



#HorizonEU

HORIZON EUROPE

HORIZON-CL4-Destination 3:
**Spurring Edge innovation
through Open Platforms**

2021 – 2027

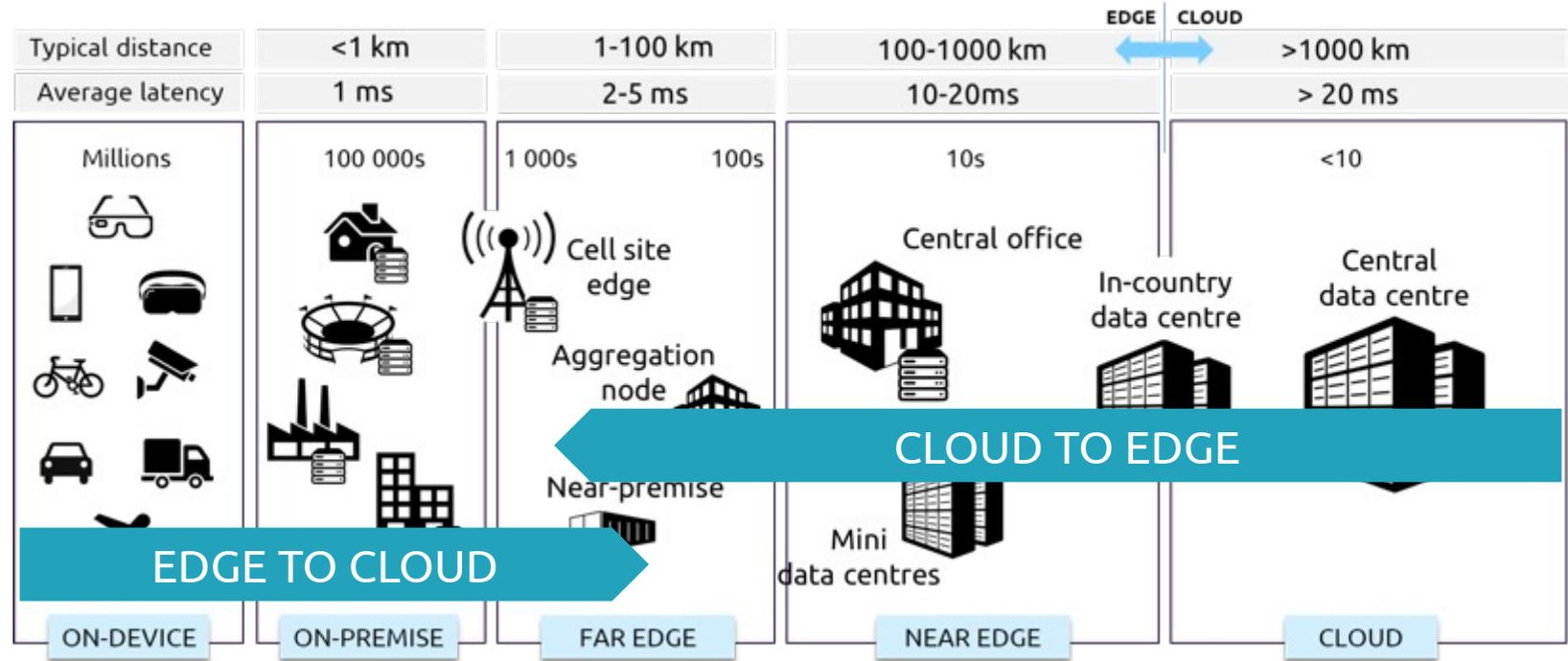
ROLF RIEMENSCHNEIDER
HEAD OF SECTOR IOT
European Commission
DG CONNECT / E4
Internet of Things

Ludwigsburg, 17 October 2023

Digital Decade objectives for the cloud & edge computing continuum by 2030



- ✓ >10.000 edge nodes by 2030
- ✓ 75% of cloud uptake by EU enterprises in 2030



Energy Rail Manufacturing Aerospace-defence
 Mobility Farming Health Public administration ...

