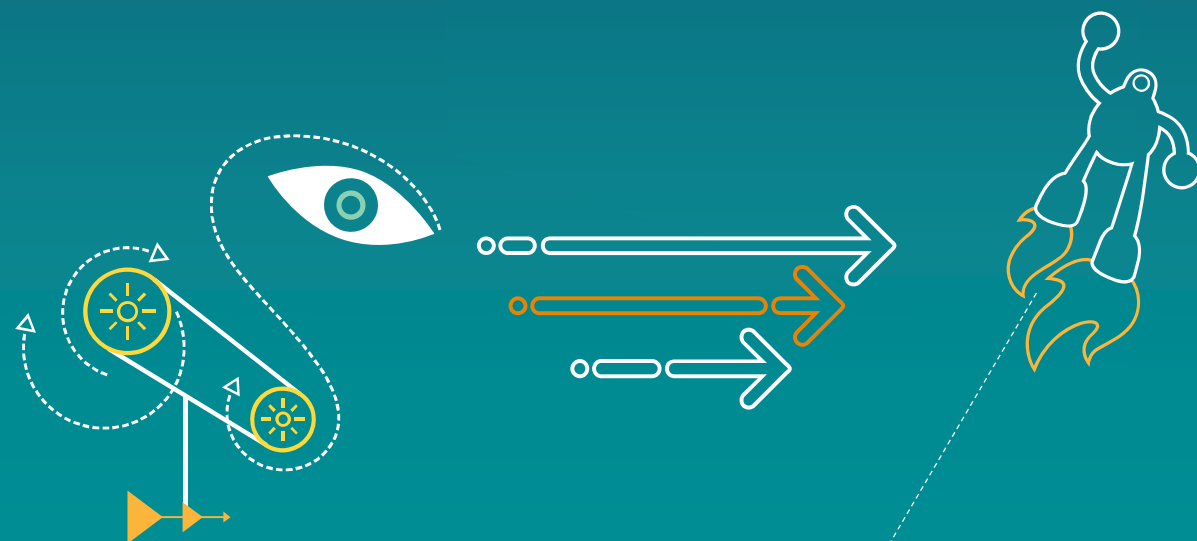


Thomas Stockhammer  
Director Technical Standards  
Qualcomm Technologies, Inc.

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# 3GPP Content Delivery Efforts

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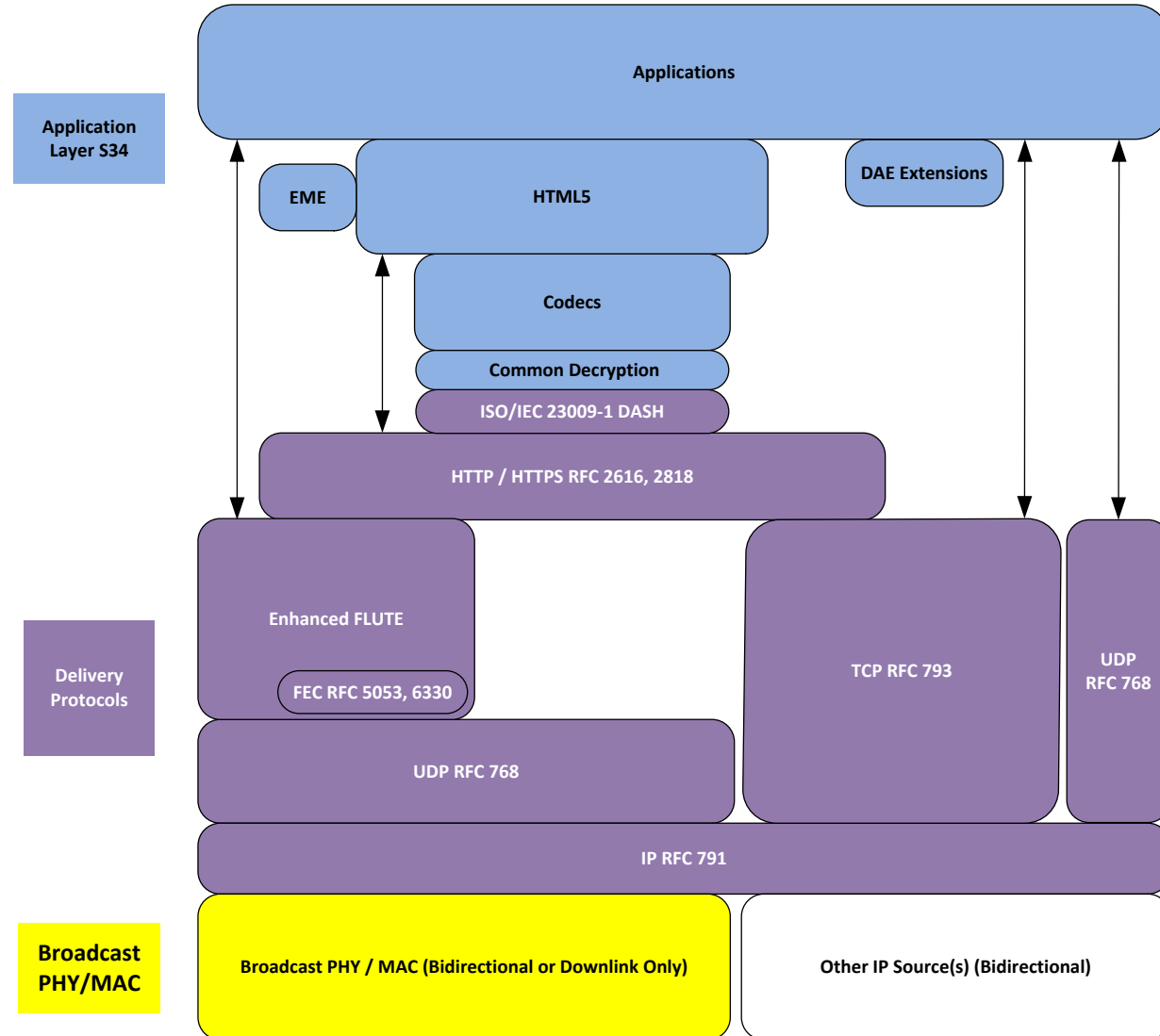
# Simplified Stack for 3GPP Content Delivery

