CloudStack Release Notes
Documentation

Release 4.4.1

Apache CloudStack

November 29, 2014
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This document contains information specific to this release of CloudStack, including upgrade instructions from prior releases, new features added to CloudStack, API changes, and issues fixed in the release. For installation instructions, please see the CloudStack Installation Guide. For usage and administration instructions, please see the CloudStack Administrator’s Guide.

Contents:
CHAPTER 1

What's New in 4.4

CloudStack 4.4.1 is a bugfix release and does not add new features to 4.4. Here is the list of new features and improvements introduce in 4.4:

- Java version upgraded to Java 1.7
- Support managed storage for root disks
- Root disk resize
- Per primary Storage OverProvisioning
- VMWare Support for DRS
- Region wide Guest networks and VPC
- Virtual Router Service Failure Alerting
- Distributed routing and network ACL with OVS plug-in
- Hyper-V support improvements
  - Zone Wide Primary Store in Hyper-V
  - VPC support on Hyper-V
  - Storage Live-Migration support for Hyper-V

1.1 Java version upgraded to Java 1.7

Apache CloudStack 4.4 is now using Java 1.7 for the management-server, cloudstack-usage, kvm agent and in system-VMs.

1.2 Support managed storage for root disks

Use of Primary Storage Plug-in for Root disks. See Configuring a Storage Plug-in

Supported hypervisors: XenServer, VMware

1.3 Root disk resize

Allow Root disk resize which remove need to have multiple templates of the same Operating System for different disk size.

Supported hypervisor: KVM
Link Root resize Functional spec
1.4 Per primary Storage Over Provisioning

Added per Primary Storage `storage.overprovisioning.factor` setting to oversee the Global Settings value.

- admin can update an existing primary store by setting `storage.overprovisioning.factor` in the per primary setting.
- This value will override the value at the global level. This leverages the granularity of global parameters introduced in 4.2
- To fall back to the global value, null value can be passed.
- To disable overprovision a value of 1 will be passed.

```
<table>
<thead>
<tr>
<th>Supported hypervisor</th>
<th>KVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>link</td>
<td>Storage Over Prov. Functional spec</td>
</tr>
</tbody>
</table>
```

1.5 VMWare Support for DRS

VMware DRS(Distributed Resource Scheduler), VM HA(High Availability): Provide highly available resources to your workloads. Balance workloads for optimal performance. Scale and manage computing resources without service disruption.

- **Load Balancing**: distribution and usage of CPU and memory resources for all hosts and VMs in the cluster are continuously monitored and compared to ideal resource utilization given the attributes of the cluster’s resource pools and VMs, the current demand, and the imbalance target. It then performs (or recommends) virtual machine migrations accordingly. Also, when a VM is powered on in the cluster, DRS attempts to maintain proper load balancing by either placing the VM on an appropriate host or making a recommendation.

- **Power Management**: When the vSphere Distributed Power Management (DPM) feature is enabled, DRS compares cluster- and host-level capacity to the demands of the cluster’s VMs, including recent historical demand. It places (or recommends placing) hosts in standby power mode if sufficient excess capacity is found or powering on hosts if capacity is needed. Depending on the resulting host power state recommendations, VMs might need to be migrated to and from the hosts as well.

- **Affinity Rules**: control the placement of virtual machines on hosts within a cluster, by assigning affinity rules

```
<table>
<thead>
<tr>
<th>Supported hypervisors</th>
<th>VMware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link</td>
<td>DRS functional spec</td>
</tr>
</tbody>
</table>
```

1.6 Region wide Guest networks and VPC

Region level Guest networks and VPC deployment. Allowing VPC tiers and guest networks accessibility across zones.

```
<table>
<thead>
<tr>
<th>Supported hypervisors</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link</td>
<td>VPC region functional spec</td>
</tr>
</tbody>
</table>
```
1.7 Virtual Router Service Failure Alerting

Send failure alerts to management server to notify admins using Monitoring VR services introduced in CloudStack 4.3.

<table>
<thead>
<tr>
<th>Supported hypervisors:</th>
<th>xenserver, kvm, vmware</th>
</tr>
</thead>
<tbody>
<tr>
<td>VR failure alerting functional spec</td>
<td></td>
</tr>
</tbody>
</table>

1.8 Distributed routing and network ACL with OVS plug-in

Support distributed routing and network ACL with OVS plug-in.

<table>
<thead>
<tr>
<th>Supported hypervisors:</th>
<th>xenserver, kvm, vmware</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLOUDSTACK-6161</td>
<td></td>
</tr>
</tbody>
</table>

1.9 Hyper-V support improvements

1.9.1 Zone Wide Primary Store in Hyper-V

SMB share as zone wide primary storage.

<table>
<thead>
<tr>
<th>Supported hypervisors:</th>
<th>Hyper-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper-V zone wide storage functional spec</td>
<td></td>
</tr>
</tbody>
</table>

1.9.2 VPC support on Hyper-V

Provide VPC capability on Hyper-V hypervisor.

<table>
<thead>
<tr>
<th>Supported hypervisors:</th>
<th>Hyper-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPC support on Hyper-V functional spec</td>
<td></td>
</tr>
</tbody>
</table>

1.9.3 Storage Live-Migration support for Hyper-V

Hyper-V 2012 R2 allows migration of volumes (virtual disks) of a virtual machine from one storage to another, while the virtual machine continues to run. It also allows live migration of a virtual machine and its volumes to another host and storage without any downtime.

The intend of this feature is to enable support of live migration of a virtual machines with its volumes across hosts and storage pools. It'll also migration of volumes across storage pools while the volume stays attached to a running virtual machine.

<table>
<thead>
<tr>
<th>Supported hypervisors:</th>
<th>Hyper-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper-V storage motion functional spec</td>
<td></td>
</tr>
</tbody>
</table>
Issues Fixed in 4.4.1

Apache CloudStack uses Jira to track its issues. All new features and bugs for 4.4.1 have been tracked in Jira, and have a standard naming convention of “CLOUDSTACK-NNNN” where “NNNN” is the issue number.

For the list of issues fixed, see Issues Fixed in 4.4.1.
<table>
<thead>
<tr>
<th>Bug ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLOUDSTACK-7624</td>
<td>Long hostnames cause CloudStack to die with an encryption error during startup...</td>
</tr>
<tr>
<td>CLOUDSTACK-7538</td>
<td>Can not remove the vm nic due to there is another vm with same internal ip havin...</td>
</tr>
<tr>
<td>CLOUDSTACK-7528</td>
<td>When AlertManager fails to sendAlert it does not log the actual issue/error...</td>
</tr>
<tr>
<td>CLOUDSTACK-7468</td>
<td>NetScaler SSL Termination does not handle Projects as expected...</td>
</tr>
<tr>
<td>CLOUDSTACK-7357</td>
<td>CLONE - Failed to stop VPC router with NPE...</td>
</tr>
<tr>
<td>CLOUDSTACK-7356</td>
<td>CLONE - NPE XenServerGuru.java:95 when remove the nic from the vm in Stopped sta...</td>
</tr>
<tr>
<td>CLOUDSTACK-7340</td>
<td>Instances unable to reach internet using SG provider and KVM...</td>
</tr>
<tr>
<td>CLOUDSTACK-7309</td>
<td>NPE when project was already deleted...</td>
</tr>
<tr>
<td>CLOUDSTACK-7257</td>
<td>CLONE - system VM not coming up in LXC zone for rhel 6.x ...</td>
</tr>
<tr>
<td>CLOUDSTACK-7225</td>
<td>SystemVM paused in a new 4.4.0 installation...</td>
</tr>
<tr>
<td>CLOUDSTACK-7193</td>
<td>Cannot display Cluster Settings after 4.4 Upgrade...</td>
</tr>
<tr>
<td>CLOUDSTACK-7192</td>
<td>Rebooting a VM doesn’t update iptables rules...</td>
</tr>
<tr>
<td>CLOUDSTACK-7140</td>
<td>Upgrade 4.2.1 -&gt; 4.4.0rc2...</td>
</tr>
<tr>
<td>CLOUDSTACK-7006</td>
<td>Template ID is missing in ROOT volume usages...</td>
</tr>
<tr>
<td>CLOUDSTACK-6892</td>
<td>Database HA Config prevents mgmt server from starting...</td>
</tr>
<tr>
<td>CLOUDSTACK-6886</td>
<td>Cannot add SDX Netscaler device...</td>
</tr>
<tr>
<td>CLOUDSTACK-6358</td>
<td>Remove hardcoded guest OS mappings...</td>
</tr>
<tr>
<td>CLOUDSTACK-6323</td>
<td>GetUser API always returns admin info...</td>
</tr>
<tr>
<td>CLOUDSTACK-6099</td>
<td>live migration is failing for vm deployed using dynamic compute offerings with NP...</td>
</tr>
<tr>
<td>CLOUDSTACK-6039</td>
<td>systemvm template for VMWare with jre7...</td>
</tr>
<tr>
<td>CLOUDSTACK-4770</td>
<td>Management server fails to start with “Unable to get the management server node”...</td>
</tr>
<tr>
<td>CLOUDSTACK-1632</td>
<td>Mistakes in authorizeSecurityGroup* API docs...</td>
</tr>
<tr>
<td>CLOUDSTACK-401</td>
<td>Storage options missing from table...</td>
</tr>
</tbody>
</table>
3.1 Supported OS Versions for Management Server

This section lists the operating systems that are supported for running CloudStack Management Server. Note that specific versions of the operating systems are tested, so compatibility with CentOS 6.3 may not indicate compatibility with CentOS 6.2, 6.1 and so on.

