

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



Politecnico
di Torino
1859
Department of Control and
Computer Engineering



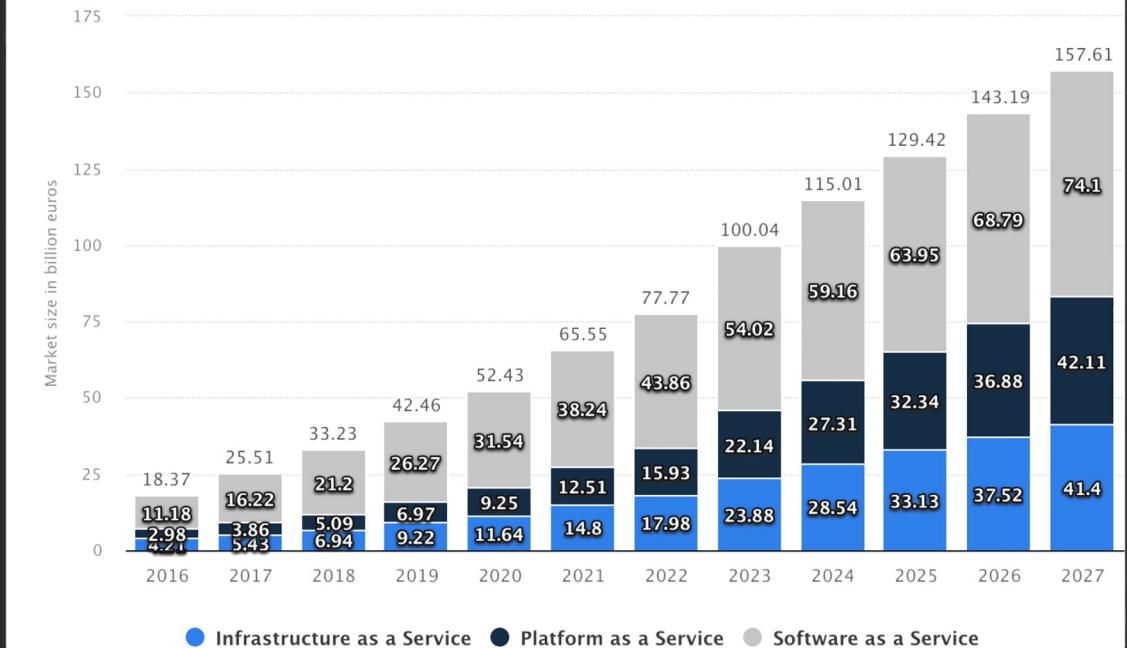
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the HaDEA. Neither the European Union nor the granting authority can be held responsible for them. Project number: 101093062. <https://vitamin-v.upc.edu>

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

RISC-V®

Scalability thanks to ISA extensions

Open-source royalty free nature

Energy efficiency

CHALLENGES

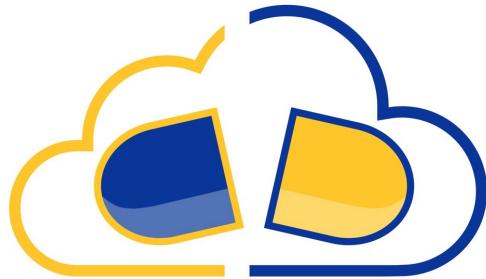
The ecosystem around RISC-V processors is still developing

