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eMBMS – BMSC & MBMS GATEWAY

This advanced multicast communication system is an efficient way to deliver real-time multimedia, voice, static content, software and data. LTE Broadcast enables the sending and streaming of rich content to multiple users simultaneously.

LTE Broadcast opportunities

The evolved Multimedia Broadcast Multicast Service (eMBMS) provides mobile operators with new revenue and cost saving opportunities. Using LTE broadcast, which enables sending and streaming of multimedia content to eMBMS-enabled handsets specific to their location, it is ideal for congestion-prone areas – sports venues and festivals for example – enabling a unique out-of-home video experience. It also provides cost-saving for mobile operators by efficiently delivering large amounts of data or content, using a fraction of the network bandwidth that would be required to individually deliver the same content.

eMBMS can provide new revenue streams and increased customer loyalty while also delivering EPC and RAN cost reductions. The one2many eMBMS solution includes many innovations that will further improve efficiency and quality of service monitoring, while providing a greatly enhanced subscriber/user experience.

New mobile services

eMBMS enables the mobile operator to offer new services via LTE broadcast:

- HD video broadcast
- Large file delivery (eg firmware)
- Mission-critical Push-To-Talk (PTT)
- Wireless emergency alerts with diagrams, maps, photos, spoken directions and video with sign language for the hearing disabled
- IPTV unicast EPC/RAN offload

The one2many eMBMS solution consists of the Broadcast Multicast Service Center (BM-SC) and Multimedia Broadcast Multicast Services Gateway (MBMS GW). BM-SC and MBMS GW modules can be deployed together or independent of each other. They can be integrated in any network supporting the 3GPP eMBMS standards. Additionally they allow operator specific eMBMS applications.

Mission Critical Communications

3GPP has defined mission critical eMBMS as a means to deliver services to user groups within a defined area. While these standards are currently being finalized; the one2many eMBMS solution is ready to support these Mission Critical services; protecting operator investments in LTE broadcast.

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KEY BENEFITS

- Increased eMBMS broadcast efficiency
- EPC and RAN vendor independent
- Improved user experience
- Enhanced control
- A more reliable and resilient service

GATEWAY FEATURES

- Basic eMBMS services support: file download, DASH, service announcements, file repair & reception reporting
- Support for Forward Error Correction(FEC) using Raptor10 and RaptorQ
- Video codec agnostic – eg supports HEVC and H.264
- Innovative broadcast algorithms reducing bandwidth per broadcast; allowing operators to broadcast more channels concurrently, minimising LTE bandwidth usage
- Smooth uninterrupted play out of video; ensures the video player will always have sufficient content to play out
- Support for operator RAN sharing
- Complete set of SNMP alarms and rich events to give operator full control of broadcast
- Support for hosted configurations supporting multiple MNOs concurrently on a single platform
- Full audit trail available for broadcasts
- Support for managing large umber of service areas
- Support for multivendor RAN and core components, allowing vendor specific interface implementation
- Ability to support operator proprietary LTE broadcast applications including Push-To-Talk (PTT)
- Prepared for low-latency 3GPP mission critical PTT and MB2 interface
- MBMS GW bearer level charging support
- Can de deployed in virtualized environment
- Extensive interoperability (IOTs)

