

Introduction to Cloud Computing

IaaS: Euca2ptus 2.0 – OSE

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Outline

- Eucalyptus 2.0 – Overview
 - architecture
 - deployment
- Usage
 - web interface;
 - CLI (euca-tools)
- Development:
 - REST-full or SOAP-based APIs
 - Walrus Client in Java

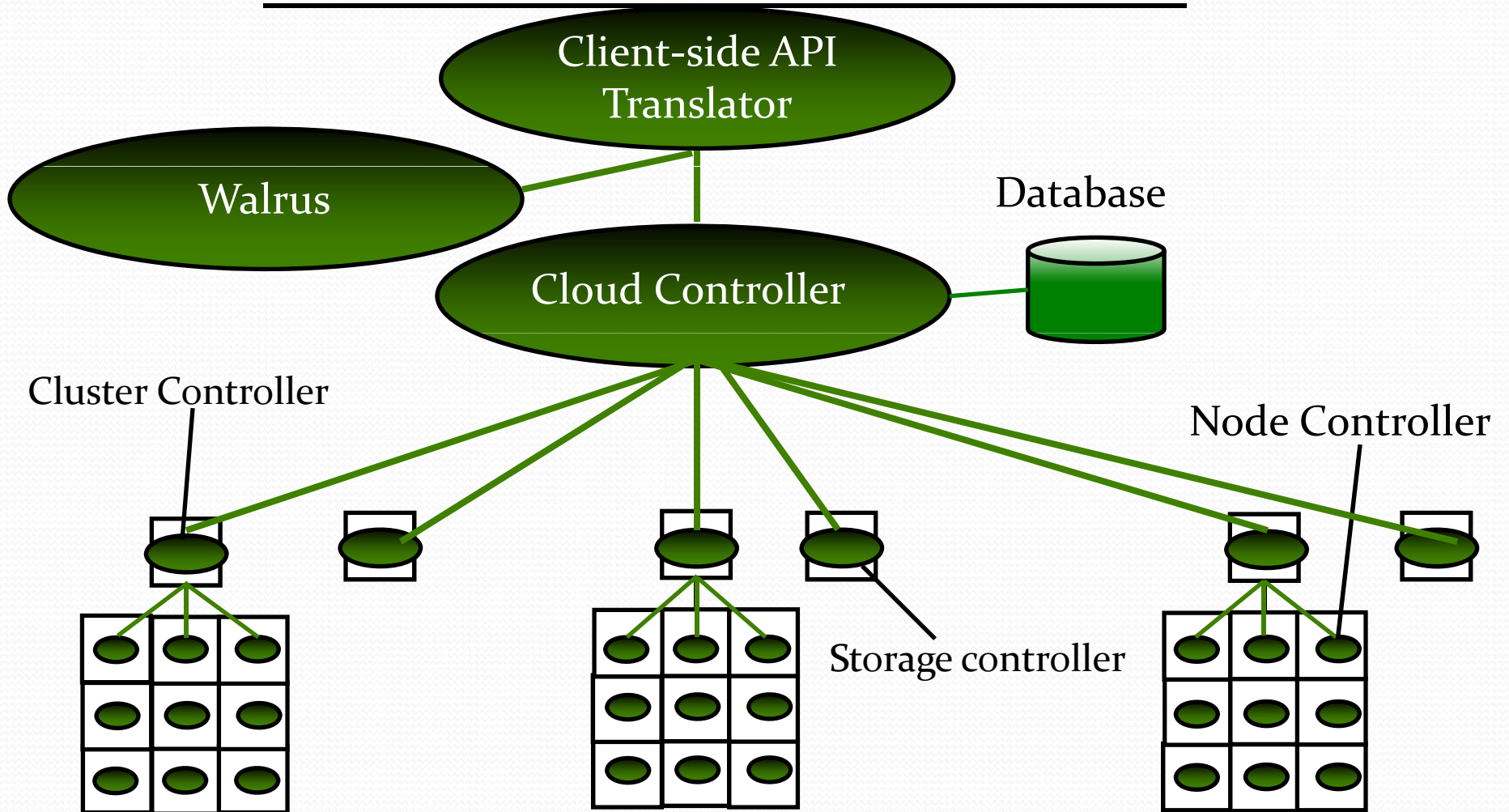


Eucalyptus 2.0 - Overview

- <http://open.eucalyptus.com/>
- Linux based software architecture that implements a private cloud;
- software package for scalable management of the resources at infrastructure level;
- high-level virtualization and workload manager

Eucalyptus 2.0 - Architecture

Amazon EC2/S3 Interface





Euca/Components

- API interface:
 - SOAP enabled;
 - REST-full interface;
- Security
 - X.509 certificates
 - Query ID/Secret key
- Core services:
 - Cloud controller (EC2 like)
 - eucalyptus central management service;
 - resource booking;
 - resource scheduling;



