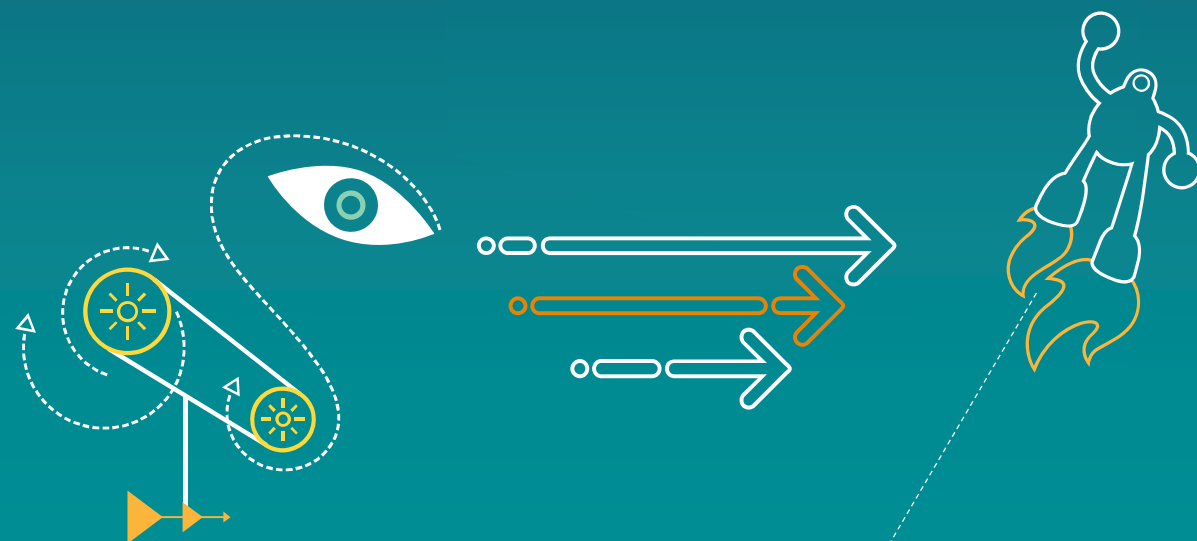


Thomas Stockhammer
Director Technical Standards
Qualcomm Technologies, Inc.

3GPP Content Delivery Efforts



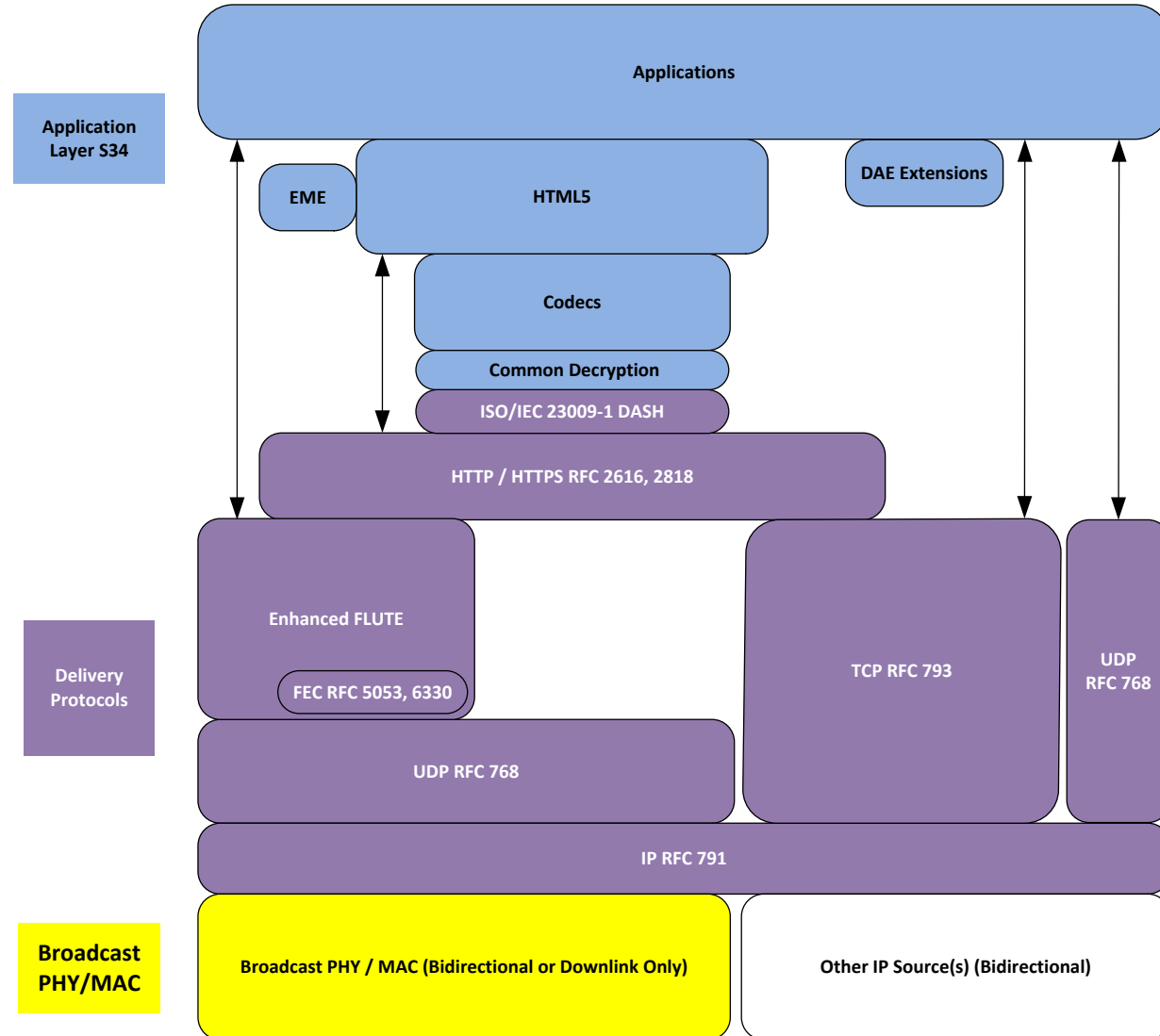
Simplified Stack for 3GPP Content Delivery