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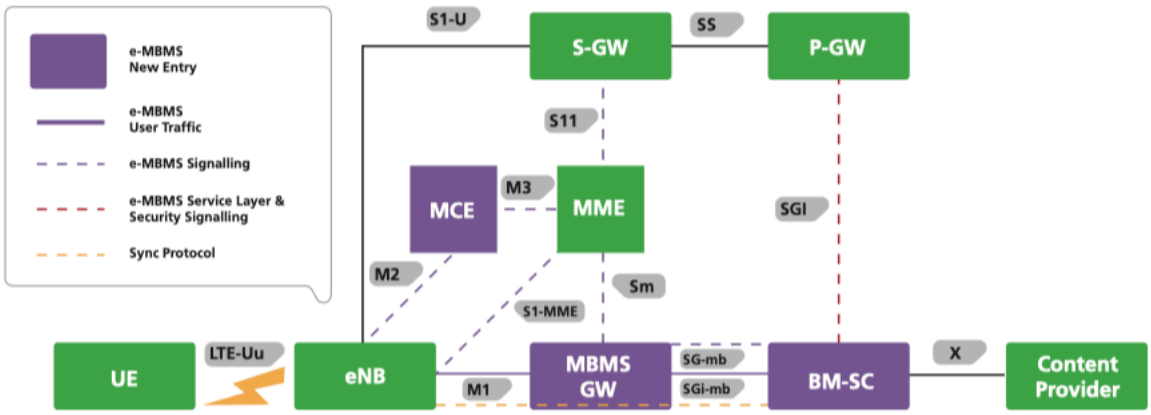
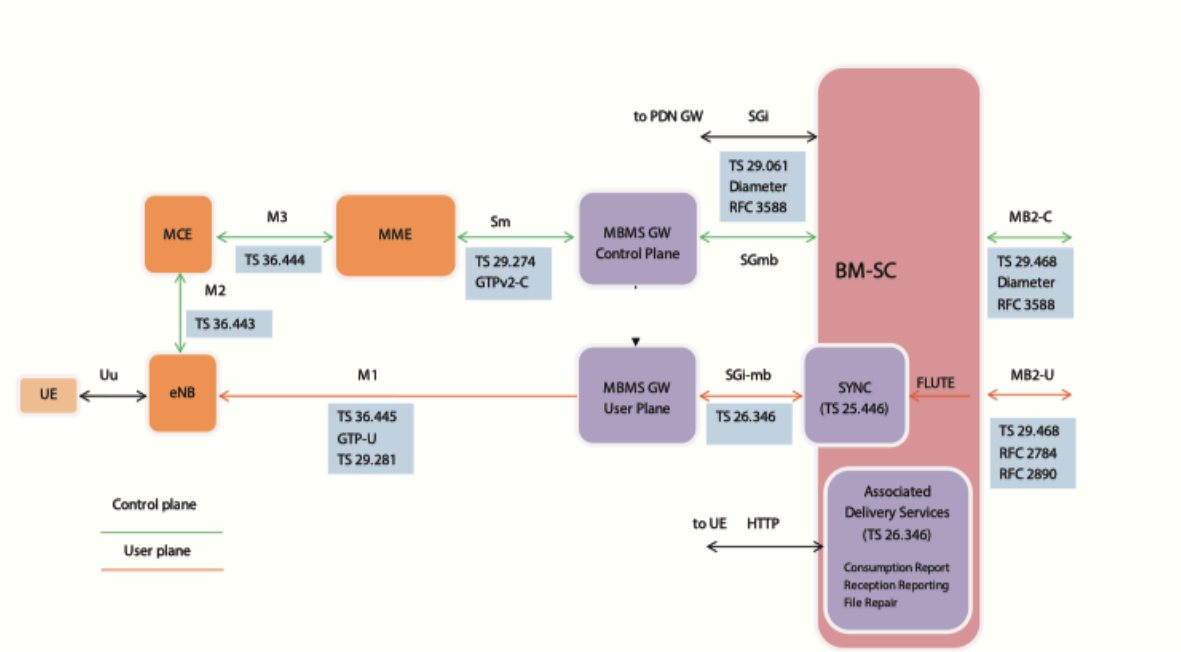
eMBMS HIGH LEVEL ARCHITECTURE



MBMS 3GPP SPECIFICATION OVERVIEW



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TECHNICAL SPECIFICATIONS

Hardware

- Running on COTS servers – eg HP DL380.
- Several redundancy options (high availability)
- Virtualized environments supported
- BM-SC and MBMS GW function can be deployed co-located or on a dedicated platform
- Per server up to 100 concurrent broadcasts and up to 250 Mb/s output rate
- N+1 scalable

Software

- Red Hat Linux 6 operating system
- Software architecture supporting 3GPP TS 26.346 MBMS functional layers
- Performance optimized coding for timing and bandwidth sensitive processes.
- Open Database architecture, by default utilizing PostgreSQL. Other databases can be supported upon request.

Compliance

- SGmb interface per 3GPP TS 29.061
- Sm interface per 3GPP TS 29.274
- M1 interface per 3GPP TS 29.281 and 25.446
- Support for FLUTE as per RFC 3926
- 3GPP and MPEG DASH support
- Support of eMBMS service announcements per 3GPP TS 26.346
- Network Time Protocol clock synchronization or GPS clock card
- Integration with content storage using DASH, HTTP, FTP & S-FTP, including shared storage mechanisms such as NFS, SAN & NAS
- Content Management API using HTTP/REST
- Alarm sending using SNMP

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eMBMS QUALITY PROBE

LTE BROADCAST MONITORING AND VALIDATION

Using an eMBMS Quality Probe from one2many, mobile operators can monitor and validate LTE broadcasts. This innovative system ensures LTE broadcasts conform to relevant standards and meet the operator's quality of service expectations.

eMBMS offers mobile operators with exciting new revenue and cost saving possibilities – but effective monitoring of the new service can be challenging. Several challenges in particular present themselves:

- End-to-end service delivery requires many different network nodes to correctly function together (Content server, MBMS GW, MME, MCE, eNodeB)
- Delivery of the content data to the eNodeB is essentially 'un-confirmed'
- Various new protocols are introduced into the mobile operator domain like FLUTE, SYNC and DASH
- eMBMS services are highly dependent on exact timings in the various nodes

Particularly challenging is the delivery of the content data to the eNodeB. The M1 delivery protocol is based on IP multicast ant therefore 'fire-and-forget', consequently the BM-SC and/ or MBMS GW does not receive confirmation from the eNodeB that the content data is received properly, potentially resulting in a broadcast appearing active from the BM-SC perspective but not reaching end users.

