MECA PROJECT TRAINING SEMINAR FOR SYSTEM ADMINISTRATORS

MINUTES OF THE MEETING

INSA Toulouse, June 2-3, 2016

Participants

1. Alexandre BOYER, INSA Toulouse, France
2. Slavka Tzanova, TUS Sofia, Bugaria
3. Rossen Radonov, TUS Sofia, Bugaria
4. Svetozar Andreev, TUS Sofia, Bugaria
5. Rosario GILL, UNED, Spain
6. Manuel CASTRO, UNED, Spain
7. Martin KLOSSEK, eWORKS, Germany
8. Massimo Ruo Roch, Politecnico di Torino, Italy
9. Danilo Demarchi, Politecnico di Torino, Italy
10. Paolo Astengo, Astel, Italy
11. Mile Stankovski, UKIM Macedonia
12. Risto Chavdarov, UKIM, Macedonia
13. Lucia Popescu, Giga Electronic Int., Romania
14. Gabriel Popescu, Giga Electronic Int., Romania
15. Galina Stavreva, AMG Technology, Bulgaria
16. Vladimir Stavrov, AMG Technology, Bulgaria
17. Elena Eyngorn, TU Berlin, Germany
18. German Sterenharz, TU Berlin, Germany
19. Oliver Krammer, BME, Hungary
20. Peter Martinek, BME, Hungary
21. Zsolt Illyefalvi-Vitez, Lightware, Hungary
22. Javier LEAL, INOMA, Spain
23. Alain Guiavarch, INES-Solaire, France
24. Dragan Stankovski, ATRONIKA, Macedonia
25. Igor Markovski, ATRONIKA, Macedonia
26. Norocel Codreanu, UPB-CETTI, Romania

DAY 1: JUNE 2ND

Massimo Ruo Roch (MRR): Introduction to Cloud Systems

MRR presents the concept of Cloud and how to apply it to MECA.

Objectives of the training:

- Understand the MECA approach
- Be ready to implement a private cloud at Home
- Be ready to interface with the Partners

Available Technologies overview

MECA Implementation:

IaaS and PaaS layers seem to be reasonably sufficient to build MECA computing environment.

Scouting has been performed on existing solutions, according to the following criteria:

- Software cost minimization: OSS software preferred
- Framework reliability: as a production level system must be built, only OSS with reliable support and reasonable roadmaps have been taken in account. No experimental feature!

Performances:

● Hypervisor must guarantee negligible virtualization penalties, both from CPU and I/O point of view

● Management software resource consumption must be negligible with respect to payload

● Deployment effort:

- Fast and efficient installation/configuration of simple system is mandatory

MECA Implementation Final choices:

- IaaS layer: Cloudstack
- PaaS: Cloudify (optional, implemented only if needed)
- Educational Cloud distributed on academic/company hosted nodes

CloudStack Architecture

- **Management server(s)**

- **Infrastructure hierarchy**
- **Storage types**
    - Primary Storage: A storage resource typically provided to a single cluster for the actual running of instance disk images. (Zone-wide primary storage is an option, though not typically used.)
    - Secondary Storage: A zone-wide resource which stores disk templates, ISO images, and snapshots.
- **Networking**

Two different networking schemes are available, according to resulting system complexity and requirements:

- Basic: Most analogous to AWS-classic style networking. Provides a single flat layer-2 network where guest isolation is provided at layer-3 by the hypervisors bridge device. All the traffic on a single network.
- Advanced: This typically uses layer-2 isolation such as VLANs, though this category also includes SDN technologies such as Nicira NVP, or OVS (OSS). Traffic separation according to payload type.

- Network traffic classification

DAY 2: JUNE 3RD

Martin Klossek (MK): Cloud Survey

MK describes the results of the survey done to students and sys admins about the usage of ICT facilities and softwares.

- answersfrom8 universities
- answersfrom8 companies
- around400 students
- 40 questions

Virtual laboratories: What is already available?

- VISR, MC68000

Virtual laboratories: What is possible?

- Basic electronic, electronic practices in a real remote lab, fieldbus simulations, virtual Laboratory

Students are very enthusiastic about sharing software (72%) and in sharing files (65%) – new feature

How can employees use the e-learning courses?