3GPP specifies

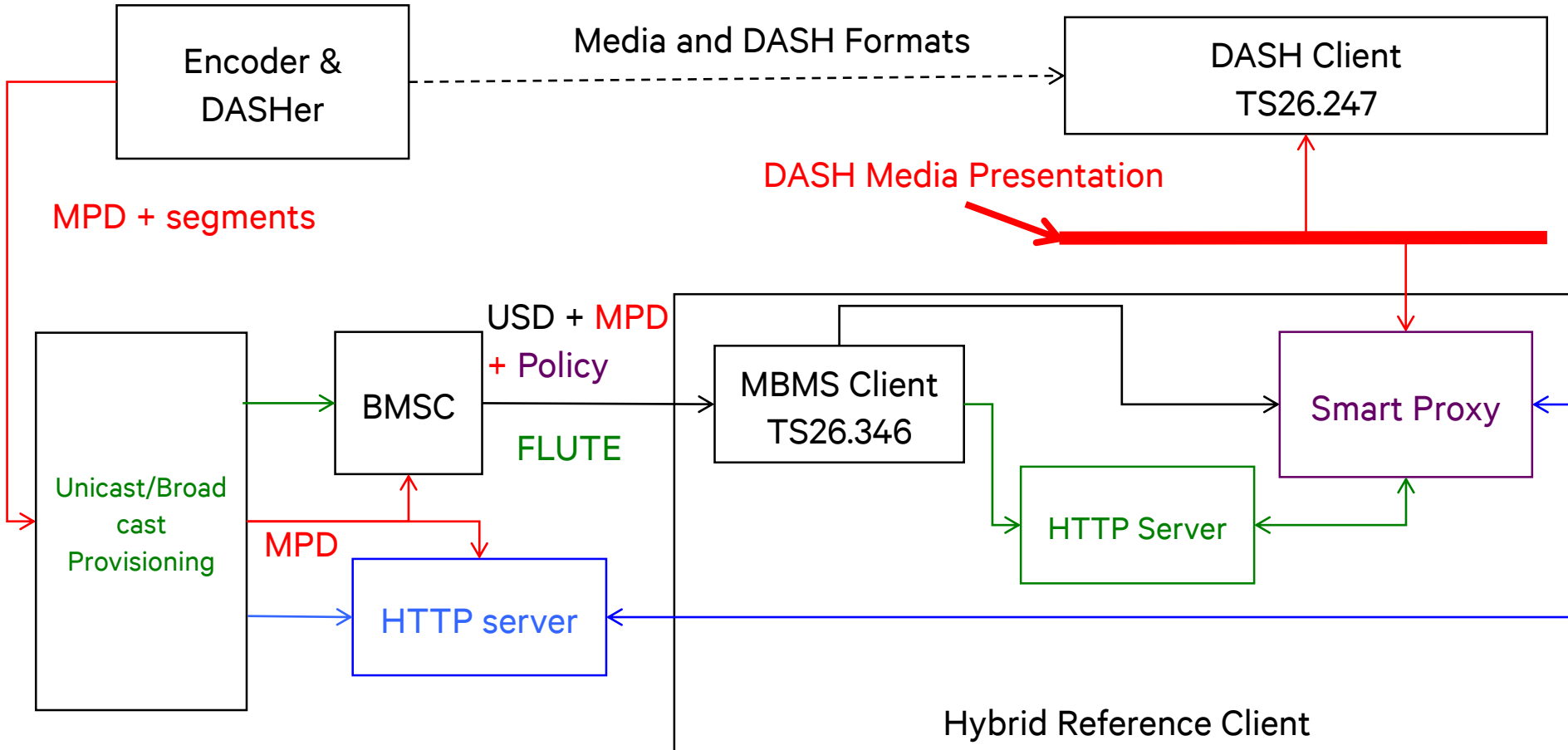
- MBMS and IP unicast (HSPA, LTE, LTE-A)
- DASH
- 3GPP/ISO File format
- AVC and HEVC
- HE-AACv2
- 3GPP Time Text
- (HTML-5)

