



# Eucalyptus Cloud Administrator H8Q07S

The Eucalyptus Administrator course is aimed at administrators and operators of the Eucalyptus cloud platform.

<b>HPE course number</b>	H8Q07S
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<b>Course length</b>	3 days
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<b>Delivery mode</b>	ILT
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## Prerequisites

- LPIC or RHCSA equivalent is recommended
- Students should be comfortable with using a command line and have a working knowledge of server virtualization
- Students should also have familiarity with networking configuration, file systems and storage systems
- Prior knowledge of cloud computing and Amazon Web Services (AWS) is beneficial

## Course objectives

- Key architectural and functional concepts: the components and underlying architecture of Eucalyptus 4 as well as the basic functionality of the platform
- Installation and configuration: how to install and configure Eucalyptus 4 in a proof-of-concept environment
- Management and maintenance: managing entities and resources in the cloud, including basic usage, and performing other administrative functions on the platform

## Detailed course outline

<b>Module 1: Introduction to Eucalyptus &amp; Cloud</b>	<ul style="list-style-type: none"> <li>• The Definition of Cloud Computing</li> <li>• On-Demand</li> <li>• Broad Network Access</li> <li>• Resource Pooling</li> <li>• Rapid Elasticity</li> <li>• Measured Service</li> <li>• Programmatic Access</li> <li>• Service Models</li> <li>• Deployment Models</li> </ul>	<ul style="list-style-type: none"> <li>• Virtualization Enables Cloud</li> <li>• Virtualization vs. Cloud</li> <li>• Summary of Cloud Characteristics</li> <li>• Eucalyptus' Origins</li> <li>• Eucalyptus Defined</li> <li>• Amazon Web Services</li> <li>• Amazon Web Services Compatibility</li> <li>• Useful Links</li> </ul>
<b>Module 2: Eucalyptus Architecture</b>	<ul style="list-style-type: none"> <li>• Key Concepts</li> <li>• High Level Architecture</li> <li>• Cluster / Availability Zones (AZs)</li> <li>• Cloud Controller (CLC)</li> <li>• Object Storage Gateway (OSG)</li> <li>• User Facing Services (UFS)</li> <li>• Management Console</li> <li>• Storage Controller (SC)</li> </ul>	<ul style="list-style-type: none"> <li>• Cluster Controller (CC)</li> <li>• Node Controller (NC)</li> <li>• Deploying Eucalyptus—Host Placement</li> <li>• Deployment Scenario 1</li> <li>• Deployment Scenario 2</li> <li>• Deployment Scenario 3</li> <li>• Software Limits</li> </ul>
<b>Module 2a: Eucalyptus Services</b>	<ul style="list-style-type: none"> <li>• Services</li> <li>• Compute (EC2)</li> <li>• Object Storage (S3)</li> <li>• Auto Scaling</li> <li>• CloudWatch</li> </ul>	<ul style="list-style-type: none"> <li>• Elastic Load Balancing</li> <li>• IAM (Identity &amp; Access Management)</li> <li>• Tokens Service</li> <li>• DNS</li> <li>• Imaging Service</li> </ul>
<b>Module 3: Eucalyptus Installation</b>	<ul style="list-style-type: none"> <li>• Deployment Planning</li> <li>• Hardware &amp; OS</li> <li>• Prerequisites</li> <li>• Installation Methods—Packages</li> <li>• Installation Methods—Automation</li> <li>• Lab Installation</li> <li>• Installation &amp; Setup Procedure</li> <li>• Package Names</li> <li>• Installing the Cloud Controller and UFS</li> <li>• Installing the OSP and Cluster Components</li> <li>• Installing the Node Controller</li> <li>• Post-Installation Tasks</li> <li>• Configure Networking</li> <li>• Networking Parameters in eucalyptus.conf</li> <li>• Configuring Java</li> <li>• Configuring the Service Interface</li> <li>• Configuring the Cluster Controller</li> <li>• Configuring the Node Controller</li> </ul>	<ul style="list-style-type: none"> <li>• Starting &amp; Stopping</li> <li>• Start Services</li> <li>• Before Registering</li> <li>• Register Components</li> <li>• Register Nodes</li> <li>• Runtime Configuration</li> <li>• Download Credentials</li> <li>• Configure the Storage Controller</li> <li>• Configure the Object Storage Provider</li> <li>• Install Service VM Images</li> <li>• Verify Service State</li> <li>• Configure Limits</li> <li>• Configuring DNS</li> <li>• Configuring the Imaging Service</li> <li>• Configuring the Load Balancing Service</li> <li>• Verify Resources</li> <li>• Runtime Configuration—Further Examples</li> </ul>
<b>Module 3: Lab—Eucalyptus Installation</b>	<ul style="list-style-type: none"> <li>• Tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> </ul>

