

VITAMIN-V

VIRTUAL ENVIRONMENT AND TOOL-BOXING FOR
TRUSTWORTHY DEVELOPMENT OF RISC-V BASED
CLOUD SERVICES

VITAMIN-V: EXPANDING OPEN-SOURCE RISC-V CLOUD ENVIRONMENTS

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RISC-V Europe Summit 2004 — Munich, Germany



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH



reSilient coMputer architectures
and LiFE Sciences



Politecnico
di Torino

Department of Control and
Computer Engineering



Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the HaDEA. Neither the European Union nor the granting authority can be held responsible for them. Project number: 101093062. <https://vitamin-v.upc.edu>

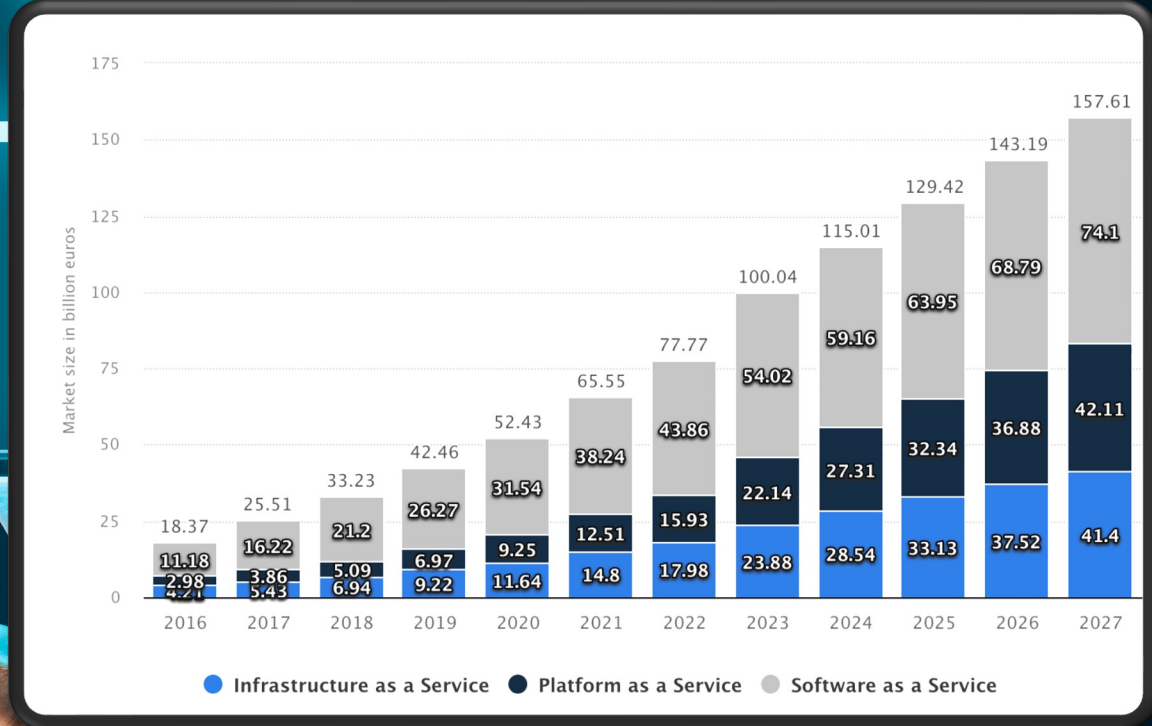
OPEN CLOUD: AN EUROPEAN OPPORTUNITY



ICs are crucial in the Cloud value chain

Most ICs used in Cloud infrastructures are manufactured outside Europe (Asia USA)

The EU must control ICs for the cloud value chain to develop and deploy cloud computing systems independently



RISC-V ISA: A PROMISE FOR CLOUD APPS



Strong effort from the European governing bodies to invest in this ISA



Scalability thanks to ISA extensions

Open-source royalty free nature

Energy efficiency

CHALLENGES



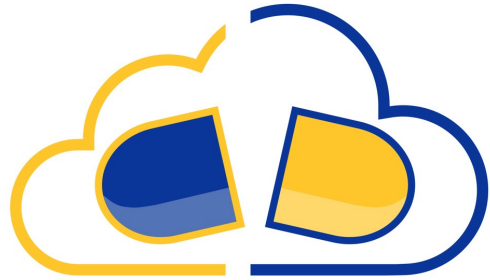
The ecosystem around RISC-V processors is still developing

