aerOS
EUROPEAN IOT-EDGE-CLOUD

aerOS: Autonomous, scalablE, tRustworthy, intelligent European meta Operating System for the IoT edge-cloud continuum
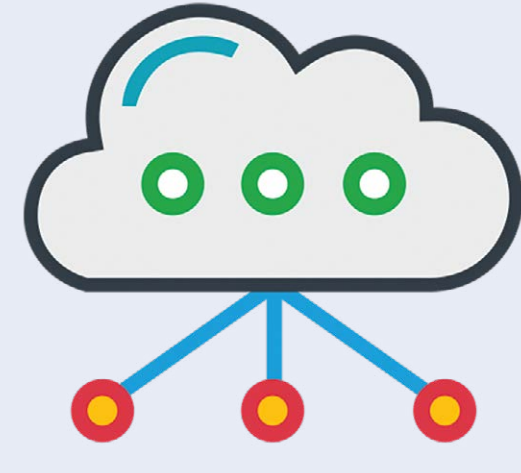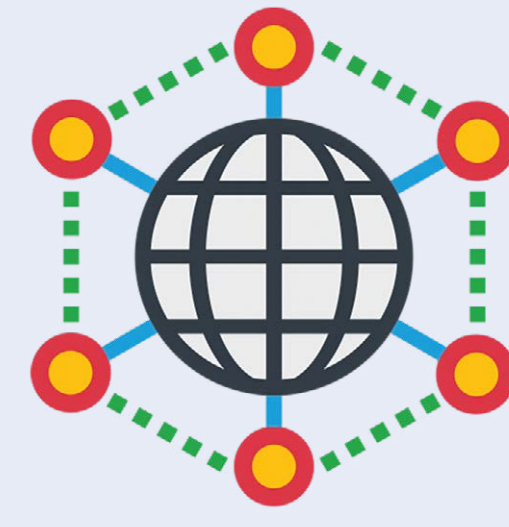
KEY CONCEPTS

aerOS description
aerOS overarching goal is to design and build a virtualised, platform-agnostic meta operating system for the IoT edge-cloud continuum.

EDGE Cloud
Design, implementation and validation for optimal orchestration

Internet of Things
Foundation for IoT-cloud continuum

Artificial Intelligence
Design, implementation and validation for optimal orchestration

Security, Privacy, Trust
Holistic cross-layer solution for cybersecurity, with federated & distributed data governance

Particularly, aerOS:

▸ Delivers common virtualised services to enable orchestration, virtual communication, and efficient support for frugal, explainable AI and creation of distributed data-driven applications;

▸ Exposes an API to be available anywhere and anytime, flexible, resilient and platform agnostic;

▸ Includes a set of infrastructural services and features addressing cybersecurity, trustworthiness and manageability.

aerOS will be implemented as virtualised modules, executed on top of any operating system (e.g., Linux-based, Android, ROS, etc.) of an Infrastructure Element (IE) of the IoT edge-cloud continuum, e.g., a smart device, IoT gateway, edge node or network component.

