EUCloudEdgeIoT.eu - The European Cloud Edge IoT Continuum for business and research.

Brussels, 15 December 2022 – A new EU-funded partnership has officially kicked off in the past months to study and contribute to the development of the new **Cloud-Edge-IoT (CEI)** paradigm.

The context

Cloud and **edge** computing are essential technologies in a computing continuum to ensure data is managed more efficiently - closer to the originating source rather than transmitting raw data to data centres. As recent studies suggest, data processing is moving closer to the edge. Thus, advancing the **IoT** can reduce communication and storage costs, energy consumption and produce benefits for citizens and businesses thanks to the integration of AI and Machine Learning.

These trends call for a shift towards **the technical and business convergence** of the so-far formally separated Cloud, Edge and IoT domains.

Ongoing research and innovation on the next-generation edge computing and data technologies and infrastructures must be developed, deployed, and adopted by European organisations to enable the European single market for data. An example of this proposition is the creation of the European Alliance for Industrial Data, Edge, and Cloud, aimed at strengthening the position of the EU industry on such technologies. However, the speed of technology change is so fast that industrial stakeholders struggle to adapt to a multi-cloud infrastructure environment and deal with the paradigm change created by a CEI scenario.

"Data is the heart of an IoT system, and with the proliferation of IoT devices, more than 500 zettabytes of data will be generated by 2025. Edge computing techniques allow these data to be processed locally, reduce security risks by data transmission to the clouds, enable real time, and offer greater privacy – as such helping organisations to take safe and reliable decisions at the point of interest. The Edge Computing paradigm will spur the next wave of Innovation of decentralised intelligence by optimising operations in a broad section of industries like mobility, farming, home/buildings, energy, logistics and manufacturing, and by mastering increasing volumes of data in their green and digital transition".

Rolf Riemenschneider, Head of Sector IoT, European Commission

In this context, the European Cloud Edge IoT Continuum aims to realise a pathway for the understanding and development of the CEI Continuum by promoting cooperation between a wide range of research projects, developers and suppliers, business users and potential adopters of this new technological paradigm. This aim will be accomplished by contributing to the coordination of a portfolio of projects in the CEI Computing Continuum funded under the Meta-Operating Systems for the Next Generation IoT and Edge Computing and ensuring consistent exploitation of their outcomes to help regain European competitiveness in core internet infrastructures.

The **European Cloud, Edge & IoT Continuum** was preliminarily presented at the IoT week in Dublin in June 2022. Its ultimate goal is to support the definition of the **large-scale pilots envisaged by the European Commission in line with the EU Data Strategy**. Future calls and projects on similar topics awarded by the EU Commission in 2023 and 2024 (see the recently released cluster 4 also presented at the Horizon Europe Info-days this week).[1] will also be included in the cluster of projects cooperating under this joint initiative

More precisely, **the European Cloud, Edge & IoT Continuum** will be supported by the effort of two Coordination and Support Actions (CSAs), namely **Open Continuum** and **UNLOCK-CEI**, which will cooperate to reach the stated common goal, focussing respectively on the supply and demand sides of the CEI Continuum. These will also benefit from the synergies and legacy of other existing EU projects in the domains of Cloud, Edge, IoT, AI, and connectivity, including, among others, NGIoT and H-Cloud, as well as companies and start-ups such as Axelera AI.

A wide set of key players and associations will also support the initiative and act as multipliers across the cloud, edge and IoT communities.

"The successful deployment of Cloud-Edge-IoT across Europe will require collaboration between multiple stakeholders. More than in any other technological shift, the needs of different end-users, from health to manufacturing, will shape which technologies are used and how devices, data and people are connected".

Tanya Suarez, Board Member AIOTI.

These networking efforts will also need related complementary or enabling technologies.

