Rolf Riemenschneider

Project Officer of UNLOCK-CEI
Head of IoT Unit, DG Connect,
European Commission

High Level Policy Welcome

The future of European Competitiveness – Report by Mario Draghi

Context

On September 9, 2024, Mario Draghi, former ECB president, presented a 400-page report - after being tasked by the European Commission - on the **future of European competitiveness**.

The findings of the report contribute to the Commission's work on a **new plan for Europe's sustainable prosperity and competitiveness**.

→ In particular, the report will contribute to **the development of the new Clean Industrial Deal for competitive industries and quality jobs**, which will be presented in the first 100 days of the new Commission mandate.

Key conclusions

Part A (Strategy)   *Part B (In-depth analysis)*

3 main areas for action to reignite sustainable growth are identified

1	2	3
Closing the innovation gap with the US and China	Joint plan for **decarbonisation and competitiveness**	Increasing **security**, reducing **dependencies**

10 sectoral policies and **5 horizontal policies** are identified, including for Automotive   *Detailed next*

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IoT-Edge: Recommendations from the Dr...

Challenges identified

Recommendations

IoT /Edge

Fragmentation also makes it harder to capitalise on new technologies. Europe currently has virtually no presence in edge computing. Edge computing refers to the distribution of computational tasks across smaller nodes closer to customers, reducing data transport to smaller distances. As the EU builds highly automated manufacturing plants requiring low latency and significant data volumes steered by AI, **edge computing for industrial applications could better enable performance and reduce latency** for industrial connected robotics, keeping data transfers more secure.

Underpin leadership in strategic IoT areas (e.g. O-RAN, **edge computing, NW API standardization**) by **deregulating new investments** (5GSA, IoT), subject to preserving competition

Coordinate standards for edge, NW APIs, and IoT at EU level To ensure that EU players remain at the forefront of new technological developments, → to establish an EU-level body with public-private participation **to develop homogenous technical standards for the deployment** of network APIs and **edge computing**

IoT (cross-domain)

Digitalisation can also contribute to Europe's decarbonisation and transition to net-zero by 2050. **Connecting advanced technologies, such as the internet of things (IoT) and remote sensors**, additive manufacturing and predictive maintenance has great potential to promote the circular economy and energy savings
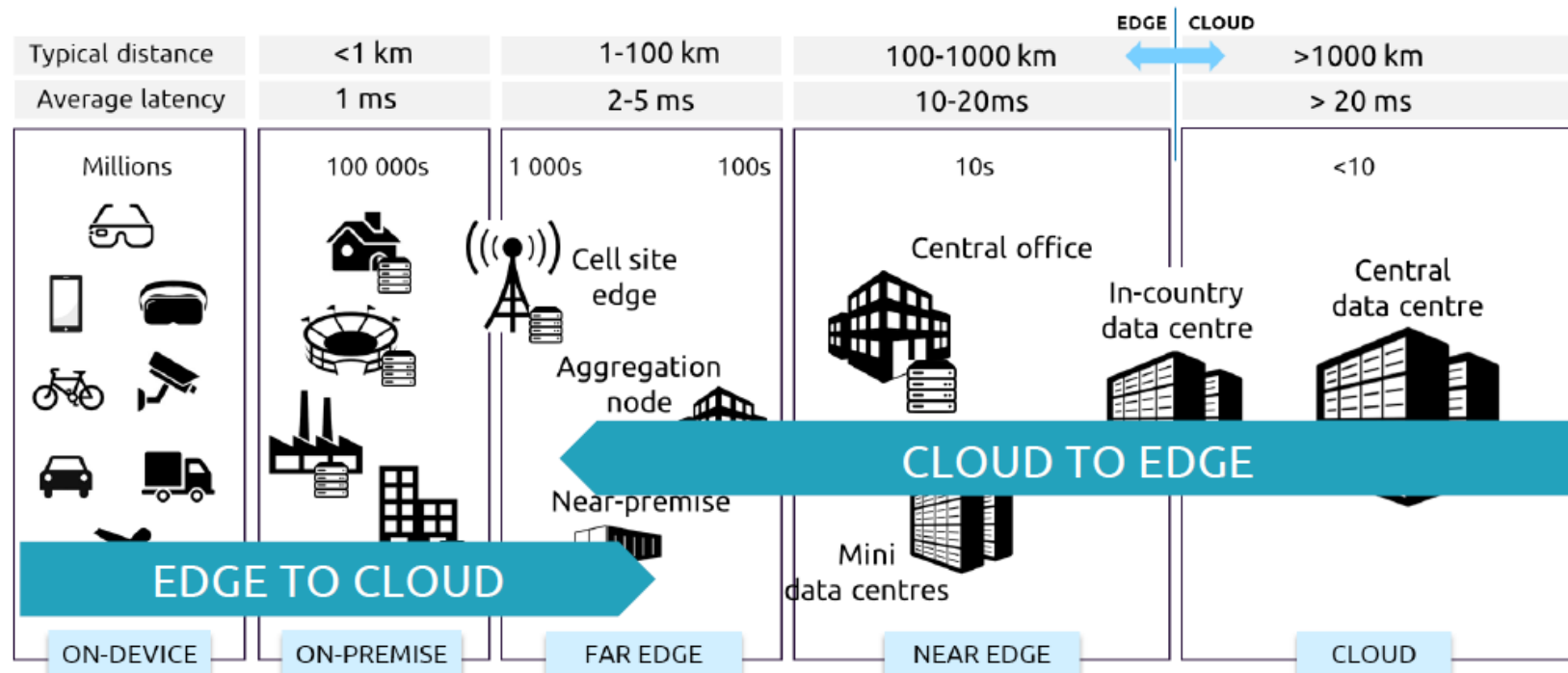
Digita exper and r

