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Inspirational 5G use case example

Real-time interaction in 5G — A use case example from the health care industry

Evolve your voice business building on VoLTE and enable new innovative communication services use cases with 5G

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At Mobile World Congress February 2019, BT, King's College London and Ericsson collaborate on a demo in Ericsson's hall showcasing how to leverage the VoLTE service for 5G. We show an Ericsson concept — the IMS data channel — which enables adding on real-time remote interaction between people and things, alongside the current VoLTE based HD voice and video calling services. The concept builds on 3GPP standards in combination with some WebRTC features, combining telco assets with web technologies, in order to create flexibility in combination with operator provided features like QoS and security Learn more how to build on today's telephony services and bring your voice network with the inherent telecom values of global find and connect with the phone number, authentication, mobility, session control, quality-of-service and security into a 5G world.

Telephony services taken to the next level with 5G

Telephony was invented in the end of the 19th century — mobile telephony was made available for the mass market in the end of the 20th century — and now 5G could enable us to touch, feel and interact on a completely new level remotely through a simple phone call.

Build on VoLTE and evolve with IMS data channel

Ericsson has put a lot of thought into how VoLTE will play an enhanced role in 5G, and not only to make basic voice calls on 5G smartphones, but how can we take the communication service to the next level.

Ericsson has created a concept combining VoLTE and WebRTC technologies. This concept we call the "IMS data channel", which is a separate data path within a VoLTE session. This means you, in addition to HD voice and video calling, can add one or several data channels. These data channels can be used to transport any types of data for any purpose, all synchronized with the voice and video communication session. This will enable "touch and interact" types of use cases.

Learn how to enable 5G voice to prepare your network for this kind of concept.

Service provider opportunity and their customers' needs

We teamed up with our customer, the service provider BT in the UK, who were also curious to research how the qualities of IMS could be used for new 5G use cases for machine-to-machine as well as person-to-person communications. BT has a lot of customers in the enterprise sector, and they are now looking into how IMS and 5G can benefit these businesses and enable new enterprise use cases, particularly those requiring real-time, critical communication service qualities. One example is in the health sector, which this case will describe in more detail.

Services for the benefit to society and public health

We teamed up with our academic partner in London, UK, King's College London, whom through their societal engagements has identified important needs in the healthcare sector where mobile and wireless communication could add tremendous value. The health care industry could capture the potentials of mobile communications in the day-to-day challenges they face.

A use case example with real-time interaction in the health industry

Bring doctors, paramedics and patients closer via remote ultrasound using IMS data channel over 5G

Ericsson, BT and academics at King's College London have teamed up to demonstrate a remote health examination over 5G using the IMS data channel concept This places the eyes, ears and the hands of a doctor alongside a paramedic, allowing faster diagnosis and decision making for patient care ahead of reaching the hospital. This new concept enables the doctor to be part of the first responder attendance where critical diagnosis can be the difference between life and death, and once again shows how 5G technology can enable a raft of mission critical services, and why 5G will deliver so much more than just enhanced mobile broadband.

Today, ambulances and paramedics have limited capability to engage remote healthcare professionals and therefore must rely on the expertise of the paramedic. Few have the training or equipment to perform ultrasound diagnosis. If the doctor can be available remotely for the patient, then the right diagnosis can be performed upfront with the right decisions on which hospital should the patient be transferred to, and what preparation is needed ahead of arrival. This can save precious time and money for the Health Care Provider.

The technology opportunity in 5G building on today's telephony service

The current telephony service network infrastructure VoLTE (using IP Multimedia Subsystem, IMS) which is globally deployed with service providers, enabling voice calls on LTE smartphones, will also be used to enable voice calls on 5G smartphones. The industry could take the next step and evolve this infrastructure and services further for a 5G world, adding on new capabilities

"BT's 5G network, which provides faster speeds, lower latency and enhanced reliability, combined with IMS technology, has the potential to deliver significant benefits to many different industry verticals. In this research collaboration we have demonstrated the types of benefits that can be provided to healthcare organisations, and in particular to remote health examination, by enabling secure, highly reliable, real-time communications between an ambulance and a centralised specialist, as required for early diagnosis and allocation to the appropriate hospital/emergency team."

— Maria Cuevas
   Head of Mobile Core Networks,
   BT Research

building on IMS.