- RHEL versions 5.5, 6.2, 6.3, and 6.4
- CentOS versions 6.3, 6.4 and 6.5
- Ubuntu 12.04 LTS

3.2 Supported Hypervisor Versions

CloudStack supports three hypervisor families, XenServer with XAPI, KVM, and VMware with vSphere.

- Windows Server 2012 R2 (with Hyper-V Role enabled)
- Hyper-V 2012 R2
- CentOS 6.2 with KVM
- Red Hat Enterprise Linux 6.2 with KVM
- XenServer 6.0.2 (with Hotfix)
- XenServer versions 6.1 and 6.2 SPI with latest hotfixes
- VMware versions 5.0, 5.1, and 5.5
- Bare metal hosts are supported, which have no hypervisor. These hosts can run the following operating systems:
  - RHEL or CentOS, v6.2 or 6.3
  
  **Note:** Use libvirt version 0.9.10 for CentOS 6.3

  - Fedora 17
  - Ubuntu 12.04

For more information, see the Hypervisor Compatibility Matrix in the CloudStack Installation Guide.
3.3 Supported External Devices

- Netscaler VPX and MPX versions 9.3 and 10.e
- Netscaler SDX version 9.3
- SRX (Model srx100b) versions 10.3 or higher
- F5 10.1.0 (Build 3341.1084)

3.4 Supported Browsers

The CloudStack Web-based UI should be compatible with any modern browser, but it’s possible that some browsers will not render portions of the UI reliably, depending on their support of Web standards. For best results, one of the following browsers recommended:

- Internet Explorer versions 10 and 11
- Firefox version 26 or lower
- Google Chrome version 31
- Safari 5
CHAPTER 4

API Changes Introduced in 4.4

4.1 API Changes Introduced in 4.4.1

updateSnapshotPolicy (Updates the snapshot policy.)

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>updateSnapshotPolicy</td>
<td>Request: New parameters: fordisplay (optional), id (optional)</td>
</tr>
<tr>
<td></td>
<td>Changed parameters: volumeid (old version - required, new version - optional)</td>
</tr>
<tr>
<td>listSnapshotPolicies</td>
<td>Response: New parameters: fordisplay</td>
</tr>
</tbody>
</table>

getUser

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>getUser</td>
<td>Request: New parameters: userapikey (required)</td>
</tr>
<tr>
<td></td>
<td>Removed parameters: apikey</td>
</tr>
</tbody>
</table>

listResourceDetails

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>listResourceDetails</td>
<td>Request: New parameters: value (optional)</td>
</tr>
</tbody>
</table>

createSnapshotPolicy

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>createSnapshotPolicy</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
</tbody>
</table>

uploadVolume

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>uploadVolume</td>
<td>Request: New parameters: diskofferingid (optional)</td>
</tr>
</tbody>
</table>

4.2 API Changes Introduced in 4.4.0
<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
</table>
| listNetworkACLs                         | **Request:** New parameters: fordisplay (optional)  
 **Response:** New parameters: fordisplay |
| reconnectHost                           | **Response:** New parameters: gpugroup(*)                                                                                                    |
| listNiciraNvpDeviceNetworks             | **Response:** New parameters: strechedl2subnet, zonesnetworkspans                                                                        |
| addNicToVirtualMachine                  | **Response:** New parameters: diskofferingid, diskofferingname, ostypeid, vgpu                                                               |
| listNetworkOfferings                    | **Response:** New parameters: supportsstrechedl2subnet                                                                                     |
| createVpnConnection                     | **Request:** New parameters: fordisplay (optional)  
 **Response:** New parameters: fordisplay     |
| listVolumes                             | **Request:** New parameters: diskofferingid (optional), displayvolume (optional)  
 **Response:** New parameters: chaininfo, isodisplaytext, isoid, isoname, templatedisplaytext, templateid, temptemplate- name |
| listLoadBalancers                       | **Request:** New parameters: fordisplay (optional)  
 **Response:** New parameters: fordisplay |
| importLdapUsers                         | **Request:** New parameters: account (optional)                                                                                           |

Continued on next page
### API Changes Introdued in 4.4.1

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
</table>
| **listLoadBalancerRuleInstances** | Request:  
New parameters: lbvmips (optional)  
Response:  
New parameters: lbvmipaddresses, loadbalancerruleinstance  
**Removed parameters:** id, account, cpunumber, cpuspeed, cpuspeed, created, details, diskioread, diskiowrite, diskkbsread, diskkbswrite, displayname, displayvm, domain, domainid, forvirtualnetwork, group, groupid, guestosid, haenable, hostid, hostname, hypervisor, instancename, isdynamicallyscalable, isodisplaytext, isoid, isoname, keypair, memory, name, networkkbsread, networkkbswrite, password, passwordenabled, project, projectid, publicip, publicipid, rootdeviceid, rootdevicetype, serviceofferingid, serviceofferingname, servicesstate, state, templatdisplaytext, templateid, templatename, zoneid, zonename, affinitygroup(*), nic(*), securitygroup(*), tags(*), jobid, jobstatus |
| **migrateVolume** | Response:  
New parameters: chaininfo, isodisplaytext, isoid, isoname, templatdisplaytext, templateid, templatename |
| **listAutoScaleVmGroups** | Request:  
New parameters: fordisplay (optional)  
Response:  
New parameters: fordisplay |
| **createNetwork** | Response:  
New parameters: strechedl2subnet, zonesnetworkspans |
| **enableAccount** | Response:  
New parameters: groups |
| **listPublicIpAddresses** | Request:  
New parameters: fordisplay (optional)  
Response:  
New parameters: fordisplay |

---

**Table 4.1 – continued from previous page**

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
</table>
| **listLoadBalancerRuleInstances** | Request:  
New parameters: lbvmips (optional)  
Response:  
New parameters: lbvmipaddresses, loadbalancerruleinstance  
**Removed parameters:** id, account, cpunumber, cpuspeed, created, details, diskioread, diskiowrite, diskkbsread, diskkbswrite, displayname, displayvm, domain, domainid, forvirtualnetwork, group, groupid, guestosid, haenable, hostid, hostname, hypervisor, instancename, isdynamicallyscalable, isodisplaytext, isoid, isoname, keypair, memory, name, networkkbsread, networkkbswrite, password, passwordenabled, project, projectid, publicip, publicipid, rootdeviceid, rootdevicetype, serviceofferingid, serviceofferingname, servicesstate, state, templatdisplaytext, templateid, templatename, zoneid, zonename, affinitygroup(*), nic(*), securitygroup(*), tags(*), jobid, jobstatus |
| **migrateVolume** | Response:  
New parameters: chaininfo, isodisplaytext, isoid, isoname, templatdisplaytext, templateid, templatename |
| **listAutoScaleVmGroups** | Request:  
New parameters: fordisplay (optional)  
Response:  
New parameters: fordisplay |
| **createNetwork** | Response:  
New parameters: strechedl2subnet, zonesnetworkspans |
| **enableAccount** | Response:  
New parameters: groups |
| **listPublicIpAddresses** | Request:  
New parameters: fordisplay (optional)  
Response:  
New parameters: fordisplay |
<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>enableStorageMaintenance</td>
<td>Response: New parameters: overprovisionfactor</td>
</tr>
</tbody>
</table>
| listVpnGateways                          | Request:  
New parameters: fordisplay (optional)  
Response: New parameters: fordisplay |
| attachVolume                             | Response: New parameters: chaininfo, isodisplaytext, isoid, isoname,  
templatedisplaytext, templateid, templatename |
| updateVPCOffering                        | Response: New parameters: distributedvpcrouter, supportsvpc                  |
| resetSSHKeyForVirtualMachine             | Response: New parameters: diskofferingid, diskofferingname, ostypeid, vgpu   |
| updateVolume                             | Request: New parameters: chaininfo (optional), customid (optional)  
Response: New parameters: chaininfo, isodisplaytext, isoid, isoname,  
templatedisplaytext, templateid, templatename |
| listNetworks                              | Request: New parameters: displaynetwork (optional)  
Response: New parameters: strechedl2subnet, zonesnetworkspans |
| createAutoScaleVmProfile                 | Request: New parameters: fordisplay (optional)  
Response: New parameters: fordisplay |
| cancelHostMaintenance                    | Response: New parameters: gpugroup(*)                                         |
| updateServiceOffering                    | Response: New parameters: hypervisorsnapshotreserve, iscustomizediops, maxiops, miniops |

Continued on next page
<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>updateStoragePool</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: overprovisionfactor</td>
</tr>
<tr>
<td>addBaremetalHost</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: gpugroup(*)</td>
</tr>
<tr>
<td>resizeVolume</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>Changed parameters: id (old version - optional, new version - required)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: chaininfo, isodisplaytext, isoid, isoname, templatedisplaytext, templateid, templatename</td>
</tr>
<tr>
<td>createIpForwardingRule</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td>updateDiskOffering</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: cacheMode, hypervisorsnapshotreserve</td>
</tr>
<tr>
<td>listNetworkACLLists</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td>recoverVirtualMachine</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>listCapabilities</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: customdiskofferingmin-size</td>
</tr>
<tr>
<td>updateVPC</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: customid (optional), fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Changed parameters: name (old version - required, new version - optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: distributedvpcrouter, fordisplay, regionlevelvpc</td>
</tr>
<tr>
<td>updateAutoScaleVmProfile</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: customid (optional), fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
</tbody>
</table>

