Smart Networks and Services International and European Cooperation Ecosystem

SNS ICE Analysis on the EU cloud landscape

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- 6G is set to combine connectivity services with compute capabilities
- Edge and cloud computing become important
- The market of cloud services is dominated by hyperscalers based in the USA, whereas edge computing is at its infancy in Europe
- Need to ensure European sovereignty of telco cloud but there are many challenges in creating a European telco
- The European Commission addresses the Connected Collaborative Computing Network (3C Network), as a European telco edge/cloud
- The importance of telco cloud has also been addressed by GSMA, 6G-IA, and European operators and telco vendors
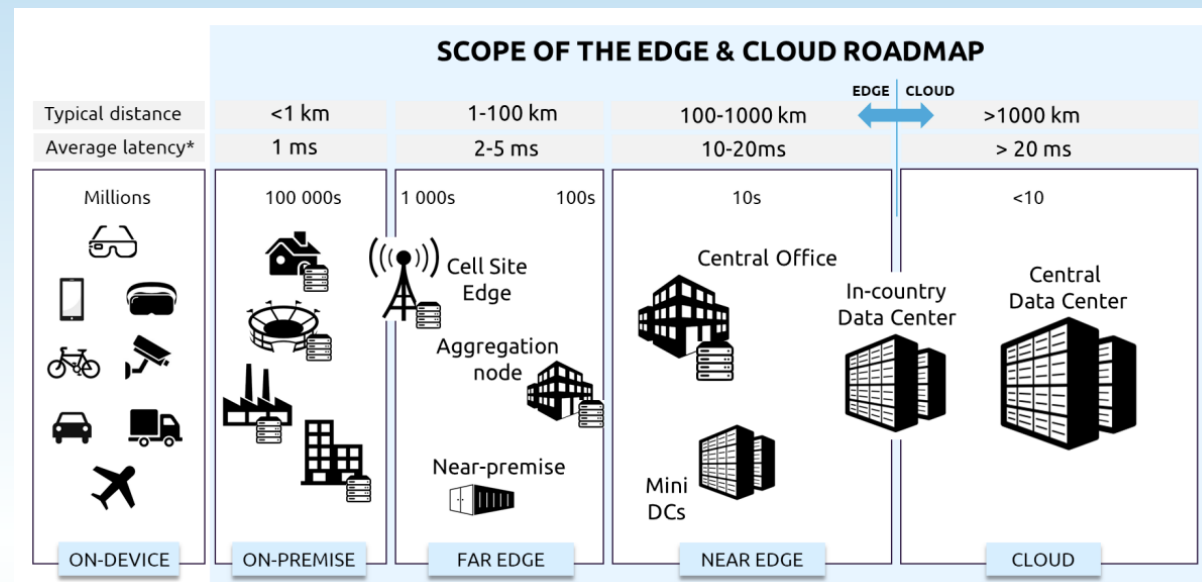

SCOPE OF THE EDGE & CLOUD ROADMAP

	<1 km	1-100 km	100-1000 km	>1000 km
Typical distance				
Average latency*	1 ms	2-5 ms	10-20ms	> 20 ms

ON-DEVICE | ON-PREMISE | FAR EDGE | NEAR EDGE | CLOUD

Figure retrieved from: European Commission, "European industrial technology roadmap for the next generation cloud-edge offering," May 2021.

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WHITE PAPER

How to master Europe's digital infrastructure needs?

Roles of cloud in 6G

- Supporting 6G functions
  - 6G core and radio functions are envisioned for deployment in the edge/cloud
  - Other functions for deployment in the edge/cloud: media processing, positioning, AI/ML, etc.
  - Need for cloud interoperability, portability of functions, and standardised interfaces
- Supporting 3rd party applications
  - Applications could also be deployed in the edge to e.g. reduce latency
  - Application interface should be independent of network operator and edge/cloud provider
- Supporting intelligent agents
  - AI agents are applications running on a device or offloaded to the network
  - 6G telco cloud should provide the hosting ecosystem for AI agents, e.g. authentication of AI agents