BT and Ericsson have been researching the flexibility of IMS to provide not just voice and video calling connectivity but any kind of data stream within the same session. The IMS platform inherently provides global find and connect with phone number, authentication, quality-of-service, mobility, security and robustness, all qualities that are essential for real-time critical point to point communications, such as the patient to doctor remote interaction use case. The low latency of 5G will enable new types of use cases, where real-time interaction will be possible over long distances.

Through the capabilities delivered with IMS, the WebRTC framework allows for configurable data channel definitions whilst still ensuring quality-of-service, security and robustness. Couple this with high data rates and low latency, provided by 5G, it is easy to realize this critical health care use case and the benefits provided to patient and health care experts.

These data channels can be used to transport any types of data for any purpose, all in synch with the voice and video communication session. The data channels are established with operator provided characteristics for the data to be sent, in order to meet the requirements of the specific use-case when it comes to latency, robustness and bandwidth.

Live demonstration at Mobile World Congress 2019 — Remote ultrasound

At Mobile World Congress 2019, BT, King's College London and Ericsson demonstrate how using the IMS data channel, can enable a remote ultrasound between an ambulance and a hospital. A patient is investigated with ultrasound by the paramedic in the ambulance, with remote support from a doctor in a hospital far away.

Utilizing standard IMS for securing point to point HD voice, video calling and data communication (over the IMS data channel) a paramedic that requires remote healthcare assistance can connect a voice and video call for 2-way communication. With the use of the IMS data channel, they can now also extend the ultrasound equipment to the doctor for remote control and have the doctor communicate with the patient and remotely control the hand of the paramedic via a haptic glove. In essence, the paramedic becomes the extension of the doctor in interacting directly with the patient and guiding the paramedic through the diagnosis.

When the paramedic determines the patient would benefit from an ultrasound diagnosis the paramedic can place a video call to the centralized ultrasound unit. The doctor, paramedic and patient can discuss and interact to determine next steps. Should an

ultrasound scan be required the paramedic can connect the doctor to the ultrasound machine with the doctor being able to see and manage the ultrasound machine directly. With the paramedic using the haptic glove the doctor can direct the paramedic using the joystick control sending small vibrations to the paramedic's glove to direct the ultrasound sensor, whilst the doctor studies the image. This allows for a non-verbal, tactile interaction between doctor, paramedic and patient. Following diagnosis, the choice of hospital in which to send the patient saves valuable time and ambulance resource and allows the team receiving the patient to prepare ahead of arrival.

In a real scenario implementation in a commercial network, it is beneficial to deliver such a service using a network slice, in this case a "national health care" slice, which
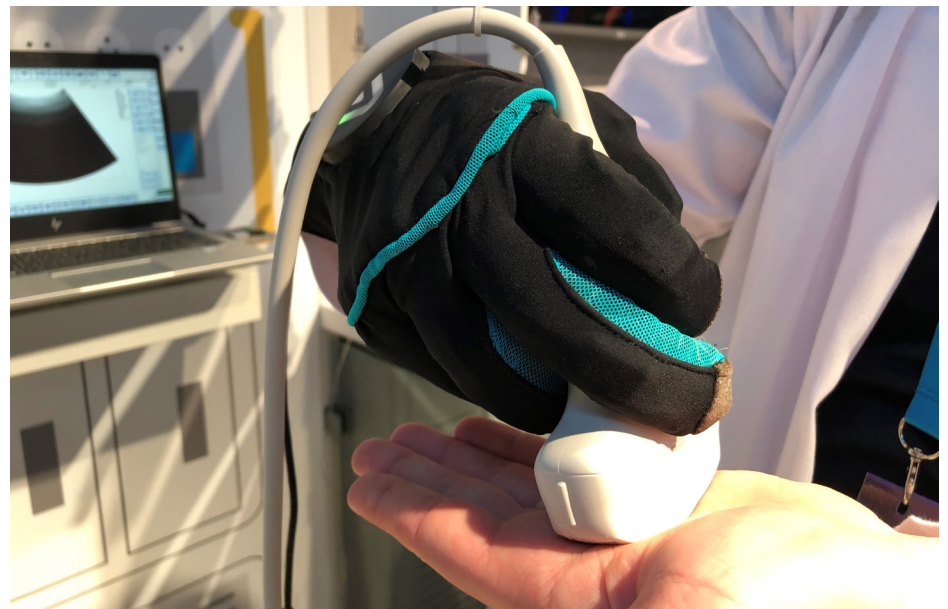

