Euca2ools User Guide

Euca2ools are command-line tools for interacting with Web services that export a REST/Query-based API compatible with Amazon EC2 and S3 services.The tools can be used with both Amazon's services and with installations of the Eucalyptus open-source cloud-computing infrastructure. The tools were inspired by command-line tools distributed by Amazon (api-tools and ami-tools) and largely accept the same options and environment variables. However, these tools were implemented from scratch in Python, relying on the Boto library and M2Crypto toolkit.

Summary of Features

- Query of availability zones (i.e. clusters in Eucalyptus)
- SSH key management (add, list, delete)
- VM management (start, list, stop, reboot, get console output)
- Security group management
- Volume and snapshot management (attach, list, detach, create, bundle, delete)
- Image management (bundle, upload, register, list, deregister)
- IP address management (allocate, associate, list, release)

Installation from source

Euca2ools can be installed from source or as a binary package (DEB or RPM). The latest source tarball and binary packages can be found here:

http://www.eucalyptus.com/download/eucalyptus

Please, download the correct package for your distribution or the tarball. Euca2ools are written in Python, relying on the Boto library and the M2Crypto cryptography and SSL toolkit. The acceptable versions for the dependencies are:

- Python 2.5 (dev) or higher
- Boto 1.9b or higher
- M2Crypto 0.20.2 or higher

In what follows substitute the desired version (e.g., 1.3.1) for $VERSION either manually or by setting a shell variable. For example

```
export VERSION="1.3.1"
```

You will need to download euca2ools-$VERSION-src-deps.tar.gz, which contains boto-1.9b.tar.gz and M2Crypto-0.20.2.tar.gz.

Build the dependencies and install as follows.

You will need to install python-dev, swig, help2man, and libssl-dev to build the following libraries.

- Download euca2ools-$VERSION.tar.gz and euca2ools-$VERSION-src-deps.tar.gz. Below, we will assume that these tarballs are located in the current directory.
- Install Boto

```
tar zvxf euca2ools-$VERSION-src-deps.tar.gz
cd euca2ools-$VERSION-src-deps
tar zxvf boto-1.9b.tar.gz
cd boto-1.9b
sudo python setup.py install
cd ..
```

- Install M2Crypto

```
tar zxvf M2Crypto-0.20.2.tar.gz
cd M2Crypto-0.20.2
sudo python setup.py install
cd ..
```

- Install Euca2ools in /usr/local/bin, adding it to your $PATH, if necessary

```
cd ..
tar zxvf euca2ools-$VERSION.tar.gz
cd euca2ools-$VERSION
sudo make
export PATH=/usr/local/bin:$PATH  # not necessary on most installations
```

- Uninstalling

```
sudo make uninstall
```

You may also wish to delete euca2ools, boto and M2Crypto from your python package installation directory.

Installing Euca2ools on CentOS 5.5

This document shows you how to install Euca2ools 1.3 from RPM packages on Centos 5.5. In the following steps, the value of $VERSION must be substituted accordingly (e.g., as 1.2, 1.3.1, etc.). For example, we can set the value of 1.3.1 using bash:

```
export VERSION=1.3.1
```

In addition, the value of $ARCH must be substituted with appropriate architecture (64-bit: x86_64 or 32-bit: i386). For example, for a 64-bit installation:

```
export ARCH=x86_64
```

There are two options for downloading and installing the packages:

1. **Yum option**

   These packages are available from our yum repository. To use this option, create '/etc/yum.repos.d/euca.repo' file with the following four lines:

   ```
   [euca2ools]
   name=Euca2ools
   baseurl=http://www.eucalyptussoftware.com/downloads/repo/euca2ools/$VERSION/yum/centos/
   enabled=1
   ```

   Now install euca2ools

   ```
   yum install euca2ools.$ARCH --nogpgcheck
   ```

1. **Tarball option**

   Download the appropriate tarball from http://www.eucalyptus.com/download/eucalyptus

   Untar the bundle in a temporary location, install Python 2.5, and install euca2ools

   ```
   tar zxvf euca2ools-$VERSION-*.tar.gz
   cd euca2ools-$VERSION-*
   sudo -s
   yum install -y swig
   rpm -Uvh python25-2.5.1-bashton1.$ARCH.rpm python25-libs-2.5.1-bashton1.$ARCH.rpm euca2ools-$VERSION-*.$ARCH.rpm
   ```

   NOTE: please use '-Uvh' and not '-i'.