Each **aerOS** IE deployment will consist of the following key modules: (i) services and API; (ii) virtualisation, abstraction and container runtime; (iii) core aerOS modules; (iv) supporting aerOS features; (v) orchestration; (vi) security, privacy and trust; and (vii) management framework.
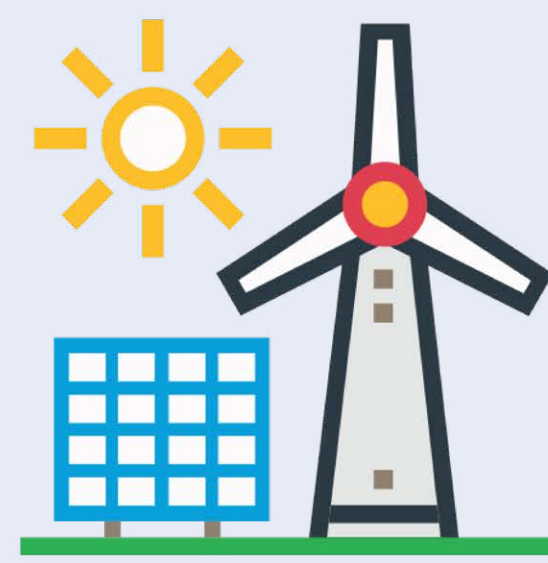
Five industry-driven heterogeneous use cases will demonstrate the value of aerOS
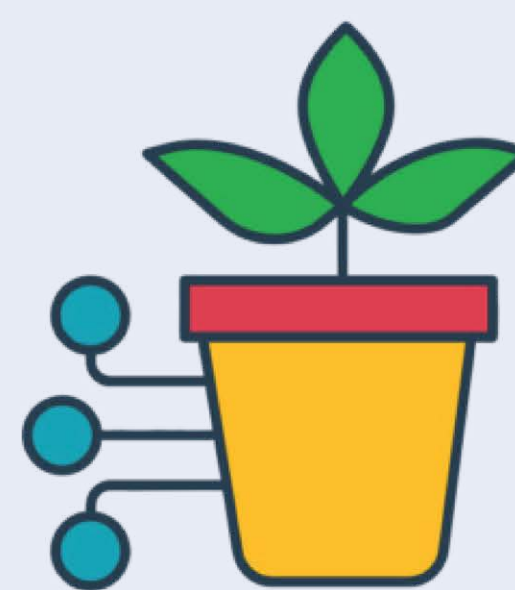
USE CASES
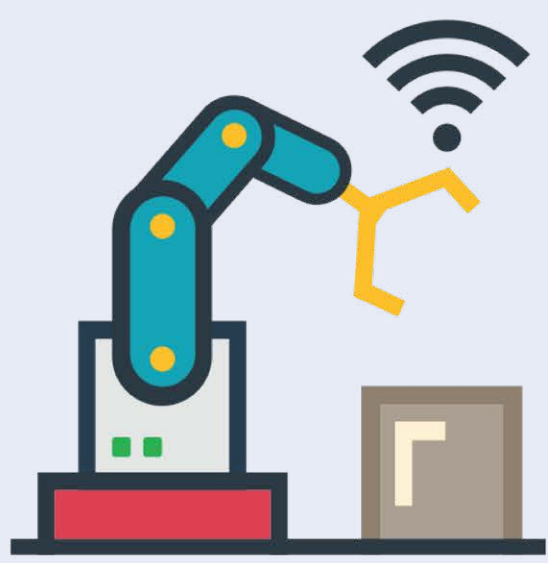
Data-Driven Cognitive Production Lines
Manufacturing Autonomy Level 4 (MAL4) in 4 public-private Pilot Lines

Edge Computing near Renewable Energy Sources
EDGE Data Centers connected to smart infrastructure providing Cloud continuity

