5G XCAST

Broadcast and Multicast Demonstration
EuCNC / Global 5G Event

5G PPP

> ❞ **5G-XCAST WILL OPEN THE DOOR TO A NEW AGE OF IMMERSIVE MEDIA DELIVERY FOR EUROPE** ❞

MAIN OBJECTIVES

Point-to-multipoint capabilities
To develop broadcast and multicast capabilities for the standalone 5G New Radio and 5G Core Network.

Adaptable and converged network architecture
Design a 5G converged network architecture combining fixed, mobile and terrestrial networks to dynamically and seamlessly switch between unicast, multicast and broadcast modes or use them in parallel.

Innovative use cases demonstration
Develop proof-of-concept prototypes at Radio Access Network (RAN), core and content distribution level and experimentally demonstrate key innovations deve-loped in the project for the media and public warning verticals.

5G-XCAST @ EUCNC / GLOBAL 5G

▶ **5G-XCAST - BOOTH 1**

DEMO 1 FORECASTER 5G: object-based broadcasting
DEMO 2 Converged, autonomous MooD in fixed/mobile networks
DEMO 3 Reliable multicast delivery in 5G networks
DEMO 4 Multimedia public warning
DEMO 5 Hybrid broadcast service with Multi-Link

▶ **5G-XCAST / SAT5G DEMO - BOOTH 12**

FORECASTER 5G:
Object-Based Broadcasting

OBJECTIVE

To efficiently deliver high quality personalised media content to many users, with the aim to:

▶ Deliver an enhanced object-based audio/video media experience, in which the presentation of the content adapts to the user's environment, the user's preferences, the device's capabilities and includes personalisation.

▶ Reduce the cost of delivering high quality live media content to a large audience over IP by using a hybrid of multicast and unicast, seamlessly combined on the device.


Sign language   Subtitles   Portrait vs landscape   Icon location
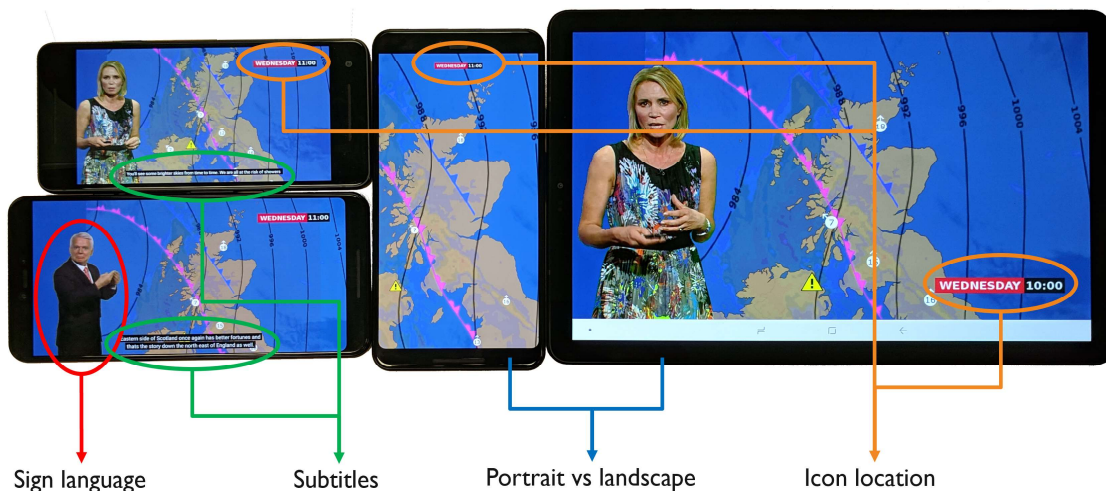
▶ The demonstration shows an object-based weather forecasting application. The weather forecast is composed of objects (e.g. MPEG-DASH video, the weather map/symbols etc.), which are delivered over the University of Surrey 5G core either using multicast (in a pseudo-live manner) or using unicast.