3GPP specifies

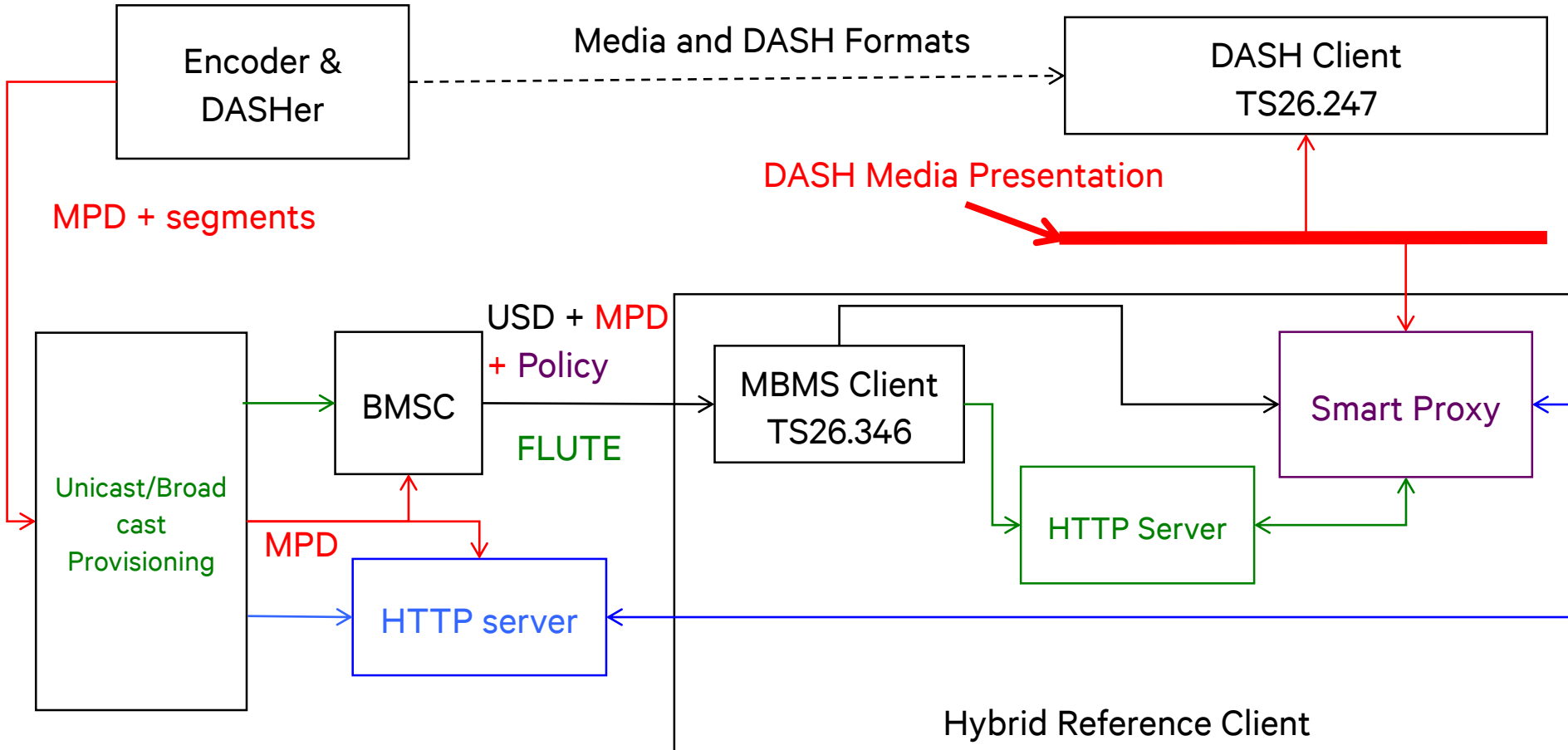
- MBMS and IP unicast (HSPA, LTE, LTE-A)
- DASH
- 3GPP/ISO File format
- AVC and HEVC
- HE-AACv2
- 3GPP Time Text
- (HTML-5)