Hardware availability for server class processors is still limited

HW/SW compatibility is a primary issue



AN ANSWER TO THESE CHALLENGES



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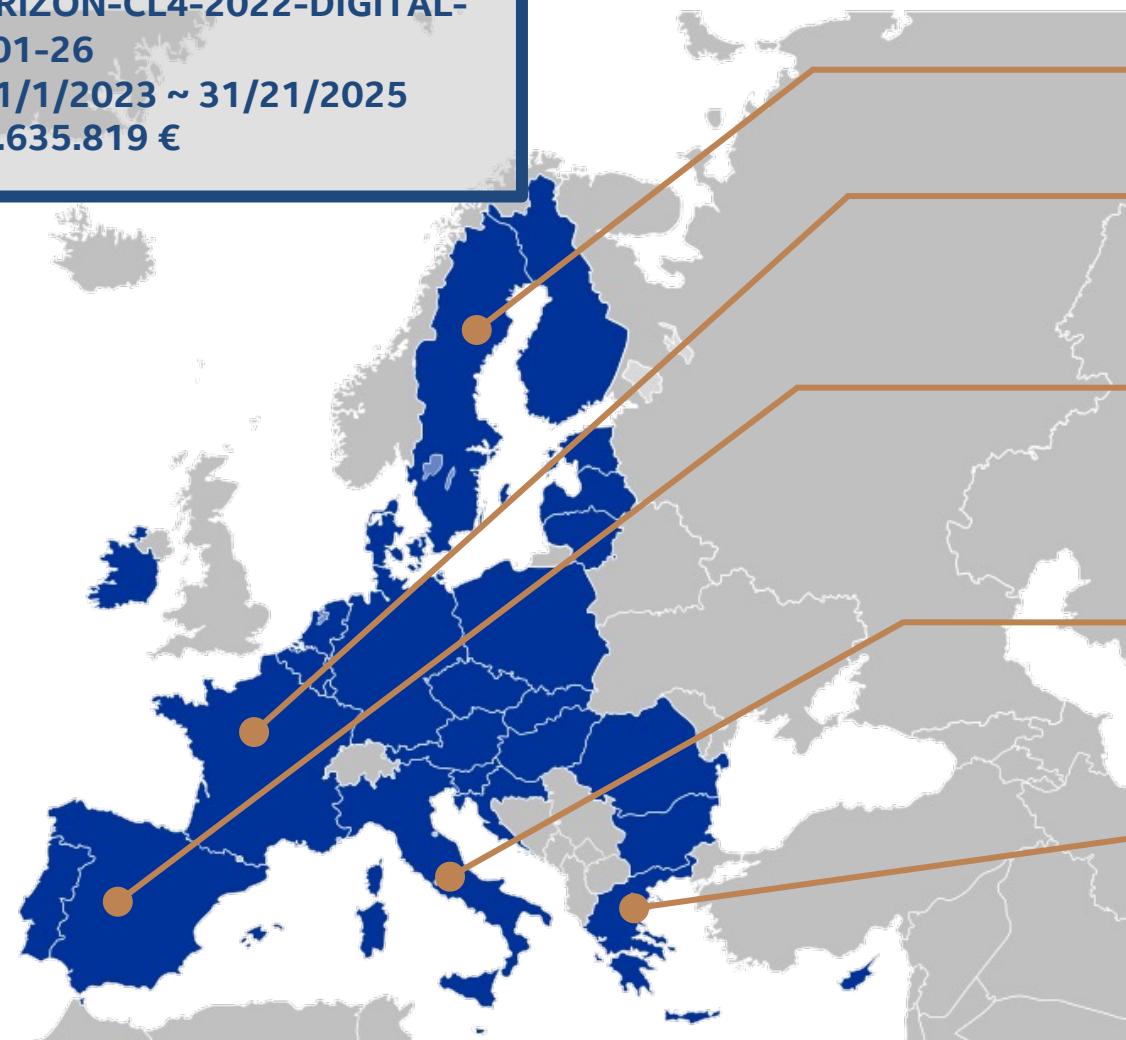
UCloudEdgeIoT.e





VITAMIN-V CONSORTIUM

Topic — HORIZON-CL4-2022-DIGITAL-EMERGING-01-26
Duration — 1/1/2023 ~ 31/12/2025
Budget — 4.635.819 €