- currently different situations in each company:

some: e-learning courses not or rarely, learning mostly off-line
many: on-demand if some specific information is needed
many: at work or at any place / mobility
some: knowledge sharing via email / intranet
many: e-learning offers of software providers are in use
many: webinars on different topics are in use

- future

most: on-demand and downloadable web courses most suitable -these courses can be studied at any time.
important for most: Access during and after the (busy) working times
some: organized group e-learning process (employees in a group in front of online courses)

System administrators:

In positive case, what would be the greatest motivation to migrate to that scenario?

-lower maintenance cost / reduced TCO

-efficiency / resource utilization

-easier deployment / faster implementation of new software or upgrading software

-flexibility

-wider accessibility / more of simultaneous connections

-improvement of quality of services

-speed / increased performance

-platform redesign with performance and higher availability

What do you think about the scenario of moving from hardware over to a private cloud? 64% positive!

The evaluation of the technical cloud questionnaires is done.

ST: we have very positive results and we have right indications of how to start.

Cloud Practical Training Session

In the Training Session several decisions have been taken.

IP ranges allocation

It is mandatory, to avoid future address conflicts. Each participating institution will use addresses of the form 172.16.x/24, where the 'x' is related to specific site:

00-15 PoliTo

16-31 eWorks

32-47 Budapest

48-63 Atronika

64-79 Ukim

Sixteen subnetworks are allocated to each site, to allow for successive experimentations.

A table of partner IP class C networks will be created and maintained

- Advantage: No IP conflicts

Required for internal and external IP addresses in CloudStack

ACTION: Every partner has to approve that this class B network is feasible in his institution

Cloudstack configuration - version 4.8

No special hardware network appliances.

No custom plugins

No IPv6 support

Basic network approach

Minimal recommended system configuration:

- 1 Firewall/router (optional): pfSense on virtual machine or standard PC

- 1 physical host for guest virtual machines

- 2 VM's (NFS + Management) OR

1 physical host for both functions OR

1 physical host with 2 distinct VM's on it

Management machine requirements:

SSH access

Strongly recommended OS: CentOS 6.7

Host machine requirements:

KVM hypervisor

SSH access

libvirt

Strongly recommended OS: CentOS 6.7

Implementation plan

ACTION: Participating institutions make some experiments with local basic installation.

ACTION: PoliTo and eWorks prepare shared installation:

1 Basic zone in PoliTO

1 Basic zone in eWorks

Redundant management server (1 per site)

Redundant database: Master in PoliTO, Backup in eWorks

Encrypt the management traffic between the different zones / data centers

Domain feature in CloudStack: Hierarchical user levels through domains, e. g. for departments inside of institutions. "Projects" in CloudStack are for grouping people

Use subdomains of meca-project.eu for the project, e. g. server1.polito.meca-project.eu or machine4.bme.meca-project.eu

OpenVPN recommended for CloudStack manager access on port 8080

- see https://openvpn.net

Recommendation: Firewall in front of CloudStack to avoid conflicts with the other organizations/departments

- Free firewall: pfSense (low system requirements, e. g. 512 MB RAM), can be installed as virtual appliance or one can buy a physical appliance. Server Load Balancing is possible. IPsec and OpenVPN is built-in

First institutions: POLITO, eWorks, BME. Later maybe UKIM and ATRONICA

Virtual vs. physical setup of CloudStack components

CloudStack Management Server and NFS-Server can be on virtual machines and can be separated

The hosts should not be virtualized because it would be virtualization in virtualization with poor performance

The management server must not be in a virtual machine managed by CloudStack (!)

For easier maintenance: If possible the management server should not be on a CloudStack host

- If possible the management server and the NFS should be on separate servers.

ACTION: MySQL master database will be installed in POLITO Data Centers and replicated to eWorks and BME

TO DO list

Sept 2016 deadline for:

- Feasibility of Cloud
  - Polito/eWorks supporting
  - Guidelines (TBD among technical experts)
  - Licenses and which software to share

  - Available HW
- Specifications
  - Model to be implemented
  - Sharing, interoperability
- Tests -> BME will join the test with Polito and eWorks
- Participating institutions make some experiments with local basic installation.
- PoliTo and eWorks prepare shared installation:
  - 1 Basic zone in PoliTO
  - 1 Basic zone in eWorks
  - Redundant management server (1 per site)
  - Redundant database: Master in PoliTO, Backup in eWorks
- MySQL master database will be installed in POLITO Data Centers and replicated to eWorks and BME

Danilo Demarchi (DD) asks that all the Server names are setup inside the Project Domain **meca-project.eu.**

NEXT Meeting: Politecnico di Torino, Torino Italy, 5th-7th October 2016.