...d enabler for the electronics value chain, and **a** ...ecurity and industrial strength across

Ensure support for the innovation potential of mainstream chips in larger nodes (more than 28 nm) as well as of chiplets, **to leverage EU strengths in established industries and innovative deployments** (e.g. the automotive industry, sensors for IoT, power controls,, etc
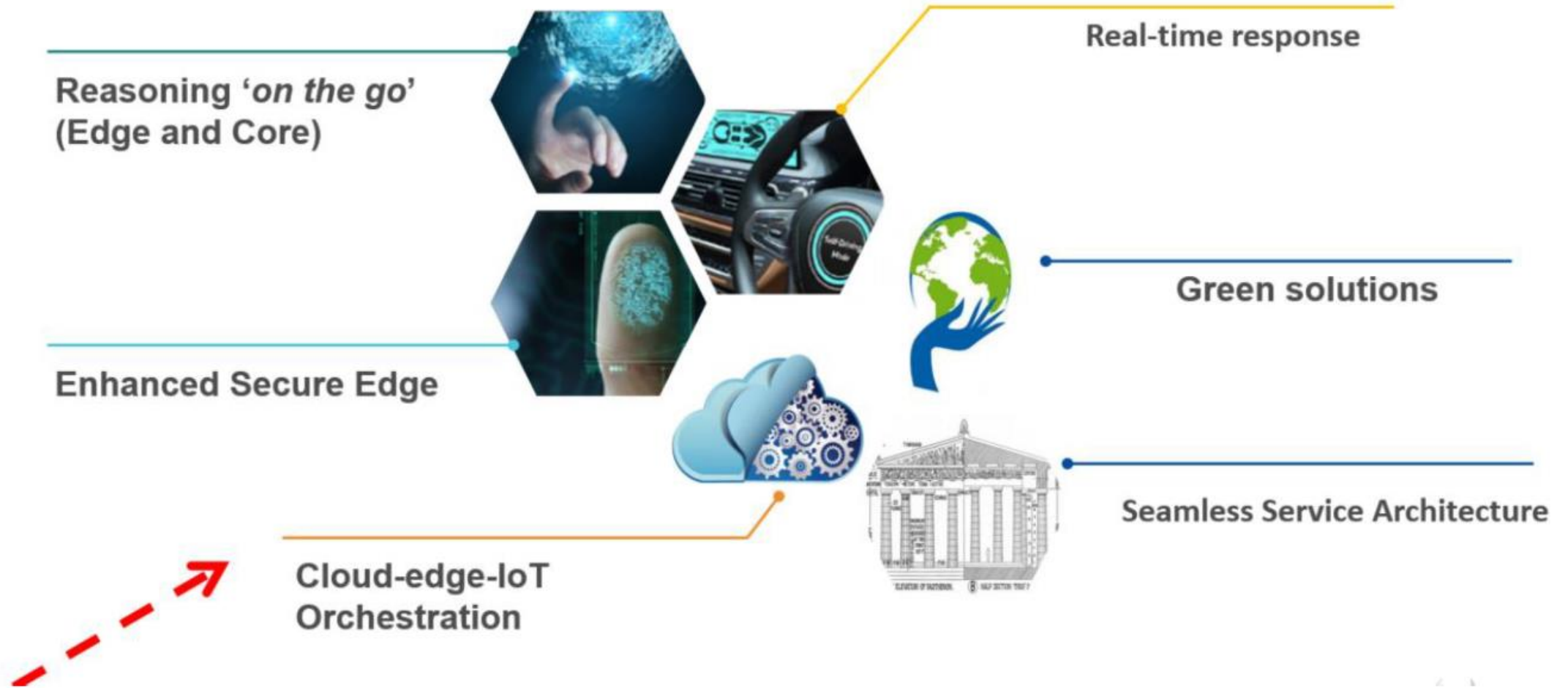
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Digital Decade objectives for the cloud & edge computing continuum by 2030

