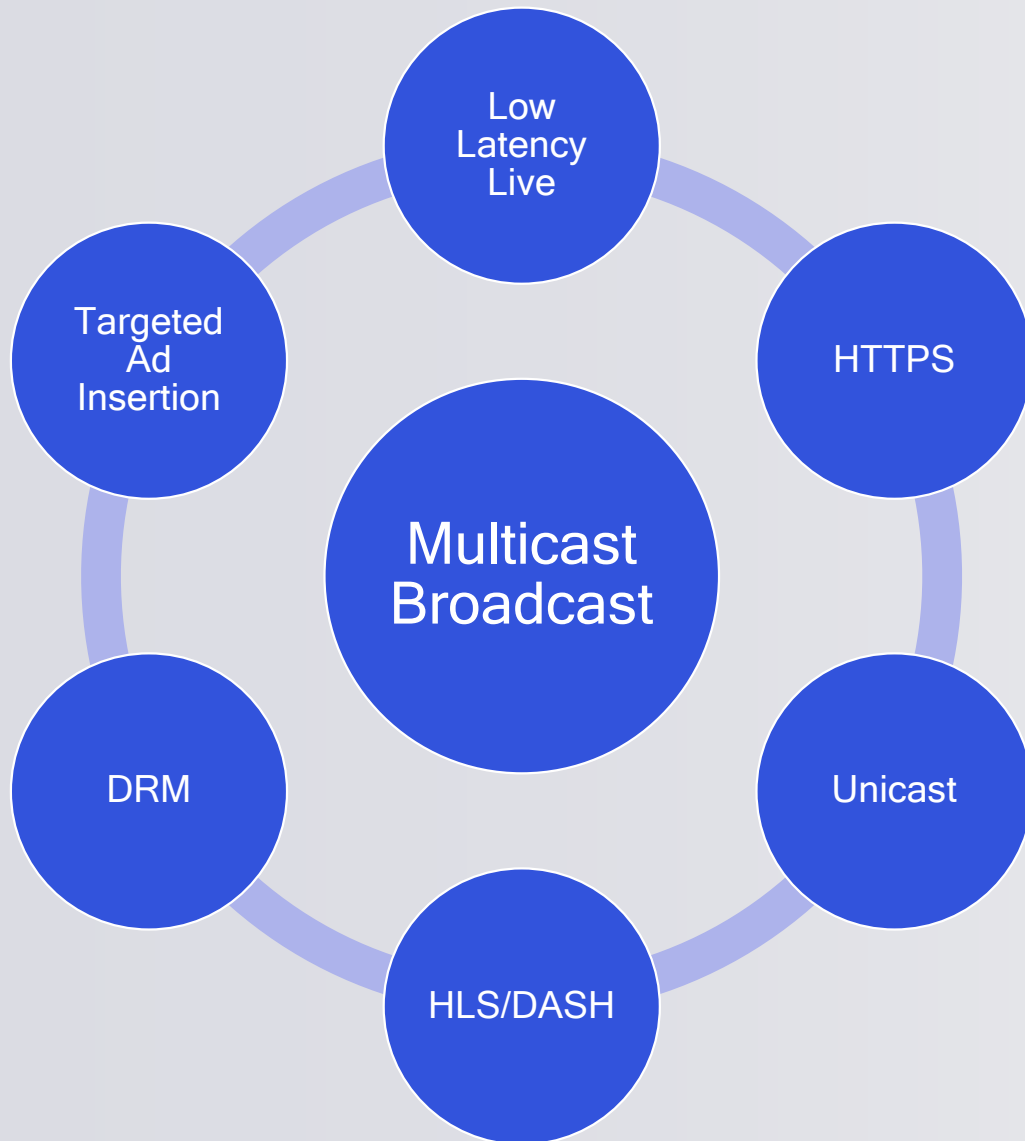
CMAF Fragments – each 1 second

CMAF Chunks

- Fragment Chunks
- Random Access Chunks
- Regular Chunks

How to find random access?

More fun ...



DVB

ABR Multicast - DOA or RTB?

3GPP




MBMS again?

DASH-IF

Anything to be done?



Thank you!

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