Fig 2: Haptic glove used to guide a paramedic to perform an ultra sound on a patient, showcasing real-time interaction capabilities over 5G with the IMS data channel concept.
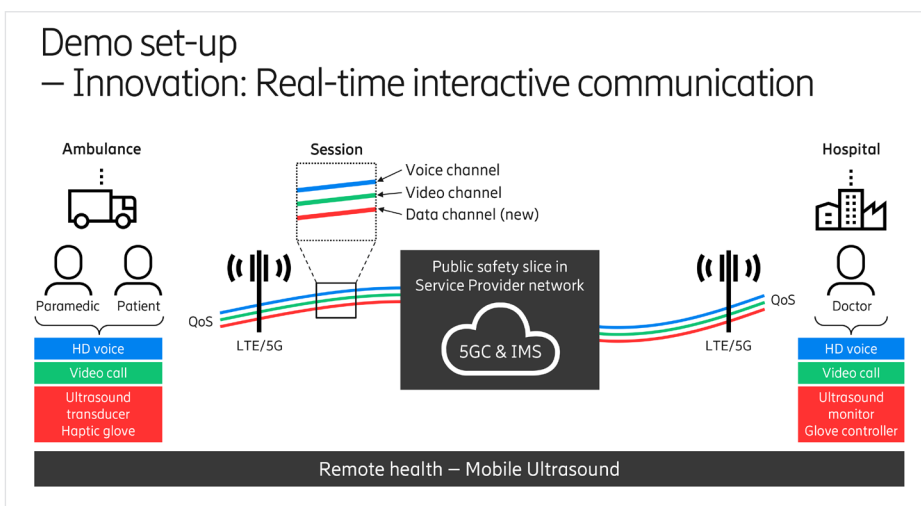

Fig 1: Demo set-up in Ericsson's hall at Mobile World Congress Feb 2019

"Being a civic university, serving urban societal problem is at heart of our research strategy. We have worked with our colleagues across King's on the vision of bringing hospital to the patient through the power of mobile and wireless connectivity. The connected ambulance and case of remote ultrasound we are demonstrating here, allow fast and precise diagnosis, and save the precious time potentially spent in traffic before patient arrives to the hospital".

— Dr Toktam Mahmoodi
    Academic,
    King's College London

would be prioritized in the network over other non-critical traffic. Within the network slice, different bearers/data flows with different characteristics can be established on need basis between the equipment in the ambulance and the hospital. This is to make sure that communication can be done, and data exchanged with guaranteed end user experience. An ambulance should of course always be given highest priority from a societal perspective, where regulators could also decide on different kinds of requirement on such kind of services and network priorities.

User feedback from health care provider

For Health Care Providers such as national health services as well as private health providers, the opportunities of centralizing experts and providing that expertise where it's needed, when it's needed, further supports the extraordinary work that paramedics do day to day. This provides further confidence to patients that they are receiving world class care in more locations than what has been possible before.

Trials with Ambulance Trusts and NHS Healthcare professionals to see the technology in action is the natural next step to further optimize the solution and bring the IMS data channel and 5G into the hands of the experts.

Other types of use cases for different businesses and enterprises

There are hundreds of other types of use cases which could benefit from using the IMS data channels, with exploration of these just getting started. The health sector is just one example. Imagine use cases such as remote surgery, VR with collaboration, field support with AR, drone steering, remote support.

Fig 3: Other examples of using this technology is for different types of remote health examinations and even remote surgery.

"The East of England Ambulance trust is focused on delivering outstanding care to patients and looking at ways we can achieve better outcomes for our communities. We are encouraged to see this 5G technology that could connect ambulances to the right clinical experts and how this can improve outcomes for patients through faster decision making. Allowing us greater use of our valuable resources. We see techniques, such as remote examination, as a great example of how 5G mobile networks and health professionals can work much closer together for the benefit of our patients and NHS staff."

— **Wayne Bartlett-Syree**
Director of Strategy and Sustainability, East of England Ambulance Service NHS Trust