▶ The multicast objects are delivered by the Dynamic Adaptive Streaming over IP Multicast (DASM) system, developed by BBC R&D.
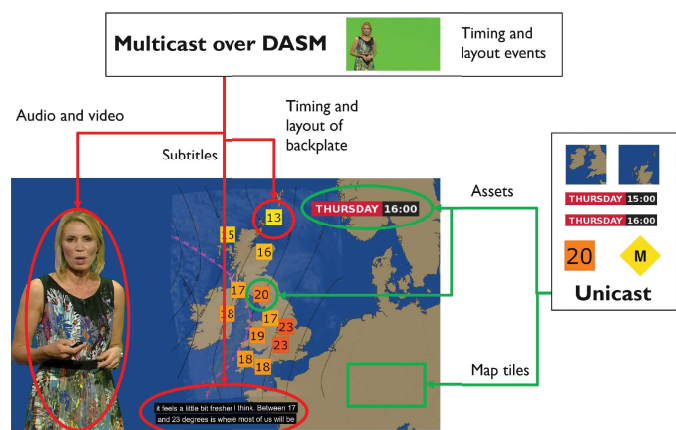
Converged, Autonomous MooD in Fixed/Mobile Networks

This demonstrator showcases key features of the content distribution framework. In particular, it will show:

▶ The use of multicast/broadcast as an internal network optimisation, rather than as a service to be sold.

▶ The use of simple unicast interfaces with content service providers to simplify integration and facilitate adoption.

▶ How client applications do not require any modification to benefit from the use of multicast/broadcast.

▶ How the framework is applicable to both fixed and mobile networks.
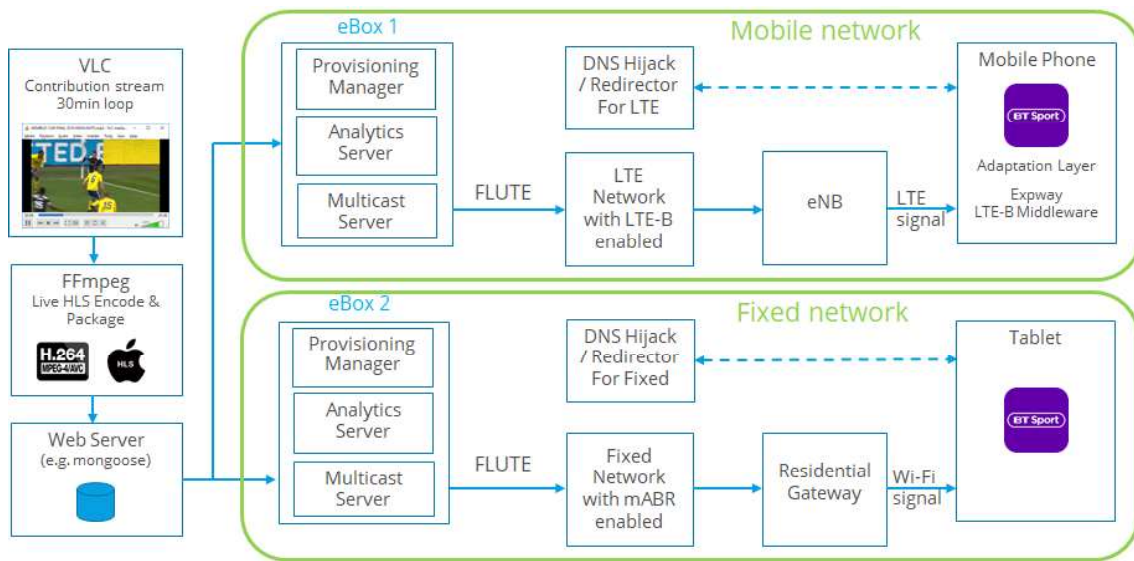
BACKGROUND

▶ Content Distribution Framework is a network agnostic framework being applicable to both fixed and mobile networks, along with future 5G converged networks.

▶ It enables existing unmodified unicast delivered services to benefit from the scalability and user experiences of broadcast delivery (MooD).

▶ It allows seamless switching between unicast and multicast/broadcast content delivery as the BT Sport audience size changes.

▶ This PoC shows the framework employed using LTE-B and Multicast ABR.

Reliable Multicast Delivery in 5G Networks

▶ This demonstrator shows the gains in and trade-offs among resource consumption, spectrum efficiency, service coverage and QoE achieved by reliable multicast delivery for popular content distribution in 5G networks.