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Table 4.1 – continued from previous page

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>updatePortForwardingRule</td>
<td>Request: New parameters: id (required), customid (optional), fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>listPortForwardingRules</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>createLoadBalancer</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>cancelStorageMaintenance</td>
<td>Response: New parameters: overprovisionfactor</td>
</tr>
<tr>
<td>deployVirtualMachine</td>
<td>Request: New parameters: customid (optional), deploymentplanner (optional), rootdisksize (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>createNetworkACLList</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>createPortForwardingRule</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>createVPCOffering</td>
<td>Request: New parameters: servicecapabilitylist (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: distributedvpcrouter, supportsregionLevelvpc</td>
</tr>
<tr>
<td>createEgressFirewallRule</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>listUsageRecords</td>
<td>Response: New parameters: cpunumber, cpuspeed, memory</td>
</tr>
<tr>
<td>updateNetworkACLItem</td>
<td>Request: New parameters: customid (optional), fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>updateAccount</td>
<td>Response: New parameters: groups</td>
</tr>
<tr>
<td>listLBHealthCheckPolicies</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td>addHost</td>
<td>Response: New parameters: gpugroup(*)</td>
</tr>
<tr>
<td>createAutoScaleVmGroup</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>createLBHealthCheckPolicy</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td>updateHost</td>
<td>Response: New parameters: gpugroup(*)</td>
</tr>
<tr>
<td>lockAccount</td>
<td>Response: New parameters: groups</td>
</tr>
<tr>
<td>listDiskOfferings</td>
<td>Response: New parameters: cacheMode, hypervisor, snapshotshotreserve</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>detachVolume</td>
<td>New parameters: chaininfo, isodisplaytext, isoid, isoname, templatedisplaytext, templateid, template-name</td>
</tr>
<tr>
<td>updateLoadBalancerRule</td>
<td>Request: New parameters: customid (optional), fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>createVpnGateway</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>listF5LoadBalancerNetworks</td>
<td>Response: New parameters: strechedl2subnet, zones-networkspans</td>
</tr>
<tr>
<td>ldapCreateAccount</td>
<td>Response: New parameters: groups</td>
</tr>
<tr>
<td>listRemoteAccessVpns</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>disableAutoScaleVmGroup</td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>createAccount</td>
<td>Response: New parameters: groups</td>
</tr>
<tr>
<td>prepareHostForMaintenance</td>
<td>Response: New parameters: gpugroup(*)</td>
</tr>
<tr>
<td>attachIso</td>
<td>Response: New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>getUser</td>
<td>Request: New parameters: apikey (required)</td>
</tr>
<tr>
<td></td>
<td>Removed parameters: userapikey</td>
</tr>
<tr>
<td>listLoadBalancerRules</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>enableAutoScaleVmGroup</td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>listResourceDetails</td>
<td>Request: Changed parameters: resourceid (old version - required, new version - optional)</td>
</tr>
<tr>
<td>listPaloAltoFirewallNetworks</td>
<td>Response: New parameters: strechedl2subnet, zones-networkspans</td>
</tr>
<tr>
<td>restartNetwork</td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>rebootVirtualMachine</td>
<td>Response: New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>listLBStickinessPolicies</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td>listFirewallRules</td>
<td>Request: New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: fordisplay</td>
</tr>
<tr>
<td>updateVMAffinityGroup</td>
<td>Response: New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>listNics</td>
<td>Request: New parameters: fordisplay (optional), networkid (optional)</td>
</tr>
<tr>
<td></td>
<td>Response: New parameters: deviceid, virtualmachineid</td>
</tr>
<tr>
<td>createStoragePool</td>
<td>Response: New parameters: overprovisionfactor</td>
</tr>
<tr>
<td>listSrxFirewallNetworks</td>
<td>Response: New parameters: strechedl2subnet, zones-networkspans</td>
</tr>
</tbody>
</table>

Continued on next page
<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
</table>
| createServiceOffering     | **Request:** New parameters: customizediops (optional), hypervisorsnapshotreserve (optional), maxiops (optional), miniops optional  
                           | **Response:** New parameters: hypervisorsnapshotreserve, iscustomizediops, maxiops, miniops |
| removeNicFromVirtualMachine | **Response:** New parameters: diskofferingid, diskofferingname, ostypeid, vgpu |
| updateDefaultNicForVirtualMachine | **Response:** New parameters: diskofferingid, diskofferingname, ostypeid, vgpu |
| createNetworkACL          | **Request:** New parameters: fordisplay (optional)  
                           | **Response:** New parameters: fordisplay |
| createVPC                 | **Request:** New parameters: fordisplay (optional)  
                           | **Response:** New parameters: distributedvpcrouter, fordisplay, regionlevelvpc |
| listOsTypes               | **Response:** New parameters: isuserdefined |
| addResourceDetail         | **Request:** New parameters: fordisplay (optional)  
                           | **Response:** New parameters: gpugroup(*) |
| listExternalLoadBalancers | **Response:** New parameters: diskofferingid, diskofferingname, ostypeid, vgpu |
| resetPasswordForVirtualMachine | **Response:** New parameters: diskofferingid, diskofferingname, ostypeid, vgpu |
| createVolume              | **Request:** New parameters: customid (optional)  
                           | **Response:** New parameters: chaininfo, isodisplaytext, isoid, isoname, templatedisplaytext, templateid, templatename |

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<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>assignToLoadBalancerRule</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: vmidipmap (optional)</td>
</tr>
<tr>
<td></td>
<td>Changed parameters: virtualmachineids (old version - required, new version - optional)</td>
</tr>
<tr>
<td>changeServiceForVirtualMachine</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>listStoragePools</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: overprovisionfactor</td>
</tr>
<tr>
<td>resetVpnConnection</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td>startVirtualMachine</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: deploymentplanner (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>createRemoteAccessVpn</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td>detachIso</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
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<tr>
<td>associateIpAddress</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td>disableAccount</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: groups</td>
</tr>
<tr>
<td>migrateVirtualMachine</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>removeFromLoadBalancerRule</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: vmidipmap (optional)</td>
</tr>
<tr>
<td></td>
<td>Changed parameters: virtualmachineids (old version - required, new version - optional)</td>
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Table 4.1 – continued from previous page

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
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</thead>
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<td>listVPCs</td>
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</tr>
<tr>
<td></td>
<td>New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: distributedvpcrouter, fordisplay, regionlevelvpc</td>
</tr>
<tr>
<td>assignVirtualMachine</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>updateVirtualMachine</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: customid (optional), name (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>listServiceOfferings</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: hypervisorsnapshotreserve, iscustomizediops, maxiops, miniops</td>
</tr>
<tr>
<td>createLoadBalancerRule</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td>restoreVirtualMachine</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td>createNetworkOffering</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: supportsstrechedl2subnet</td>
</tr>
<tr>
<td>uploadVolume</td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: chaininfo, isodisplaytext, isoid, isoname, templatedisplaytext, templateid, templatename</td>
</tr>
<tr>
<td>listAutoScaleVmProfiles</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay (optional), serviceofferingid (optional), zoneid (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td>createLBStickinessPolicy</td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td>API</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td><strong>migrateVirtualMachineWithVolume</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td><strong>stopVirtualMachine</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td><strong>listAccounts</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: groups</td>
</tr>
<tr>
<td><strong>listIpForwardingRules</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td><strong>destroyVirtualMachine</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td><strong>updateNetwork</strong></td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: customid (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: strechedl2subnet, zonenetworkspans</td>
</tr>
<tr>
<td><strong>createDiskOffering</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: cacheMode, hypervisorsnapshotreserve</td>
</tr>
<tr>
<td><strong>listNetscalerLoadBalancerNetworks</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: strechedl2subnet, zonenetworkspans</td>
</tr>
<tr>
<td><strong>createFirewallRule</strong></td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: fordisplay</td>
</tr>
<tr>
<td><strong>revertToVMSnapshot</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
<tr>
<td><strong>markDefaultZoneForAccount</strong></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: groups</td>
</tr>
<tr>
<td><strong>listVirtualMachines</strong></td>
<td>Request:</td>
</tr>
<tr>
<td></td>
<td>New parameters: displayvm (optional), ids (optional), serviceofferingid (optional)</td>
</tr>
<tr>
<td></td>
<td>Response:</td>
</tr>
<tr>
<td></td>
<td>New parameters: diskofferingid, diskofferingname, ostypeid, vgpu</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>restartVPC</td>
<td>Response: New parameters: distributedvpcrouter, fordisplay, regionlevelvpc</td>
</tr>
<tr>
<td>listHosts</td>
<td>Response: New parameters: gpugroup(*)</td>
</tr>
<tr>
<td>listVPCOfferings</td>
<td>Response: New parameters: distributedvpcrouter, supportsregionLevelvpc</td>
</tr>
<tr>
<td>updateNetworkOffering</td>
<td>Response: New parameters: supportsstrechedl2subnet</td>
</tr>
<tr>
<td>findStoragePoolsForMigration</td>
<td>Response: New parameters: overprovisionfactor</td>
</tr>
</tbody>
</table>
CHAPTER 5

General Upgrade Notes

5.1 Depreciation of realhostip.com

The realhostip.com dynamic DNS resolution service is being retired on September 30th, 2014. In advance of that, CloudStack 4.4 and later no longer uses realhostip.com DNS domains or SSL certificates to encrypt Console Proxy or file copy communications.