Euca/Components

- Cluster controller
 - management service for a group of resources;
 - scheduling at cluster level;
 - network management;
- Storage controller
 - storage server for EBS like block-based storage;
- Node controller:
 - local resource manager (a computer/server);
 - it controls the hypervisor:
 - KVM or XEN (using libvirt)
 - it runs virtual machines;
- Walrus service:
 - storage service (similar to S3 from Amazon);



How to use it

- administrative tasks:
 - web-based user interface (limited options):
 - <http://cloud.info.uvt.ro/>
 - CLI
- regular usage (for basic users):
 - CLI using euca-tools package;
 - a set of tools using almost every feature of eucalyptus;
 - all the tools are written in Python;



Eucalyptus CLI Usage

- authentication:
 - download credentials package from your web account:
 - <http://cloud.info.uvt.ro/>
 - deploy the credentials on you machine:

```
$ mkdir .euca-USER
```

```
$ mv /path/to/euca2-USER-x509.zip ./euca-USER
```

```
$ cd .euca-USER
```

```
$ unzip euca2-USER-x509.zip
```

Eucalyptus CLI Usage

- load profile file to setup a session for eucalyptus usage:

```
$ . eucarc
```

- check for available resources (availability zones):

```
$ euca-describe-availability-zones
```

```
AVAILABILITYZONE    ec-ieat 10.100.0.170
AVAILABILITYZONE    |- vm types  free / max  cpu  ram  disk
AVAILABILITYZONE    |- m1.small  0026 / 0032  1   256  2
AVAILABILITYZONE    |- c1.medium 0026 / 0032  1   512  3
AVAILABILITYZONE    |- m1.large  0026 / 0032  1  1024  5
AVAILABILITYZONE    |- m1.xlarge 0012 / 0016  2  2048  11
AVAILABILITYZONE    |- c1.xlarge 0005 / 0008  4  2048  12
```

Eucalyptus CLI Usage

- check for available OS images:
`$ euca-describe-images`
- check for available SSH keys for authentication:
`$ euca-describe-keypairs`
- create a SSH pair:
`$ euca-add-keypair mykey | tee mykey.private`
`$ euca-describe-keypairs`
`$ chmod o600 mykey.private`

Eucalyptus CLI Usage

- run an euca2 instance:

```
$ euca-run-instances --addressing private \  
-k mykey -n 1 -t m1.large -z ec-ieat emi-oDD914FA \  
--kernel eki-D30C178D --ramdisk eri-AF41170A
```

Eucalyptus CLI Usage

- allocate a public IP address for external access:

```
$ euca-describe-addresses
```

```
$ euca-allocate-address
```

```
$ euca-associate-address -i instance-ID IP_Address
```



Eucalyptus CLI usage

- create a security rule to allow SSH access to the VM:

```
$ euca-authorize
```

```
$ euca-authorize -P tcp -p 22 -s 0.0.0.0/0 default
```

```
$ euca-add-group
```

```
$euca-describe-groups
```

- connect to the machine using previously created SSH key:

```
$ ssh -i mykey.private root@IP_ADDRESS
```



Eucalyptus CLI Usage

- create and attach an EBS volume to the virtual machine:

```
$ euca-create-volume -s [GB_size] -z [cloud_zone]
```

```
$ euca-describe-volumes
```

```
$ euca-attach-volume -i instance_ID -d /dev/sdx \  
VOLUME_ID
```

- ssh to the virtual machine and use the volume:

```
# fdisk -l
```

```
# mkfs.ext3 /dev/sdx
```

```
# mount /dev/sdx /mnt
```

```
# df -h
```

Eucalyptus CLI Usage

- terminate the instance and clean-up:

```
$ euca-terminate-instances instance_ID
```

```
$ euca-release-address IP_ADDRESS
```



Eucalyptus instances

- each virtual machine can access a special service available at:
 - <http://169.254.169.254/latest/>
- user data file:
 - URL/user-data
 - -f user-data-file (extra to euca-run-instance)
- instance information:
 - URL/meta-data/public-ipv4
 - URL/meta-data/instance-id
 - /meta-data/public-keys/o/openssh-key



Eucalyptus: Walrus

- Walrus service:
 - allows you to store objects in a similar way with Amazon S3;
 - objects are stored into buckets;
- no CLI available from Eucalyptus;
- no Web client available;
- use third-party applications like:
 - Windows: S3Browser, CloudBerry etc.
 - Linux: s3cmd



Eucalyptus development

- SOAP and REST-full API
- partially compatible with Amazon's API
- compatible API with Eucalyptus 2.0:
 - EC₂:
<http://docs.amazonwebservices.com/AWSEC2/2009-04-04/DeveloperGuide/>
 - S₃:
<http://docs.amazonwebservices.com/AmazonS3/latest/dev/>



Thank you.

Questions ?!