3GPP also historically supports

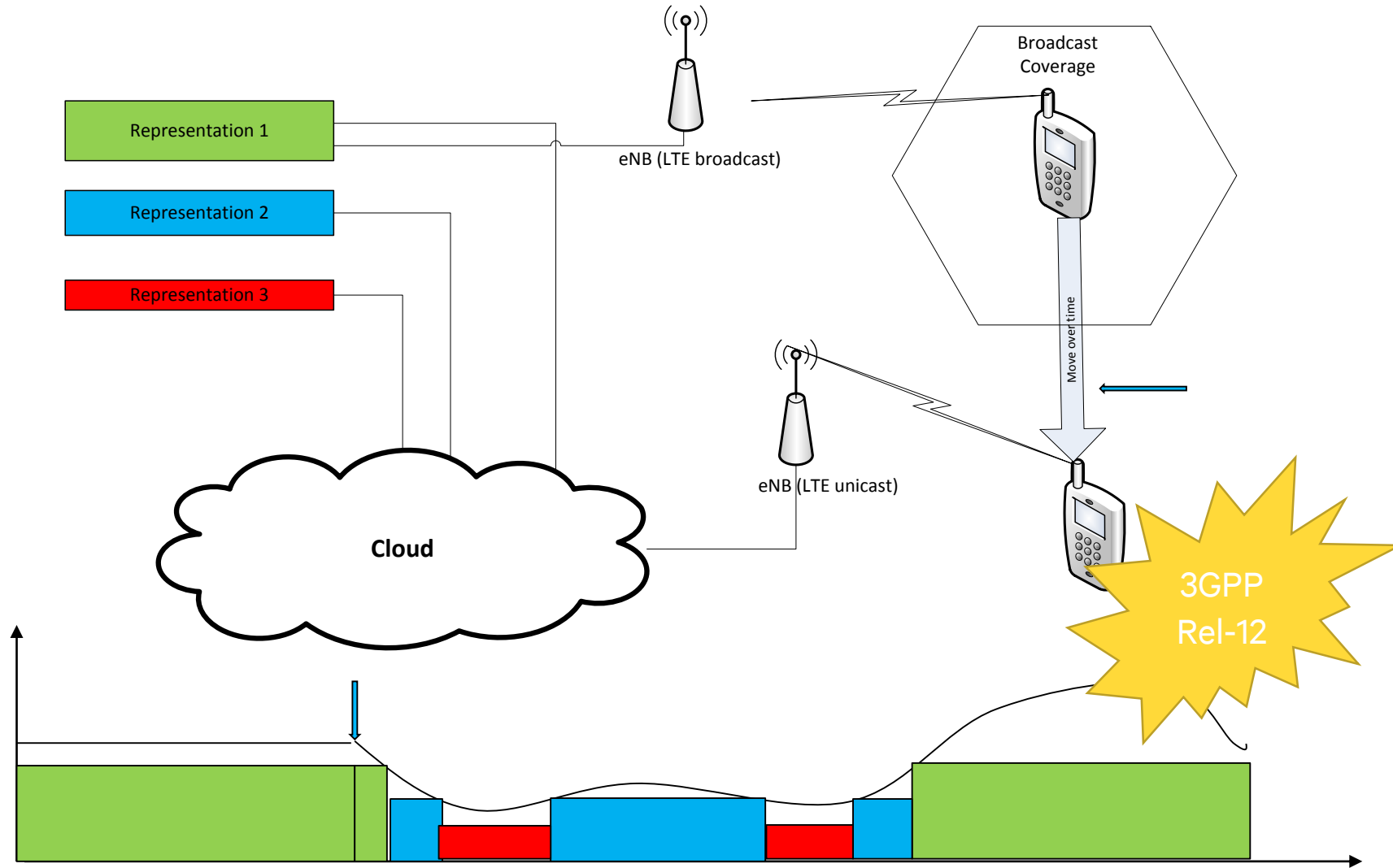
- RTP
- SMIL