For latest update about realhostip.com follow Apache CloudStack Blog.

5.2 Settings Changes

After upgrading to 4.2 and later, Settings mem.overprovisioning.factor and cpu.overprovisioning.factor are now at the cluster level and be set to 1 which is the default.

If Global Settings mem.overprovisioning.factor and cpu.overprovisioning.factor have been changed prior the upgrade to 4.2 and later, the upgrade process will be reset them to 1. Values can be changed by editing clusters settings.

All clusters created after the upgrade will get created with the Global Settings values for mem.overprovisioning.factor and cpu.overprovisioning.factor.

5.3 OVS plug-in

OVS plug-in functionality is disrupted if ovsdaemon crashes

A critical functionality issue came out with CLOUDSTACK-6779. On XenServer it is observed that on VIF unplug Ovs-Vswitchd is crashing resulting in loosing all the openflow rules added to the bridge. Ovs daemon gets started and creates a bridge but configure openflow rules are lost resulting in the disruption of connectivity for the VM’s on the host.

5.4 Active-Directory Authentication (LDAP)

If using Active-Directory (LDAP/LDAPs) as user authentication: Upgrading to 4.3 and later require changes in Global Settings. After upgrading CloudStack to 4.3 or latest, following Global Settings must be change:
### 5.5 SystemVM 32bit deprecated

32bit versions of systemvm templates are in the process of being deprecated. Upgrade instructions from this Release Notes use 64bit templates. 32bit systemvm-templates are available for this version on http://cloudstack.apt-get.eu/systemvm/4.4/. Follow the dev mailing list for further updates.

<table>
<thead>
<tr>
<th>Global Settings</th>
<th>Default</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>ldap.user.object</td>
<td>inetOrgPerson</td>
<td>user</td>
</tr>
<tr>
<td>ldap.username.attribute</td>
<td>uid</td>
<td>sAMAccountName</td>
</tr>
</tbody>
</table>
 Upgrade Instruction from 4.4.0

Any steps that are hypervisor-specific will be called out with a note.

We recommend reading through this section once or twice before beginning your upgrade procedure, and working through it on a test system before working on a production system.

**Note:** The following upgrade instructions should be performed regardless of hypervisor type.

Upgrade Steps:

1. Backup CloudStack database (MySQL)
2. Upgrade CloudStack management server(s)
3. Update hypervisors specific dependencies

### 6.1 Packages repository

Most users of CloudStack manage the installation and upgrades of CloudStack with one of Linux’s predominant package systems, RPM or APT. This guide assumes you’ll be using RPM and Yum (for Red Hat Enterprise Linux or CentOS), or APT and Debian packages (for Ubuntu).

Create RPM or Debian packages (as appropriate) and a repository from the 4.4 source, or check the Apache CloudStack downloads page at [http://cloudstack.apache.org/downloads.html](http://cloudstack.apache.org/downloads.html) for package repositories supplied by community members. You will need them for Management Server on Ubuntu or Management Server on CentOS/RHEL and **Hypervisor: KVM** hosts upgrade.

Instructions for creating packages from the CloudStack source are in the CloudStack Installation Guide.

### 6.2 Update System-VM templates

1. While running the existing 4.4.0 system, log in to the UI as root administrator.
2. In the left navigation bar, click Templates.
3. In Select view, click Templates.
4. Click Register template.
   
   The Register template dialog box is displayed.
5. In the Register template dialog box, specify the following values (do not change these):

<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer  | Name: systemvm-xenserver-4.4  
|            | Description: systemvm-xenserver-4.4  
|            | URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-xen.vhd.bz2  
|            | Zone: Choose the zone where this hypervisor is used  
|            | Hypervisor: XenServer  
|            | Format: VHD  
|            | OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
|            | Extractable: no  
|            | Password Enabled: no  
|            | Public: no  
|            | Featured: no  
|            | Routing: no |
| KVM        | Name: systemvm-kvm-4.4  
|            | Description: systemvm-kvm-4.4  
|            | URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-kvm.qcow2.bz2  
|            | Zone: Choose the zone where this hypervisor is used  
|            | Hypervisor: KVM  
|            | Format: QCOW2  
|            | OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
|            | Extractable: no  
|            | Password Enabled: no  
|            | Public: no  
|            | Featured: no  
|            | Routing: no |
| VMware     | Name: systemvm-vmware-4.4  
|            | Description: systemvm-vmware-4.4  
|            | URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-vmware.ova  
|            | Zone: Choose the zone where this hypervisor is used  
|            | Hypervisor: VMware  
|            | Format: OVA  
|            | OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
|            | Extractable: no  
|            | Password Enabled: no  
|            | Public: no  
|            | Featured: no  
|            | Routing: no |

6. Watch the screen to be sure that the template downloads successfully and enters the READY state. Do not proceed until this is successful.

### 6.3 Database Preparation

Backup current database

1. Stop your management server or servers. Run this on all management server hosts:
$ sudo service cloudstack-management stop

2. If you are running a usage server or usage servers, stop those as well:
   $ sudo service cloudstack-usage stop

3. Make a backup of your MySQL database. If you run into any issues or need to roll back the upgrade, this will assist in debugging or restoring your existing environment. You’ll be prompted for your password.
   $ mysqldump -u root -p cloud > cloud-backup_'date '+%Y-%m-%d''.sql
   $ mysqldump -u root -p cloud_usage > cloud_usage-backup_'date '+%Y-%m-%d''.sql

4. (KVM Only) If primary storage of type local storage is in use, the path for this storage needs to be verified to ensure it passes new validation. Check local storage by querying the cloud.storage_pool table:
   $ mysql -u cloud -p -e "select id,name,path from cloud.storage_pool where pool_type='Filesystem'"
   If local storage paths are found to have a trailing forward slash, remove it:
   $ mysql -u cloud -p -e 'update cloud.storage_pool set path="/var/lib/libvirt/images" where path="/var/lib/libvirt/images/"'

6.4 Management Server on Ubuntu

If you are using Ubuntu, follow this procedure to upgrade your packages. If not, skip to step Management Server on CentOS/RHEL.

Note: Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and APT repository, substitute your own URL for the ones used in these examples.

The first order of business will be to change the sources list for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

6.4.1 CloudStack apt repository

1. Update your apt package list:
   $ sudo apt-get update

2. Now that you have the repository configured, it’s time to upgrade the cloudstack-management package.
   $ sudo apt-get upgrade cloudstack-management

3. If you use CloudStack usage server
   $ sudo apt-get upgrade cloudstack-usage

6.5 Management Server on CentOS/RHEL

If you are using CentOS or RHEL, follow this procedure to upgrade your packages. If not, skip to hypervisors section, then System-VMs and Virtual-Routers.

Note: Community Packages: This section assumes you’re using the community supplied packages for CloudStack.
6.5.1 CloudStack RPM repository

1. Now that you have the repository configured, it’s time to upgrade the cloudstack-management.

   $ sudo yum upgrade cloudstack-management

2. If you use CloudStack usage server

   $ sudo yum upgrade cloudstack-usage

6.6 hypervisor: XenServer

(XenServer only) Copy vhd-utils file on CloudStack management servers. Copy the file vhd-utils to /usr/share/cloudstack-common/scripts/vm/hypervisor/xenserver.


6.7 hypervisor: VMware

Warning: For VMware hypervisor CloudStack management server packages must be build using “noredist”. Refer to Building from Source.

(VMware only) Additional steps are required for each VMware cluster. These steps will not affect running guests in the cloud. These steps are required only for clouds using VMware clusters:

1. Stop the Management Server:

   $ sudo service cloudstack-management stop

2. Generate the encrypted equivalent of your vCenter password:

   $ java -classpath /usr/share/cloudstack-common/lib/jasypt-1.9.0.jar org.jasypt.intf.cli.JasyptPBEStringEncryptionCLI encrypt.sh input="_your_vCenter_password_" password='"cat /etc/cloudstack/management/key"' verbose=false

   Store the output from this step, we need to add this in cluster_details table and vmware_data_center tables in place of the plain text password

3. Find the ID of the row of cluster_details table that you have to update:

   $ mysql -u <username> -p<password>

   select * from cloud.cluster_details;

4. Update the plain text password with the encrypted one

   update cloud.cluster_details set value = '_ciphertext_from_step_1_' where id = _id_from_step_2_

5. Confirm that the table is updated:
6. Find the ID of the correct row of `vmware_data_center` that you want to update

   ```sql
   select * from cloud.vmware_data_center;
   ```

7. Update the plain text password with the encrypted one:

   ```sql
   update cloud.vmware_data_center set password = '_ciphertext_from_step_1_' where id = _id_from_step_5_;  
   ```

8. Confirm that the table is updated:

   ```sql
   select * from cloud.vmware_data_center;
   ```

---

### 6.8 hypervisor: KVM

#### 6.8.1 KVM on Ubuntu

(KVM only) Additional steps are required for each KVM host. These steps will not affect running guests in the cloud. These steps are required only for clouds using KVM as hosts and only on the KVM hosts.

