



6GGLOBAL

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Partners:

ATIKA, Spain

ENKI, Poland

Fivecomm, Spain

IT-Av, Portugal

Nokia Spain S.L., Spain

Onesource, Portugal

Warsaw University of Technology, Poland

Wavecom, Portugal

Co-ordinator:

Jaime Ruiz

Nokia Spain, S.L. Spain

E-Mail:

jaime.jesus.ruiz_alonso@nokia.com

Project Website

www.celticnext.eu/project-6global

6G Global Interslicing for Private Networks

In the 6GGLOBAL project we envision a new 6G system architecture with the following distinct design criteria or goals in mind: slicing interoperability, simplification and sustainability, flexibility, specialization, robustness and security, and native integration of AI/ML capabilities.

Private Mobile Networks are now available in the industry and in many public sectors, and there is a real need to interconnect these isolated sovereign networks to extend the applications connectivity to reach different regions or countries where currently we have isolated networks. Sometimes the need of supporting mobility for workers of companies with several distributed centres, or users with occasional mobility that requires connectivity to some critical applications, or users of several companies working in the same project together, all them are supported by mobile private networks connectivity.

The Private Networks are more resilient and secure when hosted inside the company's locations as part of their own infrastructure, but having several locations requires multiple disconnected Private Networks that do not support mobility of users. In the 6GGLOBAL project we propose the deployment of multiple sovereign private networks that support the interconnection of users in one location to the applications deployed in other locations, or to the users connected in other locations. The interconnectivity of 5G networks will be designed to support the creation of inter-slices that will be implemented by the deployed beyond 5G infrastructure to allo-

cate the required slices to the interconnected applications or users deployed in independent mobile networks. This novel approach will add global and ubiquitous beyond 5G coverage with a higher level of resiliency and security. The project will support this inter-slice connectivity with users located in different countries and will prove the security, performance and resiliency that will be supported with the Next generation of Mobile Networks.

The different implementations in the project will achieve a new level of programmability to meet the demands of numerous and diverse use cases. The architecture will come with the flexibility and the high degree of specialization necessary for it to be deployed in large-scale wide area networks as well as in extremely local on-premises and personal-area networks. 6G will support that degree of customization to the most granular degree, making each network unique and tailored to its intended deployment needs, but not isolated from other 6G networks.

Main focus

The project consortium has extensive background on the related technology fields and the 6GGLOBAL project will build on top of the results of preceding projects. The main technological innovations that will be achieved at the end of the 6GGLOBAL project can be found in the following figure, reflecting trends ongoing in international research and on the early standardization discussions.