3GPP also historically supports

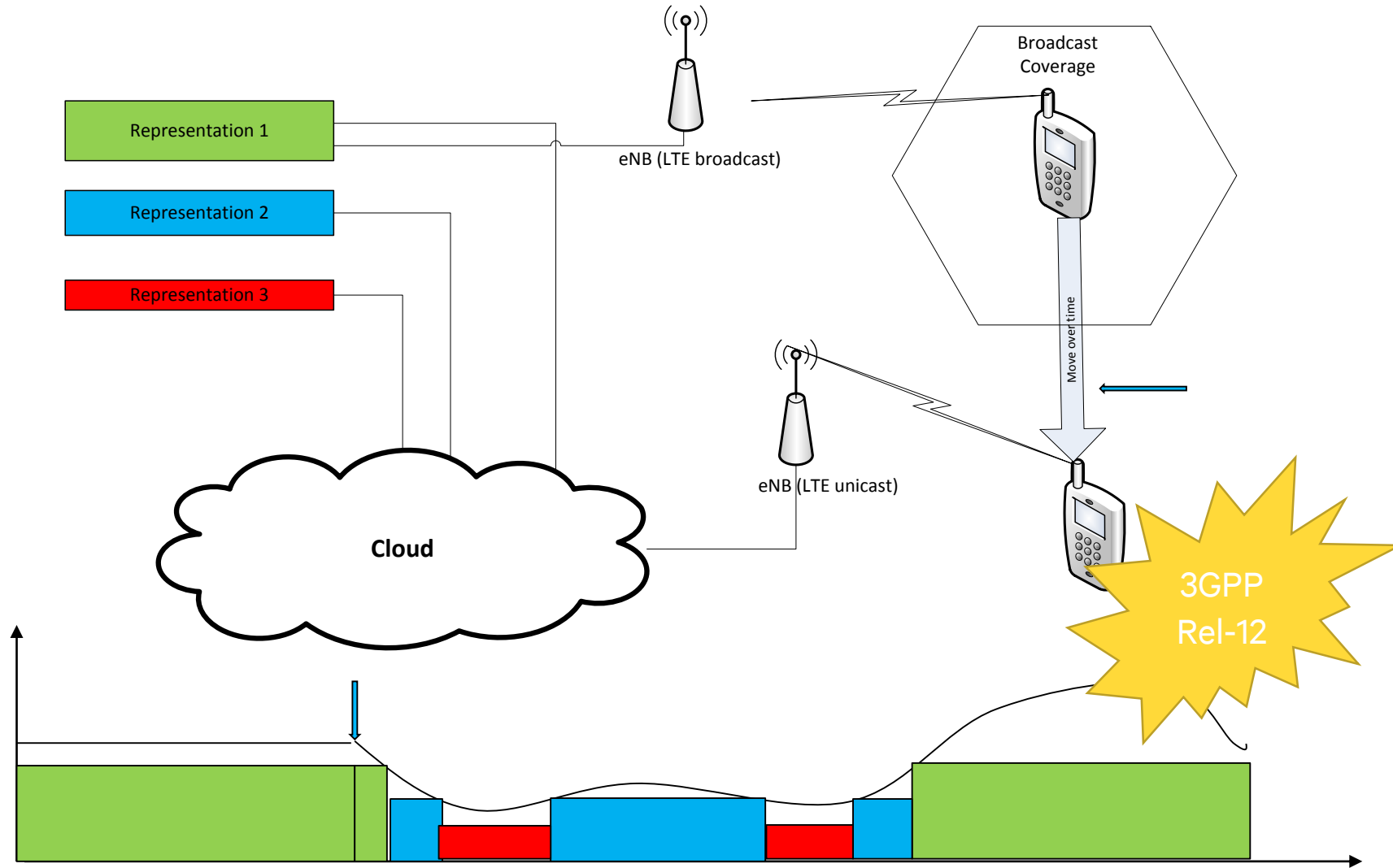
- RTP
- SMIL