1. Configure the `CloudStack apt repository` as detailed above.
2. Stop the running agent.
   ```
   $ sudo service cloudstack-agent stop
   ```
3. Update the agent software.
   ```
   $ sudo apt-get upgrade cloudstack-agent
   ```
4. Verify that the file `/etc/cloudstack/agent/environment.properties` has a line that reads:
   ```
   paths.script=/usr/share/cloudstack-common
   ```
   If not, add the line.
5. Start the agent.
   ```
   $ sudo service cloudstack-agent start
   ```

#### 6.8.2 KVM on CentOS/RHEL

For KVM hosts, upgrade the `cloudstack-agent` package

1. Configure the `CloudStack RPM repository` as detailed above.
   ```
   $ sudo yum upgrade cloudstack-agent
   ```
2. Verify that the file `/etc/cloudstack/agent/environment.properties` has a line that reads:
   ```
   paths.script=/usr/share/cloudstack-common
   ```
   If not, add the line.
3. Restart the agent:
$ sudo service cloudstack-agent stop
$ sudo killall jsvc
$ sudo service cloudstack-agent start

6.9 Restart management services

1. If upgrading fresh installation of 4.4.0

   If you are upgrading fresh installation of CloudStack 4.4.0, the following MySQL command must be executed before restarting the management server. If the system was running pre 4.4 and then upgraded to 4.4.0, the MySQL command is not required. Refer to: CLOUDSTACK-7813

   ```
   use cloud;
   ALTER TABLE 'snapshot_policy' ADD 'display' TINYINT( 1 ) NOT NULL DEFAULT '1';
   ```

2. Now it’s time to start the management server

   $ sudo service cloudstack-management start

3. If you use it, start the usage server

   $ sudo service cloudstack-usage start

6.10 System-VMs and Virtual-Routers

Once you’ve upgraded the packages on your management servers, you’ll need to restart the system VMs. Ensure that the admin port is set to 8096 by using the “integration.api.port” global parameter. This port is used by the cloud-sysvmadm script at the end of the upgrade procedure. For information about how to set this parameter, see Setting Global Configuration Parameters in the Installation Guide. Changing this parameter will require management server restart. Also make sure port 8096 is open in your local host firewall to do this.

There is a script that will do this for you, all you need to do is run the script and supply the IP address for your MySQL instance and your MySQL credentials:

```bash
# nohup cloudstack-sysvmadm -d IPaddress -u cloud -p password -a > sysvm.log 2>&1 &
```

You can monitor the log for progress. The process of restarting the system VMs can take an hour or more.

```bash
# tail -f sysvm.log
```

The output to `sysvm.log` will look something like this:

Stopping and starting 1 secondary storage vm(s)...
Done stopping and starting secondary storage vm(s)
Stopping and starting 1 console proxy vm(s)...
Done stopping and starting console proxy vm(s).  
Stopping and starting 4 running routing vm(s)...  
Done restarting router(s).
Upgrade Instruction from 4.3.x

This section will guide you from CloudStack 4.3.x to CloudStack 4.4.

Any steps that are hypervisor-specific will be called out with a note.

We recommend reading through this section once or twice before beginning your upgrade procedure, and working through it on a test system before working on a production system.

**Note:** The following upgrade instructions should be performed regardless of hypervisor type.

Upgrade Steps:

1. Backup CloudStack database (MySQL)
2. Upgrade CloudStack management server(s)
3. Update hypervisors specific dependencies

### 7.1 Packages repository

Most users of CloudStack manage the installation and upgrades of CloudStack with one of Linux’s predominant package systems, RPM or APT. This guide assumes you’ll be using RPM and Yum (for Red Hat Enterprise Linux or CentOS), or APT and Debian packages (for Ubuntu).

Create RPM or Debian packages (as appropriate) and a repository from the 4.4 source, or check the Apache CloudStack downloads page at [http://cloudstack.apache.org/downloads.html](http://cloudstack.apache.org/downloads.html) for package repositories supplied by community members. You will need them for *Management Server on Ubuntu* or *Management Server on CentOS/RHEL* and *Hypervisor: KVM* hosts upgrade.

Instructions for creating packages from the CloudStack source are in the CloudStack Installation Guide.

### 7.2 Update System-VM templates

1. While running the existing 4.3.x system, log in to the UI as root administrator.
2. In the left navigation bar, click Templates.
3. In Select view, click Templates.
4. Click Register template.

The Register template dialog box is displayed.
5. In the Register template dialog box, specify the following values (do not change these):

<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer   | Name: systemvm-xenserver-4.4  
Description: systemvm-xenserver-4.4  
URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-xen.vhd.bz2  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: XenServer  
Format: VHD  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| KVM         | Name: systemvm-kvm-4.4  
Description: systemvm-kvm-4.4  
URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-kvm.qcow2.bz2  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: KVM  
Format: QCOW2  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| VMware      | Name: systemvm-vmware-4.4  
Description: systemvm-vmware-4.4  
URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-vmware.ova  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: VMware  
Format: OVA  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |

6. Watch the screen to be sure that the template downloads successfully and enters the READY state. Do not proceed until this is successful.

### 7.3 Database Preparation

Backup current database

1. Stop your management server or servers. Run this on all management server hosts:
2. If you are running a usage server or usage servers, stop those as well:

   $ sudo service cloudstack-usage stop

3. Make a backup of your MySQL database. If you run into any issues or need to roll back the upgrade, this will assist in debugging or restoring your existing environment. You’ll be prompted for your password.

   $ mysqldump -u root -p cloud > cloud-backup_'date '+%Y-%m-%d''.sql
   $ mysqldump -u root -p cloud_usage > cloud_usage-backup_'date '+%Y-%m-%d''.sql

4. (KVM Only) If primary storage of type local storage is in use, the path for this storage needs to be verified to ensure it passes new validation. Check local storage by querying the cloud.storage_pool table:

   $ mysql -u cloud -p -e "select id,name,path from cloud.storage_pool where pool_type='Filesystem'"

   If local storage paths are found to have a trailing forward slash, remove it:

   $ mysql -u cloud -p -e 'update cloud.storage_pool set path="/var/lib/libvirt/images" where path="/var/lib/libvirt/images/"

7.4 Management Server on Ubuntu

If you are using Ubuntu, follow this procedure to upgrade your packages. If not, skip to step Management Server on CentOS/RHEL.

Note: Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and APT repository, substitute your own URL for the ones used in these examples.

The first order of business will be to change the sources list for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

7.4.1 CloudStack apt repository

Start by opening /etc/apt/sources.list.d/cloudstack.list on any systems that have CloudStack packages installed.

This file should have one line, which contains:

deb http://cloudstack.apt-get.eu/ubuntu precise 4.3

We’ll change it to point to the new package repository:

deb http://cloudstack.apt-get.eu/ubuntu precise 4.4

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

1. Now update your apt package list:

   $ sudo apt-get update

2. Now that you have the repository configured, it’s time to upgrade the cloudstack-management package:

   $ sudo apt-get upgrade cloudstack-management
3. If you use CloudStack usage server
   
   $ sudo apt-get upgrade cloudstack-usage

### 7.5 Management Server on CentOS/RHEL

If you are using CentOS or RHEL, follow this procedure to upgrade your packages. If not, skip to hypervisors section, then *System-VMs and Virtual-Routers*.

---

**Note:** Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and yum repository, substitute your own URL for the ones used in these examples.

---

#### 7.5.1 CloudStack RPM repository

The first order of business will be to change the yum repository for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent.

(No changes should be necessary for hosts that are running VMware or Xen.)

Start by opening `/etc/yum.repos.d/cloudstack.repo` on any systems that have CloudStack packages installed.

This file should have content similar to the following:

```
[apache-cloudstack]
name=Apache CloudStack
baseurl=http://cloudstack.apt-get.eu/rhel/4.3/
enabled=1
gpgcheck=0
```

If you are using the community provided package repository, change the base url to `http://cloudstack.apt-get.eu/rhel/4.4/`.

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

1. Now that you have the repository configured, it’s time to upgrade the `cloudstack-management`.
   
   $ sudo yum upgrade cloudstack-management

2. If you use CloudStack usage server

   $ sudo yum upgrade cloudstack-usage

### 7.6 Hypervisor: XenServer

(XenServer only) Copy vhd-utils file on CloudStack management servers. Copy the file `vhd-utils` to `/usr/share/cloudstack-common/scripts/vm/hypervisor/xenserver`.

```
```
7.7 Hypervisor: VMware

**Warning:** For VMware hypervisor CloudStack management server packages must be build using "noredist". Refer to Building from Source.

(VMware only) Additional steps are required for each VMware cluster. These steps will not affect running guests in the cloud. These steps are required only for clouds using VMware clusters:

1. Stop the Management Server:
   
   `$ sudo service cloudstack-management stop`

2. Generate the encrypted equivalent of your vCenter password:
   
   `$ java -classpath /usr/share/cloudstack-common/lib/jasypt-1.9.0.jar org.jasypt.intf.cli.JasyptPBEStringEncryptionCLI encrypt.sh input="_your_vCenter_password_" password='cat /etc/cloudstack/management/key' verbose=false`
   
   Store the output from this step, we need to add this in cluster_details table and vmware_data_center tables in place of the plain text password.