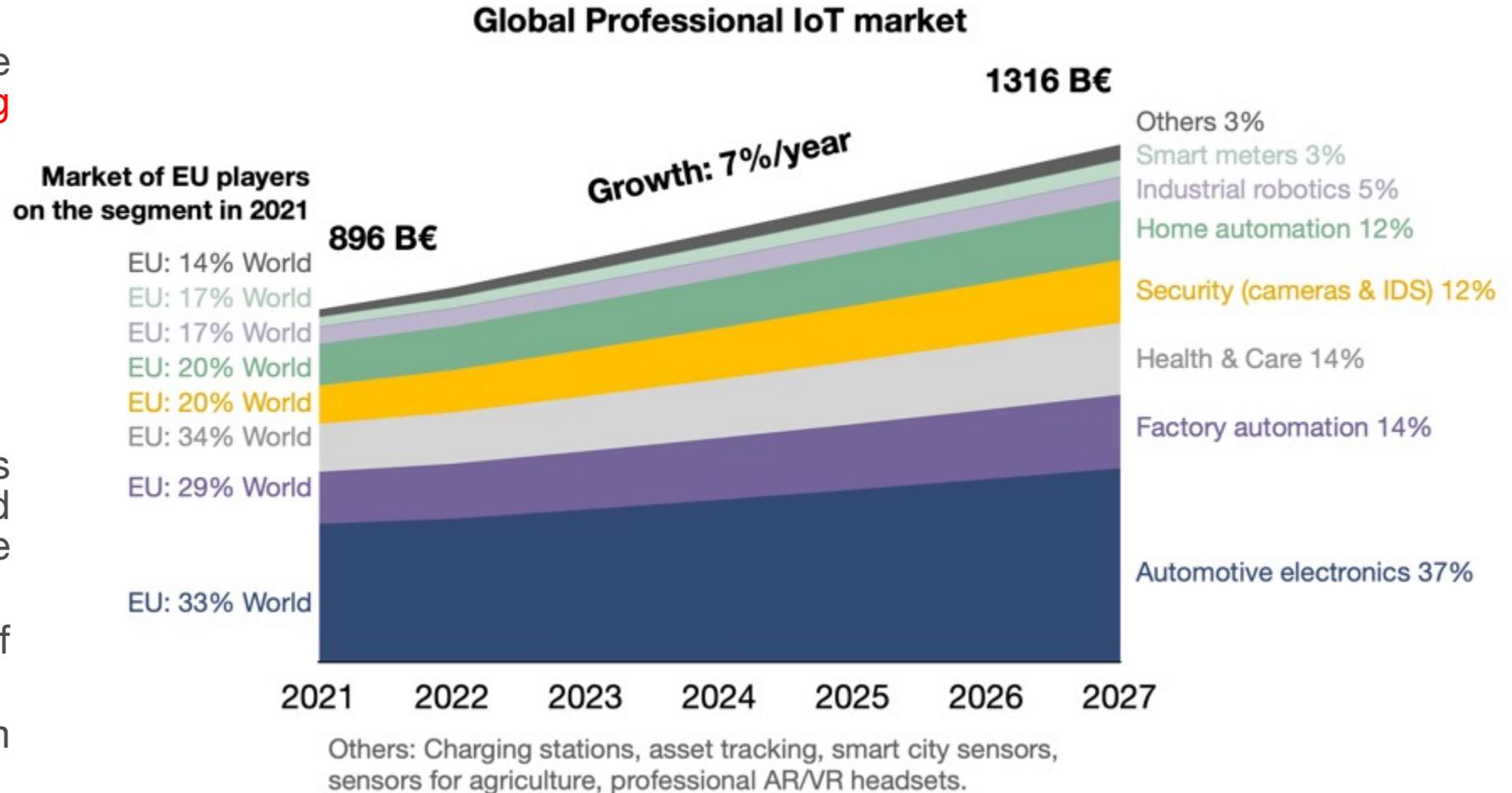
Growth in Industrial Edge-IoT Markets

In 2021, the EU players are well positioned in the **leading professional IoT segments**:

- Automotive electronics
- Factory Automation
- Energy
- Health & Care

EU ecosystems face numerous challenges that should hamper its global competitive position:

- Reversing the trend of outsourcing to Asia
- Competition from Hyperscalers



Horizon Europe Work Programmes 2021/22, 2023/24

Innovative technologies for the next generation Cloud-Edge-IoT continuum

2020 –

Software technologies

IoT Research
IoT and Digitising Industry Pilots

Cloud Computing

2021/22

Open Source for **Cloud based services**

Environments & tools for **Decentralised Intelligence** at edge
Future European Platforms for the Edge: **Meta OS**

Cognitive Cloud
Framework: AI-enabled Computing Continuum

2023/24

Open Source for Cloud/edge Digital Autonomy:

Piloting emerging Smart IoT Platforms and decentralised intelligence (IA)

