



Openstack @ACS

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Summary

- Introduction
- Cloud computing
 - Concepts
 - Existing platforms
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- Openstack
 - Components
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 - Demo/Hands-on



Introduction



- Who am I?
 - Graduated Faculty of Computer Science and Automation Control in 2010
 - Master in Advanced Network Security (2012)
 - NCIT cluster system engineer since 2010
 - + Alexandru Herisanu
 - + Mihai Carabas
 - System engineer @ Adobe

Cloud Computing (CC)



- Started around 1990s
 - Computing as public utility

- First to do it
 - Amazon (AWS – Amazon Web Services)

- First OpenSource project – AWS compatible API
 - Eucalyptus (private company) – www.eucalyptus.com
 - OpenNebula (European Project) – opennebula.org

Cloud Computing (CC) (cont)



- Why they do it?
 - Efficiency – increasing hardware utilization from 10% to 90%
 - Agility – redo an entire infrastructure easy
 - Cost – pay per use
 - Elasticity and scalability – adapt to the workload
 - ex.: Black Friday
 - Programmable infrastructure – configure your infrastructure using APIs

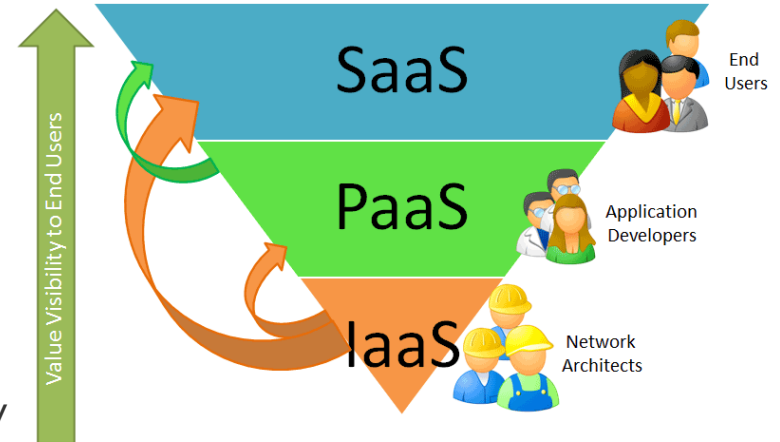
CC - concepts



- Public cloud – cloud available to general public
- Private cloud – cloud available just to the owner
 - Ex.: companies that converted their own physical infrastructure into a cloud platform
- Hybrid cloud – mix of public and private cloud
 - Ex.: companies that offer a public service and a custom service inside for their employees

CC – concepts (cont)

- Cloud computing pyramid
 - IaaS – Infrastructure as a Service
 - The product is the Virtual Machine
 - You pay for computing power
 - PaaS – Platform as a Service
 - The product is the SDK
 - You pay for application availability
 - SaaS – Software as a Service
 - The product is the software
 - You pay per use/license



CC – existing platforms



- IaaS
 - Amazon EC2 – the biggest
 - Microsoft Azure
 - Google Compute Engine
 - Rackspace, etc

- PaaS
 - Google App Engine – java, ruby, python
 - Microsoft Azure – C#
 - PiCloud – python code, etc

- SaaS
 - Salesforce – CRM (customer relationship management) application
 - Trello.com – task management, etc

OpenStack (OS)



- The most popular and supported Open Source cloud platform
- Offers IaaS (Infrastructure as a Service)
- Amazon EC2 compatible API
- Started in 2010 as a collaboration between Rackspace and NASA
- Supported by major IT companies like IBM, RedHat, Rackspace, HP, Canonical, etc.

