5G Media Production for Radio as a Service

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Radio as a service

- Jutel has participated the Business Finland 5GTN+ project and 5G Media vertical
- 5G Media vertical has concentrated on media production with 5G networks and media distribution utilising multicast technologies (eMBMS)
- Jutel is a pioneer in innovative digital broadcasting solutions with over 30 years of experience working with radio broadcasting customers
- Introducing service oriented approach for any size radio broadcasters

Radio used to be

Linear flow of music and speech from a studio

Distributed via terrestrial FM or DAB

Listened via dedicated FM or DAB receivers

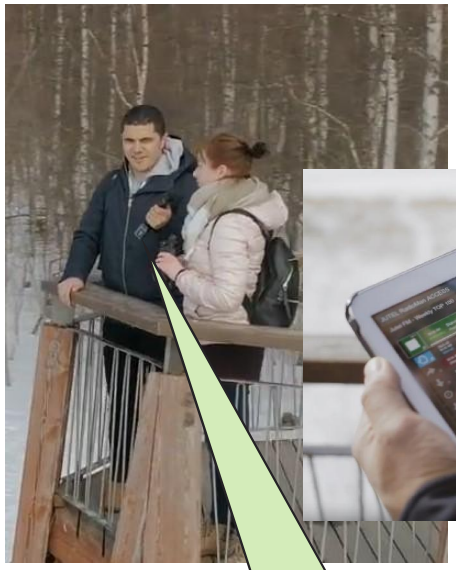
Radio and media trends

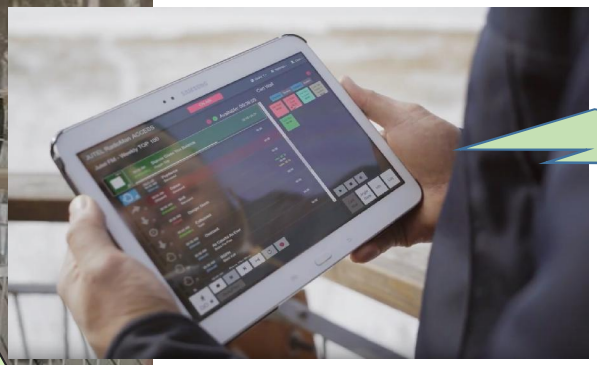
Media need to be generated close to the listeners

Less fixed production facilities

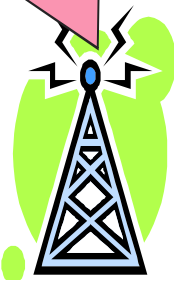
Flexible listening, On-demand, mobile use

Radio is going to be





Mobile networks have increasing major role both in production and distribution



Media need to be generated close to the listeners

Less fixed production facilities

Flexible listening, On-demand, mobile use

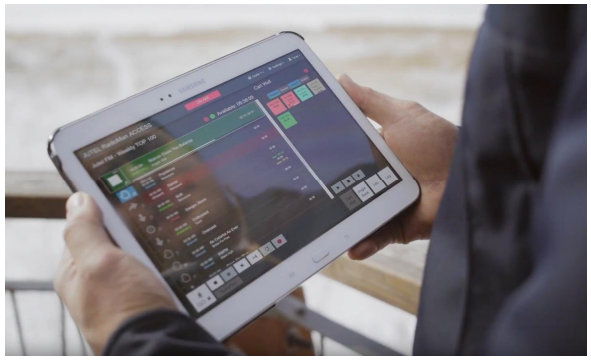
5G in Media production

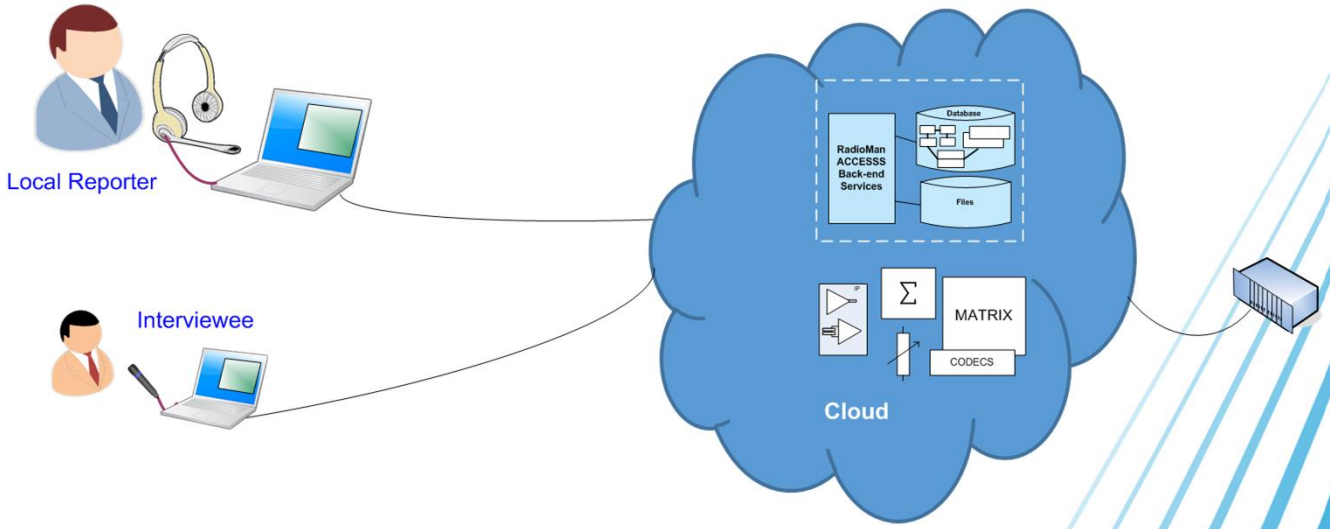
Special needs for production:

