5G-Xcast

/ Broadcast and Multicast Communication Enablers for the Fifth Generation of Wireless Systems

PROJECT COORDINATOR

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MORE INFORMATION

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MAIN OBJECTIVES

5G-Xcast will devise, assess and demonstrate a conceptually novel and forward-looking 5G network architecture for large scale immersive media delivery. The project objectives are to:

- Develop broadcast and multicast point to multipoint (PTM) capabilities for 5G considering Media and Entertainment (M&E), automotive, IoT and Public Warning (PW) use cases, and evaluate 5G spectrum allocation options for 5G Broadcast network deployments.

- Design a dynamically adaptable 5G network architecture with layer independent network interfaces to dynamically and seamlessly switch between unicast, multicast and broadcast modes or use them in parallel and exploit built-in caching capabilities.

- Experimentally demonstrate the 5G key innovations developed in the project for the M&E and PW verticals.

APPLICATIONS

5G-Xcast will be the first 5G PPP project to focus on the holistic implementation of multicast/broadcast as a critical technology element in 5G systems in addition and as a complement to unicast. 5G-Xcast technologies will be also fundamental to progress towards the vision of a converged 5G infrastructure for fixed and mobile accesses, including terrestrial broadcast, to audio-visual media content. The project will take a holistic approach to harmonize the media delivery among the three considered types of networks and to provide an optimised and seamless media user experience. In order to highlight practical applications, three demonstrations of use cases will be developed: "Hybrid Broadcast Services", "Object-based Broadcast Service" and "Public Warning Messages".

TECHNICAL AND RESEARCH CHALLENGES

Audio-visual media services generate large volumes of data traffic on networks which is unevenly distributed over time and geographical areas. At the same time, Quality of Experience (QoE) is strongly dependent on sustained minimum data rates and low latencies to all regardless of the total number of concurrent users. This is particularly challenging for very popular live content (e.g. sports) or unpredictable events (e.g. breaking news) that tend to cause large traffic spikes. The increasing bit-rate demands of 4k UHDTV and, in the future 8k UHDTV, and the emerging new interactive services (e.g. augmented reality, virtual reality and 360º visual media) will further increase the demand on network capacity and performance. None of the existing networks, whether fixed, mobile or broadcast, has the capability to support this type of future demand on their own due to limitations associated with capacity, delay and cost of deployment. Furthermore, the fractured landscape of protocols and APIs across them severely limits their ability to cooperate in addressing this demand. 5G-Xcast will develop a solution that targets such limitations and therefore addresses future demand, based on the key capabilities of 5G that by far exceed those of the legacy systems.

EXPECTED IMPACT

- Provide efficient, scalable and sustainable solutions for a large-scale distribution of media services fully consistent with the core 5G specifications, contributing to the definition of 5G and its standardization in 3GPP.

- Facilitate seamless integration of fixed, mobile and terrestrial broadcast networks into a unified heterogeneous and flexible 5G infrastructure, enabling better use of network resource, easier evolution paths to future functionalities and services and improved QoE.

- Enable new sustainable business models, new applications and services, and a graceful migration of M&E services from the legacy networks to 5G.

- Bring the M&E vertical into 5G PPP, bringing together for the first time major and small and medium size players from mobile/fixed/broadcast industries.