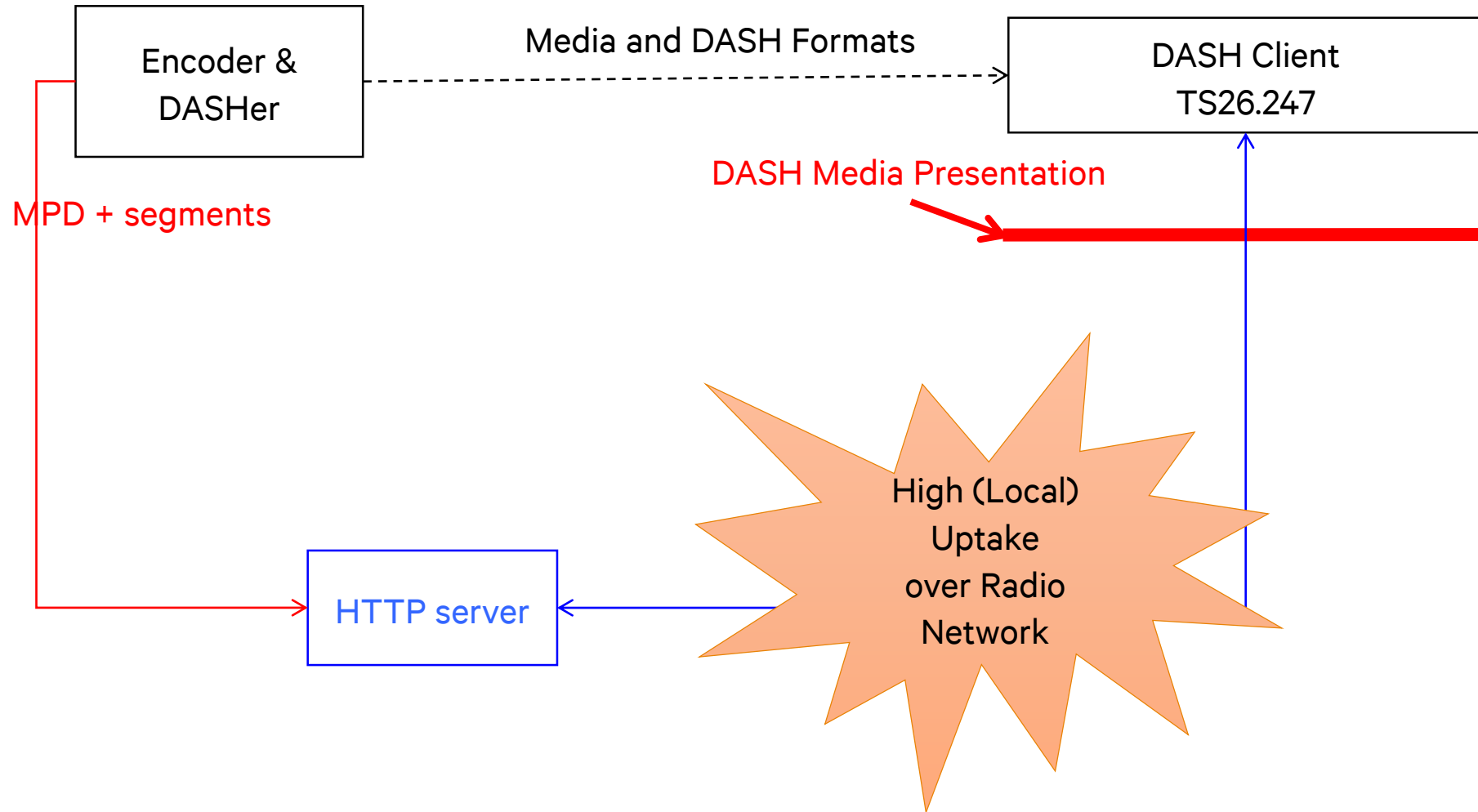
# DASH & MBMS – Hybrid Architecture



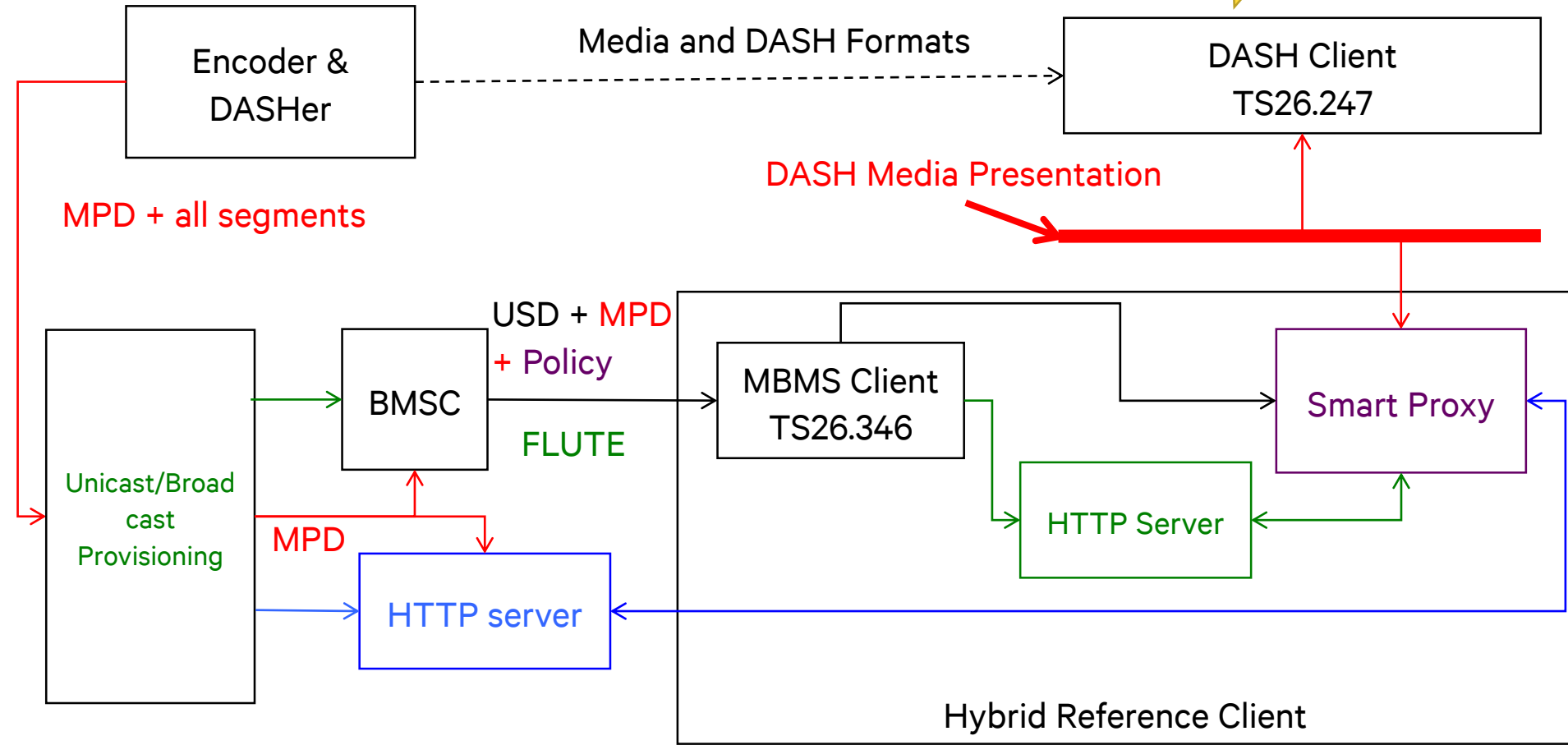
