



Cognitive Computing Continuum cluster

**Webinar “Get to know the research
initiatives about Cognitive Computing
Continuum**

08 October 2024

HaDEA (<https://hadea.ec.europa.eu>)

European Health and Digital Executive Agency (HaDEA)

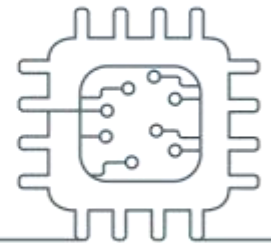
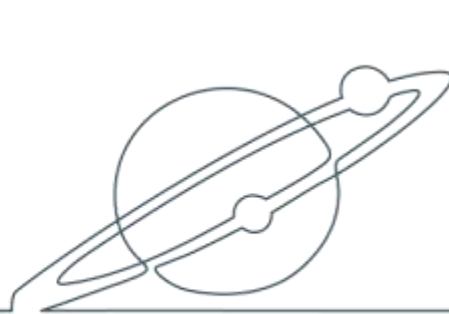
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European Health and Digital Executive Agency

HaDEA's ambition is to help rebuild a post-COVID-19 Europe at its heart which will be greener, more digital and more resilient for future challenges

Funding programmes on



health

food
safety

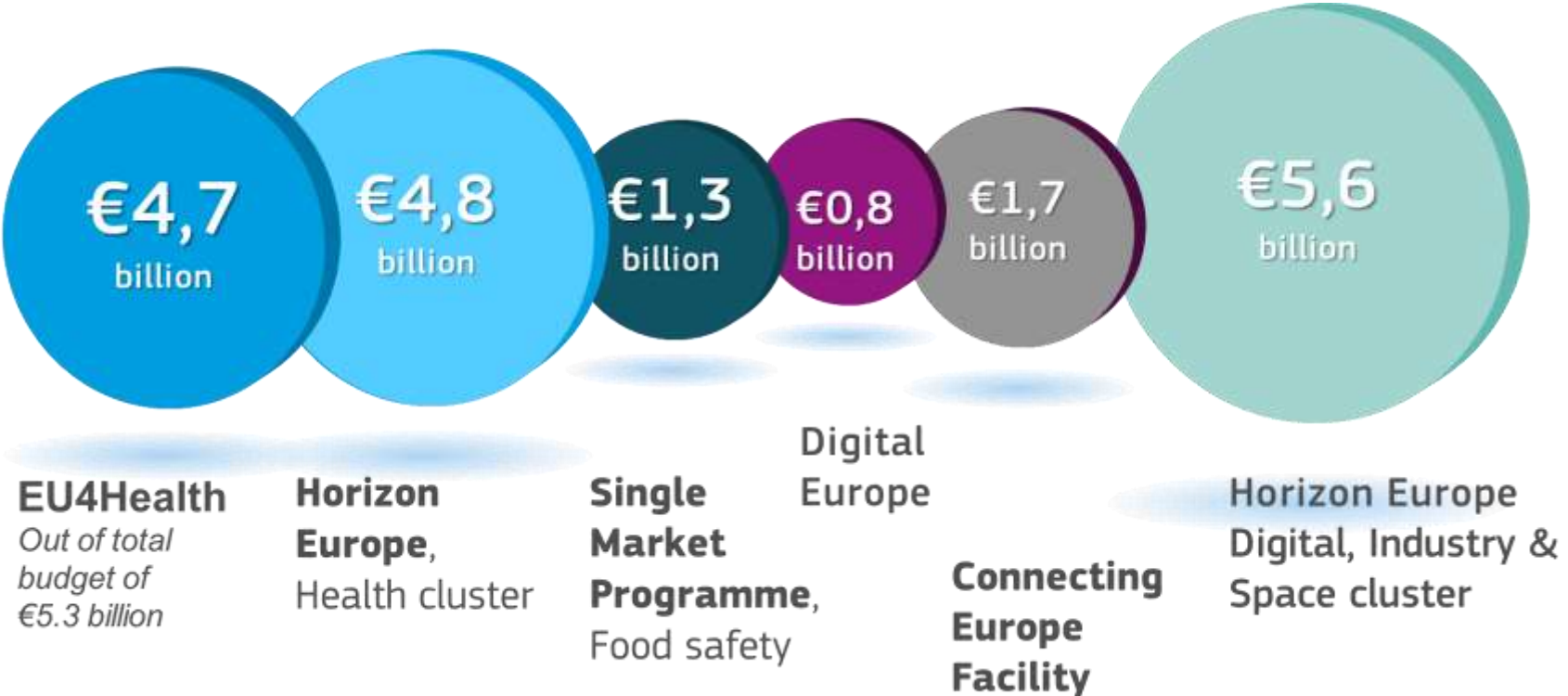
space

industry digital



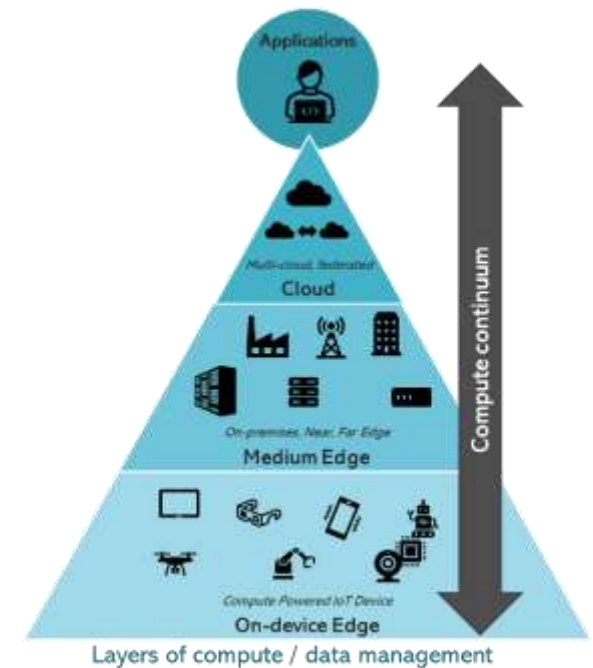
European
Commission

Programme implementation and budgets



Background

- **Cloud Compute continuum**, resource management from on-device Edge to Cloud.
- **Cognitive Compute continuum**, AI-enabled Management of the whole computing continuum.
- **BENEFITS:**
 - Increased automation and optimisation
 - End-to-end security and identity management
 - Support for resources heterogeneity
 - Intelligent orchestration mechanisms
 - Optimization of energy efficiency
- **AIM** → Allow optimal execution of services and data processing across various providers, connectivity types and network zones.



Cognitive Computing Continuum

- R&I investments in cloud, edge and the Internet of Things are necessary to enable **seamless and trustworthy integration** of **diverse computing** and **data environments**, and to **ensure digital autonomy for Europe** in key technological and application sectors
 - **Computing Continuum** provides compute, storage and networking resources
 - e.g. centralized public and private clouds as well as distributed edge, fog, hybrid and multi- clouds
 - **Cognitive computing systems:**
 - ability to adapt its behavior during runtime in response to changing requirements
 - capability to interact with its environment
 - Identifying context and extracting situational awareness
 - advanced decision making based on context information and insights learned
- Enriching the computing continuum with cognitive capabilities promises to enable significant enhancements
- e.g. predicting the load of infrastructure nodes through machine learning algorithms trained on historical data

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Cognitive Computing Continuum: Intelligence and automation for more efficient data processing (RIA)

- **Scope:**
