Challenges and Perspectives of Research for 6G Standardization

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Abstract

This talk outlines the key architectural and virtualization directions currently being shaped within 3GPP for the Sixth Generation (6G) mobile network standard. The 6G architecture will be fundamentally defined by "AI-Native Design", aiming for fully autonomous operation and optimization through the deep integration of Artificial Intelligence and Machine Learning (AI/ML) capabilities across the network stack (AI4NET).

Architecturally, 6G is an evolution of the 5G Service-Based Architecture (SBA), focused on greater simplicity, modularity, and trustworthiness. It will natively support new paradigms, most notably Integrated Sensing and Communication (ISAC), where the network simultaneously transmits data and perceives the environment. Furthermore, the architecture is designed for seamless and ubiquitous integration of Non-Terrestrial Networks (NTN). A unified, data-driven framework will manage the convergence of communication and computing, especially at the network edge, leveraging advanced resource orchestration.

Regarding implementation, 6G will be follow the design principle to be Cloud-Native by design, taking virtualisation to its maximum extent. This requires all Network Functions to be implemented as cloud-native applications, enabling highly flexible and agile deployment across diverse infrastructures (public, private, edge clouds). The core principles drive deployment flexibility, supporting the migration of functionality closer to the user for low-latency services, and leveraging declarative APIs for efficient lifecycle management. This approach underpins a future where network functions are highly disaggregated, resilient, and vendor-agnostic, aligning the architectural vision with the demands of future immersive and intelligent applications. Different EU initiatives will be cited as examples.

Biography

Hakima Chaouchi is a Full Professor and Head of strategy of digital sovereignty and sobriety at Institut Mines Telecom, Chair of the Intermediary Supervisory Board of ESFRI SLICES research Infrastructure and vice-chair of the State member representative group of the European JU SNS. She also served as telecom and 6G and future networks, Cloud and Cybersecurity Scientific Advisor at the Research and Innovation Strategy Service/French of High Education, Research Ministry-MESR in charge of national academic research structuring and research programs and initiatives development of Cybersecurity, Cloud and 5G/6G where she was the editor of the national research infrastructure roadmap of digital research infrastructures.

She is Full Professor at Institut Polytechnique de Paris/Telecom Sud Paris, Institut Mines Telecom with extensive research experience in wireless and mobile communications , Internet of Things and cybersecurity with design and validation approach of architecture protocols and optimization of different metrics such as quality of service, mobility, security and energy consumption. She is active in standardization bodies as IETF, and in different focus groups at the ITU-T focus group on Data processing and management as a chair-woman, and focus group on Environmental Efficiency for Artificial Intelligence and other Emerging Technologies, and some study groups such as the SG 13 on future networks in charge of the first guidelines for the 6G requirements and standardization roadmap.