

THE EU RESEARCH AND INNOVATION PROGRAMME (2021-27)

Horizon Europe Calls 2024 Information & Brokerage Session: Digital Platforms for the Cloud-Edge-IoT, Innovation through Open Source and Software ***4 December 2023***



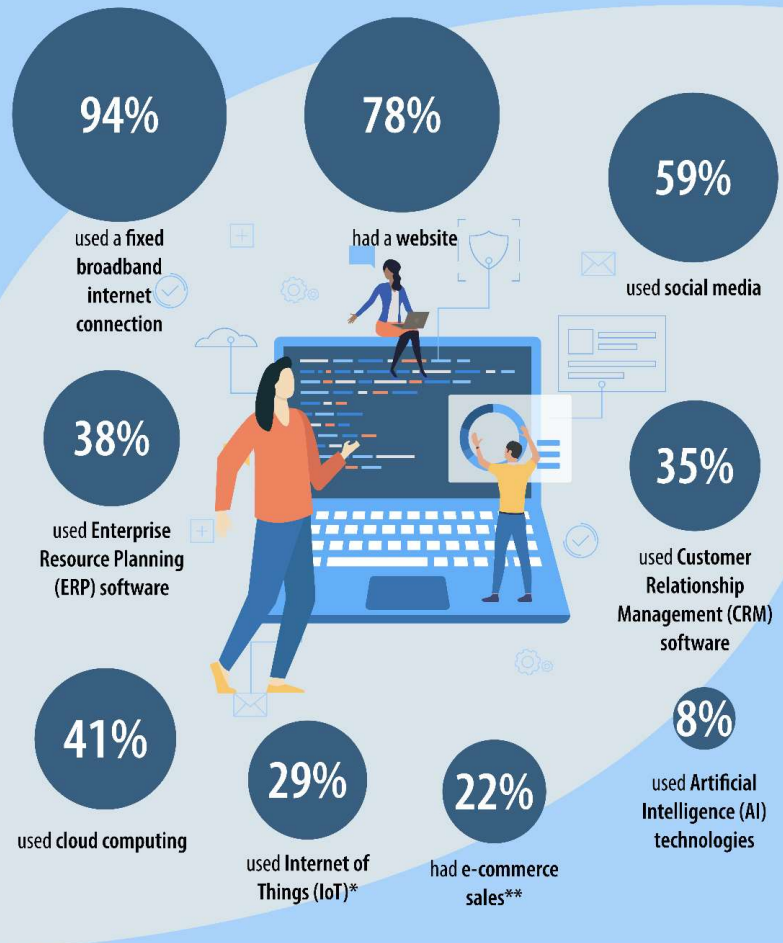
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PROGRAMME OFFICER

European Commission
DG CONNECT E2
Cloud and Software



ICT use in EU enterprises, 2021

(% of enterprises with at least 10 employees and self-employed people)

