Achieving 5G service Assurance in the Residential Domain - A5GARD -

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Project Websites

https://www.celticnext.eu/project-a5gard

https://a5gard.eu

A5GARD's focus was telecommunications for humans, in and around the home, and on human-machine interactions. We innovated and influenced standardization and development of telecommunications to support new services with technology-based self-care for chronically ill elderly as a use case. The project has reached its set technical goals and has exceeded the social goals when it comes to engaging end-users with technology.

Main focus

An ever-increasing amount of entertainment, social activities and shopping takes place in and around the home. More and more services will be consumed there, including even work, democratic processes, and healthcare. It is of paramount importance that the telecommunications infrastructure of the homes is shaped so that it can carry these services. However, a gap is forming in the otherwise tight relation between operators and end-users as control over especially the in-home Wi-Fi networks is handed over to over-the-top providers such as smart speakers and smart home assistants. This leads to home networks being under the simultaneous control of two competing systems, jeopardising the delivery of quality-sensitive services to the home.

Without losing sight on the plurality of future services, we chose to focus on healthcare as a primary use case, in particular rural healthcare for the chronically ill elderly. These services are emotionally engaging, economically important and technically challenging.

Approach

The project had goals at three different levels: technology area; company value; and individual competence development. The project's model to achieve impact in the technology area is not to create all the future technology in-house. Some of the technology was created by the project's partners, but the strongest impact of the project was to serve as a coordination platform for standardisation work and policy thinking.

At company value level, the project created value through the improvement of products and services based on the project as a joint innovation platform with shared knowledge. In addition, the innovation platform gave rise to new business relations and alliances. The amassed knowledge also reduced uncertainty about business and technology decisions.

The project brought together expertise from optical networks, 4G and 5G mobile communications, Wi-Fi connectivity, as well as in-home and copper communications. The project team is experienced and participates in standards activities on a regular basis. For the participating researchers, it was of great value to be a part of the shared intellectual environment where new findings and phenomena were constructively and openly discussed.
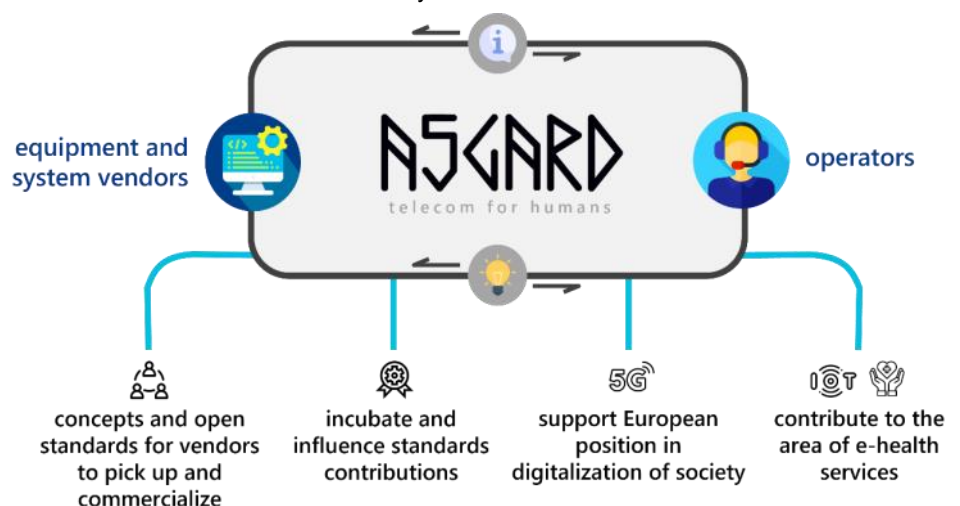

equipment and system vendors

operators

concepts and open standards for vendors to pick up and commercialize

incubate and influence standards contributions

support European position in digitalization of society

contribute to the area of e-health services

Figure 1: A5GARD approach and goals

Achieved results

The overall project goal was to facilitate the digitalization of our society by providing ubiquitous access to high-end digital services like remote healthcare to all user devices independently of geography (urban/rural). Making reliable connectivity available to the entire population in an economically viable way and ensuring the management of the combined access, 5G and in-home networks within one system are essential to achieve this goal. Some breakthrough examples for achieving reliable connectivity and realizing self-care are:

1. We established 3 showrooms where healthcare solutions are shown to the public to inspire self-care as a technology-based way of addressing the demographic challenge, and we contributed to enhancing 2 existing showrooms. This was achieved after extending the consortium with five Swedish municipalities. The showrooms can be developed further towards supporting data-driven personalized medicine and self-care.