▶ The demonstration also highlights the effects of using application layer methods, such as DASH streaming and Multilink technology on the efficiency and reliability of multicast delivery.
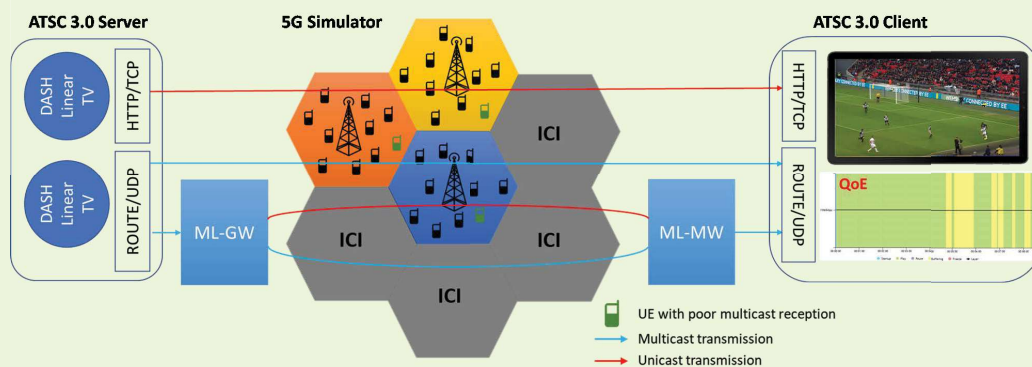
▶ High quality multimedia content is transmitted by ATSC 3.0 server through 5G simulator that handles multilink functionality and acts as a forwarding entity for the ATSC 3.0 client via which the playback is shown.

▶ The improvements in terms of better RAN efficiency and user experience are visualized by the QoE Analytics Server and the 5G simulator.
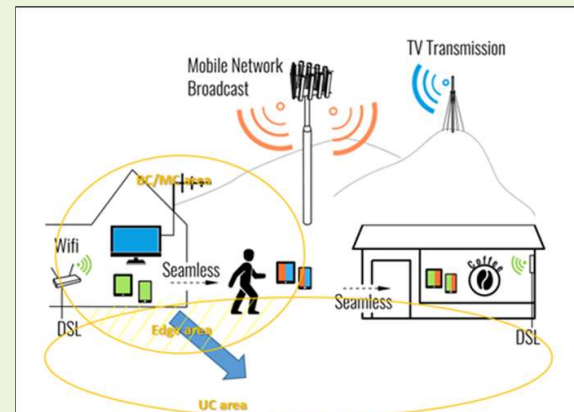
UNICAST vs MULTICAST
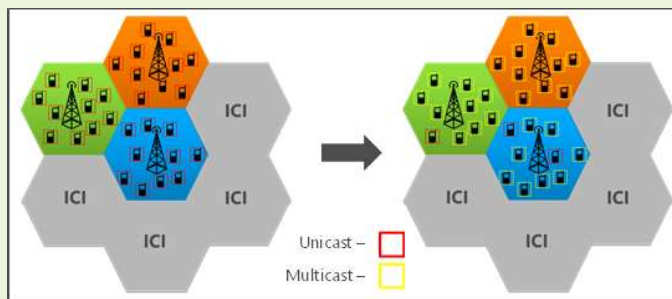
Unicast delivery of all content

Multicast delivery of popular content

MULTILINK ENHANCED MULTICAST

Multilink by means of multicast session packet duplication into unicast

Multimedia Public Warning

OBJECTIVE:

The Multimedia Public Warning system demonstrates the delivery of multimedia-based alerts.

▶ Multimedia content provides more illustrative information for the users.

▶ On the network side, multimedia content poses load to the network, as the alert should be transmitted as quickly as possible to all users in the area.

▶ For this kind of service broadcast technology is a perfect match.

▶ As it is not expected that all the terminals are broadcast reception capable, also other means of delivering the alert are required.
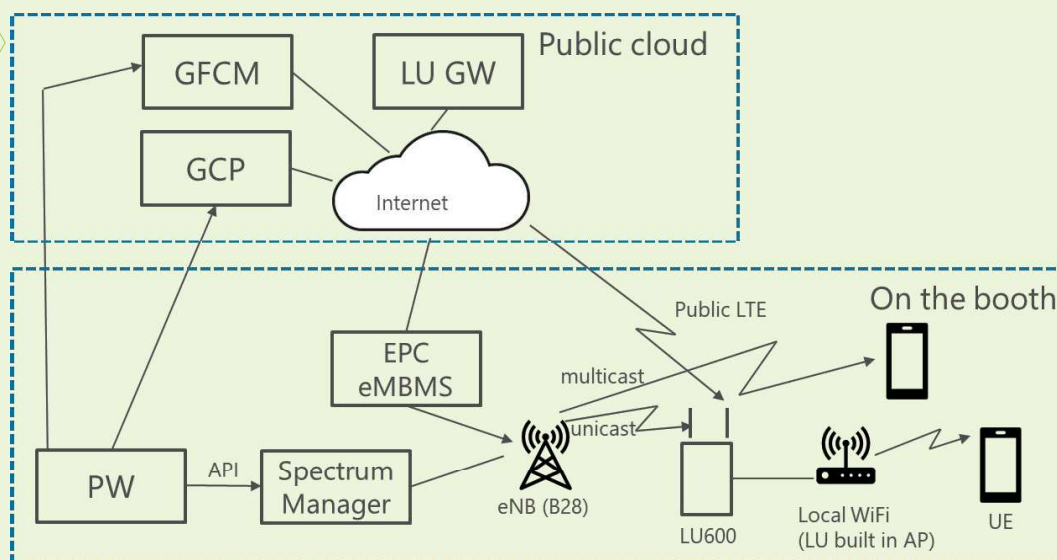