Installing Euca2ools on OpenSUSE 11.2

This document shows you how to install Euca2ools 1.3 from RPM packages on OpenSUSE 11.2. In the following steps, the value of $VERSION must be substituted accordingly (e.g., as 1.2, 1.3.1, etc.) for example we can set the value of 1.3.1 using bash:

```
export VERSION=1.3.1
```

There are two options for downloading and installing the packages:

1. **Zypper option**

   These packages are available from our repository. To use this option:

   ```
   zypper ar --refresh http://www.eucalyptussoftware.com/downloads/repo/euca2ools/$VERSION/yum/opensuse Euca2ools
   ```

   next, refresh the repository

   ```
   zypper refresh Euca2ools
   ```

   and answer "yes" to the question about trusting the packages:

   ```
   File 'repomd.xml' from repository 'Euca2ools' is unsigned, continue? [yes/no] (no): yes
   ```

   now install Euca2ools

   ```
   zypper install euca2ools
   ```

1. **Tarball option**

   Download the appropriate tarball for your architecture (64-bit: x86_64 or for 32-bit: i386) from http://www.eucalyptus.com/download/eucalyptus

   Untar the bundle in a temporary location, and install euca2ools

```
tar zxvf euca2ools-$VERSION-*.tar.gz
cd euca2ools-$VERSION-*
sudo -s
zypper install swig
rpm -Uvh  euca2ools-$VERSION-*.rpm
```

NOTE: please use '-Uvh' and not '-i'.

Installing Euca2ools on Fedora 12

This document shows you how to install Euca2ools 1.3 from RPM packages on Fedora 12. In the following steps, the value of $VERSION must be substituted accordingly (e.g., as 1.2, 1.3.1, etc.) for example we can set the value of 1.3.1 using bash:

```
export VERSION=1.3.1
```

In addition, the value of $ARCH must be substituted with appropriate architecture (64-bit: x86_64 or 32-bit: i386). For example, for a 64-bit installation:

```
export ARCH=x86_64
```

There are two options for downloading and installing the packages:

1. **Yum option**

   These packages are available from our yum repository. To use this option, create '/etc/yum.repos.d/euca.repo' file with the following four lines:

   ```
   [euca2ools]
   name=Euca2ools
   baseurl=http://www.eucalyptussoftware.com/downloads/repo/euca2ools/$VERSION/yum/fedora/
   enabled=1
   ```

   now install euca2ools

   ```
   yum install euca2ools.$ARCH --nogpgcheck
   ```

1. **Tarball option**

   Download the appropriate tarball from http://www.eucalyptus.com/download/eucalyptus

   Untar the bundle in a temporary location, and install euca2ools

   ```
   tar zxvf euca2ools-$VERSION-*.tar.gz
   cd euca2ools-$VERSION-*
   sudo -s
   yum install -y swig m2crypto
   rpm -Uvh euca2ools-$VERSION-*.$ARCH.rpm
   ```

   NOTE: please use '-Uvh' and not '-i'.

Installing Euca2ools on Debian Squeeze

This document shows you how to install Euca2ools from DEB packages on Debian squeeze. In the following steps, the value of $VERSION must be substituted accordingly (e.g., as 1.2, 1.3.1, etc.). For example, we can set the value of 1.3.1 using bash:

```
export VERSION=1.3.1
```

Download DEBs

There are two options for downloading the DEB packages:

1. **Remote repository option**

   DEB packages are available from our repository. To install them, add our repository to the list of repositories for your system to use. To do so, add somewhere in `/etc/apt/sources.list` file the following line:

   ```
   deb http://eucalyptussoftware.com/downloads/repo/euca2ools/$VERSION/debian squeeze main
   ```

1. **Tarball (local repository) option**

   Euca2ools DEB packages are also available in a single "tarball." Download the tarball from http://www.eucalyptus.com/download/eucalyptus

   Next, make sure that dpkg-dev is installed, unpack the tarball, and create the local repository:

   ```
   apt-get install dpkg-dev
   ```

```
tar zxvf euca2ools-$VERSION-squeeze.tar.gz
cd euca2ools-$VERSION-squeeze
dpkg-scanpackages . > Packages
```

Now add the appropriate directory for your architecture to your `sources.list` as root:

For 32-bit:

```
echo deb file://${PWD} ./dists/squeeze/main/binary-i386/ >> /etc/apt/sources.list
apt-get update
```

For 64-bit

```
echo deb file://${PWD} ./dists/squeeze/main/binary-amd64/ >> /etc/apt/sources.list
apt-get update
```

Install DEBs

To install Euca2ools, now run

```
apt-get update
apt-get install euca2ools python-boto
```

You will have to type "Y" if you see a warning like,

```
WARNING: The following packages cannot be authenticated!
...
Install these packages without verification [y/N]? y
```

After installation you may remove the entry from `sources.list` if you don't want to update Eucalyptus packages automatically.