To overcome these challenges and provide complete peace of mind to service providers, one2many, a leading supplier of CBC and eMBMS solutions, has developed the eMBMS Quality Probe.

KEY BENEFITS

- During service rollout, supports the integration and testing efforts. Allows for much easier troubleshooting by pinpointing issues
- Multi-vendor network support: Can be deployed in every network regardless of the BM-SC, MBMS GW, MME and eNB vendor
- Alerts above and beyond network element alarms for service interruptions
- Leverages one2many's experience in providing reliable broadcast platforms
- All eMBMS broadcasts can be monitored

The one2many eMBMS Quality Probe complies with the various 3GPP specifications pertaining to eMBMS. We can also support proprietary vendor additions to the standards and customer-specific handling scenarios.

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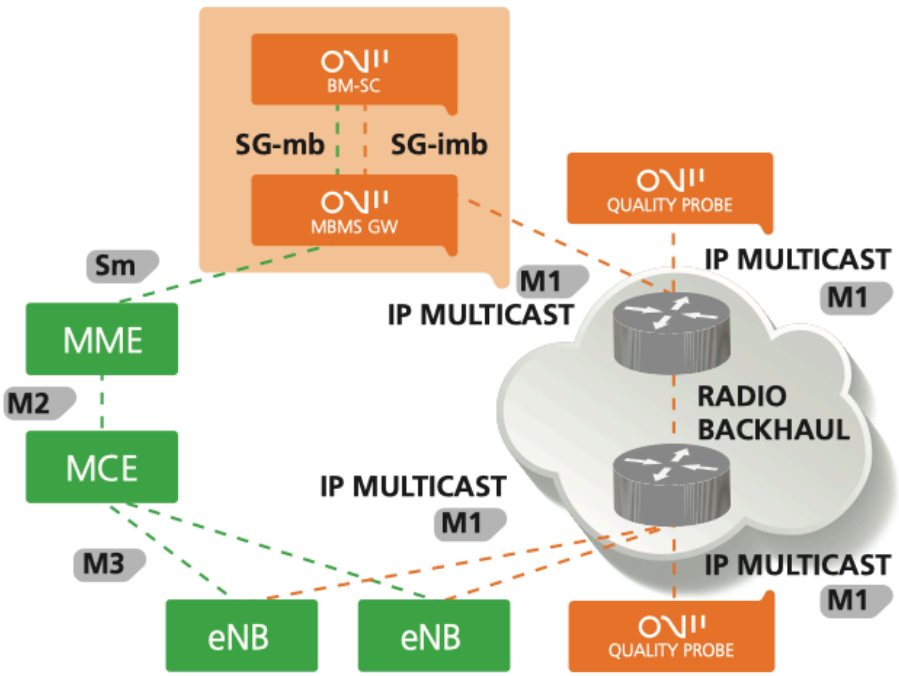
eMBMS QUALITY OF SERVICE

The eMBMS Quality Probe is designed to pro-actively test eMBMS system interfaces, monitor content interfaces and validate the content itself. The following three levels of test and validation are available:

- Session management through Sm
- Data transfer to eNodeB using M1 with GTP and SYNC support
- Emulating mobile clients with FLUTE and DASH support
- All three levels can be deployed simultaneously, providing complete end-to-end monitoring coverage of eMBMS.

Based on the data received the eMBMS Quality Probe can provide feedback in the form of alarms and events to the Network Management System and/or Service Quality Monitoring System. It is also possible to analyze and replay the content (video) that was received on the eMBMS Quality Probe, providing the definitive evidence that source and transmitted material are identical. In addition timestamps in events help to measure the delay caused when data is transmitted and received over the M1 interface.



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QUALITY PROBE FEATURES

- Monitor session management using Sm
- Monitor data transfers using M1
- Monitor service announcement
- Event generation
- Alarm generation using SNMP
- Content publishing on local web server or FTP server

TECHNICAL SPECIFICATIONS

Hardware

- Deploys as a standalone solution
- Flexible location in-network, eg can be near MBMS GW, MME or eNB groups/region
- Running on COTS servers like an HP DL120 server
- The eMBMS Quality Probe can also be run in virtualized environments

Software

- Redhat Linux 6 operating system

Compliance

- Support for session management per
- 3GPP TS 29.274
- Support for data transfer per 3GPP TS 29.281 and 25.446
- Support for FLUTE RFC 3926
- Support of eMBMS service announcements per 3GPP TS 26.346

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