# Seamless Coverage Extension



# MBMS on Demand (MooD)



# MBMS on Demand (MooD)

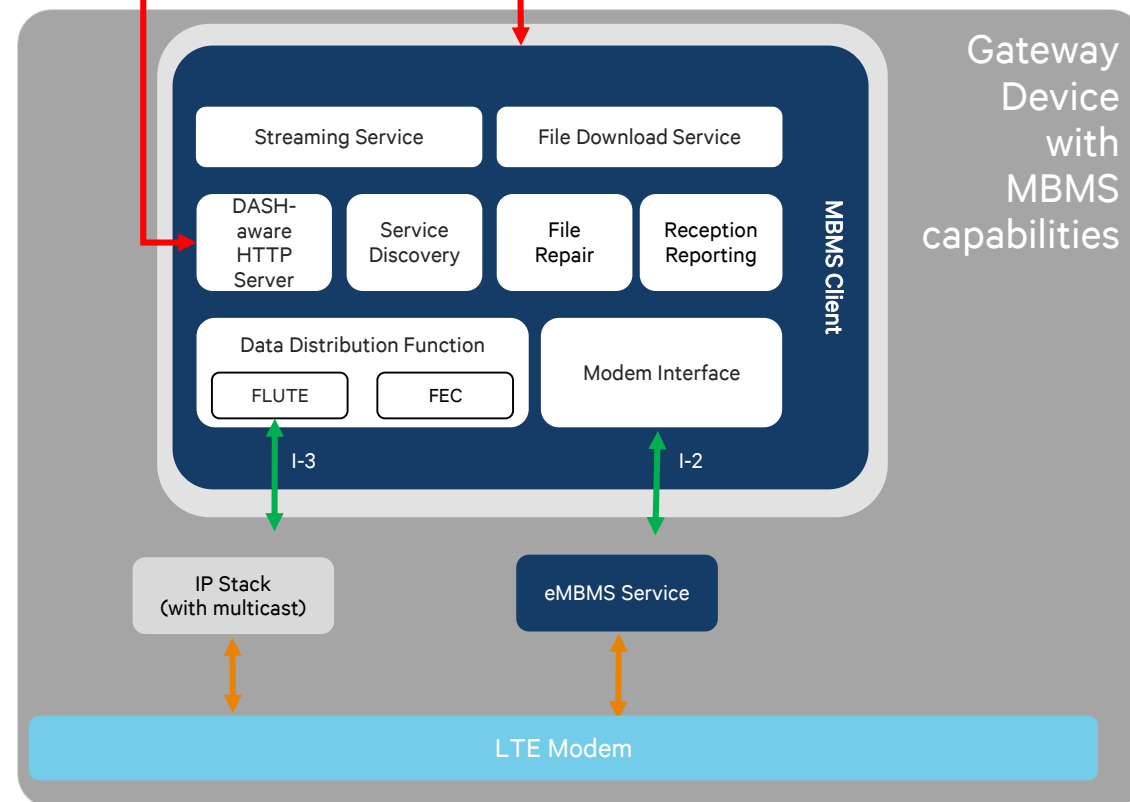