"These technologies for example include accelerators, memory technologies and better periphery components for AI model and data management. Overall, further reduction of size of existing and new hardware and software building blocks will become essential to realise applications that require tinyML at the edge such as key-word spotters close to the microphone that alert the rest of the system when a keyword is recognised."

Kay Bierzynski, EPoSS, Infineon.

[1] See cluster 4 at https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/horizon-europe-work-programmes_en.

Use Cases

Increased density of edge and cloud facilities allowing ubiquitous connectivity will enable a wide range of innovative use cases based on ultra-low latency infrastructure. The use cases underpinning the **European Cloud, Edge & IoT Continuum** initiative tackle key societal challenges, including healthcare, carbon emissions, safety, privacy, resource optimisation in storage, network and computing centres, synchronisation and Digital Twins, energy, and environmental footprint.

Some application areas and examples include: **smart agriculture** (e.g. precision farming, data autonomy of vehicle swarms, CO2-neutral intelligent farming, smart robots), **renewable energy production centres** (e.g. reliability and security of power grids), **smart homes** (sensors and robots for remote monitoring, enablement of domestic services), **factory robotics** (e.g. reducing CO2 in production, predictive maintenance), **logistics and transport** (object recognition, energy and process optimisation in movements, predictive maintenance of railway networks, smart ports, last-mile delivery optimisation), **healthcare** (e.g. remote real-time medical diagnostics with machine learning and artificial intelligence-based analytics). Particular attention will be paid to the impact of CEI across various sectors, with benefits including energy efficiency, flexibility, and security.

"Secure CEI will also be driving the semiconductor market in the next decade, and apart from creating jobs and growth, it will also be instrumental to make Europe and the world smarter and greener. A big challenge will be to find the talent to sustain the growth through innovation and to increase Europe's market share. The HiPEAC community, with its 2000 computing experts, is committed to support the transition towards secure CEI in Europe."

Koen De Bosschere, HiPEAC.

Open Source and Open Standards

In light of the ongoing cloud, edge, and IoT convergence towards a computing continuum and the interoperability needs of the mentioned use cases, an open ecosystem spanning from Cloud to Edge to IoT is key.

The **European Cloud, Edge & IoT Continuum** will promote the establishment of a global and open ecosystem for the Cloud-Edge-IoT technologies by supporting industries and researchers to create impact, promoting the link between open source and open standards, and engaging relevant industrial alliances in actions directed toward open approaches.

"The IoT & Edge are great examples of enabling multiple implementations to be delivered into the market which make for the best interoperability standards benefitting customers by enabling greater choice. To help map these ongoing efforts the technical working group (TWG) IoT & Edge, set-up as part of the StandICT.eu project, had a group of renowned experts in this field, produce a comprehensive landscape of standards report as a key reference for future work on communication infrastructures, IoT and edge computing platforms"

Silvana Muscella, Coordinator, StandICT.eu 2023.

The **European Cloud, Edge & IoT Continuum** will leverage these existing relevant outputs and act as an enabling force, to reach multiple key outcomes. These include a baseline common open architecture for computing continuum research projects and a reinforced collaboration between European public and private initiatives from cloud to edge to IoT. Finally, increased awareness of the importance of Open Source and standards for EU digital autonomy, recalling the business-friendly models proposed by associations such as the Eclipse Foundation, is needed.

"That's a fact that the platform for computing continuum will be open source. With EUCloudEdgeIoT.eu and our strong innovation push, especially with the META-OS projects, there is a unique opportunity to promote European leadership through open source!"

Gaël Blondelle, VP, Ecosystem Development at Eclipse Foundation

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Our Consortium

EUCloudEdgeIoT.eu is provided by a lean Consortium of Partners with extensive experience in the cloud, edge and IoT landscape. The Consortium includes Atos, BluSpecs, COMMpla, Eclipse Foundation, EGI foundation, IDC, Inside Industry Association, Martel Innovate, Trialog, Trust-IT Services, VDI/VDE-IT.

Contact us

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