 - **AI-enabled Management of the whole computing continuum** enabled by **Swarm computing** and **decentralized intelligence**, allowing services and data to be seamlessly processed across various providers, connectivity types and network zones
 - **Novel automated management tools, programming models, learning and decision-making methods**, and approaches able to cope with end-to-end security and identity management, resources heterogeneity, extreme scale and fault-tolerance together with elasticity to flexibly allocate resources and tasks.
 - **Intelligent compute, data and code orchestration mechanisms** to allow efficient value extraction from the huge volumes of generated data while supporting resource dynamicity and scalability across the compute continuum.
 - **Optimization of energy efficiency and ecological sustainability** considering end-to- end data processing across the continuum

NEXUSFORUM CSA Contributions



- **Support structure for the European Computing ecosystem**
 - Networking events and vision workshops for the academic and industrial computing community.
 - Collaborate with other relevant initiatives in the field, especially those related to the Important Project of Common European Interest on Cloud Infrastructure and Services (**IPCEI CIS**) and the **European Alliance** for Industrial Data, Edge and Cloud.
- **Yearly updated R&I roadmaps on the Cloud to Edge Computing Continuum.**
 - Developments should complement the Industrial Roadmap from the European Alliance for Industrial Data, Edge and Cloud by offering a long-term research perspective which enables disruptive innovations.
- **Creation of a sustainable European Cloud R&D&I Community** representing the whole Cloud to Edge to IoT Computing research and policy, industry and users.



Working groups

<https://eucloudedgeiot.eu/>
<https://nexusforum.eu/>

Funded project

- Adaptive Scheduling and Deployments of Data Intensive Workloads on Energy Efficient Edge to Cloud Continuum - [ENACT](#)
- Intent-based data operation in the computing continuum - [INTEND](#)
- Application-level Swarm-based Orchestration Across the Cloud-to-Edge Continuum - [Swarmchestrator](#)
- Multi-layer 360° dYnamic orchestration and interopeRable design environmenT for compute-continUum Systems - [MYRTUS](#)
- EMPYREAN: TRUSTWORTHY, COGNITIVE AND AI-DRIVEN COLLABORATIVE ASSOCIATIONS OF IOT DEVICES AND EDGE RESOURCES FOR DATA PROCESSING - [EMPYREAN](#)
- Hyper-Distributed Artificial Intelligence Platform for Network Resources Automation and Management Towards More Efficient Data Processing Applications - [HYPER-AI](#)
- Continuums Of Game NETs: swarm intelligence as information processing - [CoGNETs](#)