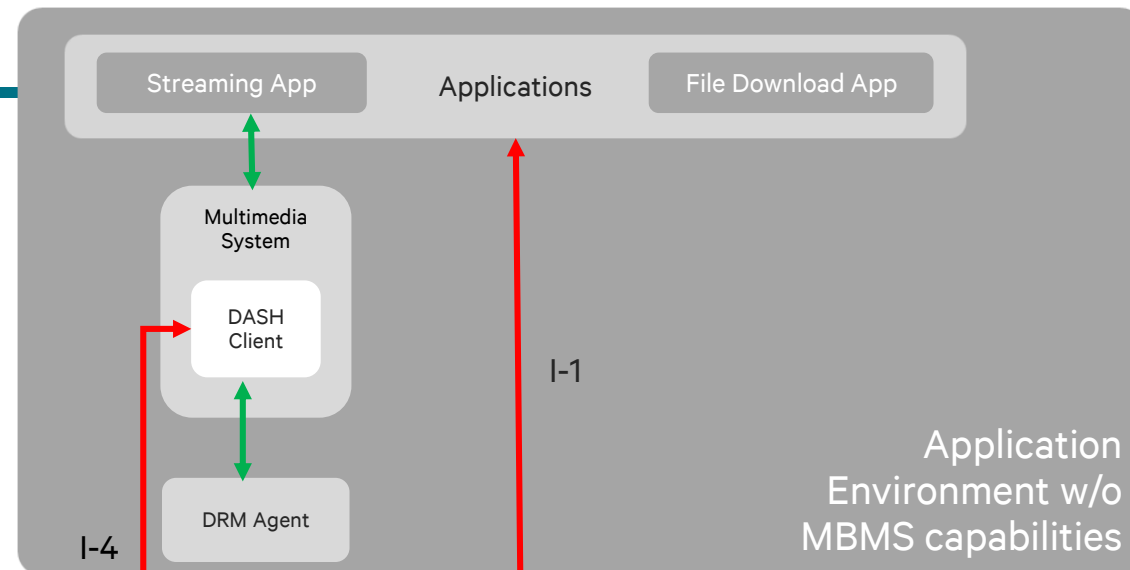
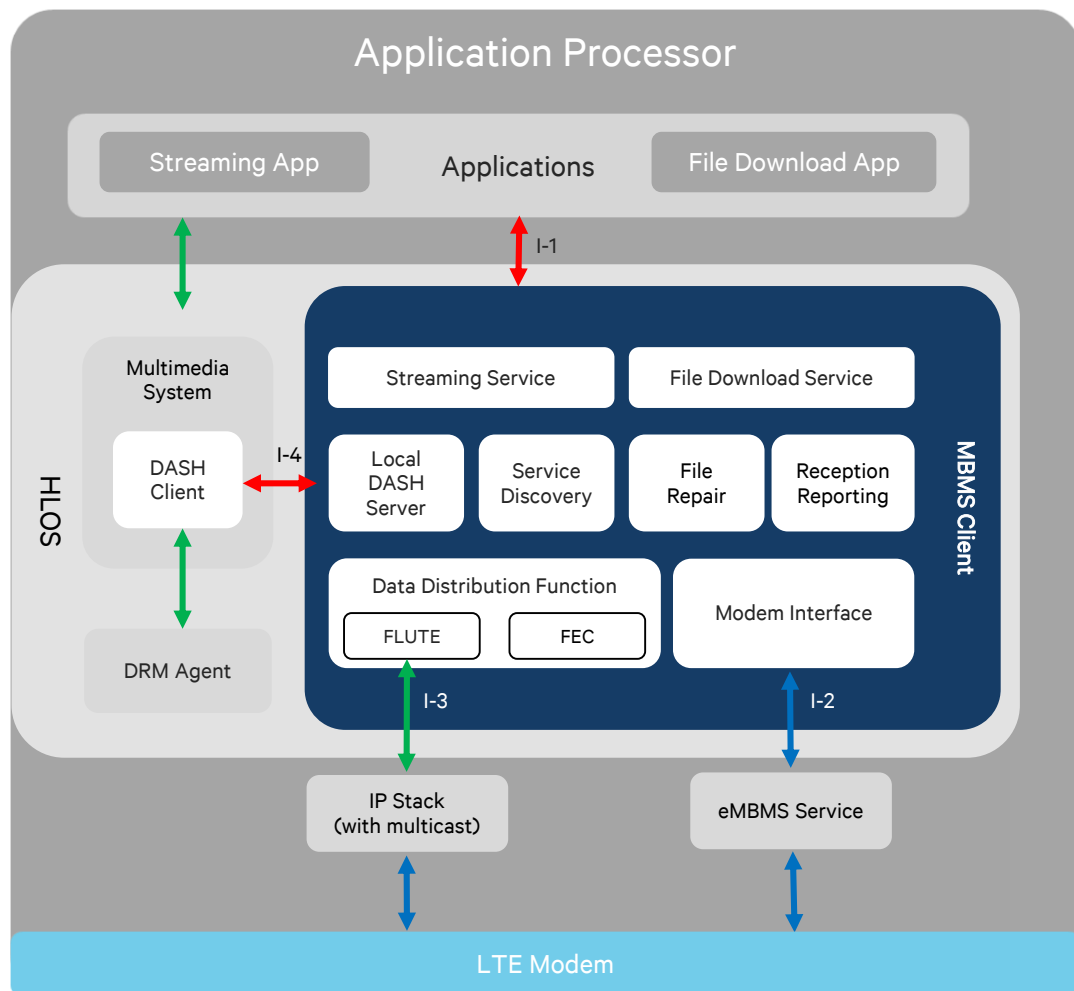