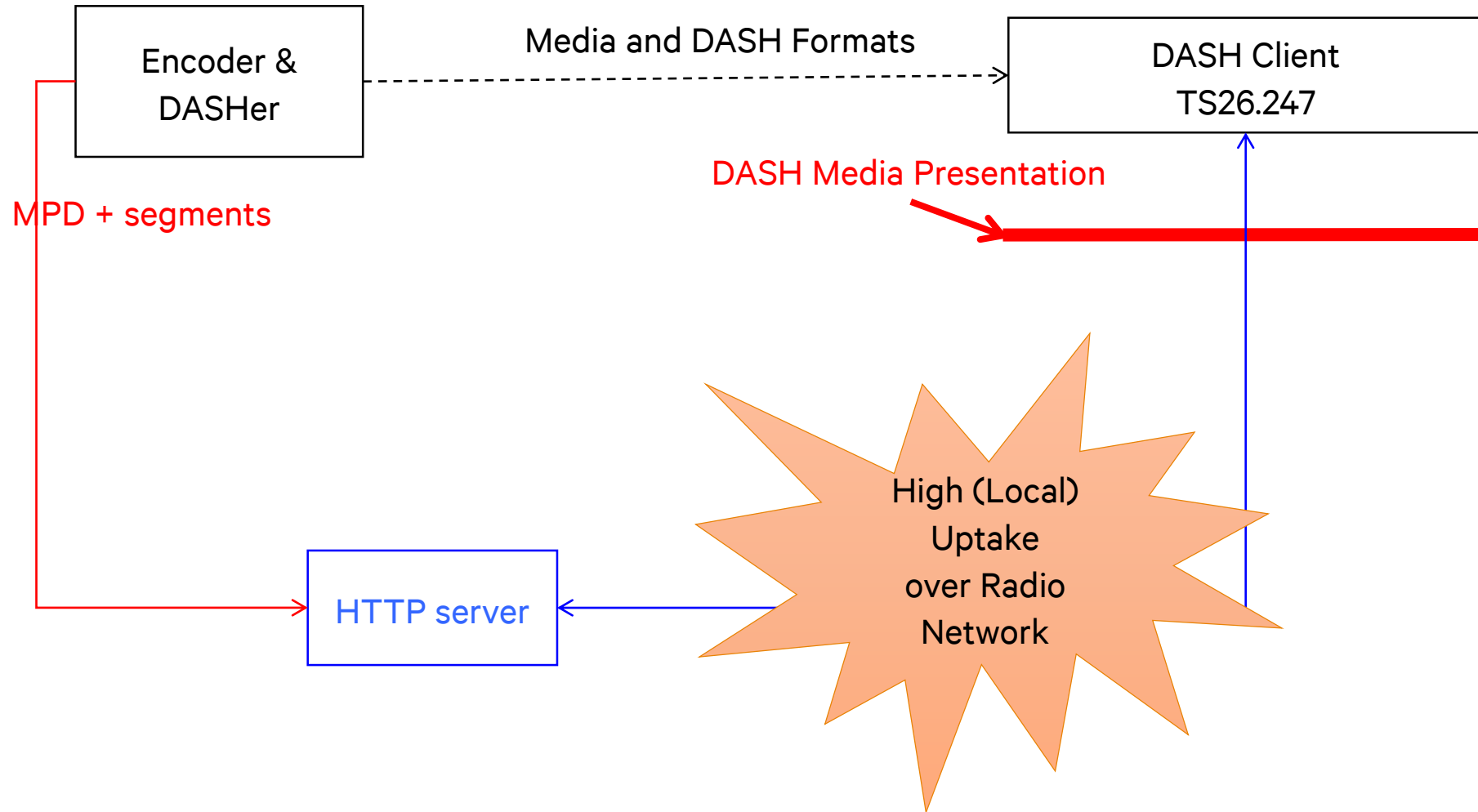
DASH & MBMS – Hybrid Architecture