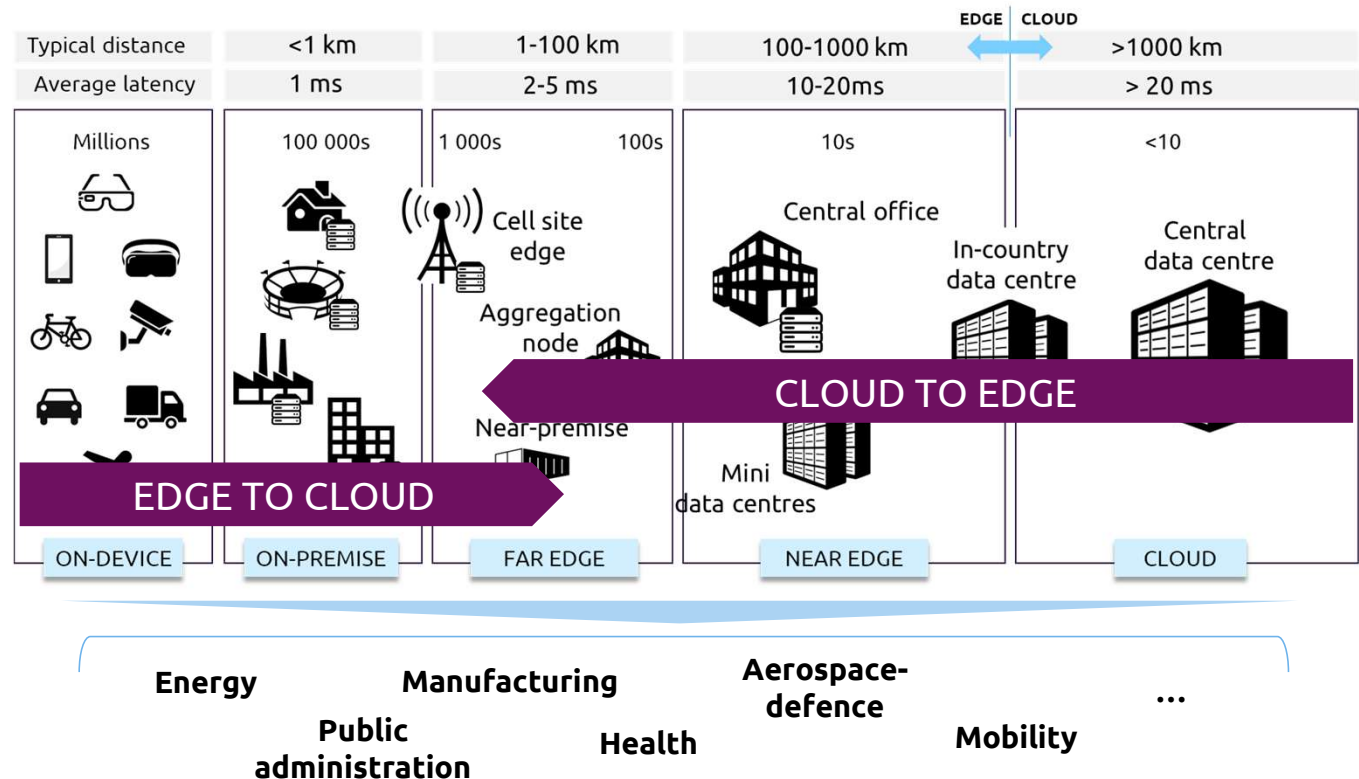


* internet-connected devices or systems that can be monitored or controlled remotely via the internet
** in 2020 reference year

Our vision: Digital Decade objectives by 2030

2030 DIGITAL COMPASS
THE EUROPEAN WAY FOR THE DIGITAL DECADE

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



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:

- Open architectures for Cloud/Edge processing
- Complementing on SW-level EU semiconductor projects
- Enabling EU HW data-centres
- Stimulating open source comm.
- Increase strategic autonomy

Piloting emerging Smart IoT Platforms and decentralised intelligence (IA)

- Mature and customise emerging smart IoT technologies
- Validate reference architectures and open platforms in application context
- Foster innovation scenarios in CCC
- Consensus and ecosystem building
- Bridging between research & adoption through piloting in/across verticals