Using Euca2ools Overview

Euca2ools use cryptographic credentials for authentication. Two types of credentials are issued by EC2- and S3-compatible services: x509 certificates and keys. While some commands only require the latter, it is best to always specify both types of credentials. Furthermore, unless the Web services reside on 'localhost', the URLs of the EC2- and S3-compatible service endpoints must also be specified.

The credentials and URLs can be specified via the command line option or by setting environment variables as follows:

Variable	Option	Explanation
EC2_URL	-U or --url [url]	http://host:8773/services/Eucalyptus or http://ec2.amazonaws.com or https://ec2.amazonaws.com:443
S3_URL	-U or --url [url]	http://host:8773/services/Walrus or http://s3.amazonaws.com or https://s3.amazonaws.com:443
EC2_ACCESS_KEY	-a or --access-key [key]	Access Key ID / Query ID
EC2_SECRET_KEY	-s or --secret-key [key]	Secret Access Key / Secret Key
EC2_CERT	-c or --cert [file]	user's PEM-encoded certificate
EC2_PRIVATE_KEY	-k or --privatekey [file]	user's PEM-encoded private key
EUCALYPTUS_CERT	--ec2cert_path [file]	OPTIONAL path to cloud cert

If you are running Euca2ools against Eucalyptus, sourcing the **eucarc** file that is included as part of the credentials zip-file that you downloaded from the Eucalyptus Web interface should be enough to set up all of the above variables correctly.

Commands start with `euca-` and typing `<command name> --help` will print a basic help message. In addition, running `man <command name>` will bring up a man page.

Image Management

In order to use run instances from images that you have created (or downloaded), you need to bundle the images with your cloud credentials, upload them and register them with the cloud. Following examples show how you would perform the necessary steps.

Bundling images

The examples here assume that you have sourced the **eucarc** config file obtained when you downloaded user credentials.

"euca-bundle-image" can be used to bundle an image for use with Eucalyptus or Amazon. A bundled image consists of a manifest file and several image parts.

For instance, to bundle an image "image.img" for user id "123456789111" in the directory "image-dir"

```
euca-bundle-image -i image.img -u 12345678111 -d image-dir
```

OR, if you wish to specify credentials separately ("cert-xyz.pem" and "pk-xyz.pem" are the user certificate and private key PEM files, respectively).

```
euca-bundle-image -i image.img -u 123456789111 -d image-dir -c cert-xyz.pem -k pk-xyz.pem
```

To bundle an image for use with Amazon, make sure you locate the Amazon ec2 cert file that is provided as part of the EC2 AMI tools. This file is generally located in $EC2_AMITOOL_HOME/etc/ec2/amitools/cert-ec2.pem

```
euca-bundle-image -i image.img -u 123456789111 -d image-dir -c cert-abc.pem -k pk-abc.pem --ec2cert $EC2_AMITOOL_HOME/etc/ec2/amitools/cert-ec2.pem
```

Make sure that the "cert-abc.pem" and "pk-abc.pem" files in the above example are your Amazon credentials (not your Eucalyptus credentials).

For more options, type,

```
euca-bundle-image --help
```

or refer to the manpage for "euca-bundle-image."

Uploading an image

To upload an image bundled with "euca-bundle-image" you can use "euca-upload-bundle."

For example, to upload the bundle corresponding to the manifest "image.img.manifest.xml" to the bucket "image-bucket," you would run the following command,

```
euca-upload-bundle -b image-bucket -m image.img.manifest.xml
```

For more options, type

```
euca-upload-bundle --help
```

or refer to the manpage for "euca-upload-bundle."

Registering an image

Bundle images that have been uploaded to the cloud need to be registered with the cloud prior to running instances.