Hardware availability for server class processors is still limited

HW/SW compatibility is a primary issue



AN ANSWER TO THESE CHALLENGES



VITAMIN-V

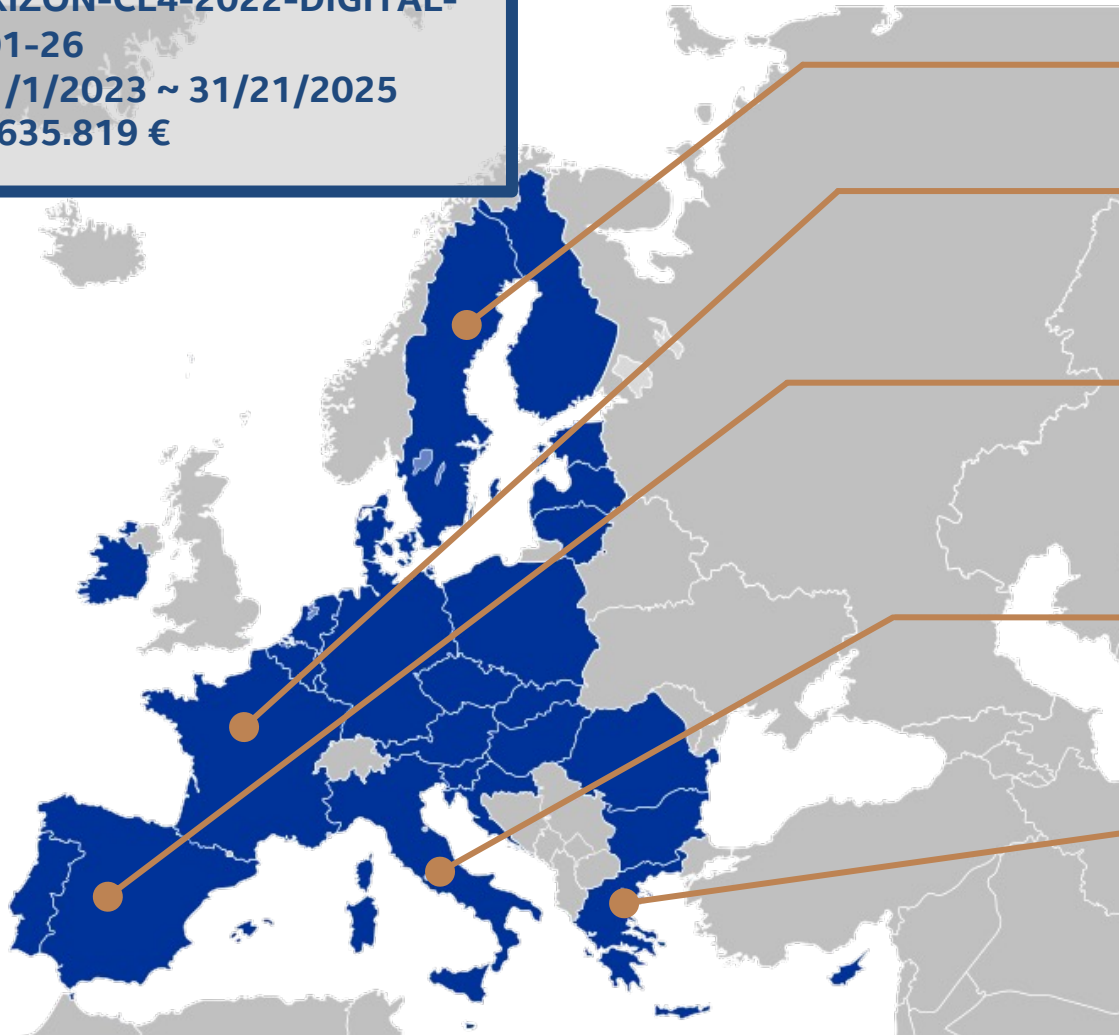
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VITAMIN-V CONSORTIUM



Topic — HORIZON-CL4-2022-DIGITAL-EMERGING-01-26
Duration — 1/1/2023 ~ 31/21/2025
Budget — 4.635.819 €



GOALS AND EXPECTATIONS



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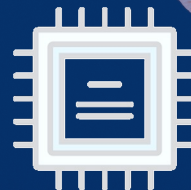


Semidynamics ATREVIDO RISC-V RV64GCV, an out-of-order RISC-V 64GCV core that can boot Linux and has been synthesized in several FPGAs for testing.