3. Find the ID of the row of cluster_details table that you have to update:
   
   `$ mysql -u <username> -p<password> select * from cloud.cluster_details;`

4. Update the plain text password with the encrypted one:
   
   `update cloud.cluster_details set value = '__ciphertext_from_step_1__' where id = '__id_from_step_2__;`

5. Confirm that the table is updated:
   
   `select * from cloud.cluster_details;`

6. Find the ID of the correct row of vmware_data_center that you want to update
   
   `select * from cloud.vmware_data_center;`

7. Update the plain text password with the encrypted one:
   
   `update cloud.vmware_data_center set password = '__ciphertext_from_step_1__' where id = '__id_from_step_5__;`

8. Confirm that the table is updated:
   
   `select * from cloud.vmware_data_center;`

7.8 Hypervisor: KVM

7.8.1 KVM on Ubuntu

(KVM only) Additional steps are required for each KVM host. These steps will not affect running guests in the cloud. These steps are required only for clouds using KVM as hosts and only on the KVM hosts.

1. Configure the CloudStack apt repository as detailed above.

2. Stop the running agent.
3. Update the agent software.
   
   $ sudo apt-get upgrade cloudstack-agent

4. Verify that the file `/etc/cloudstack/agent/environment.properties` has a line that reads:
   
   paths.script=/usr/share/cloudstack-common

   If not, add the line.

5. Start the agent.
   
   $ sudo service cloudstack-agent start

7.8.2 KVM on CentOS/RHEL

For KVM hosts, upgrade the `cloudstack-agent` package

1. Configure the `CloudStack RPM repository` as detailed above.
   
   $ sudo yum upgrade cloudstack-agent

2. Verify that the file `/etc/cloudstack/agent/environment.properties` has a line that reads:
   
   paths.script=/usr/share/cloudstack-common

   If not, add the line.

3. Restart the agent:
   
   $ sudo service cloudstack-agent stop
   $ sudo killall jsvc
   $ sudo service cloudstack-agent start

7.9 Restart management services

1. Now it’s time to start the management server
   
   $ sudo service cloudstack-management start

2. If you use it, start the usage server
   
   $ sudo service cloudstack-usage start

7.10 System-VMs and Virtual-Routers

Once you’ve upgraded the packages on your management servers, you’ll need to restart the system VMs. Ensure that the admin port is set to 8096 by using the “integration.api.port” global parameter. This port is used by the `cloudsysvmadm` script at the end of the upgrade procedure. For information about how to set this parameter, see Setting Global Configuration Parameters in the Installation Guide. Changing this parameter will require management server restart. Also make sure port 8096 is open in your local host firewall to do this.
There is a script that will do this for you, all you need to do is run the script and supply the IP address for your MySQL instance and your MySQL credentials:

```
# nohup cloudstack-sysvmadm -d IPaddress -u cloud -p password -a > sysvm.log 2>&1 &
```

You can monitor the log for progress. The process of restarting the system VMs can take an hour or more.

```
# tail -f sysvm.log
```

The output to `sysvm.log` will look something like this:

Stopping and starting 1 secondary storage vm(s)...
Done stopping and starting secondary storage vm(s)
Stopping and starting 1 console proxy vm(s)...
Done stopping and starting console proxy vm(s).
Stopping and starting 4 running routing vm(s)...
Done restarting router(s).
CHAPTER 8

Upgrade Instruction from 4.2.x

This section will guide you from CloudStack 4.2.x to CloudStack 4.4.

If you run into any issues during upgrades, please feel free to ask questions on users@cloudstack.apache.org or dev@cloudstack.apache.org.

Warning: Depreciation of realhostip.com DNS and SSL certificate
The realhostip.com dynamic DNS resolution service is being retired this summer. In advance of that, CloudStack 4.3 and later no longer uses realhostip.com DNS domains or SSL certificates to encrypt Console Proxy or file copy communications.

Any steps that are hypervisor-specific will be called out with a note.

We recommend reading through this section once or twice before beginning your upgrade procedure, and working through it on a test system before working on a production system.

Note: The following upgrade instructions should be performed regardless of hypervisor type.

Upgrade Steps:

1. Install new System-VM templates
2. Backup CloudStack database (MySQL)
3. Upgrade CloudStack management server(s)
4. Update hypervisors specific dependencies
5. Restart System-VMs and Virtual-Routers

8.1 Packages repository

Most users of CloudStack manage the installation and upgrades of CloudStack with one of Linux’s predominant package systems, RPM or APT. This guide assumes you’ll be using RPM and Yum (for Red Hat Enterprise Linux or CentOS), or APT and Debian packages (for Ubuntu).

Create RPM or Debian packages (as appropriate) and a repository from the 4.4 source, or check the Apache CloudStack downloads page at http://cloudstack.apache.org/downloads.html for package repositories supplied by community members. You will need them for Management Server Ubuntu or Management Server CentOS/RHEL and Hypervisor: KVM hosts upgrade.

Instructions for creating packages from the CloudStack source are in the CloudStack Installation Guide.
8.2 Update System-VM templates

Note: Upgrading pre-4.3 to 4.4.1 require 2 systemvm templates downloaded: the 4.3 and 4.4.

1. While running the existing 4.2.x system, log in to the UI as root administrator.
2. In the left navigation bar, click Templates.
3. In Select view, click Templates.
4. Register 4.3 systemvm template:
   (a) Click Register template.
       The Register template dialog box is displayed.
   (b) In the Register template dialog box, specify the following values (do not change these):
<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer  | Name: systemvm-xenserver-4.3  
Description: systemvm-xenserver-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: XenServer  
Format: VHD  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| KVM        | Name: systemvm-kvm-4.3  
Description: systemvm-kvm-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: KVM  
Format: QCOW2  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| VMware     | Name: systemvm-vmware-4.3  
Description: systemvm-vmware-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: VMware  
Format: OVA  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |

5. Register 4.4 systemvm template:

(a) Click Register template.

The Register template dialog box is displayed.

(b) In the Register template dialog box, specify the following values (do not change these):
### XenServer
- **Name:** systemvm-xenserver-4.4
- **Description:** systemvm-xenserver-4.4
- **URL:** [http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-xen.vhd.bz2](http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-xen.vhd.bz2)
- **Zone:** Choose the zone where this hypervisor is used
- **Hypervisor:** XenServer
- **Format:** VHD
- **OS Type:** Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)
- **Extractable:** no
- **Password Enabled:** no
- **Public:** no
- **Featured:** no
- **Routing:** no

### KVM
- **Name:** systemvm-kvm-4.4
- **Description:** systemvm-kvm-4.4
- **URL:** [http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-kvm.qcow2.bz2](http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-kvm.qcow2.bz2)
- **Zone:** Choose the zone where this hypervisor is used
- **Hypervisor:** KVM
- **Format:** QCOW2
- **OS Type:** Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)
- **Extractable:** no
- **Password Enabled:** no
- **Public:** no
- **Featured:** no
- **Routing:** no

### VMware
- **Name:** systemvm-vmware-4.4
- **Description:** systemvm-vmware-4.4
- **URL:** [http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-vmware.ova](http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-vmware.ova)
- **Zone:** Choose the zone where this hypervisor is used
- **Hypervisor:** VMware
- **Format:** OVA
- **OS Type:** Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)
- **Extractable:** no
- **Password Enabled:** no
- **Public:** no
- **Featured:** no
- **Routing:** no

6. Watch the screen to be sure that the template downloads successfully and enters the **READY** state. Do not proceed until this is successful.

### 8.3 Database Preparation

Backup current database

1. Stop your management server or servers. Run this on all management server hosts:
2. If you are running a usage server or usage servers, stop those as well:

   $ sudo service cloudstack-usage stop

3. Make a backup of your MySQL database. If you run into any issues or need to roll back the upgrade, this will assist in debugging or restoring your existing environment. You’ll be prompted for your password.

   $ mysqldump -u root -p cloud > cloud-backup_'date '+%Y-%m-%d''.sql
   $ mysqldump -u root -p cloud_usage > cloud_usage-backup_'date '+%Y-%m-%d''.sql

4. (KVM Only) If primary storage of type local storage is in use, the path for this storage needs to be verified to ensure it passes new validation. Check local storage by querying the cloud.storage_pool table:

   $ mysql -u cloud -p -e "select id,name,path from cloud.storage_pool where pool_type='Filesystem'"

   If local storage paths are found to have a trailing forward slash, remove it:

   $ mysql -u cloud -p -e 'update cloud.storage_pool set path="/var/lib/libvirt/images" where path="/var/lib/libvirt/images/"

8.4 Management Server Ubuntu

If you are using Ubuntu, follow this procedure to upgrade your packages. If not, skip to step Management Server CentOS/RHEL.

Note: Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and APT repository, substitute your own URL for the ones used in these examples.

The first order of business will be to change the sources list for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

8.4.1 CloudStack apt repository

Start by opening /etc/apt/sources.list.d/cloudstack.list on any systems that have CloudStack packages installed.

This file should have one line, which contains:

   deb http://cloudstack.apt-get.eu/ubuntu precise 4.2

We’ll change it to point to the new package repository:

   deb http://cloudstack.apt-get.eu/ubuntu precise 4.4

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

1. Now update your apt package list:

   $ sudo apt-get update

2. Now that you have the repository configured, it’s time to upgrade the cloudstack-management package.

   $ sudo apt-get upgrade cloudstack-management
3. If you use CloudStack usage server

   $ sudo apt-get upgrade cloudstack-usage

8.5 Management Server CentOS/RHEL

If you are using CentOS or RHEL, follow this procedure to upgrade your packages. If not, skip to hypervisors section, then *System-VMs and Virtual-Routers*.