For instance, to register a bundled image referenced by the manifest file "image.img.manifest.xml" that has been uploaded to the bucket "image-bucket" type the following command,

```
euca-register image-bucket/image.img.manifest.xml
```

For more options, refer to the manpage for "euca-register" or type,

```
euca-register --help
```

Downloading an image

Bundled images that have been uploaded may also be downloaded or deleted from the cloud.

For instance, to download the image(s) that have been uploaded to the bucket "image-bucket" you may use the following command,

```
euca-download-bundle -b image-bucket
```

For more options, type,

```
euca-download-bundle --help
```

Deleting a bundled image

To delete a bundled image, use "euca-delete-bundle."

For instance, to delete the images in bucket "image-bucket" you can use the following command,

```
euca-delete-bundle -b image-bucket
```

You can specify a manifest using the "-m" or "--manifest" argument if you wish to delete a specific bundle.

To delete the bucket after deleting the bundled image,

```
euca-delete-bundle -b image-bucket --clear
```

A bucket can only be deleted when it is empty.

For more options, type,

```
euca-delete-bundle --help
```

Unbundling an image

To unbundle a previously bundled image, use "euca-unbundle"

For instance, to unbundle the bundled image referenced by the manifest "image.img.manifest.xml" to the directory image-dir, use the following command,

```
euca-unbundle -m image.img.manifest.xml -d image-dir
```

For more options, try,

```
euca-unbundle --help
```

Networking and Security

You can assign IP address to instances dynamically, unassign addresses, create security groups and assign networking rules to security groups.

Allocating and associating IP addresses

You may use "euca-allocate-address" and "euca-associate-address" to allocate IP addresses and associate public IP addresses with instances, respectively.

In the following example, we will allocate an IP address and associate it with the instance "i-56785678".

```
euca-allocate-address
ADDRESS    a.b.c.d

euca-associate-address -i i-56785678 a.b.c.d
```

Disassociating and Releasing addresses

You may use "euca-disassociate-address" and "euca-release-address" to disassociate an IP address from an instance and to release the IP address to the global pool. For instance, to release and disassociate the address "a.b.c.d."

```
euca-disassociate-address a.b.c.d

euca-release-address a.b.c.d
```

Creating a security group

You can create a security group using the "euca-add-group" command. For instance, to create a group named "mygroup," you may use the following command,

```
euca-add-group -d "mygroup description" mygroup
```

Security groups may be specified when running instances with "euca-run-instances" using the "-g" parameter.

Adding networking rules to security groups

By default, a security group denies incoming network traffic from all sources. You may add networking related rules to security groups using the command "euca-authorize."

To see the entire list of options, type,

```
euca-authorize --help
```

For example, to allow incoming ssh (port 22) traffic to the security group "mygroup" you may use the following command, which specifies a protocol (tcp) a port (22) and a CIDR source network (0.0.0.0/0, which refers to any source):

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

Instead of specifying a CIDR source, you may instead specify another security group to allow access from:

```
euca-authorize --source-group someothergroup --source-group-user someotheruser -P tcp -p 22 mygroup
```

Revoking networking rules from security groups

Revocation works the same way as addition (i.e. the command takes the same parameters), except that you should use the "euca-

revoke"

```
euca-revoke -P tcp -p 22 -s 0.0.0.0/0 mygroup
```

```
euca-revoke --help
```

will list all options.

Deleting a security group

You may use "euca-delete-group" to delete a security group. For example,

```
euca-delete-group mygroup
```

will delete the security group "mygroup."

Using Block Storage

You can create dynamic block volumes, attach volumes to instances, detach volumes, deletes volumes, create snapshots from volumes and create volumes from snapshots with your cloud. Volumes are raw block devices. You can create a filesystem on top of an attached volume and mount the volume inside a VM instance as a block device. You can also create instantaneous snapshots from volumes and create volumes from snapshots.

Creating a volume

To create a dynamic block volume, use "euca-create-volume."

For instance, to create a volume that is 1GB in size in the availability zone "myzone" you may use the following command,

```
euca-create-volume --size 1 -z myzone
```

To list availability zones, you may use "euca-describe-availability-zones"

You may also create a volume from an existing snapshot. For example, to create a volume from the snapshot "snap-33453345" in the zone "myzone" try the following command,

```
euca-create-volume --snapshot snap-33453345 -z myzone
```

For more options, type,

```
euca-create-volume --help
```

Attaching a volume to an instance

You may attach block volumes to instances using "euca-attach-volume." You will need to specify the local block device name (this will be used inside the instance) and the instance identified. For instamce, to attach a volume "vol-33534456" to the instance "i-99838888" at "/dev/sdb" use the following command,

```
euca-attach-volume -i i-99838888 -d /dev/sdb vol-33534456
```

You can attach a volume to only one instance at a given time.