EPI RISC-V core extended with cloud-relevant ISA (G,H, K, B, and V)

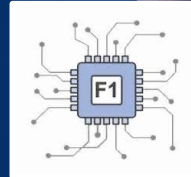
EPI memory compression and interconnect OS support



GOALS AND EXPECTATIONS

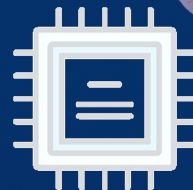


V-RISCV — Virtual execution environment
with cloud-relevant RISC-V ISA



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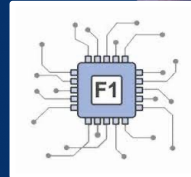
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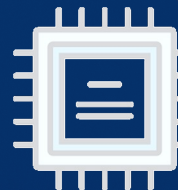


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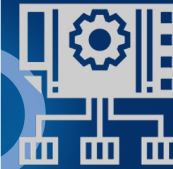


RISC-V compiler and toolchain with cloud-relevant ISA support

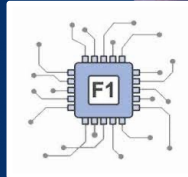
GOALS AND EXPECTATIONS



VMM and cloud management stack port to RISC-V

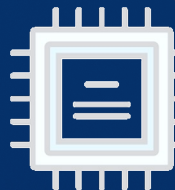


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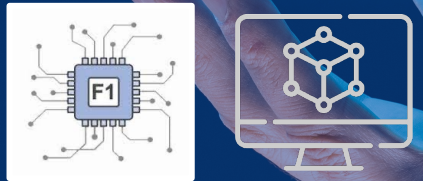
AI and BigData frameworks ported to RISC-V



VMM and cloud management stack port to RISC-V

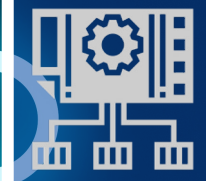
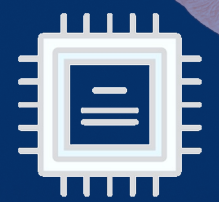


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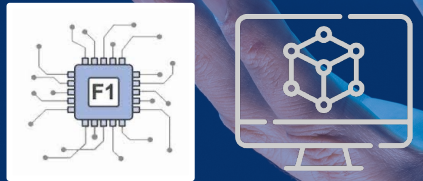
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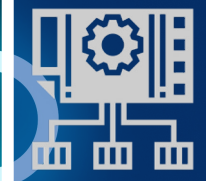
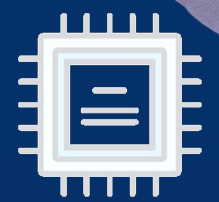


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RISC-V compiler and toolchain with cloud-relevant ISA support

TRUSTWORTHINESS THROUGHOUT VVT

GOALS AND EXPECTATIONS



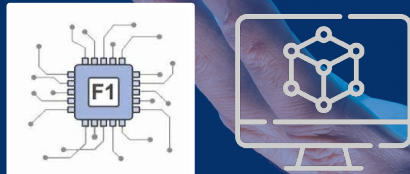
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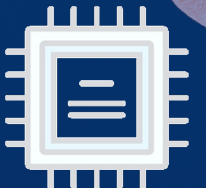


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TRUSTWORTHINESS THROUGHOUT VVT

Classical cloud

- Tensorflow/Spark
- OpenStack
- VRISC-V

Modern cloud

- Tensorflow/Spark
- Kubernetes
- VRISC-V

Serverless cloud

- OpenFaaS/Knative
- Kubernetes+Kata
- VRISC-V

FRIDAY SIDE EVENT



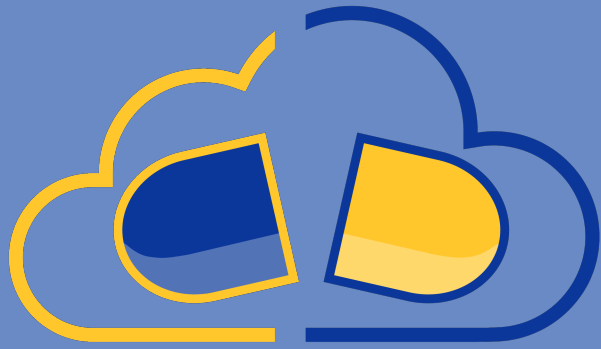
1st Open-Source RISC-V Software Workshop

Co-located with the RISC-V Summit Europe

June 28th, 2024

Join us to hear more about the plans of:

- RISC-V Foundation
- RISE
- Canonical
- Suse
- Codeplay
- Virtual Open Systems
- CNECT EU
- U. Manchester
- FORTH
- CERN
- BSC
- Links Foundation



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