CO² Inteligent Neutral Farming
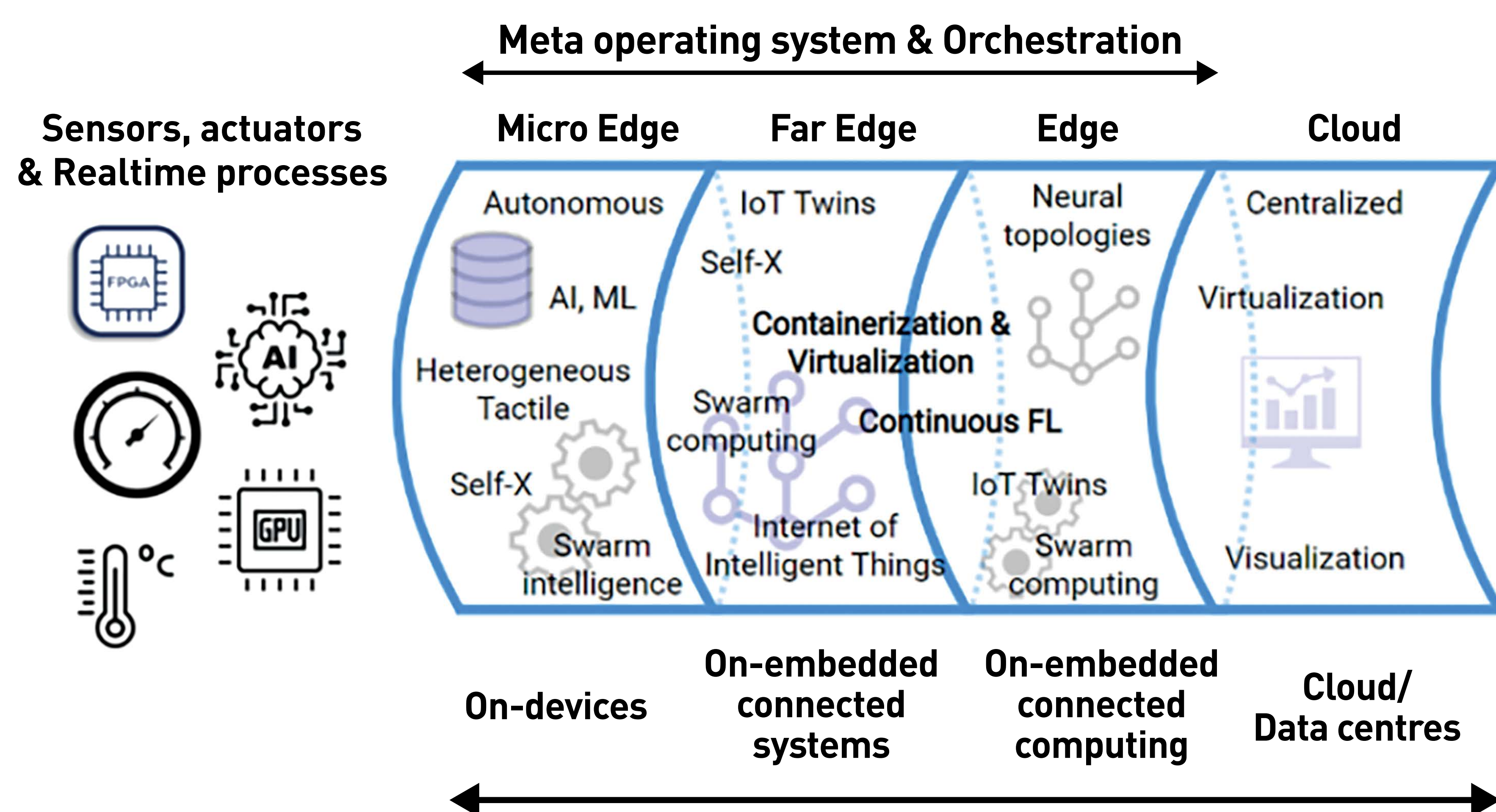Smart agriculture, Precision Farming, maximising yields and quality of goods

Smart EDGE services for the Port Continuum
Predictive maintenance of Container Handling Equipment & Risk prevention via computer vision

Energy Efficient, Health Safe & Sustainable Smart Buildings
Occupational safety & health, Cybersecurity and data privacy in building automation

Meta operating system & Orchestration

Sensors, actuators & Realtime processes

Micro Edge	Far Edge	Edge	Cloud
Autonomous	IoT Twins	Neural topologies	Centralized
AI, ML	Self-X		Virtualization
Heterogeneous Tactile	Containerization & Virtualization	Continuous FL	
Self-X	Swarm computing	IoT Twins	Visualization
Swarm intelligence	Internet of Intelligent Things	Swarm computing	

On-devices — **On-embedded connected systems** — **On-embedded connected computing** — **Cloud/Data centres**

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