

UEC CDInstall

Overview

This tutorial covers UEC installation from the Ubuntu 9.10 Server Edition CD, and assumes a basic network topology, with a single system serving as the "all-in-one controller", and one or more nodes attached.

Objective

From this Tutorial you will learn how to install, configure, register and perform several operations on a basic UEC setup that results in a cloud with a one controller "front-end" and one or several node(s) for running Virtual Machine (VM) instances. You will also use examples to help get you started using your own private compute cloud.

Tutorial

STEP 1: Prerequisites

To deploy a minimal cloud infrastructure, you'll need at least two dedicated systems:

- a front end
- one or more node(s)

The following are recommendations, rather than fixed requirements. However, our experience in developing this documentation indicated the following suggestions.

Front End

Use the following table for a system that will run one or more of:

- the cloud controller (clc)
- the cluster controller (cc)
- walrus (the S3-like storage service)
- the storage controller (sc)

Hardware	Minimum	Suggested	Notes
CPU	1GHz	2 x 2GHz	for an all-in-one front end, it helps to have at least a dual core processor
Memory	512MB	2GB	the Java web front end benefits from lots of available memory
Disk	5400rpm IDE	7200rpm SATA	slower disks will work, but will yield much longer instance startup times

Contents

1. [Overview](#)
2. [Objective](#)
3. [Tutorial](#)
 1. [STEP 1: Prerequisites](#)
 2. [STEP 2: Install the Cloud/Cluster/Storage/Walrus Front End Server](#)
 3. [STEP 3: Install the Node Controller\(s\)](#)
 4. [STEP 4: Register the Node\(s\)](#)
 5. [STEP 5: Obtain Credentials](#)
 6. [STEP 6: Install an image from the store](#)
 7. [STEP 7: Run an Image](#)
4. [More Information](#)
5. [Glossary](#)

Disk Space	40GB	200GB	40GB is only enough space for only a single image, cache, etc., Eucalyptus does <i>not</i> like to run out of disk space
Networking	100Mbps	1000Mbps	machine images are hundreds of MB, and need to be copied over the network to nodes

Node(s)

The other system(s) are nodes, which will run:

- the node controller (nc)

These systems will actually run the instances. You will need one or more systems with:

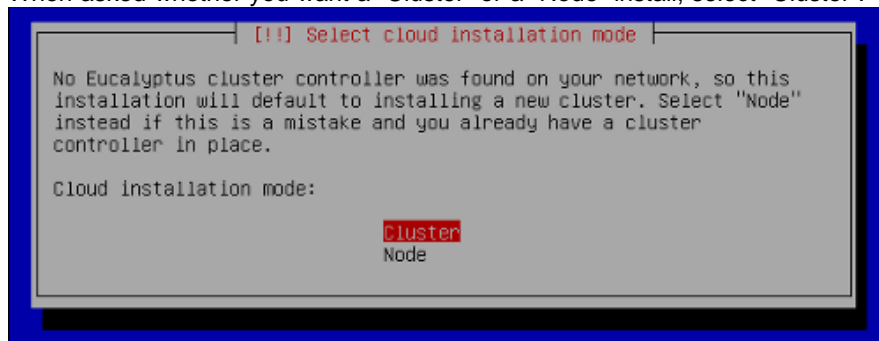
Hardware	Minimum	Suggested	Notes
CPU	VT extensions	VT, 64-bit, Multicore	64-bit can run both i386, and amd64 instances; by default, Eucalyptus will only run 1 VM per CPU core on a Node
Memory	1GB	4GB	additional memory means more, and larger guests
Disk	5400rpm IDE	7200rpm SATA or SCSI	Eucalyptus nodes are disk-intensive; I/O wait will likely be the performance bottleneck
Disk Space	40GB	100GB	images will be cached locally, Eucalyptus does <i>not</i> like to run out of disk space
Networking	100Mbps	1000Mbps	machine images are hundreds of MB, and need to be copied over the network to nodes

STEP 2: Install the Cloud/Cluster/Storage/Walrus Front End Server

1. Download the 9.10 Server ISO
2. When you boot, select "Install Ubuntu Enterprise Cloud".



3. When asked whether you want a "Cluster" or a "Node" install, select "Cluster".



4. It will ask two other cloud-specific questions during the course of the install:
 1. Name of your cluster
 - e.g. *cluster1*
 2. A range of public IP addresses on the LAN that the cloud can allocate to instances
 - e.g. *192.168.1.200-192.168.1.249*

STEP 3: Install the Node Controller(s)

The node controller install is even simpler. Just make sure that you are connected to the network on which the cloud/cluster controller is already running.