2030 DIGITAL COMPASS

THE EUROPEAN WAY FOR THE DIGITAL DECADE

✓ **>10.000 edge nodes by 2030**

✓ **75% of cloud uptake by EU enterprises in 2030**

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

Millions	100 000s	1 000s — 100s	10s	<10

Cell site edge

Aggregation node

Near-premise

Central office

In-country data centre

Central data centre

Mini data centres

CLOUD TO EDGE

EDGE TO CLOUD

ON-DEVICE	ON-PREMISE	FAR EDGE	NEAR EDGE	CLOUD

Energy   Rail   Manufacturing   Aerospace-defence   ...

Mobility   Farming   Health   Public administration

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Reasoning 'on the go'
(Edge and Core)

Real-time response

Enhanced Secure Edge

Green solutions

Cloud-edge-IoT
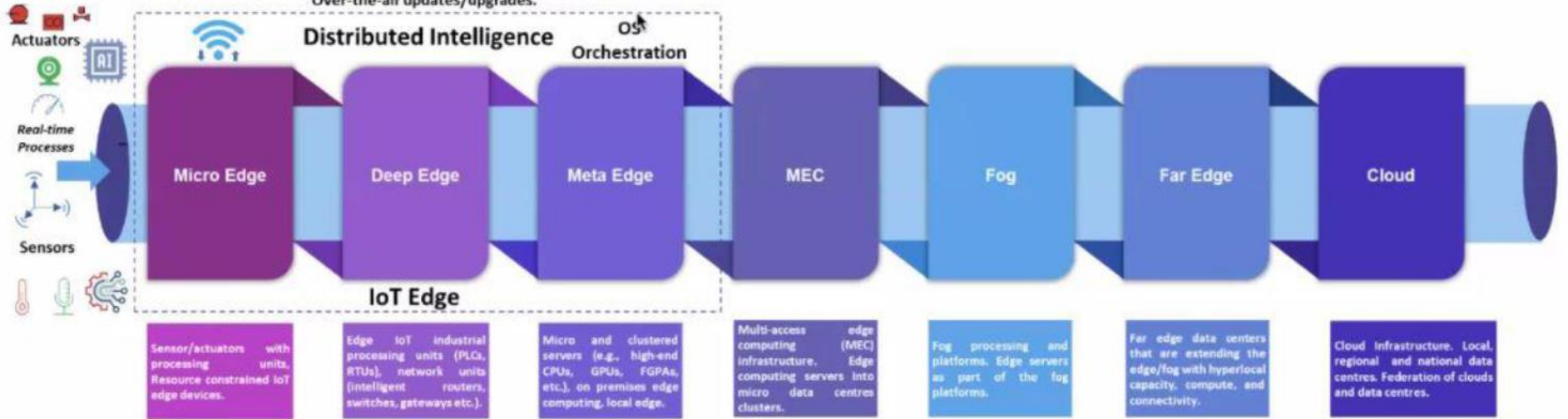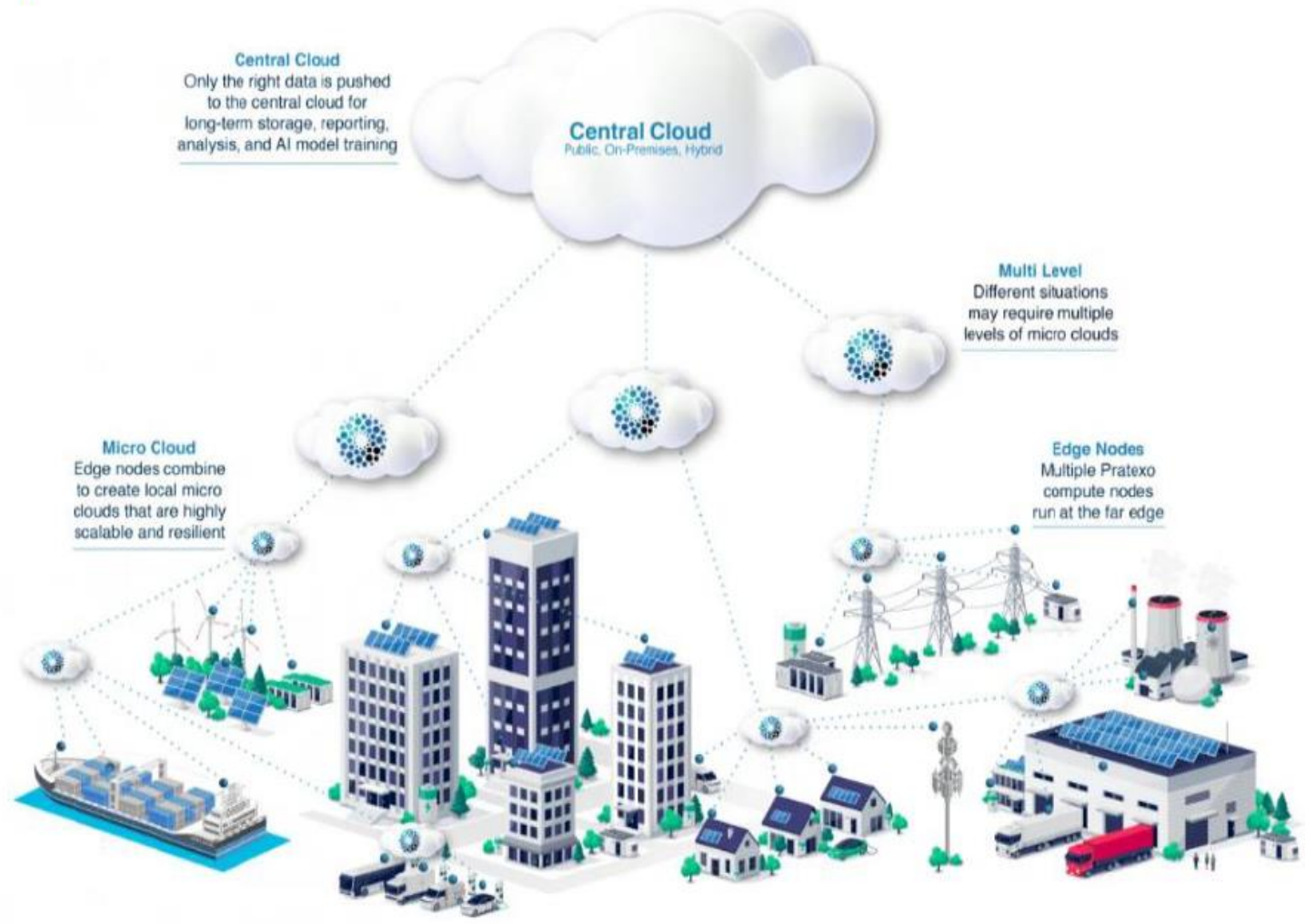Orchestration