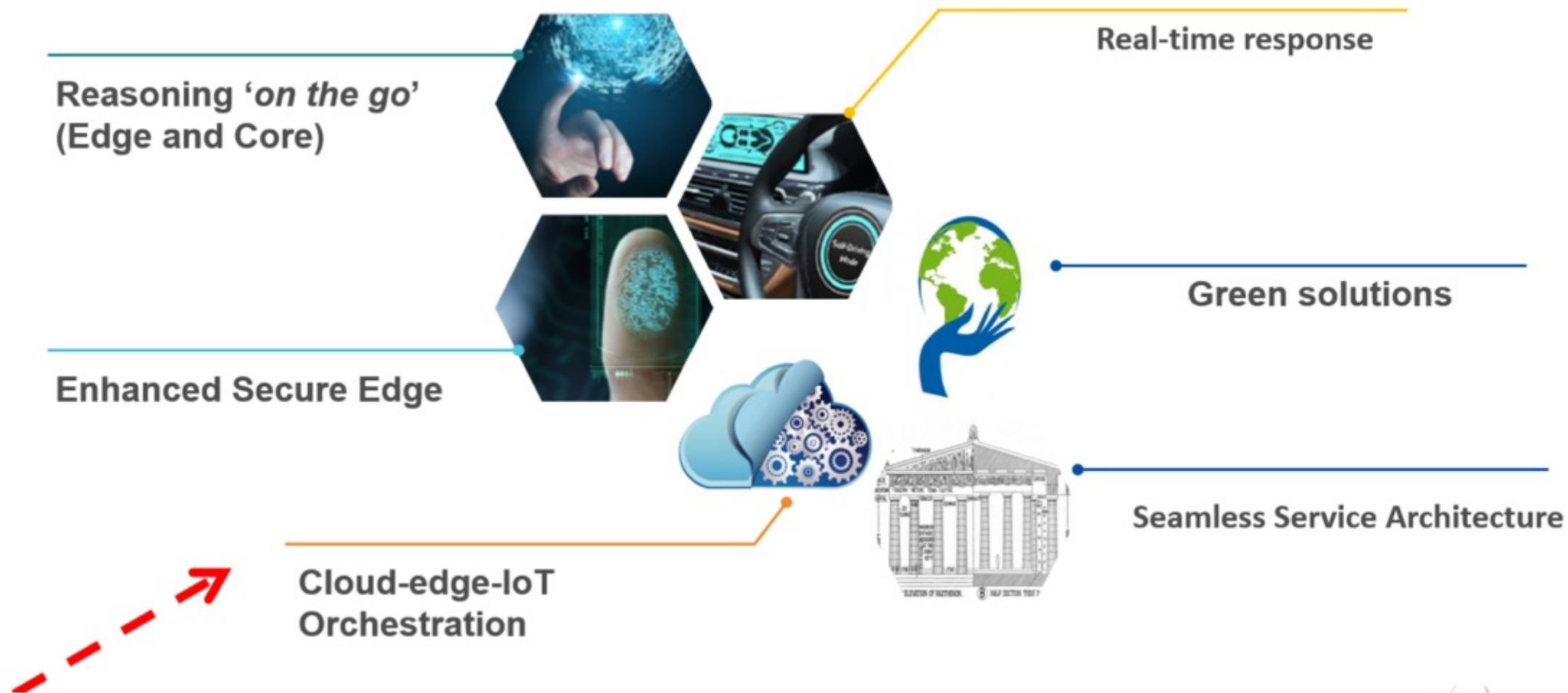
Cognitive Computing Continuum: Intelligence & automation for more efficient data processing:

2025 –

...