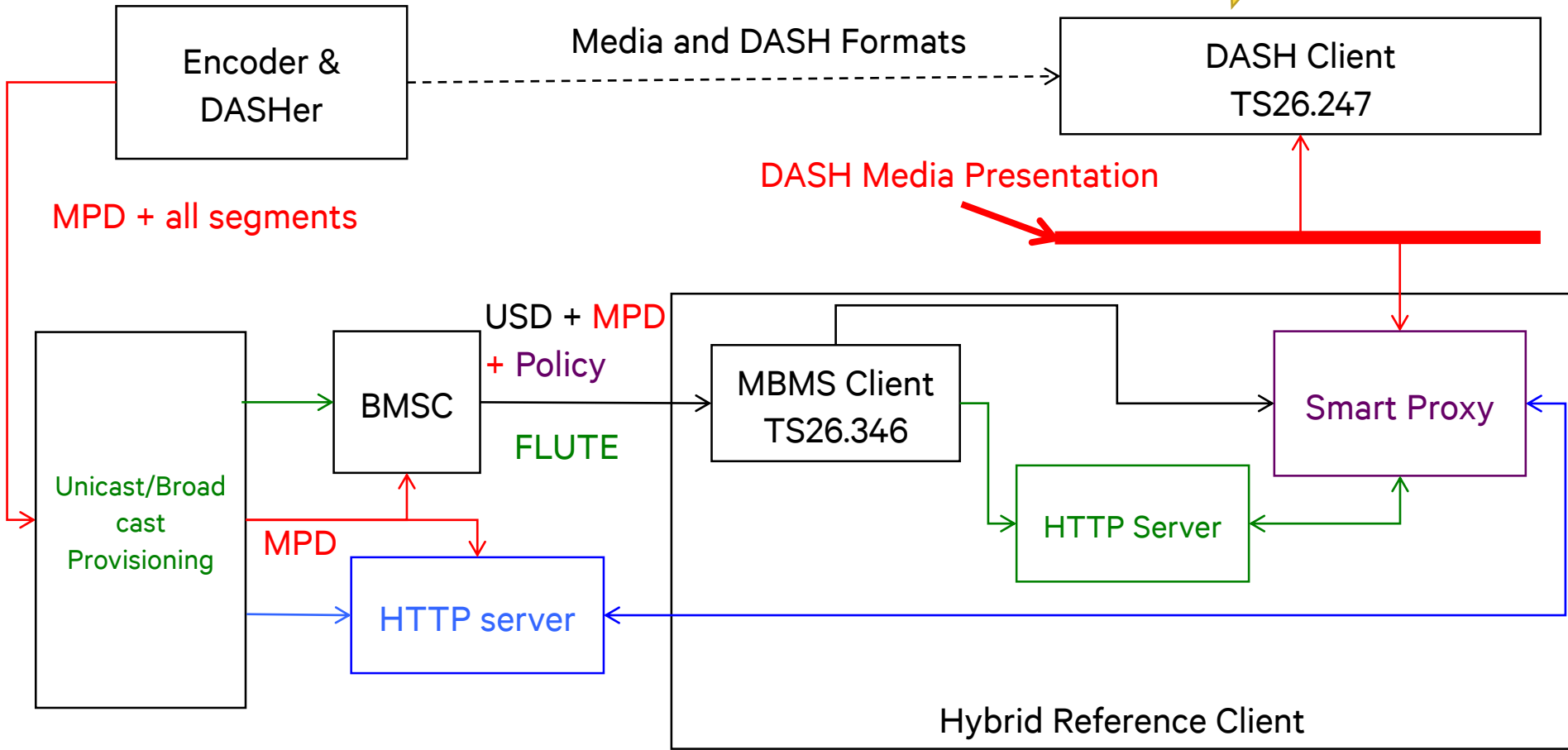
Seamless Coverage Extension



MBMS on Demand (MooD)