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

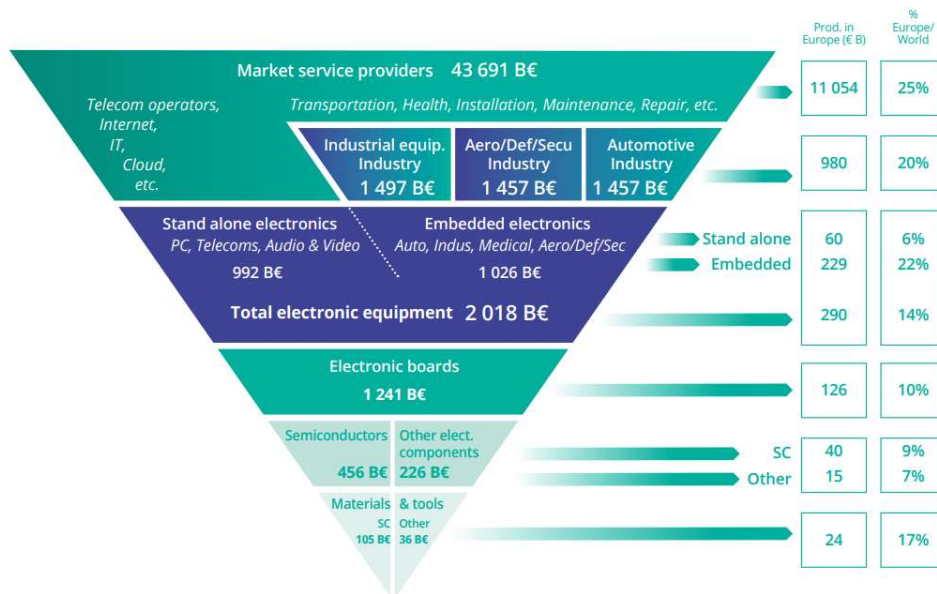
- Management of the CCC
- Swarm computing and decentralised intelligence
- End-to-end security and identity management
- „Green“ optimisation of data processing across the CCC

2025 –

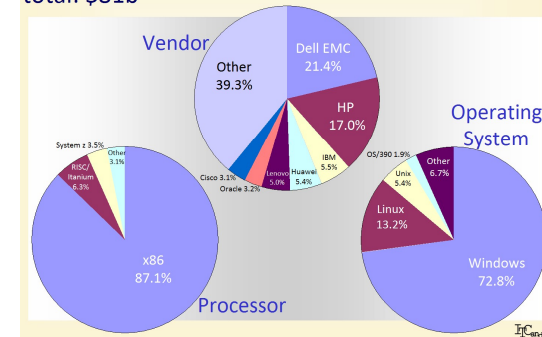
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Funding > 250 Mill € WP2021-24

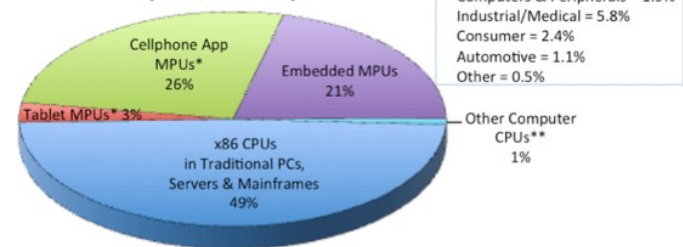
Market size and interest from the Computing Continuum perspective



Server market shares – year to end June 2019 – total: \$81b



2020 MPU Sales by Application (Fcst, \$79.3B)



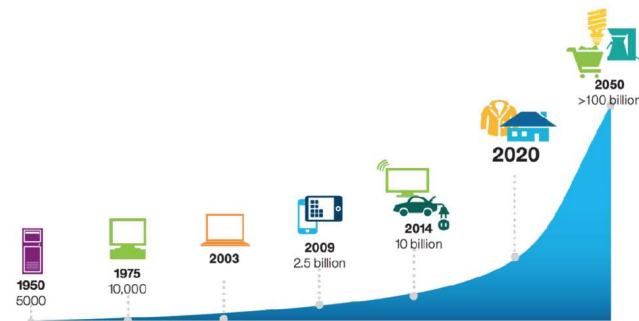
*Includes ARM-based and x86 processors. **Includes ARM-based and other RISC processors.
Source: IC Insights