CC - components

- Authn & Authz
- Image Service
- Volume Storage Service
- Compute Service
- Network Service



Virtualization

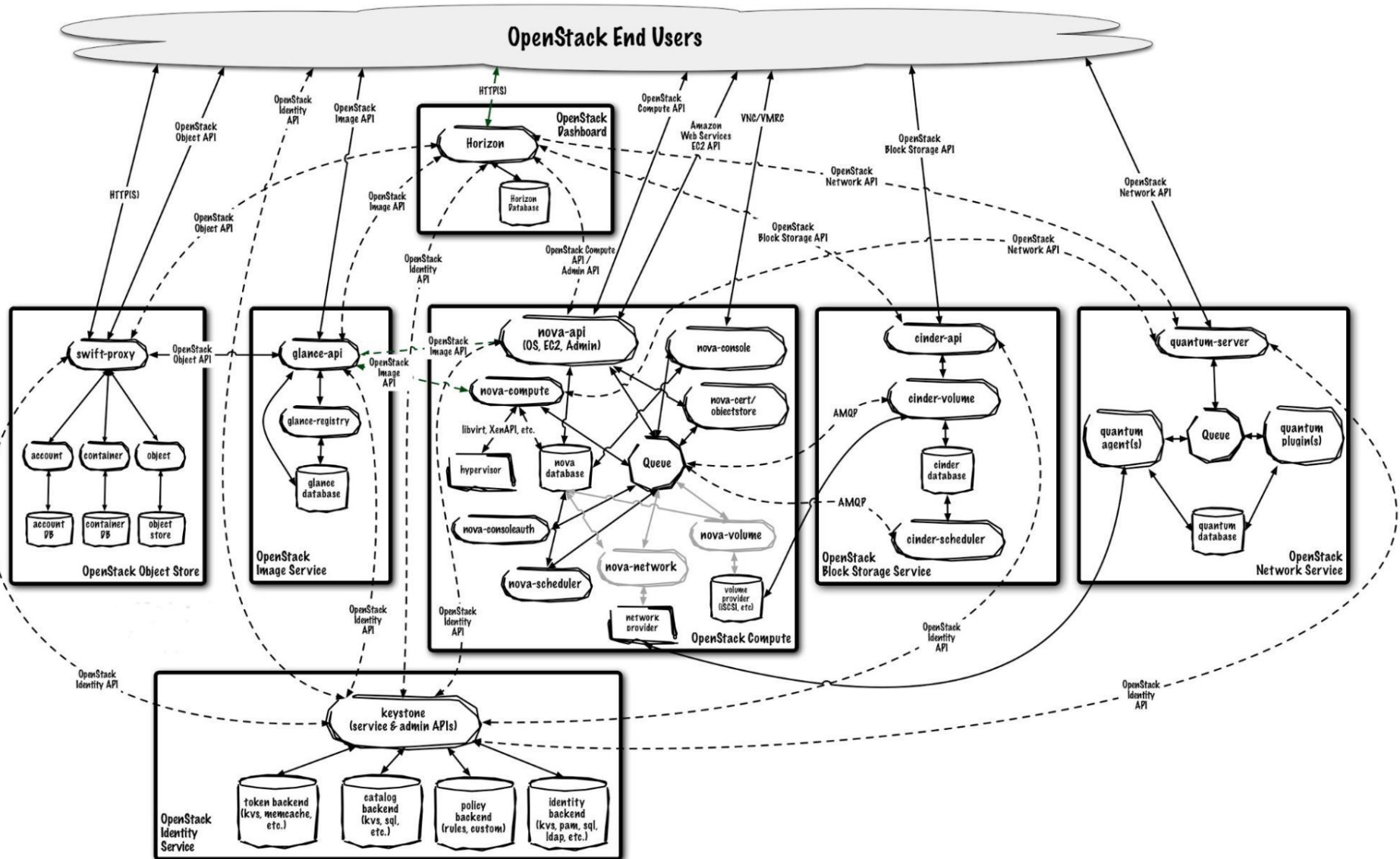
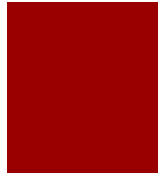


- Technologies
 - Full virtualization
 - Vmware, KVM, XEN
 - Para virtualization
 - XEN, KVM,
 - OS level virtualization
 - Containers: LXC, OpenVZ

OS - Architecture



- Service Oriented Architecture
 - Keystone – Authentication & Authorization
 - Glance – Image Service
 - Cinder – Volume Service
 - Nova Compute – Virtualization Service
 - Nova Network (deprecated as of Icehouse release)
 - Neutron – Nextgen Network Service
 - Firewall-as-a-Service
 - LoadBalancer-as-a-Service
 - Horizon - UI
 - Etc (more on www.openstack.org)