MBMS on Demand (MooD)

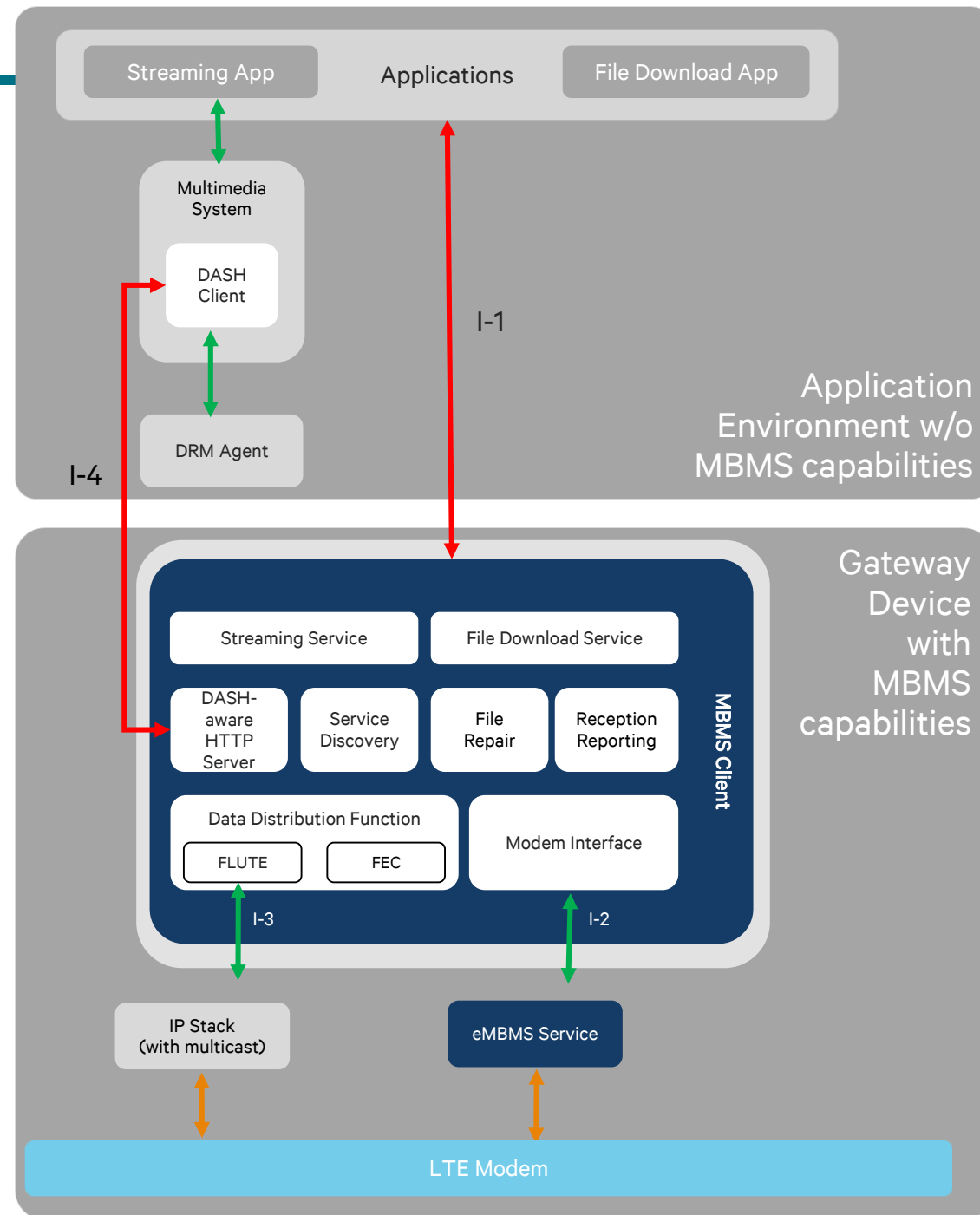