Study on the Economic Impact of Open Source in the EU economy

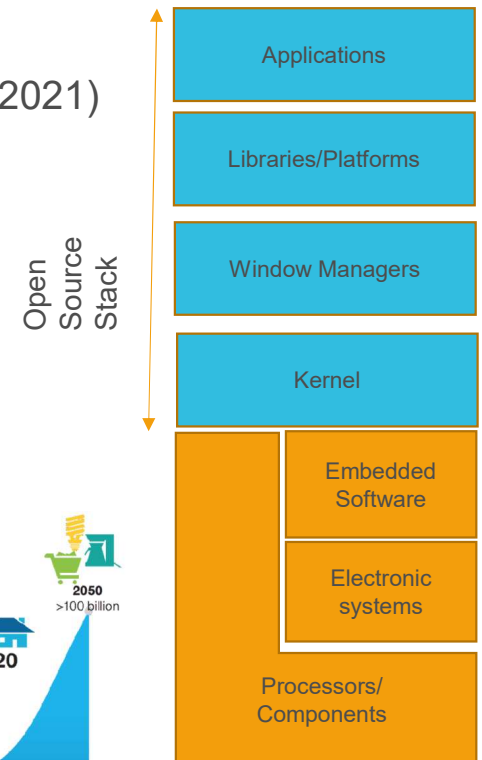
(September 2021)

- Confirmation of big impact: EU companies invested over €1b in OSS
- Cost Benefit ratio above 1:4
- Impact between €65 and €95b
- Positive correlation with GDP and confirmation of causality
- Open Source → Public good
- EU policies required.
- Case studies confirm TCO reduction, avoid vendor lock-in and increase digital autonomy.

→ Digital Autonomy



Inflection points in Computing history



Call: HORIZON-CL4-2024-DIGITAL-EMERGING-01

Open Source for Cloud/Edge and Software Engineering Fundamentals to support Digital Autonomy

- HORIZON-CL4-2024-DIGITAL-EMERGING-01-21: Open Source for Cloud/Edge to support European Digital Autonomy (RIA)
- HORIZON-CL4-2024-DIGITAL-EMERGING-01-22: Fundamentals of Software Engineering (RIA)
- HORIZON-CL4-2024-DIGITAL-EMERGING-01-23: Public recognition scheme for Open Source (CSA)

HORIZON-CL4-2024-DIGITAL-EMERGING-01-21: Open Source for Cloud/Edge to support European Digital Autonomy (RIA)

Expected Outcomes:

- Prototypes of cloud and edge servers demonstrated in relevant centralised and distributed environments and allowing full computing infrastructure deployments based on European processor technology, thereby establishing a full Open Computing Architecture stack, which supports emerging processing architectures (e.g. RISC-V).
- Standards and best practices consolidating the European Open Computing Architecture, as well as its interfaces to current industry standards.

Scope:

- Developing open source alternatives to enable the physical use of emerging processors in cloud and edge server systems. Such modules include basic input/output systems, preboot execution environments, power-on authentication, etc., supporting heterogeneous processor architectures, and
- Demonstrating actual cloud and edge systems in real life or emulated computing environments exploiting the benefits of an extended open source stack (socket to application) on emerging processor architectures (e.g. RISC-V).