# Rel-13 MBMS Work on MBMS

- Profiling Work
  - Service Announcement Profile including DASH services
  - Download Delivery Method Profile for DASH services
- Extensions: Make MBMS more accessible to apps/browsers
  - Definition of protocol handler: MBMS as a transport
    - enabling bootstrap, service access and return the identified resource/service to the application incl. APIs and network interfaces
    - URL form(s) that identify an MBMS delivered service/object
    - Methods and messages to communicate between handler and applications.
  - MBMS API Set (initially a study only as it is unclear if 3GPP will define APIs)
    - API set that abstracts details and complexity of underlying MBMS operations, but provides essential functionalities → applications leverage MBMS delivery platform.
    - Open questions on exact functionalities, abstraction level API, documentation, etc.

# API Approach





# Rel-13 eDASH Work



3GPP developed DASH in 2010 and 2011 jointly with MPEG

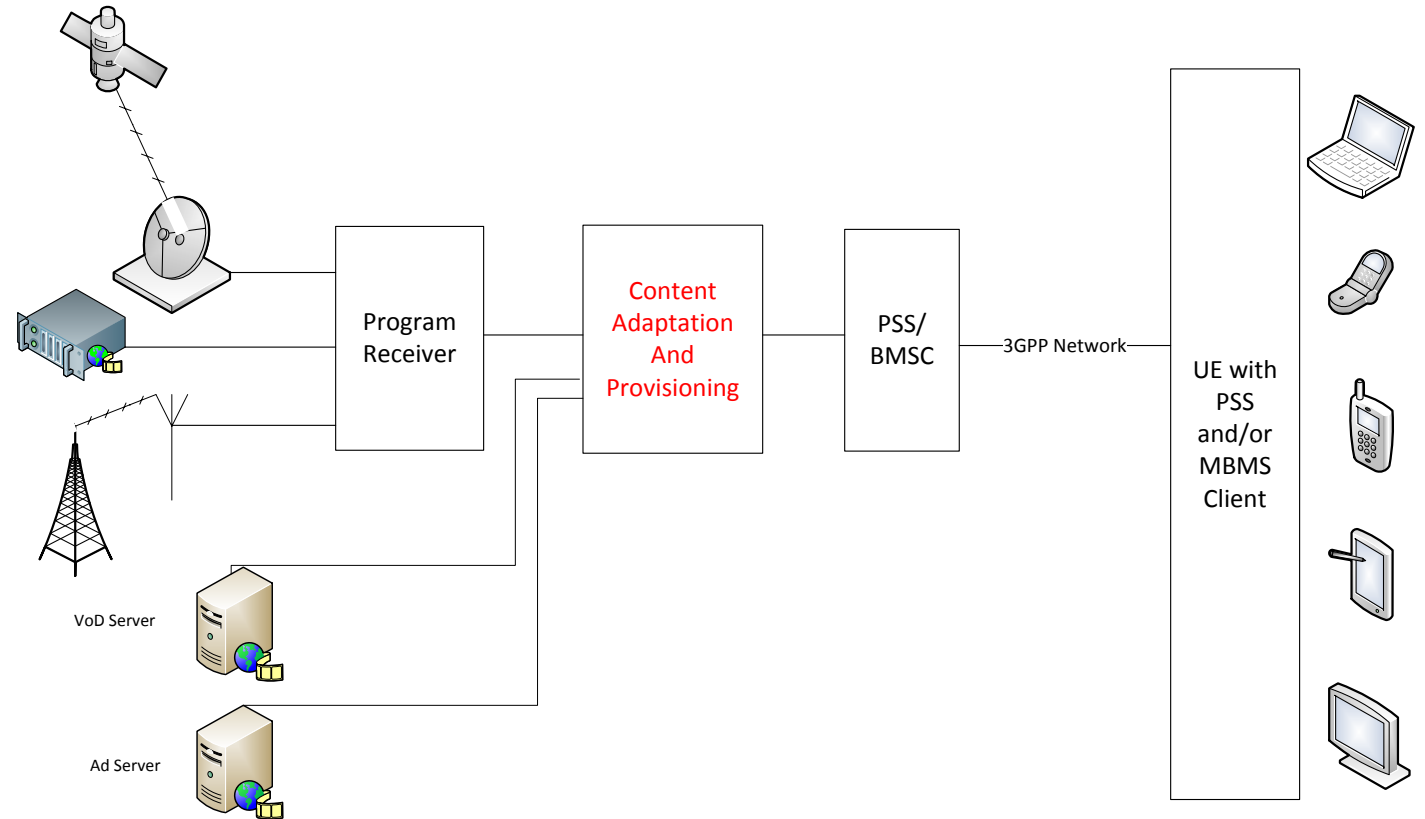
- Main Objective is alignment with industry profiles and technologies to enable cross-domain deployments
  - Live Services: align with DASH-IF
  - Ad Insertion: align with DASH-IF
  - Content Protection: align with DASH-IF
  - Profiles: Aligned with DASH-IF and MPEG-DASH
- Additional Optimizations:
  - Server and Network Assisted DASH (SAND) to support providing information to the client about network status and also to provide feedback from the client to the network
  - Additional Metadata as considered necessary (Quality, etc.)
  - Relevant MBMS extensions