Seamless Service Architecture

IoT and Edge Computing Granularity

Applications

Scalability, adaptability, transparency, dependability, trustworthiness.
Over-the-air updates/upgrades.

Distributed Intelligence

OS/Orchestration

Actuators

Real-time Processes

Sensors

Micro Edge	Deep Edge	Meta Edge	MEC	Fog	Far Edge	Cloud

IoT Edge

Micro Edge	Deep Edge	Meta Edge	MEC	Fog	Far Edge	Cloud
Sensor/actuators with processing units. Resource constrained IoT edge devices.	Edge IoT industrial processing units (PLCs, RTUs), network units (intelligent routers, switches, gateways etc.).	Micro and clustered servers (e.g., high-end CPUs, GPUs, FGPAs, etc.), on premises edge computing, local edge.	Multi-access edge computing (MEC) infrastructure. Edge computing servers into micro data centres clusters.	Fog processing and platforms. Edge servers as part of the fog platforms.	Far edge data centers that are extending the edge/fog with hyperlocal capacity, compute, and connectivity.	Cloud infrastructure. Local, regional and national data centres. Federation of clouds and data centres.

AI⊙TI

Complexity of Edge Orchestration

Central Cloud
Only the right data is pushed to the central cloud for long-term storage, reporting, analysis, and AI model training

Central Cloud
Public, On-Premises, Hybrid

Multi Level
Different situations may require multiple levels of micro clouds

Micro Cloud
Edge nodes combine to create local micro clouds that are highly scalable and resilient

Edge Nodes
Multiple Pratexo compute nodes run at the far edge

EDGE COMPUTING

CLOUD

EDGES NODES

EDGE DEVICES

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Challenge of Computing Continuum