1. Reliable media stream from production to service point
   - Network coverage in mobile use is tackled by bonding techniques: multiple SIMs; best channel wins at each time, delay vs reliability. Some priority would be nice
   - Typically UDP-type (RTP) transfer protocols, Packet losses can be covered with Forward Error Correction, FEC, Error coding delay vs reliability
   - Media coding protocols (Opus, AAC) save bits but need more buffers and delay
   - New IP-stream standards like AES67 and SMPTE 2110 are very fine for studios but not applicable for mobile use. No protocols yet that would degrade media quality gradually as errors increase
2. Low delay/latency for media and control
   - Delays cascade: processing, coding, packages, transport, buffer, decode
   - Few hundred milliseconds OK for reporting but not OK for multichannel or quick chat or music etc,
   - Monitoring delay is two-way and needs to be small for quick controls
   - Video has special needs as sometimes the camera switch should happen within a frame (20ms). This needs special arrangements with delayed distribution etc.

5G in Media production, practical case

- Architecture for mobile control of a cloud service based radio production system has been designed.
- The system has been implemented with web-based architecture utilising Rest APIs, Active-MQ messaging, web sockets and WebRTC streaming. The system is placed in AWS cloud and the playout units can be located in cloud, in server facilities or in traditional studios.
- The implementation architecture has been tested in various networks and countries.
- Up till now the 5G has been pretty same as 4G/LTE. Waiting for the 5G Next Radio





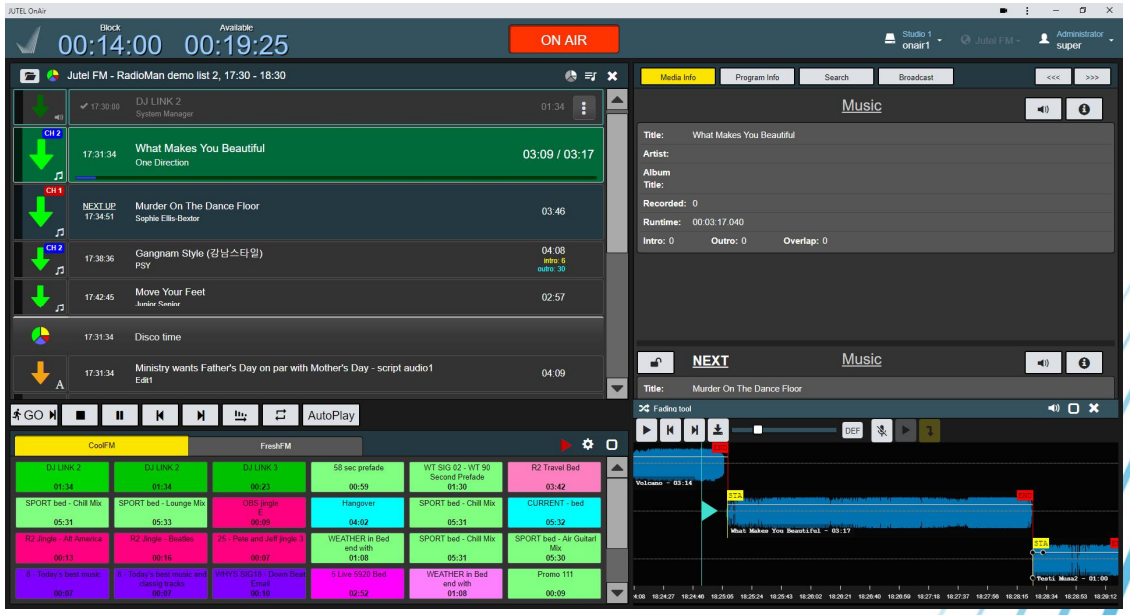
Mobile 5G networks in Broadcast

Ip-based mobile delivery for broadcast media distribution is increasing especially for the young generation.

- The role of unicast can be debated. Especially for video purposes the network capacity seems to be inadequate for some occasions.
- For excess network load situations we need multicast. eMBMS tests have shown that the technique works but practical use cases need additional features:
  - We would need to control multicasting in a dynamic way on heavy loaded cells (Edge Computing?)
  - We would need to detect multiple similar unicasts in order to utilize multicast in a dynamic way; this would need some flagging or extra control
  - The handset applications would need capability to switch dynamically between unicast and multicast offerings
  - Domestic roaming or non-SIM services would be nice
  - We need more statistical studies and predictions of consumer behavior

Project Results

- Future media production systems will use 5G networks both on production and distribution. Cloud possibilities create new business models and workflows for large radio networks and new media



Thank You

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