META-OPERATING SYSTEMS FOR THE NEXT-GENERATION IOT AND EDGE COMPUTING

EU funding: €64 million

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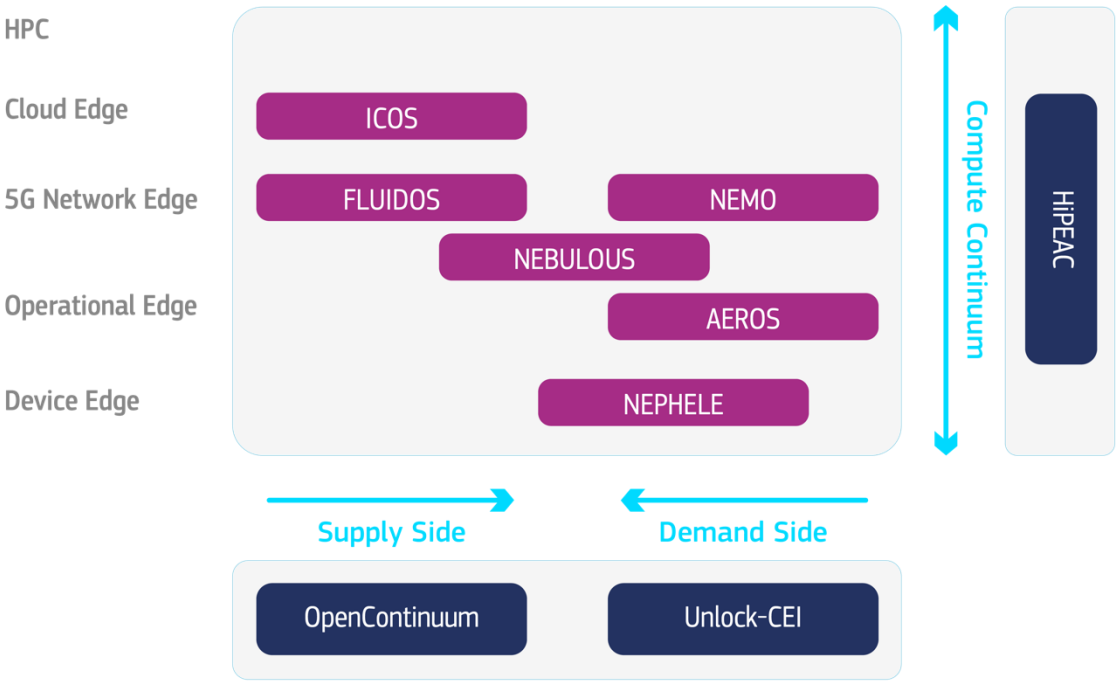

PROJECTS

aeROS

The project will deliver common virtualised services to enable orchestration, virtual communication (network-related programmable functions), and efficient support for frugal, explainable AI and creation of distributed data-driven applications. aerOS will be based on continuum infrastructure elements like smart devices, tiny/far/near edge computing nodes, and public/private clouds (including virtual services and NetApps), providing scalable and secure access to applications and services while keeping its data autonomy. The solution will be generic and directly applicable to any vertical, cross-vertical business process, and several different physical or virtual platforms.

FluiDOS

This project will deliver a fluid, dynamic, scalable, and trustworthy computing continuum, spanning across devices and unifying edge and cloud in an energy-efficient manner. FluiDOS will build on consolidated operating systems and orchestration solutions, resource sharing in the computing continuum, AI-based optimisation for cost and energy, and a zero-trust paradigm to enable an open, collaborative ecosystem that will support European digital autonomy. Stakeholders will be involved through pilots and demonstrators in the fields of agriculture, energy, and logistics, challenging the project's ability to adapt to different environments and operating conditions, showcasing its true innovation potential.