Funding > 250 Mill € WP2021-24

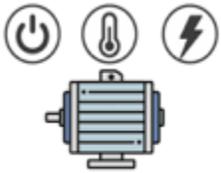
Technology Drivers



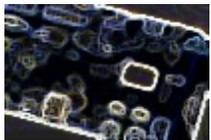
Edge Topology

IoT ecosystem: From Smart devices to Cloud

Smart devices



IoT modules



- Hardware
- Software
- IA/ML

Network



- LP WAN
- WiFi
- LTE-M
- 5G
- Bluetooth
- MQTT

Near Edge Cloud

Network / joint server



Security / IAM



Application



Far Edge Cloud

Hyperscalers
Big Data Cloud



Applications

Mobility

Manufacturing
& Logistics

Energy

Smart City

Smart Building

Agriculture

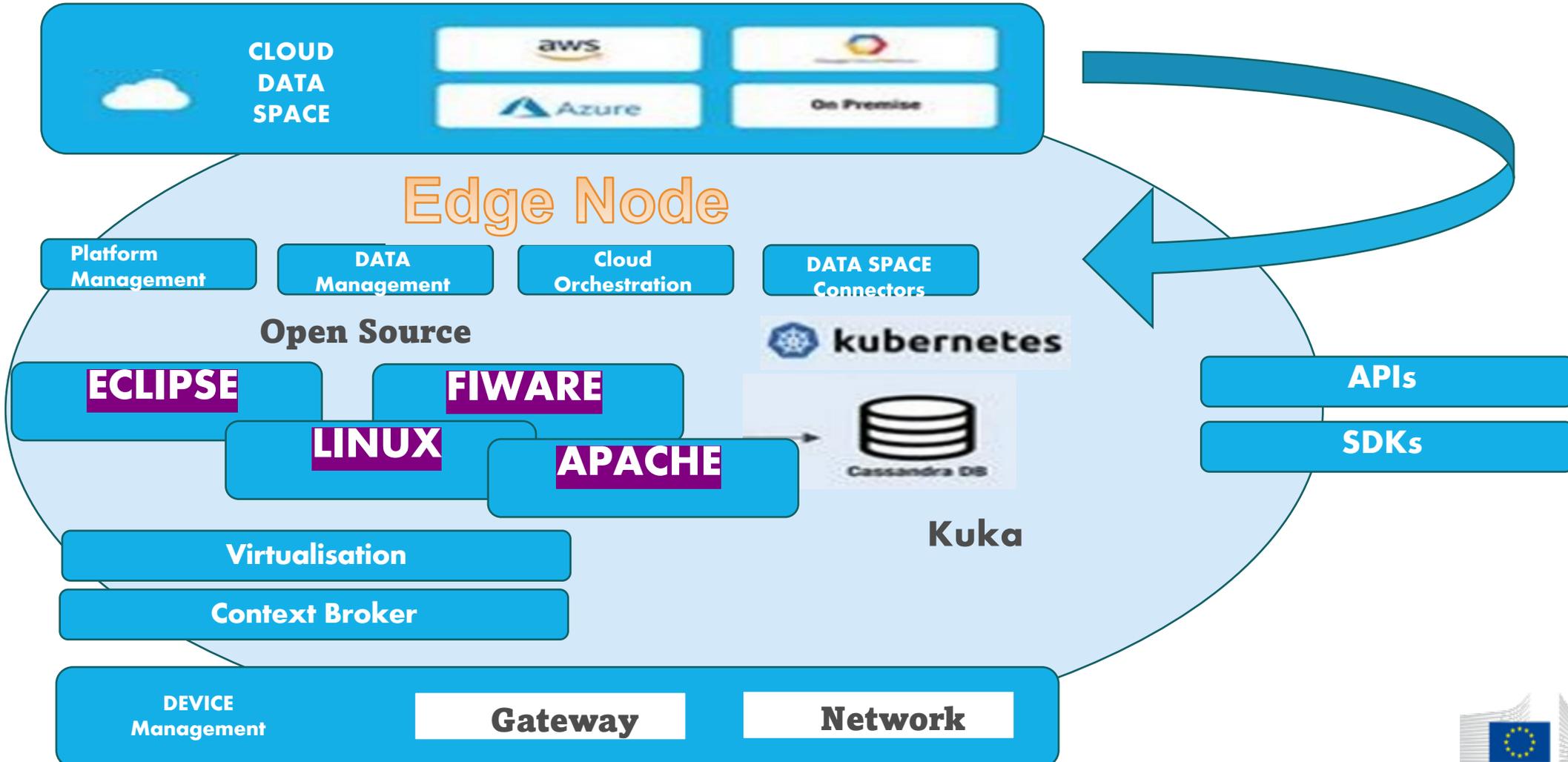
Platforms for the Edge

- **Challenges of System Integration**
- Embedded Systems & Control
- Internet of Things – Connected Objects
- Cloud – Digital Twins - Orchestration

