**FOSS Field Trip: Eucalyptus**

**Brief History:**

Eucalyptus began as a University project in the MAYHEM labs of the Computer Science Dept. at [UC Santa Barbara](http://www.cs.ucsb.edu). The MAYHEM team's experience in Grid Computing, HPC, and massively scalable systems (Rich Wolski's team of NWS and EveryWare fame) made it the natural place for the birth of Eucalyptus. The name EUCALYPTUS is an acronym and stands for **E**lastic **U**tility **C**omputing **A**rchitecture for **L**inking **Y**our **P**rograms **T**o **U**seful **S**ystems. A brief description of this period can be read [here](http://www.cs.ucsb.edu/common/wordpress/?p=296). This is of course no coincidence as UCSB is a leading University in [Cloud Computing research](http://convergence.ucsb.edu/article/ahead-in-the-cloud). In 2009, the Eucalyptus team started a company (Eucalyptus Systems Inc.) to commercialize Eucalyptus. Currently there is Eucalyptus, the open source project, and Eucalyptus EE (Enterprise Edition), which is the commercial version of Eucalyptus.

**About Eucalyptus**

Eucalyptus is cloud computing which enables the creation of on-premise private clouds, with no requirements for retooling the organization's existing IT infrastructure or need to introduce specialized hardware. Eucalyptus implements an IaaS (Infrastructure as a Service) private cloud that is accessible via an API compatible with Amazon EC2 and [Amazon S3](http://docs.amazonwebservices.com/AmazonS3/latest/API/). For more information on our API see our [Developer's Corner](http://open.eucalyptus.com/participate/contribute#api). This compatibility allows any Eucalyptus cloud to be turned into a hybrid cloud, capable of drawing compute resources from public cloud. And Eucalyptus is compatible with a wealth of [tools](http://open.eucalyptus.com/wiki/ToolsEcosystem) and applications that also adhere to the de facto EC2 and S3 standards. Here are some of the characteristics that make Eucalyptus the most widely deployed cloud platform for the private (on-premise) cloud:

**Open Source**

Eucalyptus is open source: if you want to modify it, contribute to it, assess its security or just learn from it you can [download it](http://open.eucalyptus.com/download) and have the [source code](http://open.eucalyptus.com/participate/contribute/#source) at your fingertips. The Eucalyptus development process is in the open, as are bug reports, community contributions and [security advisories](http://open.eucalyptus.com/security).

**Modular**

Eucalyptus' design is modular. The [Eucalyptus components](http://open.eucalyptus.com/themes/eucalyptus/images/architecture-1.6.png) have well-defined interfaces (via WSDL, since they are web services) and thus can be easily swapped out for custom components.

**Distributed**

Eucalyptus allows its components to be installed strategically close to the needed/used resources. For example Walrus can be installed close to the storage, while the Cluster Controller can be installed close to the cluster it will manage.

**Designed to Perform**

Eucalyptus was designed from the ground up to be scalable and to achieve optimal performance in diverse environments (designed to overlay an existing infrastructure).

**Flexible**

Eucalyptus is flexible and can be installed on a very minimal setup. Yet it can be installed on thousands of cores and terabytes of storage. And it can do so as an overlay on top of an existing infrastructure.

**Compatible**

Eucalyptus is compatible with the most popular and widely used Cloud API currently available: Amazon EC2 and S3. Eucalyptus' design allows for any other API to be implemented, but to date no other real Cloud API contender is as complete and as requested as Amazon's.

**Hypervisor Agnostic**

Eucalyptus is designed to easily support most available and future hypervisors. Currently Eucalyptus fully supports KVM and Xen. Additionally, the Enterprise Edition supports the proprietary VMware hypervisor.

**Hybrid Cloud**

All of the above characteristics makes Eucalyptus easy to deploy as an hybrid cloud. An hybrid cloud combines resources drawn from multiple clouds, typically one private and one public. Eucalyptus compatibility with Amazon's EC2 API allows for a natural hybrid cloud with the biggest public cloud available.

**Eucalyptus API**

Eucalyptus supports the AWS APIs for EC2 and S3. If you wish to develop client tools against Eucalyptus, you may find the AWS documentation for these APIs a useful resource. Please note that since these APIs are constantly being updated, Eucalyptus may support a slightly older version of each API. Here are links to documentation for the AWS APIs currently supported by Eucalyptus:

EC2 API (2009-04-04)

S3 API

**Source code**

The best way to familiarize yourself with the development version of Eucalyptus is via our Nightly Builds. Here you will find versions of Eucalyptus development code that has passed our internal QA and are therefore easier to install, configure, and test.

You can find Eucalyptus code branches on Launchpad. This page contains stable releases of Eucalyptus (listed as Mature) and development branches of Eucalyptus (listed as Development) provided by both the Eucalyptus team and community developers. If you wish to contribute to Eucalyptus code, please confirm that you are using a branch provided by the Eucalyptus team.

Eucalyptus branches inside Launchpad use the Bazaar versioning control system. To work with Eucalyptus branches you must install Bazaar on your machine and create a local branch. For example, to create a local branch of the eucalyptus-devel (the official Eucalyptus development branch) enter the following:

bzr branch lp:eucalyptus/eucalyptus-devel

You can then operate on the local branch. For example you could check the last 10 commits log with:

bzr log -l 10 -n 0 eucalyptus-devel

**Contributing Code to Eucalyptus**

As a Eucalyptus code contributor, you will receive an issue tracker ID that lets you submit patches to our internal ticketing system (RT). Interactions with Eucalyptus will be conducted via the issue tracker.

1. Information Required with Patch Submission

Contributed patches must be generated against one of our official Eucalyptus code branches. When making your submission, please include the following information: the name and revision number of the branch to which the patch applies a brief summary of what the patch does details on how to test the patch (this allows us to create automatic regression tests for it) links to any bugs the patch addresses list of any new software dependencies, as well as their availability/status on the distributions we support.

1. Required Patch Properties

The patch itself must have the following characteristics:

must be generated using bzr diff against the current head of the branch

must apply cleanly to the targeted branch

must compile cleanly once applied

must be the original work of the contributor.

1. Patch "Life-cycle"

This is a summary of the patch "life-cycle":

The patch is submitted (following the above guidelines) and Eucalyptus support/development engineers initiate patch acceptance process and interaction with contributor;

The patch is checked for basic integration (apply cleanly, compile cleanly, obvious incompatibilities);

The patch receives closer inspection and is put through our internal QA system: This system runs tests on various architectures (32 and 64 bit) and various distributions we currently support (and plan to support);

If the patch shows regressions or integration problems, suggestions are made to the contributor on what failed and how to fix it, if possible. (Note that once a new version of the patch is submitted, the procedure will start from the beginning);

Specific tests are produced for the patch, and the patch is tested against them, to ensure behavior of the patch is correct for current and future branches;

If the patch is accepted, it is integrated into our development branch;

If the patch is not accepted, a report is issued explaining why it cannot be accepted, and guidelines are provided showing how to remedy the problem for subsequent patch acceptance.

These steps will be documented in RT and available for view at anytime. Community members can comment on patches in the Eucalyptus forum.