Detaching a volume

To detach a previously attached volume, use "euca-detach-volume." For example, to detach the volume "vol-33534456"

```
euca-detach-volume vol-33534456
```

You must detach a volume before terminating an instance or deleting a volume. If you fail to detach a volume, it may leave the volume in an inconsistent state and you risk losing data.

Delete a volume

To delete a volume, use "euca-delete-volume." For example, to delete the volume "vol-33534456" use the following command

```
euca-delete-volume vol-33534456
```

You may only delete volumes that are not currently attached to instances.

Creating a snapshot

You may create an instantaneous snapshot of a volume. A volume could be attached and in use during a snapshot operation. For example, to create a snapshot of the volume "vol-33534456" use the following command

```
euca-create-snapshot vol-33534456
```

Deleting a snapshot

To delete a snapshot, use "euca-delete-snapshot." For example, to delete the snapshot snap-33453345, use the following command,

```
euca-delete-snapshot snap-33453345
```

VM Control

A cloud will let users control virtual machine (VM) instances using uploaded images as a template. The following commands can be used to control VM instances.

Displaying instances currently running

You may use "euca-describe-instances," which will display a list of currently running instances.

```
euca-describe-instances
```

To get information about a specific instance, you can use the instance id as an argument to euca-describe-instances. For example,

```
euca-describe-instances i-43035890
```

For more options, type,

```
euca-describe-instances --help
```

Running instances

"euca-run-instances" will allow you to deploy VM instances of images that have been previously uploaded to the cloud.

For instance, to run an instance of the image with id "emi-53444344" with the kernel "eki-34323333" the ramdisk "eri-33344234" and the keypair "testkey" you can use the following command,

```
euca-run-instances -k testkey --kernel eki-34323333 --ramdisk eri-33344234 emi-53444344
```

To run more than one instances, you may use the "-n" or "--instance-count" option.

For more help, try,

```
euca-run-instances --help
```

or refer to the manpage for "euca-run-instances."

Shutting down instances

You may shutdown running instances using the "euca-terminate-instances" command. For example, to terminate an instance "i-34523332"

```
euca-terminate-instance i-34523332
```

For more options, type,

```
euca-terminate-instances --help
```

or refer to the manpage.

Rebooting instances

To reboot running instances, you can use "euca-reboot-instances." For example, to reboot the instance "i-34523332"

```
euca-reboot-instances i-34523332
```

A reboot will preserve the root filesystem for the instance across restarts.

Changelog

Version 1.3.1 (2010-09-03)

- Fixed image registration issue #629118.
- CentOS packages fixed and updated to correctly reference the python executable.

Version 1.3 (2010-08-24)

- Windows API support (bundle instance, describe bundle tasks, cancel bundle task, get password data).
- Updates spec file for Fedora packages.
- Updated bash completion rules.
- API refresh to support new command line options (including block device mappings, updates to euca-register).
- Support newer versions of dependencies.
- A number of bug fixes including :

```
#522398 #522396 #522396 #523332 #516738 #525137
#527477 #526697 #530296 #531076 #526591 #536876
#543221 #544706
```

Version 1.2 (2010-02-12)

- Support for bash completion of commands
- A number of bug fixes including:

```
#479823 #450044 #485106 #495618 #439366 #497495
#507840 #510982 #510982 #516486 #516738
```

Version 1.1 (2009-11-05)

- Addresses incompatibilities in some uncommon command line options
- A number of bug fixes including

```
#461301 #450044 #444747 #444105 #444097 #436950
#436947 #404951 #429010 #427367 #424212 #423500
#419583 #417937 #413735 #409732 #407710 #401225
#403244 #402670 #401172 #401222 #401190 #404951
#429010 #427367 #424212 #423500 #419583 #417937
#419583 #413735 #409732 #407710 #401225 #403244
#402670 #401172 #401222 #401190
```

- Addressed incompatibility in several command line options.
- Number of fixes for euca-bundle-vol
- euca-describe-availability-zones accepts "--region"
- Better error reporting for fault strings.
- Incorporated changes to debian rules from Steffen Moeller et al

Version 1.0 (2009-07-17)

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