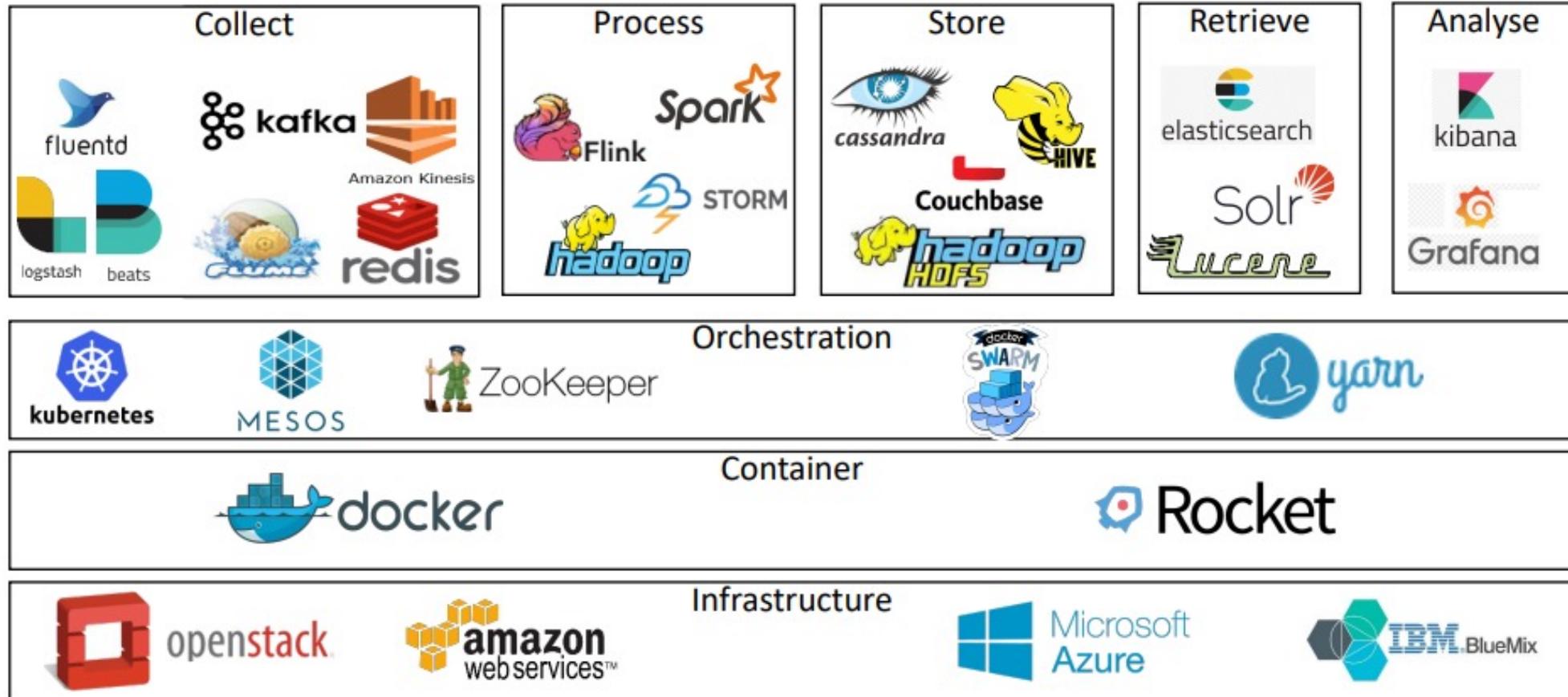
- **A Platform Economy @theEdge**
 - **taking a system-level approach**
 - * from hardware of smart devices
 - * to operating systems at device and at system level,
 - * to middleware and to application software
 - *Functions/Apps over the Air up-dates*
 - *Avoid Vendor Lock-in - Open, vibrant ecosystem*