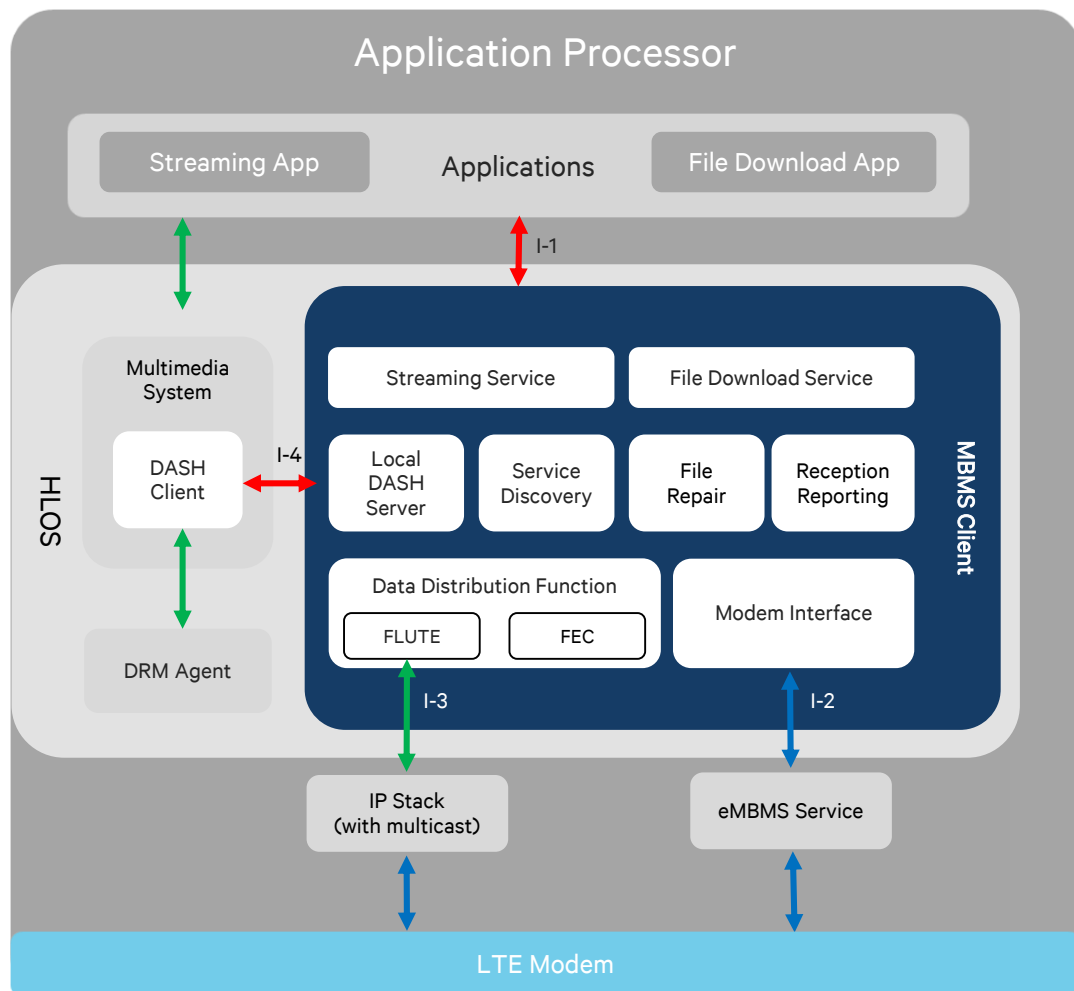