Source: AIOTI 2023
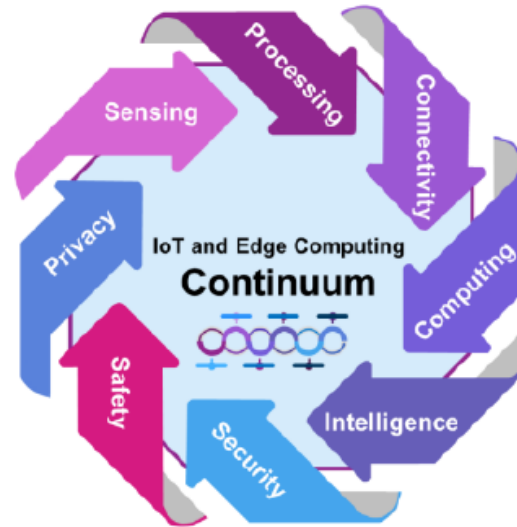
Figure 4 X- continuum paradigm

Source: NebulOus Platform
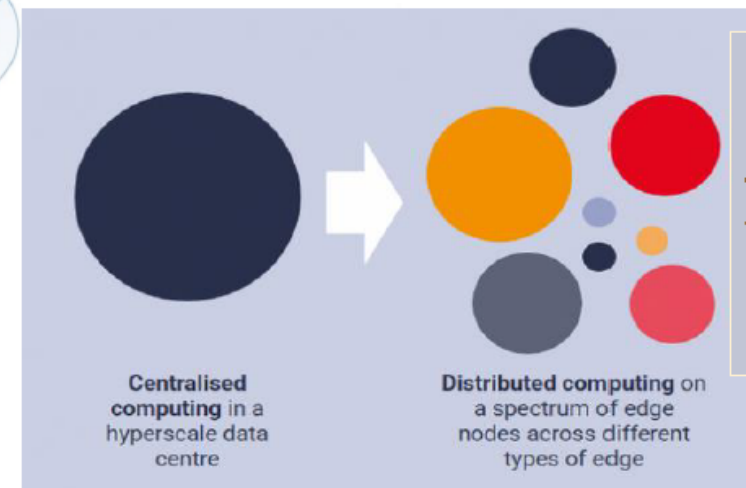
Technical Challenges

Develop Edge Cloud Infrastructure **as a Virtual continuum** orchestrating edge workloads, and as a platforms to manage the network, storage and compute resources.

Application Paradigm

Applications move to highly decentralized, distributed models, as they ran at the edge and exploit off-loading computing resources including network functions to cloud backend systems
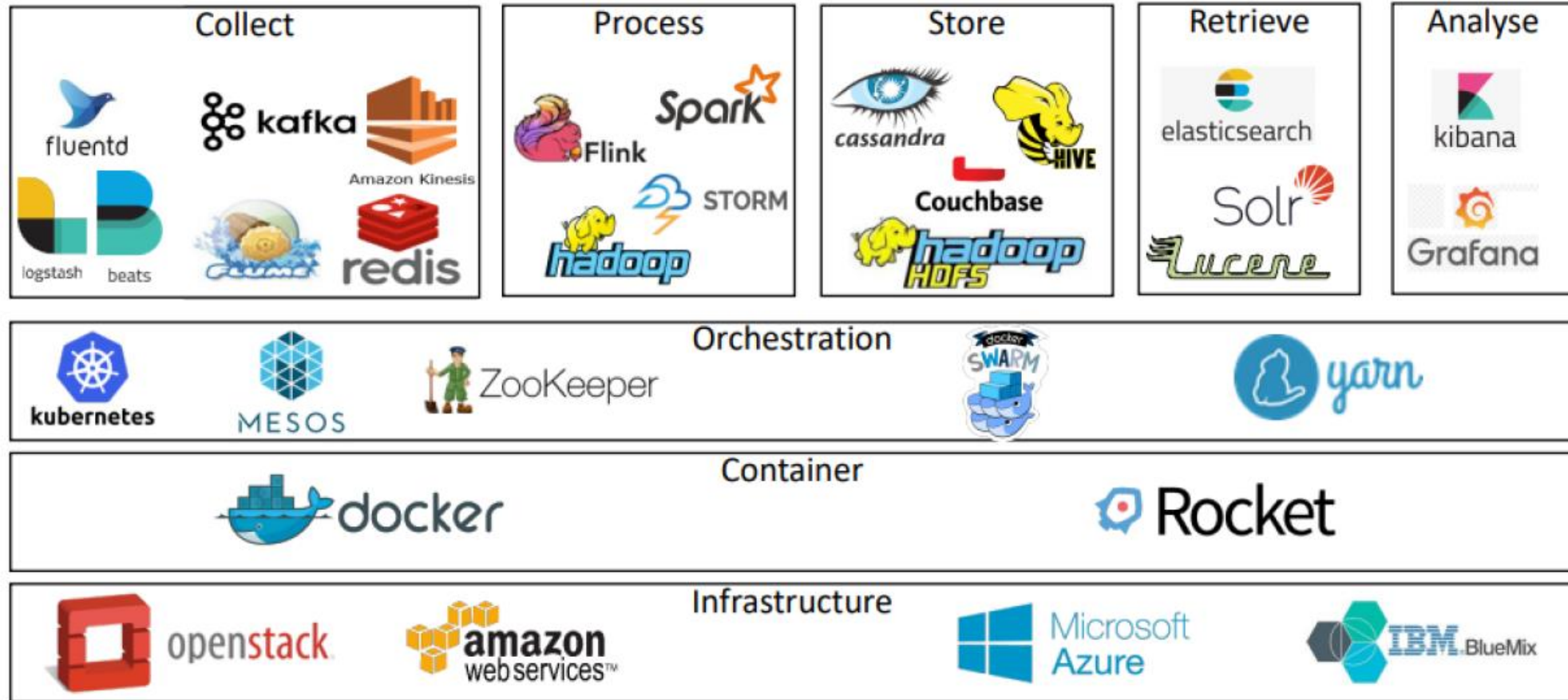
Economic Impact