<b>Module 4: Eucalyptus Networking</b>	<ul style="list-style-type: none"> <li>• Networking Modes</li> <li>• Changes in 4.x</li> <li>• MANAGED and MANAGED-NOVLAN Logical Topology</li> <li>• MANAGED &amp; MANAGED-NOVLAN Physical Example</li> <li>• Edge Logical Topology</li> <li>• Edge Physical Example</li> <li>• Public and Private IP Addresses</li> <li>• IP Addressing—Example</li> <li>• Private Network Overlay</li> <li>• Private Network Configuration</li> <li>• MANAGED Mode VM Isolation</li> <li>• MANAGED—NOVLAN Mode VM Isolation</li> <li>• EDGE VM Isolation</li> <li>• MANAGED(-NOVLAN) Multi-Cluster—Single Physical Network</li> </ul>	<ul style="list-style-type: none"> <li>• MANAGED(-NOVLAN) Multi-Cluster—Two Physical Networks</li> <li>• EDGE Multi-Cluster—Single Physical Network</li> <li>• EDGE Multi-Cluster—Multiple Physical Network</li> <li>• MANAGED(-NOVLAN) Requirements</li> <li>• Edge Requirements</li> <li>• Choosing a Network Mode</li> <li>• Network Mode Configuration—MANAGED(-NOVLAN)</li> <li>• Network Configuration Example—MANAGED(-NOVLAN)</li> <li>• Network Mode Configuration—Edge</li> <li>• Network Mode Example—Edge</li> <li>• Edge Implementation</li> <li>• Reloading Network State—Edge</li> </ul>
<b>Module 4: Lab—Eucalyptus Networking</b>	<ul style="list-style-type: none"> <li>• Tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> </ul>
<b>Module 5: Eucalyptus Block Store</b>	<ul style="list-style-type: none"> <li>• Eucalyptus Block Store (Overview)</li> <li>• EBS Use Cases</li> <li>• Characteristics</li> <li>• Provisioning EBS Volumes</li> <li>• EBS Snapshots</li> <li>• Snapshot Use Cases</li> <li>• Snapshot Provision</li> <li>• EBS—The Underlying Technology</li> <li>• Volume Creation (DAS)</li> <li>• Volume Attachment</li> <li>• SAN-based Volume Creation &amp; Attach</li> <li>• Device Pass-through</li> </ul>	<ul style="list-style-type: none"> <li>• EBS Usage</li> <li>• Snapshots—How They Work</li> <li>• EBS Snapshot Operations</li> <li>• EBS Snapshots &amp; SANs</li> <li>• EBS Snapshot Provision</li> <li>• Configuring the Storage Controller</li> <li>• Choosing a Storage Backend</li> <li>• Storage Properties</li> <li>• Storage Backends</li> <li>• Best Practices</li> <li>• Storage Networking</li> <li>• Management</li> </ul>
<b>Module 5: Lab—Eucalyptus Block Storage</b>	<ul style="list-style-type: none"> <li>• Tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> </ul>
<b>Module 6: Eucalyptus Object Storage</b>	<ul style="list-style-type: none"> <li>• Object Storage Overview</li> <li>• Eucalyptus Object Storage</li> <li>• Object Storage Use Cases</li> <li>• Features &amp; Characteristics</li> <li>• Using Object Storage</li> <li>• Eucalyptus Object Storage Technology</li> <li>• Eucalyptus OSG</li> <li>• Eucalyptus OSP</li> </ul>	<ul style="list-style-type: none"> <li>• Eucalyptus OSG Operation—RiakCS</li> <li>• Eucalyptus OSG Operation—Walrus</li> <li>• Configuring Object Storage</li> <li>• Registering Components</li> <li>• Configure Provider Parameters (RiakCS)</li> <li>• Best Practices</li> <li>• Resource Limits</li> <li>• Detailed Architecture</li> </ul>
<b>Module 6: Lab—Eucalyptus Object Storage</b>	<ul style="list-style-type: none"> <li>• Tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> </ul>
<b>Module 7: Identity &amp; Access Management (IAM)</b>	<ul style="list-style-type: none"> <li>• Eucalyptus IAM</li> <li>• Concepts</li> <li>• Detailed Concepts</li> <li>• Accounts</li> <li>• Account structure</li> <li>• Account Administration</li> <li>• Users</li> <li>• Groups</li> <li>• Eucalyptus Account—The Special(s)</li> <li>• Special Powers</li> </ul>	<ul style="list-style-type: none"> <li>• Creating &amp; Deleting Accounts</li> <li>• Managing Groups</li> <li>• Managing Users</li> <li>• Credentials</li> <li>• Paths</li> <li>• Eucalyptus Resource Names</li> <li>• Components of Eucalyptus Resource Names</li> <li>• IAM and S3 ERN Examples</li> <li>• EC2 ERN Examples</li> </ul>