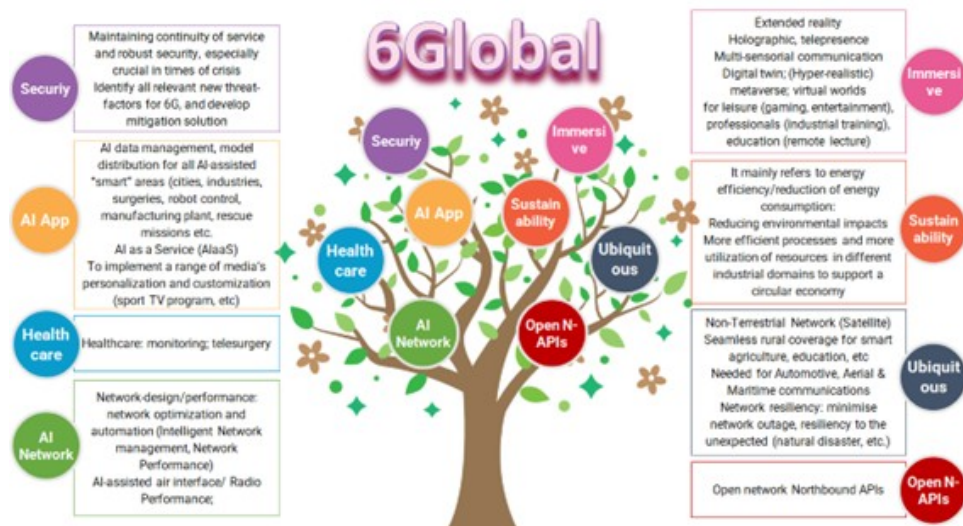


Figure 1 – Main technological innovations of 6GGLOBAL

Approach

The project's five use cases provide complementary validation scenarios for demonstrating the practical advantages of inter-slicing. Together, they represent different operational conditions, mobility requirements, service priorities, and levels of criticality. Their implementation will show how network slices belonging to separate private 5G networks can cooperate to support distributed applications, mobile users and assets, cross-site operations, and services requiring consistent end-to-end performance. By validating the architecture under different sector-specific conditions, the use cases will demonstrate that inter-slicing is not limited to a single deployment model, but can support both wide-area distributed environments and highly localised on-premises networks.

Next generation mobile networks will require advanced management capabilities that are scalable, largely automated, and reliable to fully exploit future use cases. In addition, these solutions should enable the integration of data from the underlying networks and applications to enrich such advanced management capabilities. Undoubtedly, the arrival of 6G will cause the creation of an avalanche of data coming from the operators and third parties, a kind of information which will be essential for network and service management purposes.

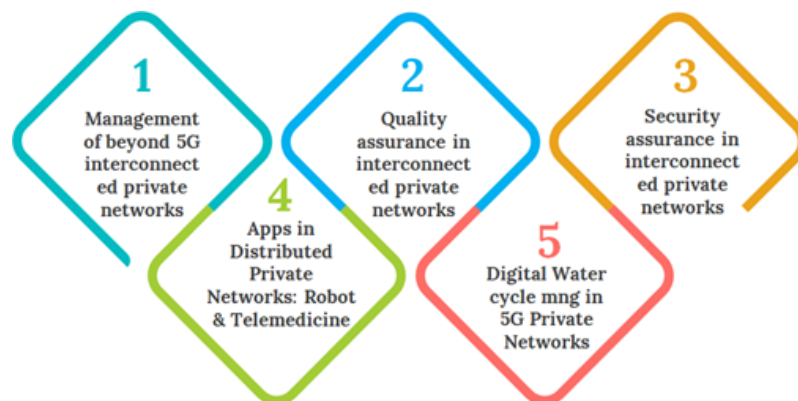
Main results

The five use cases will also assess how inter-slicing can improve service programmability, resilience, security, and resource effi-

ciency. They will demonstrate the dynamic configuration and coordination of connectivity, computing, and application resources across multiple administrative and technological domains. Attention will be given to service continuity during mobility and roaming, the protection of critical infrastructure, the prioritisation of demanding applications, and the orchestration of resources across heterogeneous public and private cloud platforms. These scenarios will provide evidence of how inter-slicing can help private networks operate as spe-

advanced assurance and fulfilment functions, and next-generation private network management. The project will also explore XR and digital twins for remote operations, develop 5G RedCap technologies, support multi-stakeholder service federation, and define key 6G enablers such as Multiple Experience modelling, new KPI metrics, management architectures, Network Exposure Function capabilities, and security foundations.

These developments will be validated through datasets, machine-



cialised yet interconnected systems rather than as isolated technological islands.

Impact

The 6GLOBAL project will deliver a broad portfolio of products, specifications, and technical capabilities for advanced 5G and future 6G network management. Its main outcomes include improved roaming between public and private networks, AI-driven management and optimisation, enhanced security incident response, behavioural control of IoT devices, energy-efficient network operation,

learning models, integrated demonstrators, prototypes, testbeds, field trials, and proof-of-concept management tools. The project will also promote its results through scientific publications, public demonstrations, participation in industry events, and contributions to organisations such as VQEG, ITU, and ETSI. Overall, 6GLOBAL aims to establish a scalable, secure, intelligent, and efficient ecosystem for managing future wireless networks, while accelerating the transition from conventional 5G systems to data-driven and experience-aware 6G infrastructures.

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.

CELTIC Office

c/o Eurescom, Wieblinger Weg 19/4
69123 Heidelberg, Germany
Phone: +49 6221 989 0
E-mail: office@celticnext.eu
www.celticnext.eu



Public Authorities

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