→ From Cloud to Edge business models
Total edge computing addressable market will grow from US$9 billion in 2020 to US$445 billion in 2030
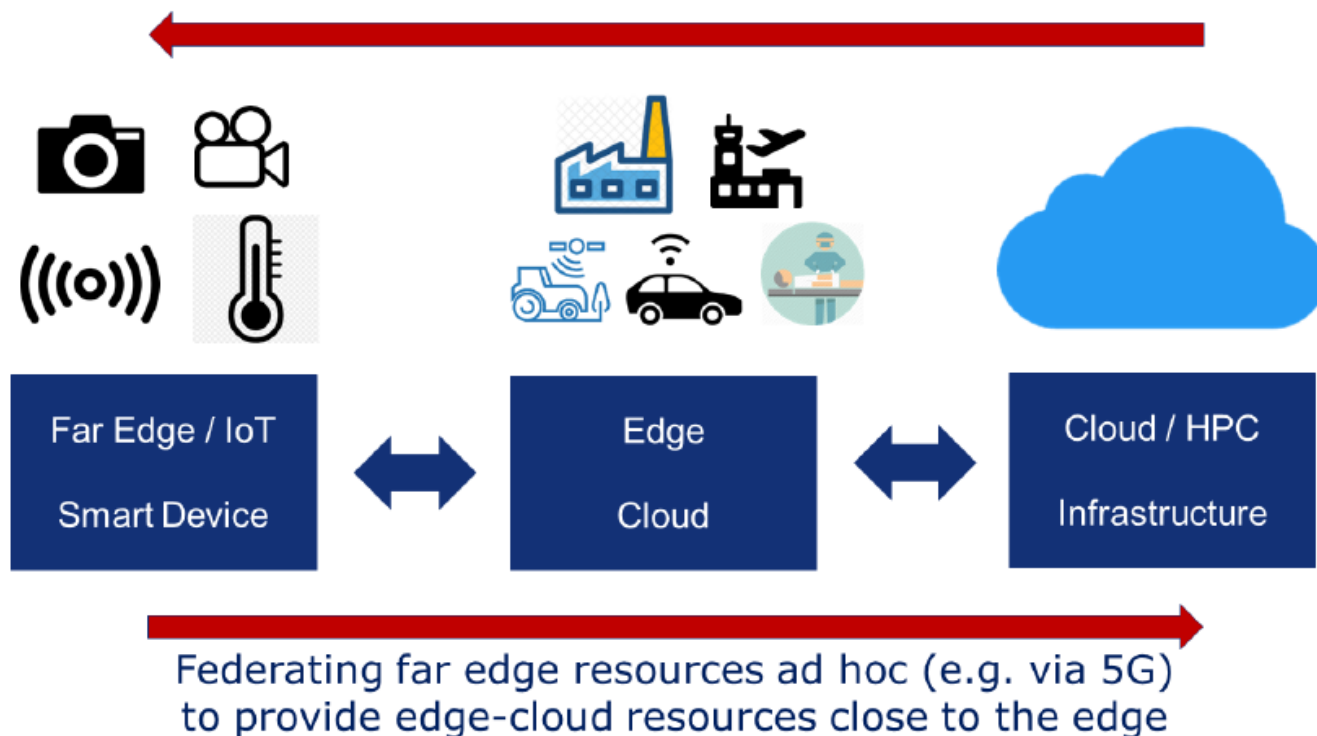*(courtesy: STL Partners, 2023)*