1. Boot from the same ISO on the node(s)
2. Select "Install Ubuntu Enterprise Cloud"
3. It should detect the Cluster and preselect "Node" install for you
4. Confirm the partitioning scheme
5. The rest of the installation should proceed uninterrupted; complete the installation and reboot the node

STEP 4: Register the Node(s)

Nodes are the physical systems within UEC that actually run the virtual machine instances of the cloud.

Once one or more Ubuntu Server node(s) are installed and running the *eucalyptus-nc* service, log onto the Cloud Controller and run:

```
sudo euca_conf --no-rsync --discover-nodes
```

This will discover the systems on the network running the *eucalyptus-nc* service, and the administrator can confirm the registration of each node by its IP address.

- *Note: If you get prompted for passwords, or receive errors from scp, you may need to revisit the key synchronization instructions at [UEC/NodeInstallation](#).*

STEP 5: Obtain Credentials

After installing and booting the Cloud Controller, users of the cloud will need to retrieve their *credentials*. This can be done either through a web browser, or at the command line.

From a Web Browser

1. From your web browser (either remotely or on your Ubuntu server) access the following URL:

```
https://<cloud-controller-ip-address>:8443/
```

Important! You must use a secure connection, so make sure you use "https" not "http" in your URL. You will get a security certificate warning. You will have to add an exception to view the page. If you do not accept it you will not be able to view the Eucalyptus configuration page.

2. Use username 'admin' and password 'admin' for the first time login (you will be prompted to change your password).
3. Then follow the on-screen instructions to update the admin password and email address.
4. Once the first time configuration process is completed, click the 'credentials' tab located in the top-left portion of the screen.



5. Click the 'Download Credentials' button to get your certificates
6. Save them to `~/ .euca`
7. Unzip the downloaded zipfile into a safe location (`~/ .euca`)

```
unzip -d ~/ .euca mycreds.zip
```

From a Command Line

1. Alternatively, if you are on the command line of the Cloud Controller, you can run:

```
mkdir -p ~/ .euca
chmod 700 ~/ .euca
cd ~/ .euca
sudo euca_conf --get-credentials mycreds.zip
unzip mycreds.zip
cd -
```

Extracting and Using Your Credentials

Now you will need to setup EC2 API and AMI tools on your server using X.509 certificates.

1. Source the included "eucarc" file to set up your Eucalyptus environment

```
. ~/ .euca/eucarc
```

2. You may additionally wish to add this command to your `~/ .bashrc` file so that your Eucalyptus environment is set up automatically when you log in. Eucalyptus treats this set of credentials as 'administrator' credentials that allow the holder global privileges across the cloud. As such, they should be protected in the same way that other elevated-priority access is protected (e.g. should not be made visible to the general user population).

```
echo "[ -r ~/ .euca/eucarc ] && . ~/ .euca/eucarc" >> ~/ .bashrc
```

3. Install the required cloud user tools:

```
sudo apt-get install euca2ools
```

4. To validate that everything is working correctly, get the local cluster availability details:

```
. ~/ .euca/eucarc
euca-describe-availability-zones verbose
AVAILABILITYZONE myowncloud 192.168.1.1
AVAILABILITYZONE - vm types free / max cpu ram disk
AVAILABILITYZONE - m1.small 0004 / 0004 1 128 2
AVAILABILITYZONE - c1.medium 0004 / 0004 1 256 5
AVAILABILITYZONE - m1.large 0002 / 0002 2 512 10
AVAILABILITYZONE - m1.xlarge 0002 / 0002 2 1024 20
AVAILABILITYZONE - c1.xlarge 0001 / 0001 4 2048 20
```

STEP 6: Install an image from the store

The following is by far the simplest way to install an image. However, advanced users may be interested in learning how to [Bundle their own image](#).