ZeroPoint

Virtual Open Systems

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Politecnico di Torino

links
PASSION FOR INNOVATION

**HELLENIC REPUBLIC
National and Kapodistrian University of Athens**
EST. 1837

EXAPSYS
Exascale Performance Systems

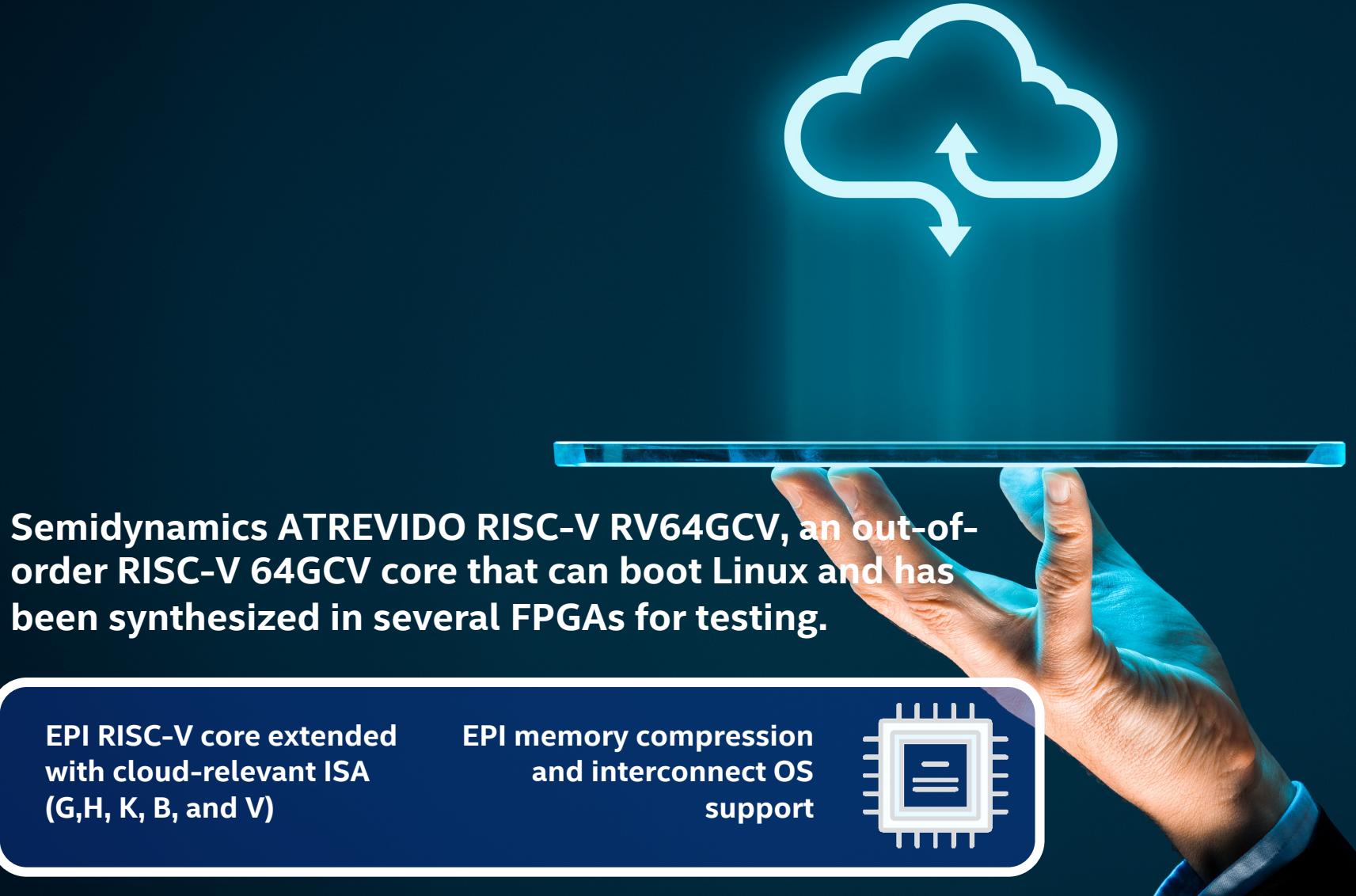




GOALS AND EXPECTATIONS



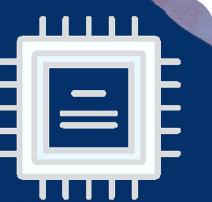
GOALS AND EXPECTATIONS



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)

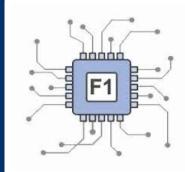
EPI memory compression and interconnect OS support

A small graphic of a central processing unit (CPU) or field-programmable gate array (FPGA) chip, showing internal circuitry and pins.