- Review on different types of cloud-related activities, e.g. projects, open-source initiatives, and standardisation bodies
- Overview for each activity on general information, topics addressed, and organization

Telco Cloud Reference Architecture

Source: SNS ICE Deliverable D2.2 Findings and Trends from European 6G R&I Initiatives report

Topic	IPCEI-CIS	European Alliance	Gaia-X	GSMA	CAMARA	ETSI NFV	CNTI	Anuket	Sylva
Focus	IT	IT & Telco	IT	Telco	Telco	Telco	Telco	Telco	Telco
Deployment	Industrial	N/A	Commercial	Commercial	Commercial	Industrial	Industrial	Validation	Validation
Open Source	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specifications	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Policy/ Standardisation	***	***	***	*	*	*	**	*	*
Support 6G functions	-	***	-	-	*	***	***	***	***
Support 3rd party applications	-	***	-	***	***	-	-	-	-
Architecture/ Infrastructure	***	***	**	**	-	*	**	***	*
Orchestration and Management	***	***	**	-	-	***	**	***	***
Security	***	***	***	**	***	***	**	**	***
Environmental Sustainability	***	***	*	-	-	-	*	-	***
Business Models	-	***	**	***	-	-	*	-	-

- Different types of deployments are addressed
- Development of open-source solutions
- Development of standardised solutions (via specifications or contributing to standardisation)
- Distinction on activities focused on support of 6G functions and 3rd party applications
- High interest on security aspects

- Starting point for the private side -2023

- Planning -2024

- Meetings with IPCEI-CIS, European Alliance for Industrial Data, Edge and Cloud – 2024 & 2025
- SNS JU Policy WG on 3CN – 2024 & 2025

Working for European Solutions

Cloud solutions	Short- term	Medium-term	Synergies
3C cloud provision –multi provider- multi technology- (including cloud RAN, edge, far edge)		X	IPCEI-CIS
Sustainable telco cloud solutions (scale with the load)	X (after the gap analysis of call 2024)	X	
Multi-provider, cross-domain telco cloud native network function orchestration and management	X (after the gap analysis of call 2024)	X	IPCEI-CIS (workload deploy management)
Hardware offload (open-source?cl hardware) and accelerator abstraction layers			Chips JU
Native AI cloud support (handling trustability, explainability, conflict resolution, …)		X	
Improved network software lifecycle (DevOps,…)	X		
Compute, function & network as a service and API	X		
Secure, Dependable and reliable telco cloud	X		
Data storing/using/handling/curating/privacy	X		
Stateless and event driven principles	X		
Interconnected/federated and interoperable (public and private) 3C networks and with standardized APIs	X		IPCEI-CIS
Multi-stakeholder Service continuity (seamless service roaming)		X	
Large scale clusters of accelerated compute			HPC, Gen AI Initiative
Task based core network – extending the SBA	X		
Extending CAMARA edge discovery, reanchoring	X		

Service Provision	Short-term	Medium-term	Synergies
Services creation delivery and management (resources network and compute) including sustainability	X (after the gap analysis of call 2024)		
MLOps & AI aaS		X	
Exposure and ecosystem interactions	X		
Digital twin as a support of global optimisation and AI enabled operation		X	
Human centricity and digital trust, secure service distribution	X		
Service market place (catalogue of services) – standardizing a multi-stakeholder communication	X		IPCEI-CIS

1. Stimulate innovative European solutions that address the need for network cloudification in all domains (RAN, edge, core),
2. Exploit and enhance open-source solutions to contribute to 6G technological sovereignty,
3. Develop open interfaces to enable cloud interoperability, cloud enabled telco services interoperability
4. Prioritize European solutions that conform to European values, legislation for data security and privacy,
5. Implement EU-based open, interoperable, and multi-provider cloud infrastructures for ICT networks.

Enable the convergence of R&D European activities to close to market solutions

Ensure that pan-European experimental infrastructures will be available to support further R&D development

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Thank you for you attention!

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