<b>Module 7: Lab—Eucalyptus IAM</b>	<ul style="list-style-type: none"> <li>• Tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> </ul>
<b>Module 8: Eucalyptus Tools</b>	<ul style="list-style-type: none"> <li>• euca2ools</li> <li>• Supported Services</li> <li>• Installing euca2ools</li> <li>• Configuring euca2ools</li> <li>• Order of Precedence</li> <li>• User Credentials</li> <li>• Multi-cloud Access</li> </ul>	<ul style="list-style-type: none"> <li>• Multi-cloud Access—Use Case Example</li> <li>• euca2ools.ini—User Configuration</li> <li>• euca2ools.ini—Region Configuration</li> <li>• Interacting with Multiple Clouds</li> <li>• Administrator Actions</li> <li>• Eucalyptus Admin Tools</li> <li>• Eucalyptus Admin Tools—Examples</li> </ul>
<b>Module 8: Lab—Eucalyptus Tools (euca2ools)</b>	<ul style="list-style-type: none"> <li>• Tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> </ul>
<b>Module 9: Eucalyptus Management Console</b>	<ul style="list-style-type: none"> <li>• Management Console Overview</li> <li>• Installing the Management Console</li> <li>• Configuring the Management Console</li> <li>• Optional Configuration</li> <li>• Starting the Management Console</li> </ul>	<ul style="list-style-type: none"> <li>• Login &amp; Use</li> <li>• Configuring SSL</li> <li>• Load Balancing Multiple Consoles</li> <li>• Performance Optimisation</li> <li>• Login Profile</li> </ul>
<b>Module 9: Lab—Eucalyptus Management Console</b>	<ul style="list-style-type: none"> <li>• Tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> </ul>
<b>Module 10: Images &amp; Instances</b>	<ul style="list-style-type: none"> <li>• Eucalyptus Machine Images (EMIs)</li> <li>• Image Characteristics</li> <li>• Image Format</li> <li>• Image Format Ingress</li> <li>• Launching Instances</li> <li>• Instance Store &amp; EBS-backed</li> <li>• Images—Administrative Considerations</li> <li>• Image Conversion</li> <li>• Imaging Service</li> <li>• Imaging Worker</li> <li>• Creating &amp; Importing Images</li> <li>• Image Registration</li> <li>• Launch Permissions</li> <li>• Cloud Properties</li> <li>• Instance Types</li> </ul>	<ul style="list-style-type: none"> <li>• Ephemeral Storage</li> <li>• Instances</li> <li>• Instance Creation</li> <li>• Instance Artifacts</li> <li>• Running Instances</li> <li>• Controlling Instances</li> <li>• Node Controller Storage</li> <li>• Overcommit</li> <li>• Node Controller Configuration</li> <li>• Instance Configuration</li> <li>• Eucalyptus Metadata Service</li> <li>• Accessing Metadata</li> <li>• Metadata Keys</li> <li>• User Data</li> </ul>
<b>Module 10: Lab—Images &amp; Instances</b>	<ul style="list-style-type: none"> <li>• Tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> </ul>
<b>Module 11: Instance Security</b>	<ul style="list-style-type: none"> <li>• Instance Security</li> <li>• Security Groups</li> <li>• Security Group Characteristics</li> <li>• Security Group Defaults</li> <li>• Security Group Management</li> <li>• Manipulating Security Groups</li> </ul>	<ul style="list-style-type: none"> <li>• Keypairs</li> <li>• Keypairs with Linux</li> <li>• Keypair Retrieval in Linux</li> <li>• Keypairs with Windows</li> <li>• Security Best Practices</li> </ul>
<b>Module 11: Lab—Instance Security</b>	<ul style="list-style-type: none"> <li>• Tasks</li> <li>• Access Management Controls</li> <li>• IAM Policies</li> <li>• Why use Policies?</li> <li>• IAM Policy Components</li> <li>• Policy Document</li> <li>• Policy Document Example</li> <li>• ARNs, Paths and Policy Scope</li> <li>• Permissions Evaluation</li> <li>• Policy Generation</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions</li> <li>• Managing Policies</li> <li>• Cluster Policies</li> <li>• Quotas</li> <li>• Quota Policy</li> <li>• Quota Keys</li> <li>• Quota Evaluation</li> <li>• Roles</li> <li>• Why use Roles?</li> <li>• Roles &amp; Instance Profiles</li> </ul>

## Course data sheet

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### Module 12: —Permissions

- Access Management Controls
- IAM Policies
- Why use Policies?
- IAM Policy Components
- Policy Document
- Policy Document Example
- ARNs, Paths and Policy Scope
- Permissions Evaluation
- Policy Generation
- Managing Policies
- Cluster Policies
- Quotas
- Quota Policy
- Quota Keys
- Quota Evaluation
- Roles
- Why use Roles?
- Roles & Instance Profiles

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### Module 12: Lab—Permissions

- Tasks
- Solutions

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### Module 13: Reporting

- Reporting
- Reporting Architecture
- Data Warehouse (Bodega)
- Exporting Data from the CLC
- Importing Data & Generating a Report

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### Module 13: Lab—Eucalyptus Reporting

- Tasks
- Solutions

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### Module 14: Logging & Troubleshooting

- Logging
- Log Rotation
- Fault Logs
- Interrogating System State
- Audit Logging
- Tracing Activity
- Tracing an Instance Launch
- Debugging Servos
- Troubleshooting Image Conversion
- Worker Time Sync
- Component Connectivity
- Sosreports
- Triage Tips
- Functional Testing

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### Module 14: Lab—Eucalyptus Troubleshooting

- Tasks
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