SUPERCLOUD - User-centric management of security and dependability in clouds of clouds

Newsletter

May 2016 - Issue 3

Message from the Coordinator

Since the last newsletter in December 2015, major attention was drawn to refinement of the use cases as well as to the implementation of the demonstrators. Many conference calls and events and a face-2-face meeting were dedicated to the project development and discussing suitable solutions and detailed concepts. During the Advisory Board meeting in March in Eindhoven valuable comments and feedback were provided, which helped to guide the partners' future project work. In addition, a conference call with the Advisory Board members that could not be physically present in Eindhoven was organized, which allowed to present the project status to those members as well and to receive more constructive feedback.

In this Issue

SUPERCLOUD General Assembly, Advisory Board & technical meeting in Eindhoven

The SUPERCLOUD consortium met for a technical, the 2nd General Assembly, and 1st Advisory Board meeting that was organized in Eindhoven, The Netherlands, from 15th to 17th of March 2016.The meeting hosted by PEN started with an overview of the architecture building blocks. Aside from synchronizations on individual WPs and deliverables, first demonstrations were presented. Expectations related to the 1st review meeting that will take place in September were discussed and a roadmap for upcoming tasks and responsibilities was defined, notably for integration. One of the highlights of the meeting was certainly the Advisory Board meeting, which was characterized by interesting in-depth discussions and valuable feedback and comments from the external advisors. Summing up it was a constructive and effective meeting, which defined directions and actions towards the preparation for the upcoming review meeting.

SUPERCLOUD team at meeting in Eindhoven

Publications

Expression and Enforcement of Security Policy for Virtual Resource Allocation in IaaS Cloud
Y. Li, N. Cuppens-Boulahia, J.-M. Crom, F. Cuppens, V. Frey, IFIP SEC 16: International Conference on ICT Systems Security and Privacy Protection, May 2016.

Medusa: An Efficient Cloud Fault-Tolerant MapReduce
P. Costa, X. Bai, F. Ramos, M. Correia, CCGrid 2016: IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing, May 2016.

Privacy-Preserving Linear Programming with Correctness Guarantees by Certificate Validation
S. de Hoogh, B. Schoenmakers, M. Veeningen, AFRICACRYPT 2016: International Conference on Cryptology, April 2016.

(Literally) above the clouds: virtualizing the network over multiple clouds
M. Alaluna, F. M. V. Ramos, N. Neves,IEEE Conference on Network Softwarization (NetSoft), March 2016.

Consensus in a Box: Inexpensive Coordination in Hardware
Z. István, D. Sidler, G. Alonso, M. Vukolić, NSDI 16: 13th USENIX Symposium on Networked Systems Design and Implementation, March 2016.

SUPERCLOUD presentation to DG Connect in Brussels

SUPERCLOUD also gave to DG Connect an overview on the technological state of the art on cloud and virtualization security, data protection and anonymity, and network security. The meeting that took place on 2nd February 2016, enabled to share the SUPERCLOUD vision and first results, to identify key tough questions and technology trend gaps on cloud security, and to show how the project overcomes some of them.

Key Data:

Start Date:	1 February 2015
End Date:	31 January 2018
Duration:	36 months
Project Reference:	643964
Project Costs:	€ 6.863.279
Project Funding:	€ 5.398.280

Consortium:	9 partners (6 countries)
Project Coordinator:	Dr. Klaus-Michael Koch coordination@supercloud-project.eu
Technical Leader:	Dr. Marc Lacoste marc.lacoste@orange.com
Project Website:	www.supercloud-project.eu

LinkedIn

FOLLOW US ON twitter

https://twitter.com/SUPERCLOUD_EU

SUPERCLOUD - User-centric management of security and dependability in clouds of clouds

Newsletter

May 2016 - Issue 3

SUPER CLOUD

Technical progress and achieved results

During the last couple of months the focus was put on refining the use-cases and starting to implement the demonstrators. The implementation of demonstrators of individual components of the SUPERCLOUD architecture has started in work packages WP2, WP3 and WP4 with the goal of demonstrating basic functionality of the compute, data and network sub-architectures. The role of WP1 is to oversee the integration of these demonstrators. The initial design of an integrated demonstrator has started for defining the required interfaces and dependencies between demonstrators of different sub-architectures. As the work on individual demonstrators matures, this design will be refined towards an integrated demonstrator design of the SUPERCLOUD architecture.