A reference architecture – edge design space



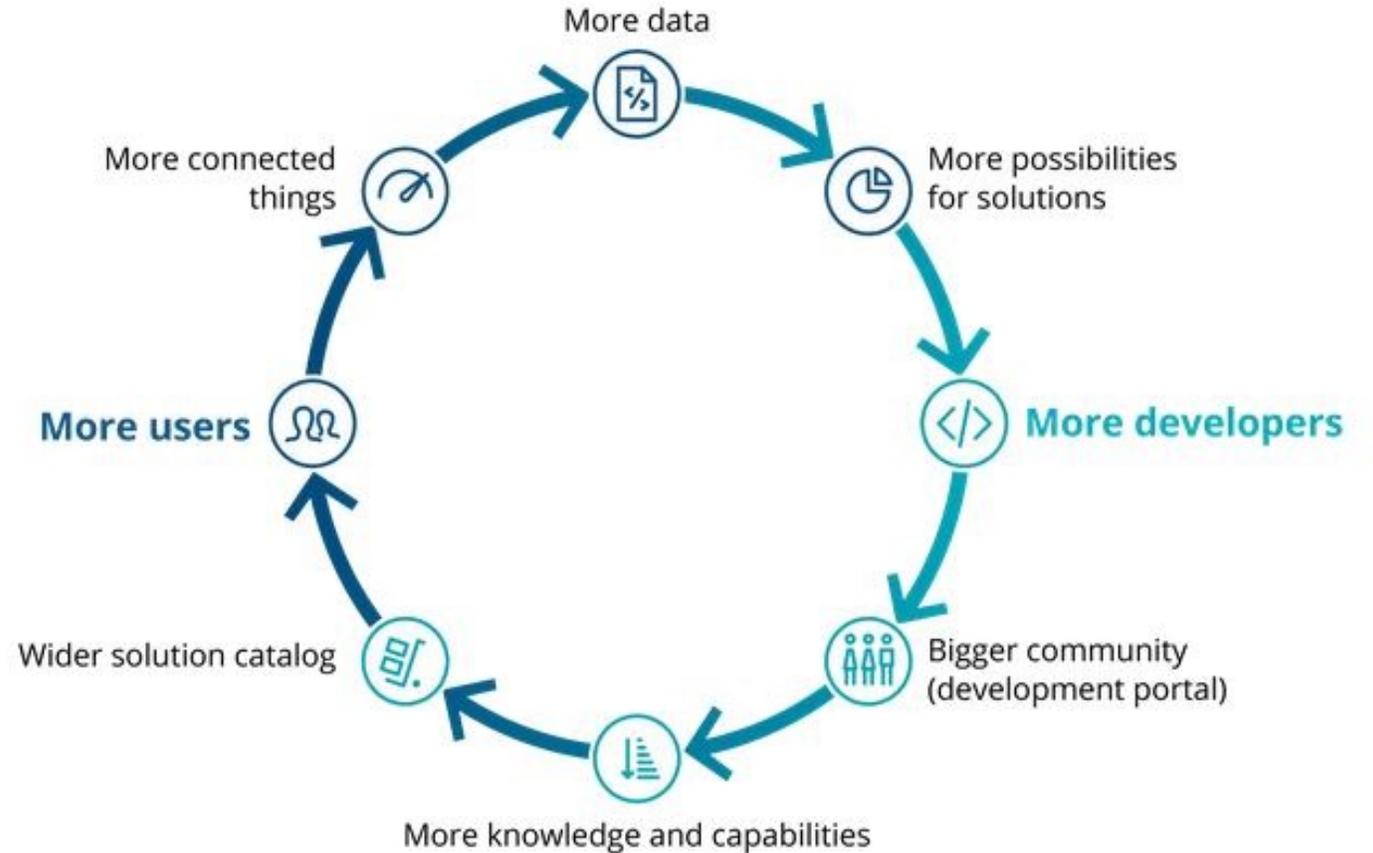
Momentum of Open Source Initiatives



Courtesy: Omar Elloumi, Nokia

A framework to spur a vibrant IoT ecosystem

- Manage Complexity through *an open platform approach*
- *The value of an IoT-Edge Platform corresponds to the size of its ecosystem* behind the platform
- Require consensus on interoperability and standards as well as ecosystem building in and across verticals
- *Edge platforms could leverage the momentum of Open Source Communities*



Source: Deloitte analysis.

Deloitte Insights | deloitte.com/insights

Navigation Map of Open Source

- Courtesy : ECLIPSE Foundation



Key Use cases requiring Edge Computing



Manufacturing:
Data-Driven Cognitive Production Lines (Manufacturing Autonomy Level 4 – MAL4)



Renewable energy:
Containerised Edge Computing near Renewable Energy Sources



Smart Buildings:
Energy Efficient, Health Safe & Sustainable Smart Buildings



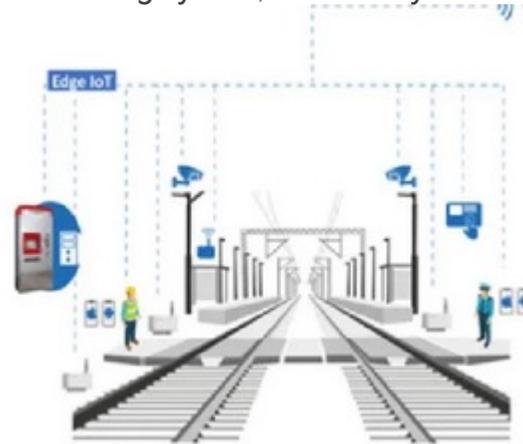
Logistics:
Cloud/Edge for automated routing and warehouse solutions



Renewable energy:
Cloud/Edge for secure and sustainable solutions
Flexibility adapted to consumer needs



Railway:
Cloud/Edge for Structural Alert Monitoring system, local safety

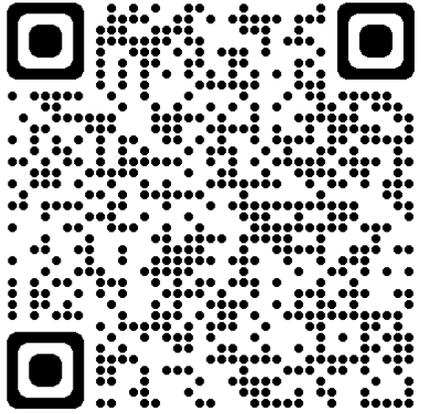


SW-defined Vehicle:
Cloud/Edge for onboard intelligence and connected infrastructure
In-car multimedia management