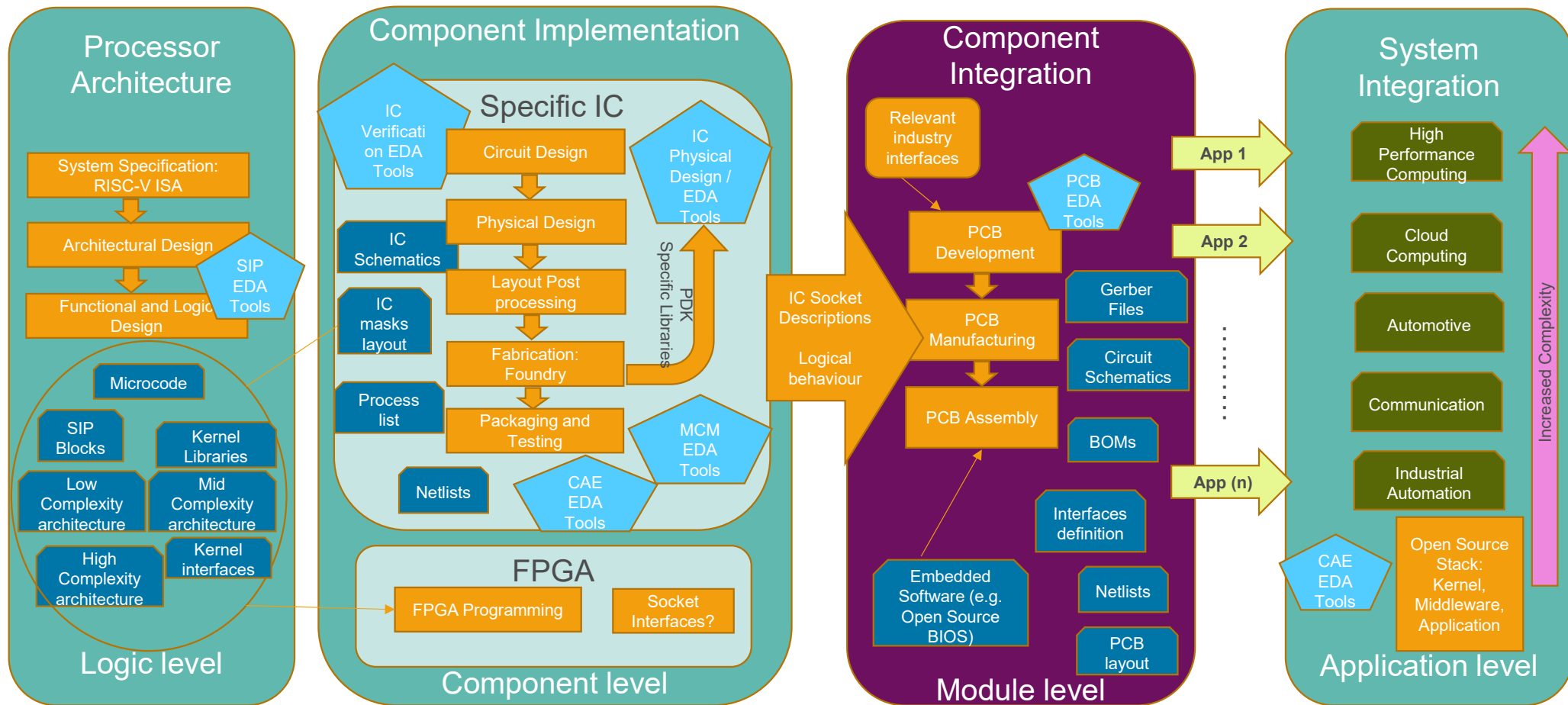
Indicative budget: 20 000 000 EUR

EU contribution per project: 4-6 MM EUR

Type of Action: RIA

TRL: From 4 to 6

RISC-V Development foci from Architecture to Application



HORIZON-CL4-2024-DIGITAL-EMERGING-01-22: Fundamentals of Software Engineering (RIA)

Expected Outcomes:

- Responsible software engineering methods and tools
- Best practices leveraging, among others, novel AI and data technologies to accelerate the development and maintenance of software
- Methods and tools for multi-architecture systems
- Efficient and agile modelling, verification and validation, vulnerability assessment and mitigation.

Scope:

- Methods, mechanisms and tools that allow smart intelligent system specification, agile system and code development, advanced code analysis, fault prediction and location and self-repair by using emerging techniques, in particular based on AI and data technologies.
- Methods and tools for the development of dynamic and resilient software for systems running on multiple processing architectures including cross-compilation, run-time self adaptation and multi-architecture executables.

Indicative budget: 13 500 000 EUR

EU contribution per project: 4-6 MM EUR

Type of Action: RIA

TRL: From 2 to 5

HORIZON-CL4-2024-DIGITAL-EMERGING-01-23: Public recognition scheme for Open Source (CSA)

Expected Outcomes:

- Establishment of a system of European annual awards that acts as a spotlight stirring up contributions to Open Source Software and Hardware projects.
- Increased interest for the contribution to, integration of and exploitation of Open Source assets

Scope:

- Development of a scheme including a list of fields related to Open Source
- Elaboration of an adequate process to:
 - scrutinize different fields of action relevant to open source
 - select appropriate candidates for being recognized
 - implement adequate award ceremonies.

Indicative budget: 2 000 000 EUR

EU contribution per project: 2 000 000 EUR

Type of Action: CSA

TRL: N/A