Momentum of Open Source Initiatives

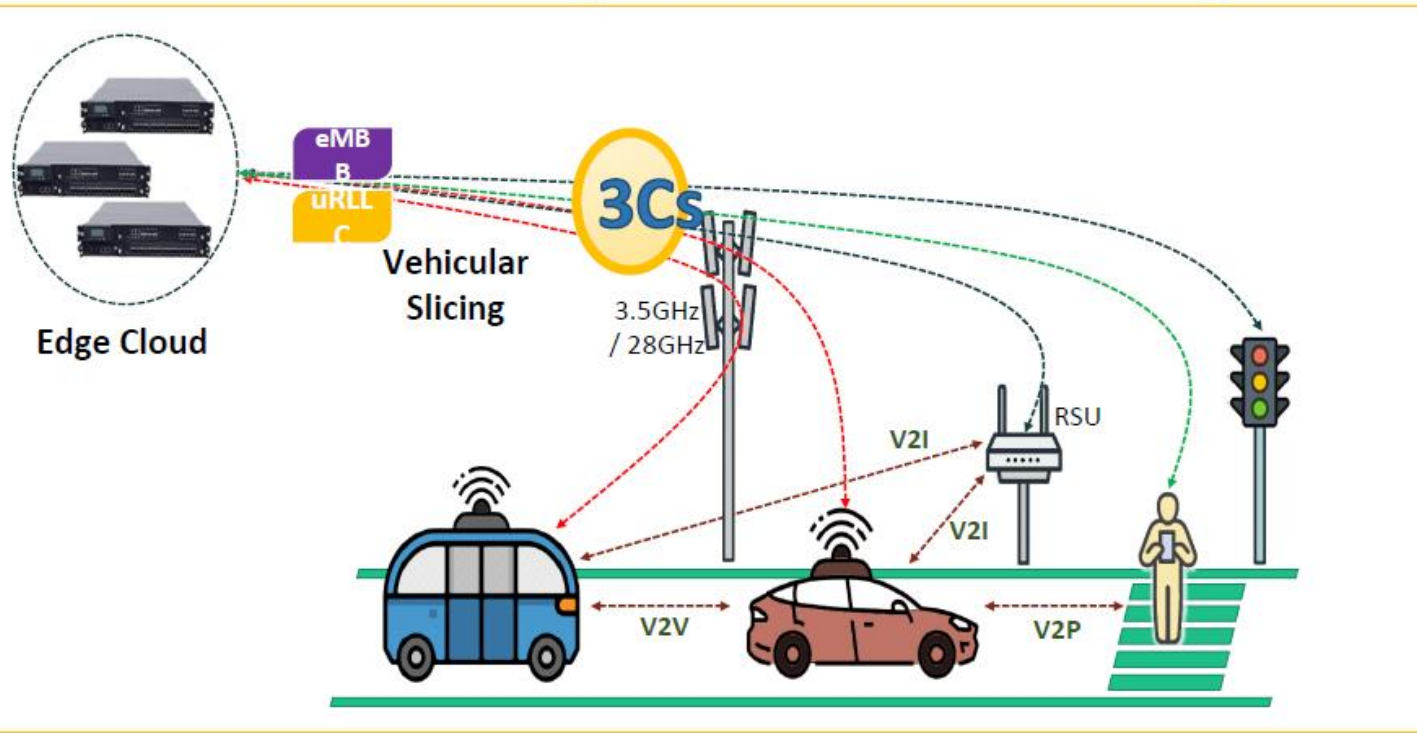# Pilots to explore new IoT Paradigms and their Impact of EU Markets

- **Trends like edge technologies and decentralised Intelligence** will reshape the industrial landscape,

    - **spurring innovation** towards the edges of the IoT network (edge clouds and edge computing)

    - **accelerate the pick-up of novel advanced edge technology** in most important sectors for Europe's economy, and competitiveness

- **An open framework for a vibrant Edge-IoT ecosystem** is key for up-scaling and to leverage economies of scale

    - **Standardisation & Open Source**

    - compliance, **security** as well as synergies across sectors.

    - Underpinning an emerging **open edge ecosystem** including midcaps, SMEs and start-ups,

Trend/Paradigm Shift: from Cloud to Edge
Bringing compute resources closer to the data

Far Edge / IoT

Smart Device

Edge

Cloud

Cloud / HPC

Infrastructure

Federating far edge resources ad hoc (e.g. via 5G) to provide edge-cloud resources close to the edge

