

Turning Months into Minutes with Eucalyptus

Whitepaper

Overview

One of the main advantages of using Eucalyptus as the core of a cloud-based IT management strategy is that it can streamline many operational procedures so that activities previously requiring months can be completed in minutes instead. Often as an application is developed and subsequently put into production, the process of provisioning the development infrastructure then later provisioning the production infrastructure and managing the transition between the two can be as or more time consuming as the coding of the application itself.

A fundamental property of Eucalyptus as a cloud computing model for IT is that application users (developers, administrators, etc.) can consider the automated deployment of a virtualized and isolated machine and network environment as part of the application itself. Similarly, if the application infrastructure footprint needs to expand or contract during its lifetime, Eucalyptus allows its users automatically to add pre-configured virtualized resources to the application or to remove them as needed. Thus, months in the application deployment timeline can be turned into minutes.

Eucalyptus also streamlines the technology procurement cycle by agglomerating heterogeneous sets of data center technologies to provide a unifying resource platform. Cloud “elasticity”—the ability for an application to draw dynamically from a resource pool—is enabled by a uniform resource model that can be implemented using a variety of hardware and software infrastructure components. The greater the degree to which the cloud platform can combine different hardware and software technologies, the greater the elasticity supported by the cloud.

Many proponents of cloud computing cite elasticity as a key enabler of user productivity and operational agility. Eucalyptus has been specifically designed to comprise diverse collections of infrastructure components as a way of maximizing available elasticity. Through this design it provides dual, reinforcing benefits. The additional elasticity it can achieve improves productivity and agility. At the same time it also streamlines technology lifecycle management by allowing new technologies to be combined with older ones in the same cloud. New technologies can be evaluated alongside proven ones. As the data center moves through its technology lifecycle, the cloud provides a stable, unifying platform for its users and applications. In this way, an on-premise cloud can turn months in the technology management schedule into minutes.

Speeding up Application Deployment and Management

One of the significant benefits that IT management can derive from adopting Eucalyptus as an application hosting environment is the increase in speed and precision with which applications can be deployed. Modern applications, particularly those that use web services, depend on a vast ecosystem of software dependencies to work properly. Moreover, applications are often developed for specific versions of these dependencies. In cases where backwards compatibility is not preserved, the application is “locked” to a specific version of a library or system function. Finally, these dependencies may, themselves, have interdependencies so that only a specific set is compatible with the application as it is developed. Retooling an application in response to dependency changes is a time-consuming, and often error-prone process. Thus, infrastructure maintainers often must plan for software upgrades and maintenance over the course of months or years.

Compared to a non-cloud environment, in a Eucalyptus cloud:

- Applications are embedded within a set of virtual machines, each of which contains the software ecosystem components necessary to run the application.
- Any persistent data that the application requires or maintains is accessed by the virtual machine through a set of scalable cloud storage facilities.
- Network interconnectivity between virtual machines, and between virtual machines and storage is isolated and private.
- Unforgeable credentials, issued to a “user,” enable control over security policy, as well as the ability to start, stop, and/or re-configure the virtual machines, storage, or networking components.

This collection of resources—virtual machines, storage, networking components, and access control rules—forms a “container” for the application that contains the system software, application-level software dependencies, libraries, and configuration necessary for the application to function. That is, the environment that the application requires is captured by a set of cloud resources, and the access control for those resources implements security policy based on cloud-issued credentials.

Because Eucalyptus users have the ability to control the application environment directly they can ensure that the software ecosystem required by the application is correct and that it accompanies the application itself whenever and wherever the application is run in the cloud. That is, the application user, developer, and/or administrator specifies the environment for the application to the cloud, rather than to the IT management staff and the cloud automatically ensures that the specified environment is present when the application is invoked. Since the user and/or developer “co-develops” the environment with the application, it can be more precisely deployed by the cloud than if this specification must be communicated to various members of the IT staff.

The container that captures the application environment is a set of virtualized data center resources (machines, storage, and network) and for this reason, the term “provisioning” is used to describe the process of setting up the application environment in the cloud. When users can specify and configure the resources that are to be provisioned, and then control that provisioning automatically without local IT intervention, the labor and time burden are drastically reduced.

Indeed, provisioning activities that may require months without Eucalyptus as meetings are scheduled, memos reviewed, etc., can be replaced by use of its automated provisioning capabilities requiring only minutes to complete.

Clouds, On-premise and Off

Notice that the potential benefits that derive from faster and more precise provisioning are independent of whether the cloud resources are “rented” from a third-party provider or are drawn from a Eucalyptus cloud operated by the local IT staff. Off-premise or “public” clouds offer the advantage that a remote, unseen IT staff has the responsibility for maintaining the physical resources that are used to implement the cloud platform.