The simplest way to add an image to UEC is to install it from the Image Store on the UEC web interface.

1. Access the web interface at the following URL (Make sure you specify https):

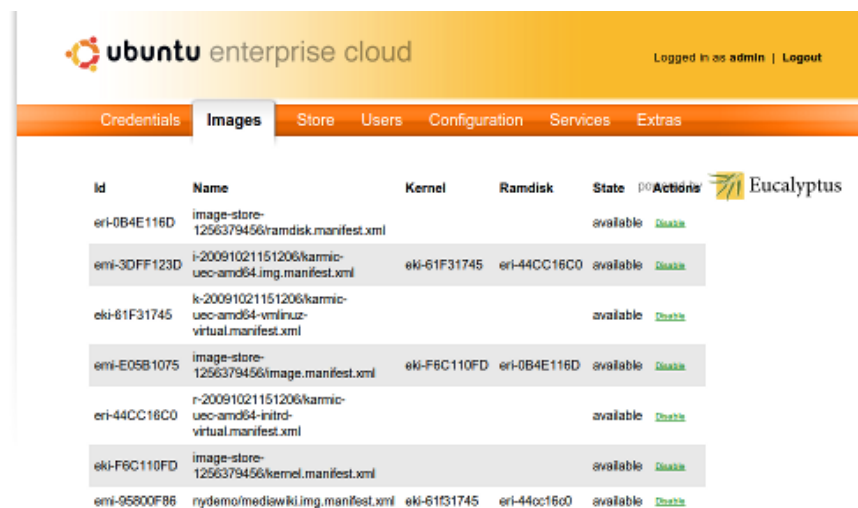
```
https://<cloud-controller-ip-address>:8443/
```

2. Enter your login and password (if requested, as you may still be logged in from earlier)
3. Click on the Store tab



4. Browse available images
5. Click on install for the image you want

Once the image has been downloaded and installed, you can click on "How to run?" that will be displayed below the image button to view the command to execute to instantiate (start) this image. The image will also appear on the list given on the Image tab.



STEP 7: Run an Image

There are multiple ways to instantiate an image in UEC:

- Use the command line
- Use one of the UEC compatible management tools such as Landscape
- Use the [ElasticFox](#) extension to Firefox

Here we will describe the process from the command line:

1. Before running an instance of your image, you should first create a keypair (ssh key) that you can use to log into your instance as root, once it boots. The key is stored, so you will only have to do this once. Run the following command:

```
if [ ! -e ~/.euca/mykey.priv ]; then
  touch ~/.euca/mykey.priv
  chmod 0600 ~/.euca/mykey.priv
  euca-add-keypair mykey > ~/.euca/mykey.priv
fi
```

Note: You can call your key whatever you like (in this example, the key is called 'mykey'), but remember what it is called. If you forget, you can always run `euca-describe-keypairs` to get a list of created keys stored in the system.

2. You must also allow access to port 22 in your instances:

```
euca-describe-groups # Work around Bug:452556
euca-authorize default -P tcp -p 22 -s 0.0.0.0/0
```

3. Next, you can create instances of your registered image:

```
euca-run-instances $EMI -k mykey -t c1.medium
```

Note: If you receive an error regarding `image_id`, you may find it by viewing Images page or click "How to Run" on the Store page to see the sample command.

4. The first time you run an instance, the system will be setting up caches for the image from which it will be created. This can often take some time the first time an instance is run given that VM images are usually quite large. To monitor the state of your instance, run:

```
watch -n5 euca-describe-instances
```

In the output, you should see information about the instance, including its state. While first-time caching is being performed, the instance's state will be 'pending'.