Rel-13 MBMS Work on MBMS

- 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

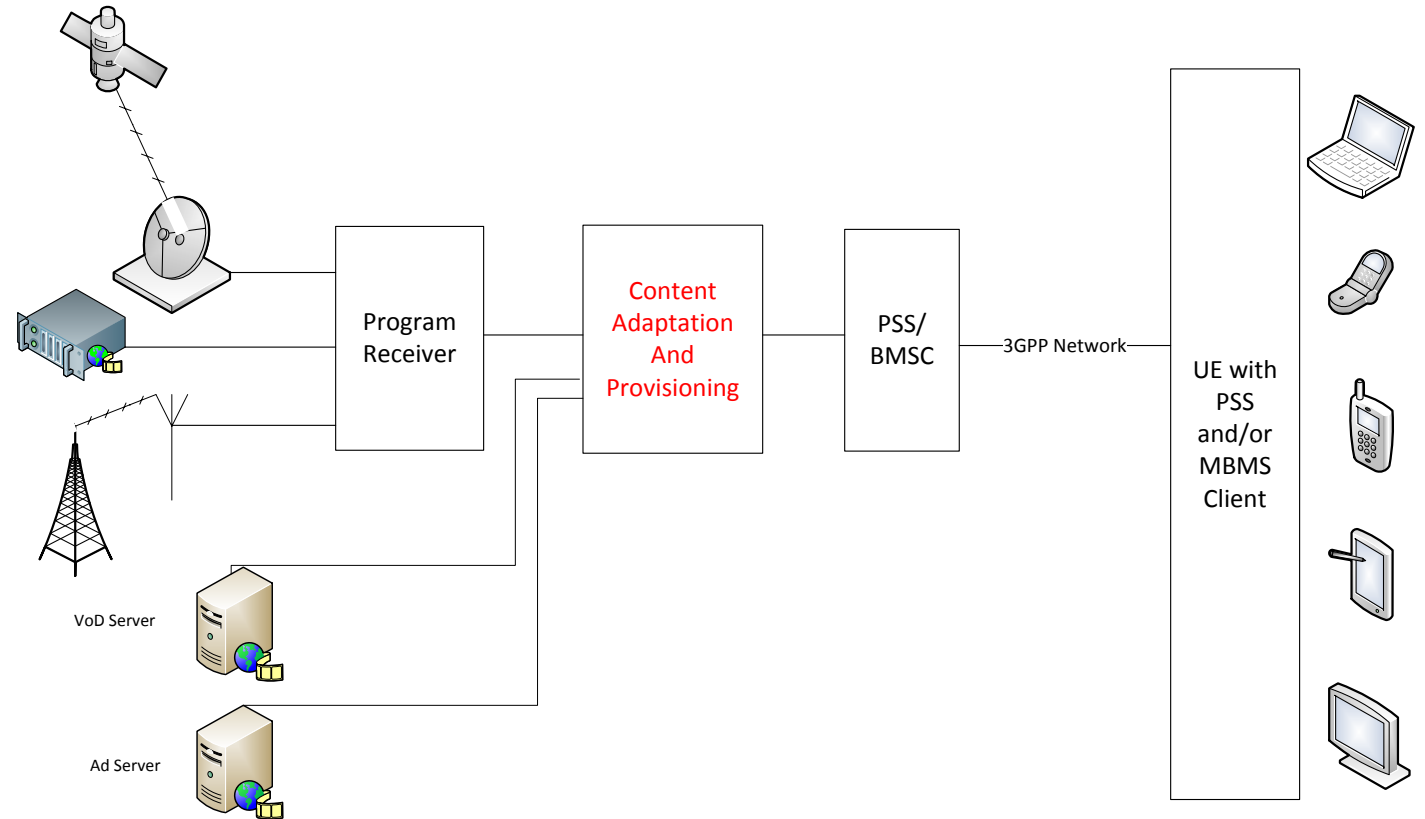
- Main Objective is alignment with industry profiles and technologies to enable cross-domain deployments
 - Live Services: align with DASH-IF
 - Ad Insertion: align with DASH-IF
 - Content Protection: align with DASH-IF
 - Profiles: Aligned with DASH-IF and MPEG-DASH
- Additional Optimizations:
 - Server 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



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

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

Thank you

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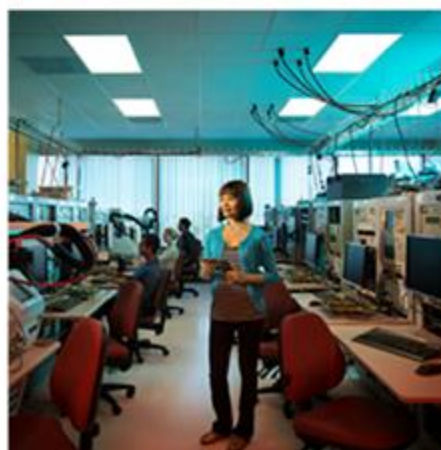
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