Live media production with 5G – testing a new architecture for multiple wireless cameras

From the left: The EBU's Ievgen Kostiukevych and Pavlo Kondratenko with M. Nabil Ibrahim and Thorsten Lohmar from Ericsson, at the Ericsson facilities in Aachen

The EBU takes part in the Horizon 20202 project 5G-RECORDS, alongside Ericsson, the BBC, TV2 Denmark, Rai, and a number of other partners. 5G RECORDS explores the feasibility of live media production over a 5G network, with the aim to bring new opportunities for producing TV shows or news coverage wirelessly and remotely, or in situations that require using as few cables as possible.

In terms of using multiple wireless cameras, 5G promises major benefits over traditional solutions. Bridging wired (e.g. ST 2110 based production facilities) wireless production is however not straightforward and one of the major issue is to synchronize multiple cameras.

Synchronization is usually performed with either of two types of protocols over IP networks: the Network Time Protocol (NTP) or the Precision Time Protocol (PTP). While NTP is the most commonly used of the two, it might not be precise enough for this kind of use, at an accuracy of typically for wired networks, and 10ms over 4G. PTP is more precise with typically tens of ns for wired, but there has been very little research over how this protocol can be used over a 5G network. 5G RECORDS therefore set out to test the accuracy of the PTP.

Our EBU T&I team has joined Ericsson in their facilities in Aachen, Germany, for three rounds of tests so far. The first tests conducted in May 2021, confirmed that PTP was indeed usable in a 5G network. However, the 5G release of that time (release 15) did not fully support precise time synchronization with PTP yet: At 1.6ms, the accuracy of PTP was therefore not significantly outperforming the NTP one at that point.

The next round which took place in Aachen in January 2022, tested time-sensitive networking to help improve accuracy, using additional features of release 16 and 17 and the service they provide of Ultra-Reliable Low-Latency Communication (URLLC). This time, the precision improved by 4 orders of magnitude, which brought the accuracy of PTP to the promising level of less than 4 µs.

The latest tests performed at the Ericsson facilities in Aachen, took place this April. It aimed to assess the overall operability of the whole chain of equipment and of its individual components, as well as measure the overall latency. Instead of using cameras, this set-up consisted of sending a full video stream back and forth through an encoder, through the 5G network and through a Media Gateway, which acted as a decoder and converter to ST 2110. The architecture proved operational, and the latency was down to 8-9 frames one way and 5-6 frames in reverse.

As a next step, 5G RECORDS will replicate the previous set-up with actual cameras instead of a recorded video playback. A portable encoder/modem is also in the works within the consortium, which will increase the portability of the architecture.

These tests and the development work happening in parallel to it are bringing the media industry closer to being able to use 5G in fully producing wirelessly, remotely, and in combination with wired equipment, which will provide new production scenario opportunities.

20 May 2022

Contact us

Ievgen Kostiukevych
Senior IP Media Technology Architect
kostiukevych@ebu.ch

Latest news

New position paper calls for European Media Data Space

positioning paper authored by the EBU and its Members, arguing for the creation of dedicated dataspaces for the European media and creative industry,...