# Rel-13 Video Work



Making 3GPP capable for mainstream content delivery

- TV video profile
- HTML-5 profile
- Study Item Video enhancements in 3GPP multimedia service
- Study Item for Interactivity for 3GPP-based Streaming and Download Services



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# Rel-14 Enhanced TV Services – work in SA1

## Making 3GPP including MBMS a flexible Platform for TV Service delivery

- Radio Enhancements
  - eMBMS Spectral Efficiency
  - Flexible capacity allocation
  - eMBMS Coverage enhancement
  - Wide area coverage and moving receivers
  - Coverage on-demand support
- Service Enhancements
  - eMBMS sharing
  - Standalone eMBMS Network
  - General LTE based TV service
  - Access to, charging of TV programs and anonymity of reception
  - Decoupled eMBMS content, service, and transport
  - Service Layer Function and Codec Support
  - Hybrid Transport

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# Conclusions

- 3GPP is upgrading their specification to provide a new delivery platform
  - highest-quality
  - Any device (mobile, tablet, stationary TVs)
  - Highly efficient use of radio resources
  - Sharing resources among users and MNOs for more efficiency
- With Rel-14, 3GPP will be ready to delivery innovative TV and Content Services
- These services are expected to available and further enhanced in the 5G context

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# Thank you

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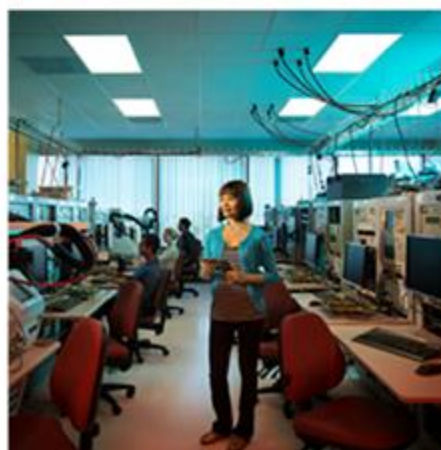
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