Dynamic spectrum management, multi-link and broadcast technologies are integrated in a system to demonstrate delivery of public warning multimedia alerts to the user equipment.

Hybrid Broadcast Service with Multi-Link
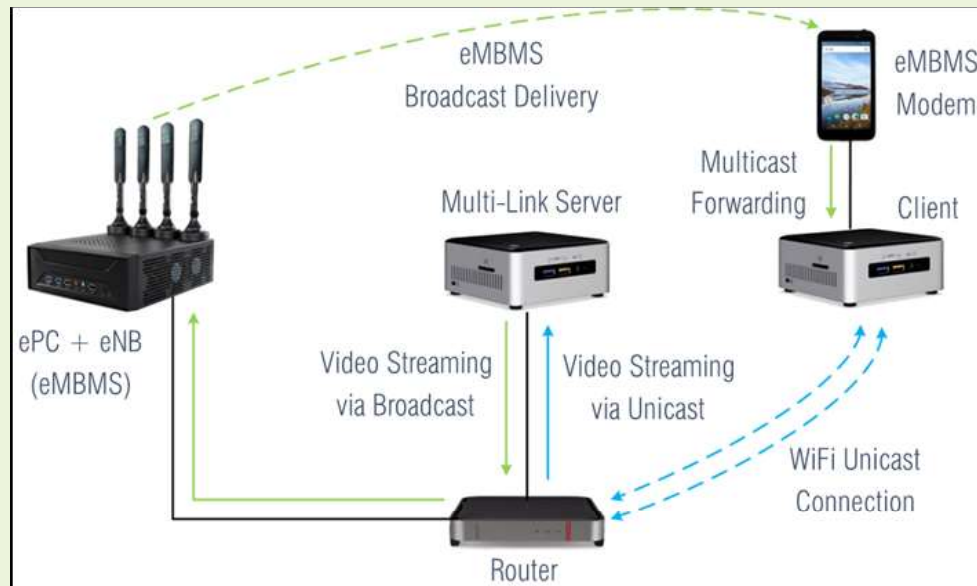
- Improving reliability, bandwidth, mobility and traffic optimization by multi-link connectivity between different radio access technologies and networks.

- A virtual single broadband connection by the simultaneous use of multiple networks in a dynamic way.

- Moving from outdoor 4G/5G connectivity to indoor WiFi with a seamless viewing experience.

- Multi-Link protocol for enhanced broadcast delivery using on-demand video stream repair via unicast.
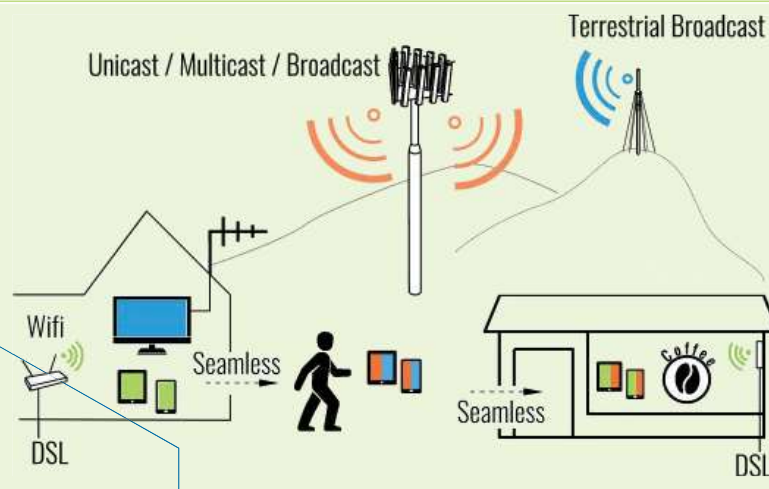
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