5. When the instance is fully started, the above state will become 'running'. Look at the IP address assigned to your instance in the output, then connect to it:

```
IPADDR=$(euca-describe-instances | grep $EMI | grep running | tail -n1 | awk '{print $4}')
ssh -i ~/.euca/mykey.priv ubuntu@$IPADDR
```

6. And when you are done with this instance, exit your SSH connection, then terminate your instance:

```
INSTANCEID=$(euca-describe-instances | grep $EMI | grep running | tail -n1 | awk '{print $2}')
euca-terminate-instances $INSTANCEID
```

More Information

How to use the [Storage Controller](#)

Controlling eucalyptus services:

- `sudo service eucalyptus [start|stop|restart]` (on the CLC/CC/SC/Walrus side)
- `sudo service eucalyptus-nc [start|stop|restart]` (on the Node side)

Locations of some important files:

- Log files:
 - `/var/log/eucalyptus`
- Configuration files:
 - `/etc/eucalyptus`
- Database:
 - `/var/lib/eucalyptus/db`
- Keys
 - `/var/lib/eucalyptus`
 - `/var/lib/eucalyptus/.ssh`

Notes:

- Don't forget to source your `~/euca/eucarc` before running the client tools.

Links:

- [Eucalyptus Project Site \(forums, documentation, downloads\)](#)
- [Eucalyptus on Launchpad \(bugs, code\)](#)
- [Eucalyptus Troubleshooting \(1.5\)](#)
- [Register your cloud with RightScale](#)

Glossary

The Ubuntu Enterprise Cloud documentation uses terminology that might be unfamiliar to some readers. This page is intended to provide a glossary of such terms and acronyms.

- Cloud - A federated set of physical machines that offer computing resources through virtual machines, provisioned and recollected dynamically.
- Cloud Controller (CLC) - Eucalyptus component that provides the web UI (an https server on port 8443), and implements the Amazon EC2 API. There should be only one Cloud Controller in an installation of UEC. This service is provided by the Ubuntu *eucalyptus-cloud* package.
- Cluster - A collection of nodes, associated with a Cluster Controller. There can be more than one Cluster in an installation of UEC. Clusters are sometimes physically separate sets of nodes. (e.g. floor1, floor2, floor2).
- Cluster Controller (CC) - Eucalyptus component that manages collections of node resources. This service is provided by the Ubuntu *eucalyptus-cc* package.
- EBS - Elastic Block Storage.
- EC2 - Elastic Compute Cloud. Amazon's pay-by-the-hour, pay-by-the-gigabyte public cloud computing offering.
- EKI - Eucalyptus Kernel Image.
- EMI - Eucalyptus Machine Image.
- ERI - Eucalyptus Ramdisk Image.
- Eucalyptus - Elastic Utility Computing Architecture for Linking Your Programs To Useful Systems. An open source project originally from the University of California at Santa Barbara, now supported by Eucalyptus Systems, a Canonical Partner.
- Front-end - Physical machine hosting one (or more) of the high level Eucalyptus components (cloud, walrus, storage controller, cluster controller).
- Node - A node is a physical machine that's capable of running virtual machines, running a node controller. Within Ubuntu, this generally means that the CPU has VT extensions, and can run the KVM hypervisor.

Node Controller (NC) - Eucalyptus component that runs on nodes which host the virtual machines that comprise the cloud. This service is provided by the Ubuntu package *eucalyptus-nc*.

- S3 - Simple Storage Service. Amazon's pay-by-the-gigabyte persistent storage solution for EC2.
- Storage Controller (SC) - Eucalyptus component that manages dynamic block storage services (EBS). Each 'cluster' in a Eucalyptus installation can have its own Storage Controller. This component is provided by the 'eucalyptus-sc' package.
- UEC - Ubuntu Enterprise Cloud. Ubuntu's cloud computing solution, based on Eucalyptus.
- VM - Virtual Machine.
- VT - Virtualization Technology. An optional feature of some modern CPUs, allowing for accelerated virtual machine hosting.
- Walrus - Eucalyptus component that implements the Amazon S3 API, used for storing VM images and user storage using S3 bucket put/get abstractions.

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[Parent Page](#) [Page History](#)

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