Software models, tools and processes for the continuum

Concertation and Consultation on Computing Continuum: From Cloud to Edge to IoT
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Organized by Open Continuum
Continuous development and operations of learning-enabled autonomous systems (I)
Continuous development and operations of learning-enabled autonomous systems (II)

Design Flow for Trustable Learning Components

Co-simulation Framework
Design time – IaC development and verification

Runtime – Deployment /life-cycle management and monitoring dashboards

Challenges

Dev

- Terraform, TOSCA, Ansible, Docker, …
- Optimisation?
- Provider?

Sec

- Linters and scans?
- Monitoring?
- Security monitoring?
- Staging/testing?

Ops

- Life-cycle mngm.:
- Deploy?
- Repair/update?
- Self-heal?
- Self-learn?
- DOML – domain specific language
- Model checker
- IaC Optim. Platform + catalogue
- IaC Code Generator (Terraform, Ansible, …)
- IaC Execution manager
- PIACERE runtime controller
- Canary sandbox environment
- IaC security inspector
- Component security inspector
- (Security) monitoring
- Self-learning
- Self-healing

Plan, create and package IaC
Release and configure IaC
Verify the trustworthiness of IaC
Monitor, plan and self-heal IaC
Demand a whole new set of tools, environments, and processes to support new open-source hardware designs into the cloud continuum

- Hardware will be as good as the software that runs on top of it.
- Embracing RISC-V and Open-Source:
  - **Collaborative effort** beyond the timespan of the project
  - **Comparable to standardization**
  - **Higher-impact** of project’s results
- **Computing continuum**
  - Cloud (Vitamin-V), HPC (EPI, EUPILOT, other), Automotive (SELENE, KDT JU calls)
  - Heterogeneous IoT-Edge-Cloud continuum convergence.
Demand a whole new set of tools, environments, and processes to support new open-source hardware designs into the cloud continuum

Vitamin-V aims to develop further RISC-V …

1) Open-source virtual environments
   QEMU, Gem5, cloud-FPGA

2) Open software validation suites
   Software bugs, Malicious code

3) Open-source cloud hardware-software stacks
   Compiler and tool-chain: LLVM, JVM, Python, …
   VMMs and container suites: VOSySmonitor, KVM, QEMU, Docker,
   RustVMM and Kata containers
   Cloud management middleware: OpenStack, Kubernetes
   AI & BigData applications: Apache Spark and Google Tensorflow.
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