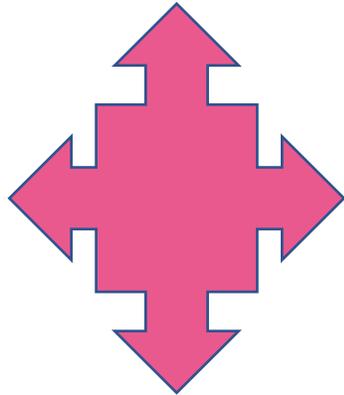
Farming:
Agriculture Operational Robotic Platform

Building the European Cloud, Edge & IoT Continuum for business and research



InfoDay **ENERGY Focus**

Ecosystem
Engagement



VDI|VDE|IT

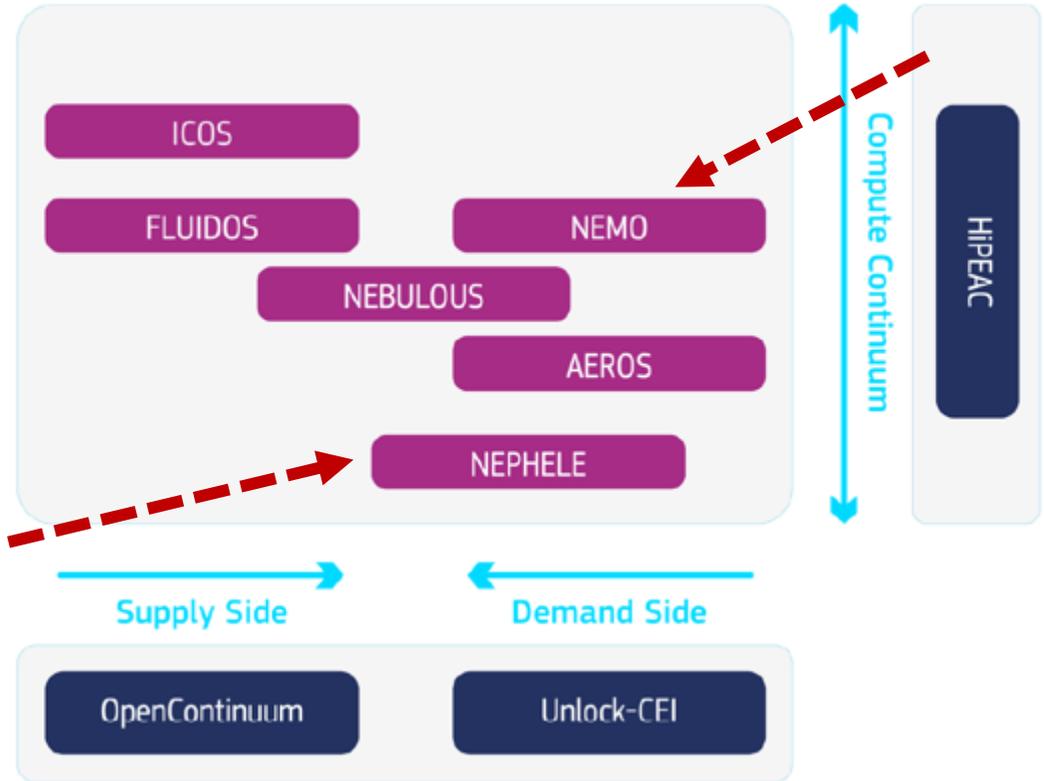
HPC

Cloud Edge

5G Network Edge

Operational Edge

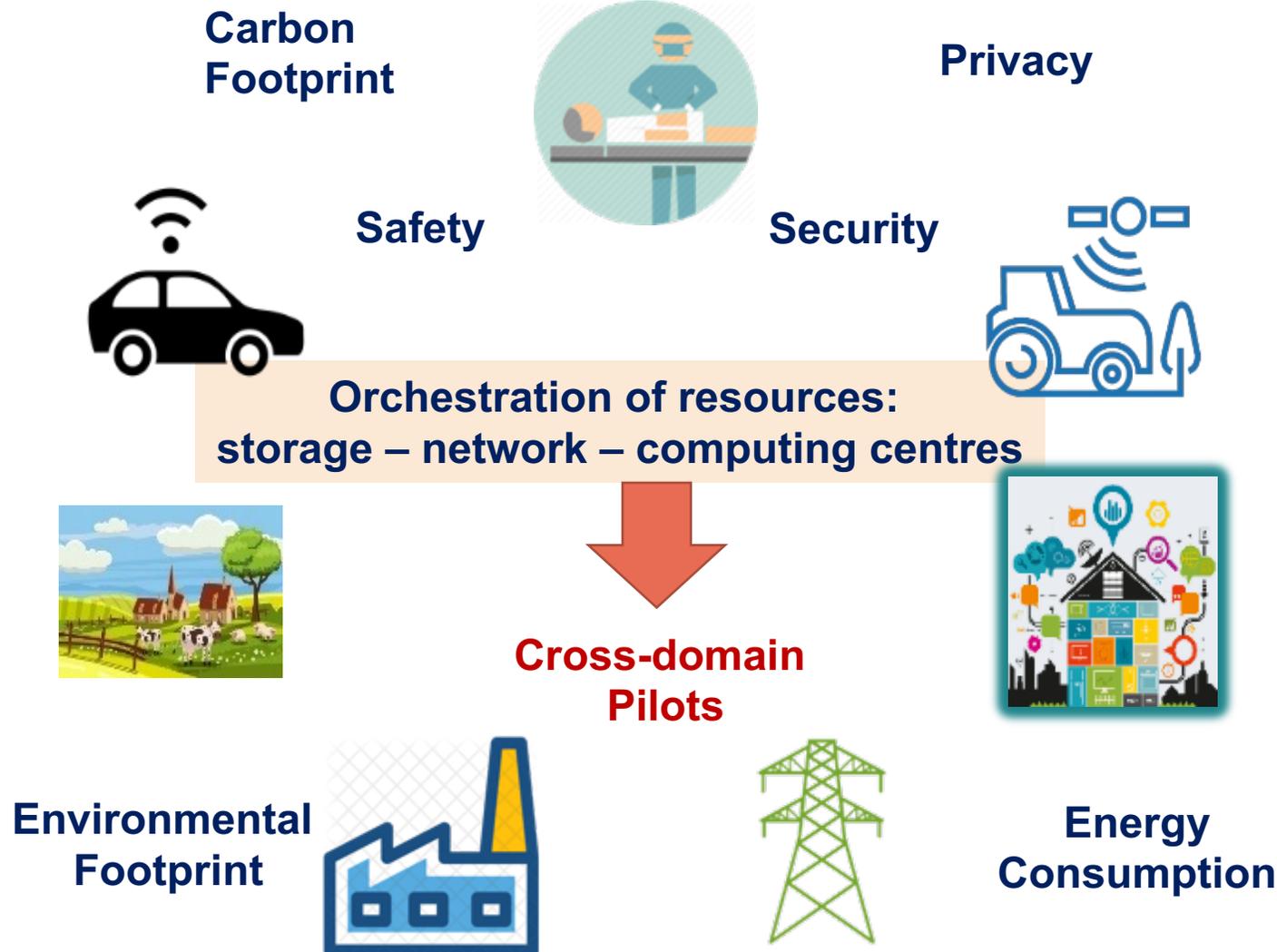
Device Edge



Driving Innovation => Edge OS Platform

Online InfoDay 10 Nov. 2023 => [Energy Focus](#)

Industrial IoT Use cases underpinning the trend towards the edge



Closing:
March 2024

Strategy:
A Platform Approach to share hardware and foster an Open Ecosystem

Piloting Smart IoT Platforms + decentralised Intelligence