OS - Usecases

- Automate existing physical infrastructure
- Multitenant with traffic isolation
- High availability – VM live migration

OS - Deployment



- Prereq
 - KVM needs hardware virtualization
 - Intel VT
 - AMD-V

- One node deployment
 - <http://devstack.org/>

- Multi node deployment
 - Manual
 - Automated using puppet (configuration management tool)

OS – Demo/Hands-on



- We want to have a couple of virtual machines
- How?
 - By using openstack deployment located at <https://cloud.curs.pub.ro/dashboard/>

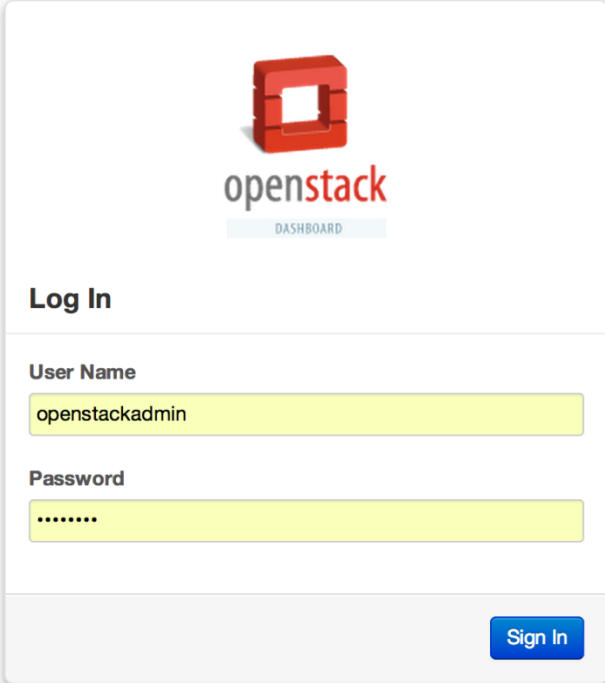
OS – Demo/Hands-on



- Concepts that we use:
 - **Instance** – a virtual machines created from a template
 - **Security groups** – software firewall controlled by the end-user for limit or permit traffic to its virtual machine
 - **Keypair** – a pair of public and private SSH key used for authentication inside the instance
 - **Private IP** – IPaddress associated with the instance, not visible from outside
 - **Floating IP (public IP)** – IP address that is publicly accessible witch is DNAT-ed to Private IP

OS – Demo/Hands-on

- First contact
 - Username: openstackdemo
 - Password: Demo123.
 - URL: <https://cloud.curs.pub.ro/dashboard/>
 - Documentation: <https://cloud.curs.pub.ro/>



The image shows a screenshot of the OpenStack Dashboard login interface. At the top center is the OpenStack logo, which consists of a red 3D cube with a square hole in the center, and the text "openstack" below it, with "DASHBOARD" in a smaller font underneath. Below the logo is the heading "Log In". There are two input fields: "User Name" with the text "openstackadmin" and "Password" with a masked password ".....". A blue "Sign In" button is located at the bottom right of the form.

OS – Demo/Hands-on



- Our first instance
 - Name: my_instance_\${yourname}
 - Template: fedora
 - Keypair: defaul
 - Floating ip: choose one from Access & Security

- Access the instance
 - Login to fep.grid.pub.ro with openstackdemo user
 - `ssh -i ~/openstack/openstack.key fedora@$floating_ip`

OS – Demo/Hands-on



- CLI
 - Source the auth file
 - `source ~/openstack/openstackrc`
 - `nova boot --flavor FLAVOR_ID \
--image IMAGE_ID --key-name KEY_NAME \
--user-data USER_DATA_FILE \
--security-groups SEC_GROUP \
--meta KEY=VALUE \
INSTANCE_NAME`
 - `nova help boot`

OS – Demo/Hands-on



- Automation
 - Userdata scripts
 - Cloud init
 - APIs
 - Python
 - Php
 - ...any language

Q/A

- <http://www.doraz.ro>
- <https://my.bluedrive.ro/cms/>