**Note:** Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and yum repository, substitute your own URL for the ones used in these examples.

8.5.1 ClouStack RPM repository

The first order of business will be to change the yum repository for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

Start by opening `/etc/yum.repos.d/cloudstack.repo` on any systems that have CloudStack packages installed. This file should have content similar to the following:

```
[apache-cloudstack]
name=Apache CloudStack
baseurl=http://cloudstack.apt-get.eu/rhel/4.2/
enabled=1
gpgcheck=0
```

If you are using the community provided package repository, change the base url to `http://cloudstack.apt-get.eu/rhel/4.4/`

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

1. Now that you have the repository configured, it’s time to upgrade the `cloudstack-management`.

   $ sudo yum upgrade cloudstack-management

2. If you use CloudStack usage server

   $ sudo yum upgrade cloudstack-usage

8.6 Hypervisor: Xen/XenServer

*(XenServer only)* Copy vhd-utils file on CloudStack management servers. Copy the file `vhd-utils` to `/usr/share/cloudstack-common/scripts/vm/hypervisor/xenserver`.

```
```
8.7 Hypervisor: VMware

**Warning:** For VMware hypervisor CloudStack management server packages must be build using “noredist”. Refer to Building from Source.

(VMware only) Additional steps are required for each VMware cluster. These steps will not affect running guests in the cloud. These steps are required only for clouds using VMware clusters:

1. Stop the Management Server:
   
   `$ sudo service cloudstack-management stop`

2. Generate the encrypted equivalent of your vCenter password:
   
   `$ java -classpath /usr/share/cloudstack-common/lib/jasypt-1.9.0.jar org.jasypt.intf.cli.JasyptPBEStringEncryptionCLI encrypt.sh input="_your_vCenter_password_" password="'cat /etc/cloudstack/management/key'" verbose=false`

   Store the output from this step, we need to add this in cluster_details table and vmware_data_center tables in place of the plain text password

3. Find the ID of the row of cluster_details table that you have to update:
   
   `$ mysql -u <username> -p<password>`

   `select * from cloud.cluster_details;`

4. Update the plain text password with the encrypted one
   
   `update cloud.cluster_details set value = '_ciphertext_from_step_1_' where id = _id_from_step_2_;`

5. Confirm that the table is updated:
   
   `select * from cloud.cluster_details;`

6. Find the ID of the correct row of vmware_data_center that you want to update
   
   `select * from cloud.vmware_data_center;`

7. Update the plain text password with the encrypted one:
   
   `update cloud.vmware_data_center set password = '_ciphertext_from_step_1_' where id = _id_from_step_5_;`

8. Confirm that the table is updated:
   
   `select * from cloud.vmware_data_center;`

8.8 Hypervisor: KVM

8.8.1 KVM on Ubuntu

(KVM only) Additional steps are required for each KVM host. These steps will not affect running guests in the cloud. These steps are required only for clouds using KVM as hosts and only on the KVM hosts.

1. Configure the CloudStack apt repository as detailed above.

2. Stop the running agent.
$ sudo service cloudstack-agent stop

3. Update the agent software.
   $ sudo apt-get upgrade cloudstack-agent

4. Verify that the file /etc/cloudstack/agent/environment.properties has a line that reads:
   paths.script=/usr/share/cloudstack-common
   If not, add the line.

5. Start the agent.
   $ sudo service cloudstack-agent start

### 8.8.2 KVM on CentOS/RHEL

For KVM hosts, upgrade the cloudstack-agent package

1. Configure the ClouStack RPM repository as detailed above.
   $ sudo yum upgrade cloudstack-agent

2. Verify that the file /etc/cloudstack/agent/environment.properties has a line that reads:
   paths.script=/usr/share/cloudstack-common
   If not, add the line.

3. Restart the agent:
   $ sudo service cloudstack-agent stop
   $ sudo killall jsvc
   $ sudo service cloudstack-agent start

### 8.9 Restart management services

1. Now it’s time to start the management server
   $ sudo service cloudstack-management start

2. If you use it, start the usage server
   $ sudo service cloudstack-usage start

### 8.10 System-VMs and Virtual-Routers

Once you’ve upgraded the packages on your management servers, you’ll need to restart the system VMs. Ensure that the admin port is set to 8096 by using the “integration.api.port” global parameter. This port is used by the cloudsysvmadm script at the end of the upgrade procedure. For information about how to set this parameter, see Setting Global Configuration Parameters in the Installation Guide. Changing this parameter will require management server restart. Also make sure port 8096 is open in your local host firewall to do this.
There is a script that will do this for you, all you need to do is run the script and supply the IP address for your MySQL instance and your MySQL credentials:

```
# nohup cloudstack-sysvmadm -d IPaddress -u cloud -p password -a > sysvm.log 2>&1 &
```

You can monitor the log for progress. The process of restarting the system VMs can take an hour or more.

```
# tail -f sysvm.log
```

The output to `sysvm.log` will look something like this:

```
Stopping and starting 1 secondary storage vm(s)...
Done stopping and starting secondary storage vm(s)
Stopping and starting 1 console proxy vm(s)...
Done stopping and starting console proxy vm(s).
Stopping and starting 4 running routing vm(s)...
Done restarting router(s).
```
CHAPTER 9

Upgrade Instruction from 4.1.x

This section will guide you from CloudStack 4.1.x versions to CloudStack 4.4.

If you run into any issues during upgrades, please feel free to ask questions on users@cloudstack.apache.org or dev@cloudstack.apache.org.

**Warning:** Deprecation of realhostip.com DNS and SSL certificate
The realhostip.com dynamic DNS resolution service is being retired this summer. In advance of that, CloudStack 4.3 and later no longer uses realhostip.com DNS domains or SSL certificates to encrypt Console Proxy or file copy communications.

Any steps that are hypervisor-specific will be called out with a note.

We recommend reading through this section once or twice before beginning your upgrade procedure, and working through it on a test system before working on a production system.

**Note:** The following upgrade instructions should be performed regardless of hypervisor type.

Upgrade Steps:

1. Install new System-VM templates
2. Backup CloudStack database (MySQL)
3. Upgrade CloudStack management server(s)
4. Update hypervisors specific dependencies
5. Restart System-VMs and Virtual-Routers

### 9.1 Packages repository

Most users of CloudStack manage the installation and upgrades of CloudStack with one of Linux’s predominant package systems, RPM or APT. This guide assumes you’ll be using RPM and Yum (for Red Hat Enterprise Linux or CentOS), or APT and Debian packages (for Ubuntu).

Create RPM or Debian packages (as appropriate) and a repository from the 4.4 source, or check the Apache CloudStack downloads page at [http://cloudstack.apache.org/downloads.html](http://cloudstack.apache.org/downloads.html) for package repositories supplied by community members. You will need them for Management Server Ubuntu or Management Server on CentOS/RHEL and Hypervisor: KVM hosts upgrade.

Instructions for creating packages from the CloudStack source are in the CloudStack Installation Guide.
9.2 Update System-VM templates

**Note:** Upgrading pre-4.3 to 4.4.1 require 2 systemvm templates downloaded: the 4.3 and 4.4.

1. While running the existing 4.1.x system, log in to the UI as root administrator.
2. In the left navigation bar, click Templates.
3. In Select view, click Templates.
4. Register 4.3 systemvm template:
   (a) Click Register template.
      The Register template dialog box is displayed.
   (b) In the Register template dialog box, specify the following values (do not change these):
<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer  | Name: systemvm-xenserver-4.3  
Description: systemvm-xenserver-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: XenServer  
Format: VHD  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| KVM        | Name: systemvm-kvm-4.3  
Description: systemvm-kvm-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: KVM  
Format: QCOW2  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| VMware     | Name: systemvm-vmware-4.3  
Description: systemvm-vmware-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: VMware  
Format: OVA  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |

5. Register 4.4 systemvm template:

(a) Click Register template.

The Register template dialog box is displayed.

(b) In the Register template dialog box, specify the following values (do not change these):
6. Watch the screen to be sure that the template downloads successfully and enters the READY state. Do not proceed until this is successful.

## 9.3 Database Preparation

Backup current database

1. Stop your management server or servers. Run this on all management server hosts:
$ sudo service cloud-management stop

2. If you are running a usage server or usage servers, stop those as well:

   $ sudo service cloud-usage stop

3. Make a backup of your MySQL database. If you run into any issues or need to roll back the upgrade, this will assist in debugging or restoring your existing environment. You’ll be prompted for your password.

   $ mysqldump -u root -p cloud > cloud-backup_'date '+%Y-%m-%d''.sql
   $ mysqldump -u root -p cloud_usage > cloud_usage-backup_'date '+%Y-%m-%d''.sql

4. (KVM Only) If primary storage of type local storage is in use, the path for this storage needs to be verified to ensure it passes new validation. Check local storage by querying the cloud.storage_pool table:

   $ mysql -u cloud -p -e "select id,name,path from cloud.storage_pool where pool_type='Filesystem'"

   If local storage paths are found to have a trailing forward slash, remove it:

   $ mysql -u cloud -p -e "update cloud.storage_pool set path="/var/lib/libvirt/images" where path="/var/lib/libvirt/images/"

9.4 Management Server Ubuntu

If you are using Ubuntu, follow this procedure to upgrade your packages. If not, skip to step Management Server on CentOS/RHEL.