2. We explored the enhancement of a "broadband via cellular networks" product (BBM) with end-to-end management and QoS capabilities for service assurance and self-healing, applied to our e-health use case. The data available in the service assurance environment represents an accurate statistical model of the performance of the external receiver of BBM (owned by the customer) in terms of radio characteristics as well as data usage. This

achievement takes us one step closer to the deployment of a network with the end-to-end management and QoS capabilities envisioned within A5GARD.

compatible with the ITU standard. Increasing pressure on operators to save energy both at the OLT and ONU meant that investigations on this subject were very timely.
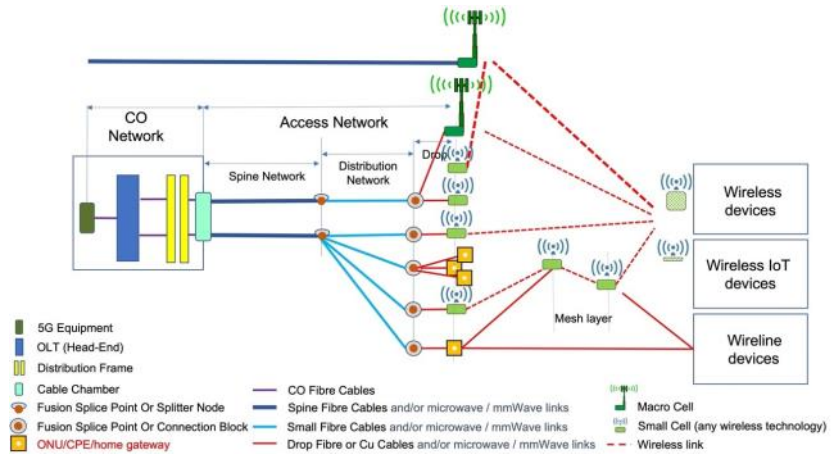

Figure 2: A5GARD reference architecture

3. We developed a testbed for fibre-to-the-home optical network monitoring. It addresses the newest access network standard, the XGS-PON, as a use case for novel monitoring solutions. We also realized that the FTTH network could serve as basis for sensing services, i.e. detection of ambient environment conditions such as temperature, strain, and vibration. Any anomalies detected this way could provide information on earthquakes, road traffic, infrastructure conditions etc. In the long-term, it could aid the idea of smart cities and become a large-scale application.

4. We simulated an XGS-PON using the ns-3 open-source simulation tool. Using ns-3, we investigated low power modes

As e-health was of special concern as a service in the project, the project investigated and further developed novel secure IoT-technologies to medical applications to safely allow remote health monitoring solutions. With the new technologies we expect to be able to provide highly cost-efficient connectivity solutions to the e-health area.

Impact

The project served in many ways as an interaction platform for sharing ideas and information between leading equipment and system vendors and operators. It incubated and influenced standards contributions that were brought to the relevant standards bodies. The project results that have been made visible to the outside world relate to methodologies, architectures, proof of concepts and open standards that any vendor in the ecosystem can pick up and commercialize. This will result in products to support the European front position in the digitalization of society.

Our contribution to the area of e-health services will attract interest for end-service providers, to build new medical end-user services based on new standardized IoT technologies. In a continuation this will improve the quality of life for the patients, e.g. the elderly population, that can remain in their homes for a longer time. The project worked towards creating a 'blueprint' for showrooms that can serve as platforms to show technology for the general population. The intention with this blueprint is to enable more municipalities to create display rooms and, in this way, enable self-care.

About CELTIC–NEXT

CELTIC-NEXT is the EUREKA Cluster for next-generation communications enabling the digital society. CELTIC-NEXT stimulates and orchestrates international collaborative projects in the Information and Communications Technology (ICT) domain.

The CELTIC-NEXT programme includes a wide scope of ICT topics based on new high-performance communications networks supporting data-rich applications and advanced services, both in the ICT sector and across all vertical sectors.

CELTIC-NEXT is an industry-driven initiative, involving all the major ICT industry players as well as many SMEs, service providers, and research institutions. The CELTIC-NEXT activities are open to all organisations that share the CELTIC-NEXT vision

of an inclusive digital society and are willing to collaborate to their own benefit, aligned with their national priorities, to advance the development and uptake of advanced ICT solutions.

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