For virtualization, a framework called ORBITS (Orchestration for Beyond InTer-Cloud Security) was proposed to solve horizontal orchestration challenges, and realize a distributed U-Cloud over multiple Open Stack distributions upon which security services may be "weaved" selectively under user control for a secure-by-design environment to deploy applications, relying on Mesos and Heat/TOSCA templates. A paper was submitted to a Special Issue of **IEEE Cloud Computing**, and a demonstration presented to the **SUPERCLOUD Advisory Board (AB)**, during the meeting in Eindhoven. For vertical challenges, a first U-Cloud prototype running nested VMs over Xen using the NOVA micro-hypervisor was developed with interesting performance and TCB size benefits. Current extensions include support for containers and running dynamically user-centric system services. An integrated proof-of-concept prototype of the security self-management infrastructure has also been developed by IMT around an availability use case, based on refinement of OrBAC policies and enforcement through a Floodlight SDN controller. The prototype was demonstrated to the AB jointly with WP4, and related results on security policies and SLAs were published at the IFIP SEC 2016 conference. A last stream of activity concerns trust management with Intel SGX as focal technology for strong isolation: several partners are working on a prototype to run VMs inside SGX enclaves, to see which adaptations are necessary on the hypervisor to support such features, or to harden a self-protection framework like VESPA with such technology to manage chains of trust through attestation: the VESPA self-protection framework jointly developed by Orange and IMT was put into open source within the OW2 Open source consortium after approval by the OW2 Technology Council. In the same area, a solution has been proposed for the trusted execution of services in the cloud with very large code bases (e.g. databases), with a paper accepted at the IEEE/IFIP DSN 2016 conference. Some first results are also available regarding data isolation with regards to geo-location using PHHC data formats. Regarding WP3, on 17th February 2016, IBM open sourced its state-machine replication fabric, partially developed and architectured within the SUPERCLOUD project. The code is available within the Hyperledger blockchain of the Linux Foundation, where it currently stands as Hyperledger fabric incubator. This state-machine replication fabric is a generic fabric for building secure and reliable distributed systems and, as such, relevant to many projects, beyond SUPERCLOUD and blockchains.

The network virtualization part of SUPERCLOUD intends to give tenants the freedom to specify virtual network topologies and addressing schemes of their choosing, which are then deployed across multiple (public or/and private) clouds. In order to support this vision, the project has been designing several components, such as network embedding solutions that take into consideration the requirements of the user in terms of security and privacy, and an approach that supports the chaining of security services (e.g. firewall, malware detection) to be placed at various locations in the physical network. In order to improve the resilience of the control plane, we have also been exploring a solution that facilitates the replication of the SDN controller while keeping a consistent view of the state of the network. WP5 "Use-case and testbed" enables to demonstrate and validate SUPERCLOUD core technology. A testbed that will enable the reproduction in realistic settings of the two use cases, using component configuration and virtualization, will be set up. Discussions among WP5 partners are going on to further develop the upcoming deliverable of this WP: **D5.1 Use Case Requirements, Specification and Evaluation plan** (M18). Use cases and detailed requirements are described by all WP5 partners.

Key Data:

Start Date:	1 February 2015
End Date:	31 January 2018
Duration:	36 months
Project Reference:	643964
Project Costs:	€ 6.863.279
Project Funding:	€ 5.398.280

Consortium:	9 partners (6 countries)
Project Coordinator:	Dr. Klaus-Michael Koch coordination@supercloud-project.eu
Technical Leader:	Dr. Marc Lacoste marc.lacoste@orange.com
Project Website:	www.supercloud-project.eu

LinkedIn

FOLLOW US ON twitter

https://twitter.com/SUPERCLOUD_EU