However, the public cloud platform must be able to serve many customers with a variety of competing needs, at very large scales, while offering an inexpensive price point for each rental. These requirements result in public clouds that offer excellent commodity pricing for a relatively homogeneous set of virtualized resources and security policies. Porting an application to the offered commodity, however, can require extensive modifications, particularly with respect to security policy. As these policy changes are defined, reviewed, and ultimately built into the application’s ecosystem, some or all of the time savings from automated, self-service provisioning can be lost.

Alternatively, Eucalyptus can be tailored to the existing infrastructure so that the governance policies that are already present in the organization are used to manage it. That is, IT management specifies how the underlying physical resources are to be used and what policies the Eucalyptus platform must enforce to govern this usage and the platform becomes the instrument through which this management is implemented. By adapting to local infrastructure and infrastructure management practices, Eucalyptus can deliver the potential time saving benefits that come from precise automated provisioning.

Elasticity that Streamlines Technology Lifecycle Management

Eucalyptus also speeds the adoption of new technologies, and the sun-setting of old ones. The virtualized machines, storage, and network components supported by its implementation of the cloud model are abstractions that can be deployed across a wide variety of hardware and software technologies. By comprising a multitude of different hardware and software technologies and a similarly multitudinous number of different ways in which they can be configured, Eucalyptus offers the possibility of substantial time savings in terms of lifecycle management.

The key enabler of this flexibility is elasticity. An on-premise cloud that can map the cloud abstractions to the widest set of disparate infrastructure components offers the greatest elasticity. One often-reported benefit of elasticity is that users can request and release virtualized resources “on demand,” thereby providing the illusion of infinite scale to each user. In terms of time savings, however, heterogeneous elasticity allows IT staff to manage technologies at different points in their respective lifecycles within the same cloud. As new technologies are introduced, they can be evaluated alongside the older existing infrastructure components. Then, when a technology forward-shift takes place, and new technologies replace older ones, the cloud abstractions remain stable and precise.

Eucalyptus enables the shift of technology forward while maintaining a stable application environment, thus reducing technology planning and procurement times. With Eucalyptus installed and configured on evaluation hardware or new production hardware, the elasticity supported by the platform naturally ingresses these technologies into usage in a way that is controlled by the cloud administrator.

Similarly, as technologies are decommissioned, Eucalyptus shifts load to the resources that are available. Elasticity enables this flexibility while the cloud is in operation, and the quality of the implementation of the cloud abstractions across base technologies maintains application stability. Thus, months spent in planning, evaluations, and shift-over can be replaced by minutes as Eucalyptus uses elasticity to ingress and egress infrastructure components.

Eucalyptus: An On-premise Cloud Platform Designed for Maximum Elasticity

Eucalyptus is a scalable, open-source cloud platform designed for heterogeneous data center infrastructure. It implements fast, self-service provisioning using the industry-standard Amazon Web Services™ (AWS) APIs and cloud abstractions. For scalability, it combines fast transactional user response with eventually consistent resource management services using conservative status and update protocols.

By implementing machine, storage, network, and credential abstractions as an integrated platform, it is able to achieve the time-saving benefits that come from scalable, user-controlled provisioning. It is also designed to conform to locally defined infrastructure configurations and policy specifications within the data center. That is, its configuration and installation APIs permit it to be customized to the data center in which it is run. Finally, Eucalyptus is designed to be agnostic with respect to underlying hardware and software components and their various configurations. Thus, it is possible to run a single unifying Eucalyptus cloud spanning different physical machines, networks, operating systems, and hypervisors. This portability and independence from the underlying infrastructure maximizes the elasticity it can achieve.

Get Started with Eucalyptus

Visit www.eucalyptus.com and click on “Free Trial” so you can see how you can quickly benefit from cloud technology while getting the most efficient use from your existing IT infrastructure.

About Eucalyptus Systems

Eucalyptus Systems provides IT organizations in enterprises, government agencies and Web and mobile businesses with the most widely deployed **cloud software** platform for on-premise Infrastructure as a Service (IaaS). To date, over 25,000 Eucalyptus clouds have been started all over the world, including more than 20 percent of Fortune 100 companies. Eucalyptus is specifically designed for enterprise cloud use, and the software platform is uniquely suited for private cloud or hybrid cloud computing. Built as an **open source cloud** product, Eucalyptus supports the industry-standard **Amazon Web Services (AWS)** cloud APIs, as well as all major virtualization platforms including Xen, KVM and VMware vSphere, ESX and ESXi. The company has an active and growing ecosystem of customers, partners, developers, and researchers that benefit from Eucalyptus’ open, fast, and standards-compliant path to cloud computing. For more information about Eucalyptus, please visit www.eucalyptus.com.



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