➤ More Computing Capacity at the Edge

- Leverage next generation of chip supply in Europe

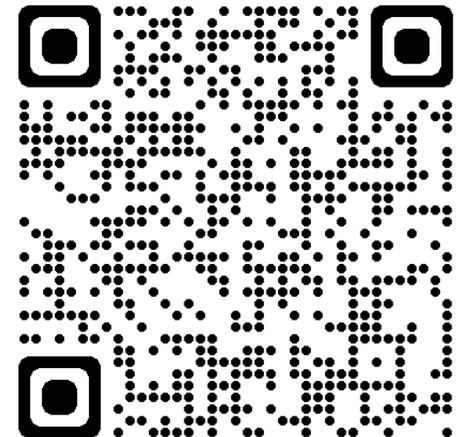
➤ Platform Economy at the Edge

- Open APIs .. Towards an App Store at the Edge
- Up to 20% for Open Call for Edge applications

➤ Fostering the Green and Digital Transition

- Edge services spanning across different key domains
- Common architectures and open standards

• **HE WP2024 call for Innovation Actions with 45 Mill €**



HORIZON-CL4-2024-DATA-01-05: Platform Building, standardisation and Up-scaling of the 'Cloud-Edge-IoT' Solutions (Horizontal Activities - CSA)

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
- **Brokerage Event Meeting 04 December 2023** .. [→ Registration](#)

