

## Questions that were answered via the Q&A interface during the webinar

(Note: a few questions from the end of the webinar are missing from this transcription.)

What will happen if Access ISP does not support multicast?

Richard Bradbury 02:21 PM

It is possible to terminate the multicast distribution at any point in the network. In the case you describe, one could place a Multicast gateway as an edge node just upstream of the access network.

where the mcast server can be located???... I mean, close to the customer home

Richard Bradbury 02:18 PM

It is most efficient to place the Multicast server as far from the home as possible to ensure that multicast transmission is used for as much of the end-to-end path as possible.

It is typically deployed at the head-end.

how much latency does the multicast server and multicast gateway introduce? They must both be buffering to an extent.

Richard Bradbury 02:20 PM

I think this is an implementation-dependent factor. Typically, one would need to introduce a small amount of extra end-to-end latency to allow for repair of multicast packets that are lost in the network. But the network can be engineered to control the quality of service. Repair can be by means of Forward Error Correction or unicast HTTP.

Can MABR be compatible with cloud based timeshifting. If a viewer hits "pause" on a live event, rewinds for 15 seconds to see a goal again and joins back live right after, can MABR be used before and after the time-shifting seamlessly, while timeshifting is done in unicast?

Richard Bradbury 02:37 PM

Yes, this architecture is potentially compatible with time-shifting. The Multicast gateway can cache content received via multicast for as long as it likes, subject to available storage, to allow live pause, rewind (potentially up to the start of the client's streaming session) and fast forward (up to the live edge). Obviously, the amount of cache is implementation-dependent.

Are you proposing only a small percentage of the channels (most viewed) are covered by MABR or are you expecting some form of PIM-SM to be used in multicast? We cant be sending 100/200+ channels to the gateway. They wont have sufficient BW/memory/storage to support this.

Richard Bradbury 02:25 PM

Yes, we're aware that some Customer Premises Equipment has limitations on the total number of multicast groups that can be subscribed simultaneously. Firstly, the Multicast gateway only needs to subscribe to those groups it is interested in passing on to its clients. (It would be very inefficient to subscribe to all groups all the time.) Secondly, it's an operational decision how many representations/renditions are actually made available via multicast by the Multicast server. Some representations/renditions (e.g. less popular ones) can be made available via unicast only.

How do you manage target ad insertion? Now a days it is very common to add ads modifying the manifest client by client in the CDN, how do you think that we could manage that?

Richard Bradbury 02:28 PM

Ad insertion wasn't in the scope of this first phase of technical work, but we believe that the concept of unique client manifests is compatible with this approach.

is it possible to estimate the effort on terminal (player) to be mABR compliant?

i see the link to "rendezvous service"

Richard Bradbury 02:27 PM

The Multicast rendezvous service operates by means of standard HTTP redirects, so we think there is no significant additional load on the player in the simplest deployment scenarios (see more later in today's presentation). In fact, it was one of our Commercial Requirements that existing players should just work without modification.

Even when mcast server replicate CDN chunk, so Ultra Low Latency ABR is replicated , but does it need some support in the Multicast Gateway?

Richard Bradbury 02:32 PM

Yes, to fully support low-latency presentation, the Multicast gateway needs to have support for this too. The specification makes some recommendations on this.

**Why don't u do the repair assistance using RTP Retry?**

Richard Bradbury 02:34 PM

RTCP-based repair only works for RTP-based multicast transport protocols. The two mandatory protocols specified (FLUTE and ROUTE) are based on LCT/ALC rather than RTP.

**does this multicast ABR work the same in IPV6 network ?**

Richard Bradbury 02:35 PM

Yes, it is intended that IPv6 operation using MLD should work equivalently to IPv4 using IGMP. Operation with IPv6 was one of our Commercial Requirements.

**In addition to MPEG-DASH and HLS, is it also possible to transport Microsoft Smooth Streaming with Multicast ABR ?**

Richard Bradbury 02:40 PM

We have tried to make the specification format-agnostic as much as possible. We particularly had DVB DASH in mind, and we have made some provision for HLS. But we have tried to avoid anything that would preclude the use of other segmented media like Microsoft Smooth Streaming.