ICOS

This project will cover challenges of the IoT-edge-cloud paradigm, proposing an approach to embed a set of functionalities, defining an IoT-Cloud Operating System (ICOS). Its aim is to design, develop and validate a meta-operating system by addressing the challenges of device volatility and heterogeneity, continuum infrastructure virtualisation and diverse network connectivity, optimised and scalable service execution and performance, as well as resources consumptions. It will also cover security, privacy, and trust, and reduce integration costs and effective mitigation of cloud provider lock-in effects, in a data-driven system built on openness, adaptability, data sharing and a future edge market scenario for services and data.

NebulOus

NebulOus will contribute to research in cloud and fog computing brokerage, by introducing advanced methods to enable secure and optimal application provisioning, resource adaptation and reconfiguration. It will contribute to the cloud computing continuum through the development of a meta-operating system and platform to exploit edge and fog nodes, in conjunction with multi-cloud resources, to cope with requirements posed by low latency applications.

NEMO

This project establishes itself as the gamechanger of the AIoT-edge-cloud continuum by introducing an open source, modular and cybersecure meta-operating system, leveraging on existing technologies and introducing novel concepts, methods, tools, testing and engagement campaigns. NEMO will bring intelligence closer to the data and make AI-as-a-Service an integral part of network self-organisation and micro-services execution orchestration. Its widespread penetration and massive acceptance will be achieved via new technology, pre-commercial exploitation components and liaison with open-source communities.

NEPHELE

This project's vision is to enable the efficient, reliable, and secure end-to-end orchestration of hyper-distributed applications over a programmable infrastructure spanning across the cloud-edge-IoT continuum, removing existing openness and interoperability barriers in the convergence of IoT technologies against cloud and edge computing orchestration platforms, and introducing automation and decentralised intelligence mechanisms powered by 5G and distributed AI technologies. The outcomes will be demonstrated, validated, and evaluated in a set of use cases across vertical industries such as energy, healthcare, and logistics.

COORDINATION & SUPPORT ACTIONS

HiPEAC

HiPEAC will reinforce the development of Europe's computing ecosystem to support our digitalisation by guiding the research and innovation (R&I) of key emerging technologies, sectors, and value chains. Its goal is to strengthen European leadership in the global data economy and accelerate the digital and green transitions through human-centred innovation. This will be achieved by mobilising partnerships and stakeholders to provide roadmaps on the creation of next-generation computing technologies, infrastructures, and platforms. The aim is to contribute to the technological development and market uptake of advanced applications across the value chain. This next generation of computing will increase European autonomy in the data economy, which is required to support future hyper-distributed applications and provide opportunities for the digital transformation of our economy and society, new business models, economic growth, and job creation.

OpenContinuum

OpenContinuum supports the cloud-edge-IoT domain by focusing on the supply side of the computing continuum landscape. Its goal is to foster European strategic autonomy and interoperability through an open ecosystem for the computing continuum, with open source and open standards as two key enablers to be supported and leveraged throughout the community. Such an ecosystem will contain R&I projects in the cloud-edge-IoT portfolio to be coordinated, the diverse community evolved from the current cloud and IoT ones, with the addition of actors, initiatives, and significant alliances. The supply-side nature of OpenContinuum's agenda will orient the themes and focus of project activities but will not limit the scope of community building. The project's active landscaping and engagement work will bring the cloud and IoT communities together and express all points of view with a common understanding. It will then provide guidance to European actors to contribute to and lead open-source projects and standardisation efforts.

Unlock-CEI

Unlock-CEI's ambition is to unlock the potential for accelerating the deployment of the cloud-edge-IoT (CEI) computing continuum in Europe by focusing on demand-side drivers and challenges to identify technology-driven innovation and business opportunities driving demand value chains. The project represents the cloud-edge-IoT demand constituency, provides insights and guidance to Horizon Europe R&I projects, and contributes to a proactive dialogue with suppliers to encourage the development of an open European cloud-edge-IoT ecosystem. It focuses on emerging value chains where investment is needed to foster the deployment of the cloud-edge-IoT continuum through forthcoming large-scale pilots, which will ultimately foster European autonomy in the digital economy.

The above projects will be funded under the Horizon Europe programme's Cluster 4, Destination 3: "Future European Platforms for the Edge: Meta-Operating Systems".