GOALS AND EXPECTATIONS

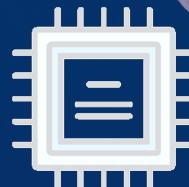


**V-RISCV — Virtual execution environment
with cloud-relevant RISC-V ISA**

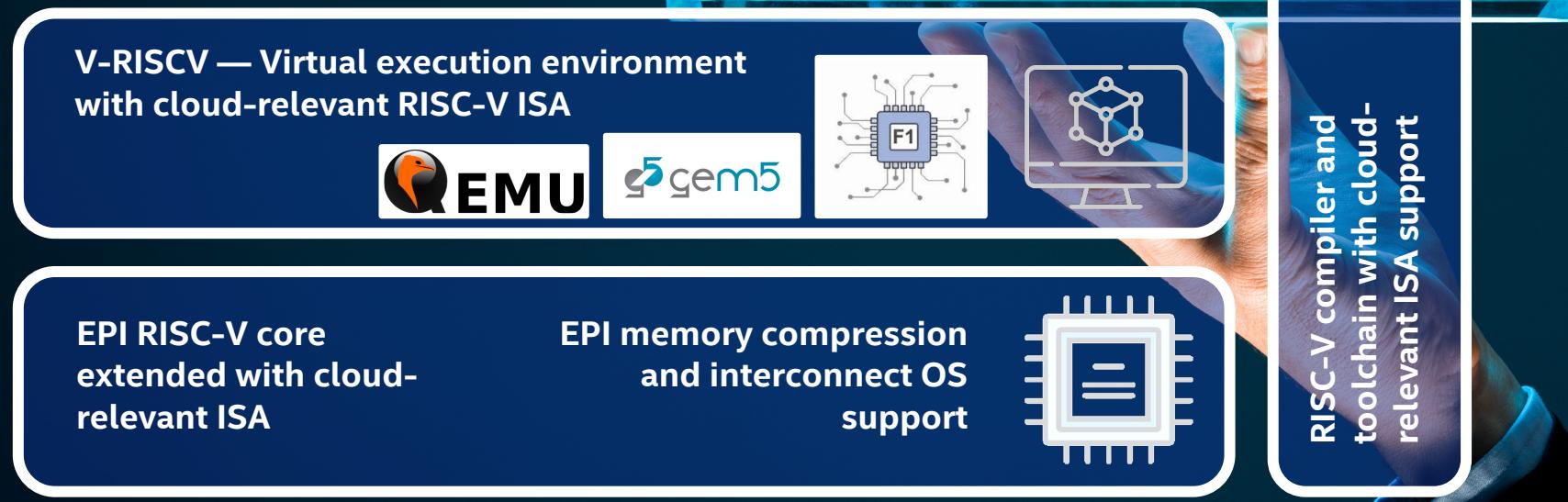


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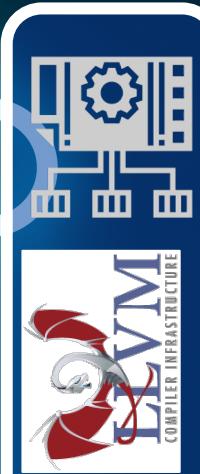


GOALS AND EXPECTATIONS

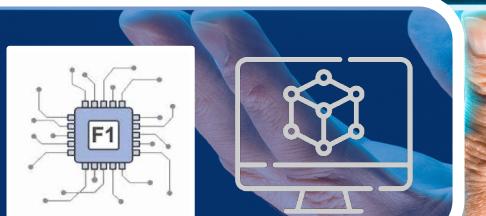


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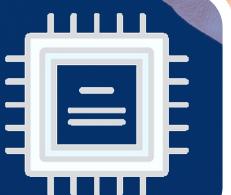
VMM and cloud management stack port to RISC-V



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



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



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GOALS AND EXPECTATIONS

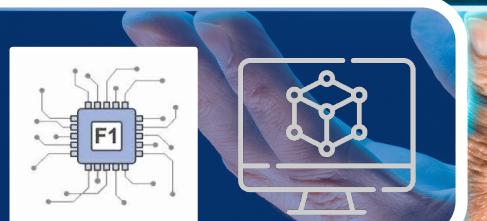
AI and BigData frameworks ported to RISC-V



VMM and cloud management stack port to RISC-V



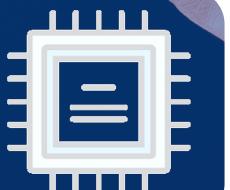
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RISC-V compiler and toolchain with cloud-relevant ISA support

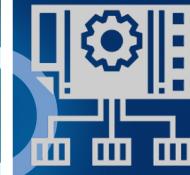
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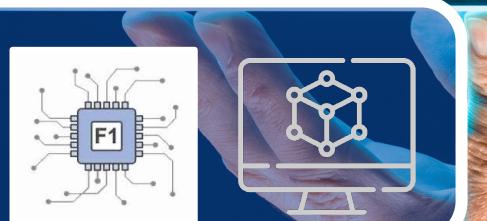
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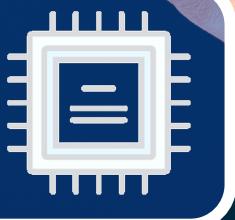
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**TRUSTWORTHINESS
THROUGHOUT VWT**



GOALS AND EXPECTATIONS

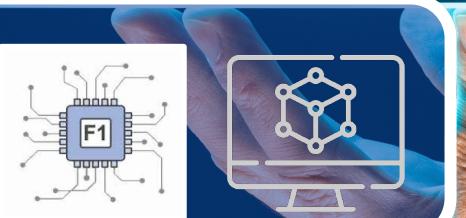
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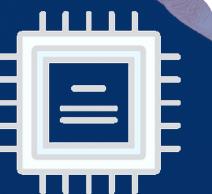
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TRUSTWORTHINESS
THROUGHOUT VWT

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



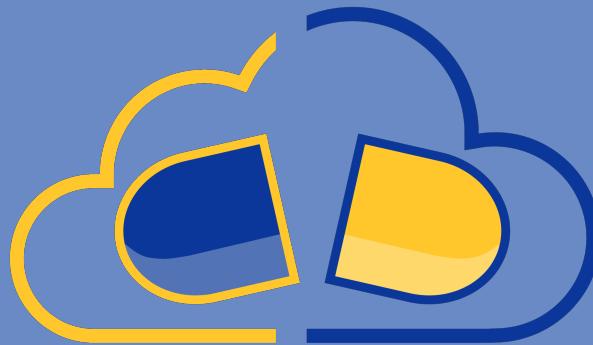
1st Open-Source RISC-V Software Workshop

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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