Large-scale pilots as a basis for Connected Collaborative Computing Networks (3C networks)
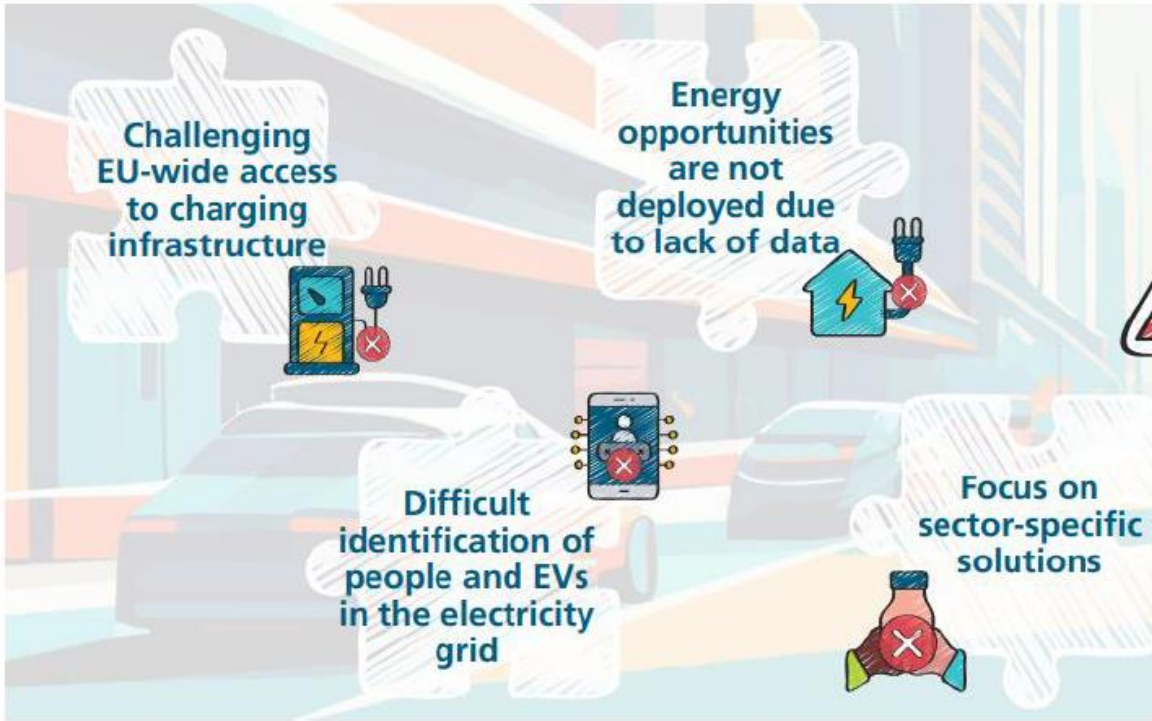
"How to master Europe's digital infrastructure needs?"

## Use case: Mobile Edge Infrastructure for Intelligent Crossing

Reference: South Korean Pilot Daejeon, South Korea, https://autopilot-project.eu/

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Unsymmetric Decarbonisation

Challenges

Challenging EU-wide access to charging infrastructure

Energy opportunities are not deployed due to lack of data

Difficult identification of people and EVs in the electricity grid

Focus on sector-specific solutions

Opportunities

Bidirectional Charging Services Enabled by Digital Authentication

EV Integration via Smart Home Energy Application

Seamless Bidirectional Charging Infrastructure Access

Crosssector Collaboration

Study Report by Fraunhofer FIT, May 2024 <<LEVERAGING TWIN TRANSFORMATION DIGITAL INFRASTRUCTURES TO ADVANCE DECARBONISATION AT THE NEXUS OF ENERGY AND MOBILITY >>

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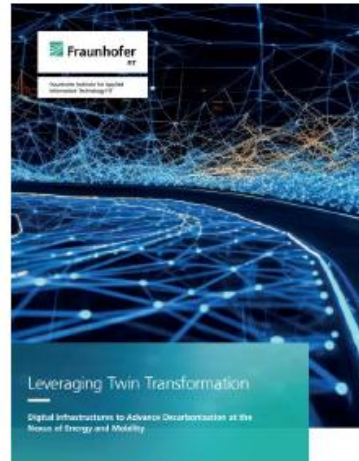
EU-US Collaboration – DISCOVER US

→ Open for expression of interest
https://discover-us.eu/#/

International Standardisation

→ Workshop on 26-27 Nov. 2024 in Brussels

3Cs Initiative

→ Calls under WP2025, launched by end 2024

Related Background

- **Horizon Europe**:
  → Calls, topics, deadlines WP2023-24

- **Position Papers and Event Reports**
  → Alliance AIOTI Strategic Foresight : IoT and Edge Computing Convergence

- **Cloud-Edge-IoT Portal** – see www.EUCloudEdgeIoT.eu

- HIPEAC Vision https://www.hipeac.net/vision/#/latest/

- Edge-IoT Policy on Europa

➢ **3Cs Strategy**:
  → Calls, topics, deadlines WP2023-24