**Note: Community Packages:** This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and APT repository, substitute your own URL for the ones used in these examples.

1. The first order of business will be to change the sources list for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

   Start by opening `/etc/apt/sources.list.d/cloudstack.list` on any systems that have CloudStack packages installed.

   This file should have one line, which contains:

   deb http://cloudstack.apt-get.eu/ubuntu precise 4.1

   We’ll change it to point to the new package repository:

   deb http://cloudstack.apt-get.eu/ubuntu precise 4.4

   If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

2. Now update your apt package list:

   $ sudo apt-get update

3. Now that you have the repository configured, it’s time to install the cloudstack-management package. This will pull in any other dependencies you need.

   $ sudo apt-get upgrade cloudstack-management

4. If you use CloudStack usage server
9.5 Management Server on CentOS/RHEL

If you are using CentOS or RHEL, follow this procedure to upgrade your packages. If not, skip to hypervisors section, then System-VMs and Virtual-Routers.

Note: Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and yum repository, substitute your own URL for the ones used in these examples.

9.5.1 CloudStack RPM repository

The first order of business will be to change the yum repository for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent.

(No changes should be necessary for hosts that are running VMware or Xen.)

Start by opening /etc/yum.repos.d/cloudstack.repo on any systems that have CloudStack packages installed.

This file should have content similar to the following:

```bash
[apache-cloudstack]
name=Apache CloudStack
baseurl=http://cloudstack.apt-get.eu/rhel/4.1/
enabled=1
gpgcheck=0
```

If you are using the community provided package repository, change the base url to http://cloudstack.apt-get.eu/rhel/4.4/

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

1. Now that you have the repository configured, it’s time to install the cloudstack-management package by upgrading the older cloudstack-management package.

   $ sudo yum upgrade cloudstack-management

2. If you use CloudStack usage server

   $ sudo yum upgrade cloudstack-usage

9.6 Hypervisor: Xen/XenServer

(XenServer only) Copy vhd-utils file on CloudStack management servers.

Copy the file vhd-utils to /usr/share/cloudstack-common/scripts/vm/hypervisor/xenserver.

9.7 Hypervisor: VMware

(VMware only) Additional steps are required for each VMware cluster. These steps will not affect running guests in the cloud. These steps are required only for clouds using VMware clusters:
1. Stop the Management Server:

   `service cloudstack-management stop`

2. Generate the encrypted equivalent of your vCenter password:

   `java -classpath /usr/share/cloudstack-common/lib/jasypt-1.9.0.jar org.jasypt.intf.cli.JasyptPBEStringEncryptionCLI encrypt.sh input="_your_vCenter_password_" password='cat /etc/cloudstack/management/key' verbose=false`

   Store the output from this step, we need to add this in cluster_details table and vmware_data_center tables in place of the plain text password

3. Find the ID of the row of cluster_details table that you have to update:

   `mysql -u <username> -p<password>`

   `   select * from cloud.cluster_details;`

4. Update the plain text password with the encrypted one

   `update cloud.cluster_details set value = '_ciphertext_from_step_1_' where id = _id_from_step_2_;`

5. Confirm that the table is updated:

   `select * from cloud.cluster_details;`

6. Find the ID of the correct row of vmware_data_center that you want to update

   `select * from cloud.vmware_data_center;`

7. Update the plain text password with the encrypted one:

   `update cloud.vmware_data_center set password = '_ciphertext_from_step_1_' where id = _id_from_step_5_;`

8. Confirm that the table is updated:

   `select * from cloud.vmware_data_center;`

9.8 Hypervisor: KVM

9.8.1 KVM on Ubuntu

(KVM only) Additional steps are required for each KVM host. These steps will not affect running guests in the cloud. These steps are required only for clouds using KVM as hosts and only on the KVM hosts.

1. Configure the CloudStack yum repository as detailed above.

2. Stop the running agent.

   `$ sudo service cloud-agent stop`
   `$ killall jsvc`

3. Update the agent software.

   `$ sudo apt-get upgrade cloudstack-agent`

   During the installation of cloudstack-agent, APT will copy your `agent.properties`, `log4j-cloud.xml`, and `environment.properties` from `/etc/cloud/agent` to `/etc/cloudstack/agent`.

   When prompted whether you wish to keep your configuration, say Yes.
4. Verify that the file /etc/cloudstack/agent/environment.properties has a line that reads:

    paths.script=/usr/share/cloudstack-common

If not, add the line.

5. Start the agent.

   $ sudo service cloudstack-agent start

9.8.2 KVM on CentOS

1. Stop the running agent.

   # service cloud-agent stop
   # killall jsvc

2. Configure the CloudStack RPM repository as detailed above.

   # yum upgrade cloudstack-agent

3. Verify that the file /etc/cloudstack/agent/environment.properties has a line that reads:

    paths.script=/usr/share/cloudstack-common

If not, add the line.

9.9 Restart management services

1. Now it’s time to start the management server

   $ sudo service cloudstack-management start

2. If you use it, start the usage server

   $ sudo service cloudstack-usage start

9.10 System-VMs and Virtual-Routers

Once you’ve upgraded the packages on your management servers, you’ll need to restart the system VMs. Ensure that the admin port is set to 8096 by using the “integration.api.port” global parameter. This port is used by the cloud-sysvmadm script at the end of the upgrade procedure. For information about how to set this parameter, see Setting Global Configuration Parameters in the Installation Guide. Changing this parameter will require management server restart. Also make sure port 8096 is open in your local host firewall to do this.

There is a script that will do this for you, all you need to do is run the script and supply the IP address for your MySQL instance and your MySQL credentials:

   # nohup cloudstack-sysvmadm -d IPAddress -u cloud -p password -a > sysvm.log 2>&1 &

You can monitor the log for progress. The process of restarting the system VMs can take an hour or more.

   # tail -f sysvm.log

The output to sysvm.log will look something like this:
Stopping and starting 1 secondary storage vm(s)...
Done stopping and starting secondary storage vm(s)
Stopping and starting 1 console proxy vm(s)...
Done stopping and starting console proxy vm(s).
Stopping and starting 4 running routing vm(s)... 
Done restarting router(s).
CHAPTER 10

Upgrade Instruction from 4.0.x

This section will guide you from CloudStack 4.0.x versions to CloudStack 4.4.

If you run into any issues during upgrades, please feel free to ask questions on users@cloudstack.apache.org or dev@cloudstack.apache.org.

Warning: Depreciation of realhostip.com DNS and SSL certificate
The realhostip.com dynamic DNS resolution service is being retired this summer. In advance of that, CloudStack 4.3 and later no longer uses realhostip.com DNS domains or SSL certificates to encrypt Console Proxy or file copy communications.

Any steps that are hypervisor-specific will be called out with a note.

We recommend reading through this section once or twice before beginning your upgrade procedure, and working through it on a test system before working on a production system.

Note: The following upgrade instructions should be performed regardless of hypervisor type.

Important: Package Structure Changes: The package structure for CloudStack has changed significantly since the 4.0.x releases. If you’ve compiled your own packages, you’ll notice that the package names and the number of packages has changed. This is not a bug. However, this does mean that the procedure is not as simple as an apt-get upgrade or yum update, so please follow this section carefully.

10.1 Packages repository

Most users of CloudStack manage the installation and upgrades of CloudStack with one of Linux’s predominant package systems, RPM or APT. This guide assumes you’ll be using RPM and Yum (for Red Hat Enterprise Linux or CentOS), or APT and Debian packages (for Ubuntu).

Create RPM or Debian packages (as appropriate) and a repository from the 4.4 source, or check the Apache CloudStack downloads page at http://cloudstack.apache.org/downloads.html for package repositories supplied by community members. You will need them for Ubuntu or CentOS/RHEL hosts upgrade.

Instructions for creating packages from the CloudStack source are in the CloudStack Installation Guide.

10.2 Update System-VM templates
Note: Upgrading pre-4.3 to 4.4.1 require 2 systemvm templates downloaded: the 4.3 and 4.4.

1. While running the existing 4.0.x system, log in to the UI as root administrator.
2. In the left navigation bar, click Templates.
3. In Select view, click Templates.
4. Register 4.3 systemvm template:
   (a) Click Register template.

   The Register template dialog box is displayed.

   (b) In the Register template dialog box, specify the following values (do not change these):
### Hypervisor

<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer  | Name: systemvm-xenserver-4.3  
Description: systemvm-xenserver-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: XenServer  
Format: VHD  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| KVM        | Name: systemvm-kvm-4.3  
Description: systemvm-kvm-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: KVM  
Format: QCOW2  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| VMware     | Name: systemvm-vmware-4.3  
Description: systemvm-vmware-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: VMware  
Format: OVA  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |

5. Register 4.4 systemvm template:

   (a) Click Register template.

   The Register template dialog box is displayed.

   (b) In the Register template dialog box, specify the following values (do not change these):
## Hypervisor Description

<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer  | Name: systemvm-xenserver-4.4  
  Description: systemvm-xenserver-4.4  
  URL: [http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-xen.vhd.bz2](http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-xen.vhd.bz2)  
  Zone: Choose the zone where this hypervisor is used  
  Hypervisor: XenServer  
  Format: VHD  
  OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
  Extractable: no  
  Password Enabled: no  
  Public: no  
  Featured: no  
  Routing: no |
| KVM        | Name: systemvm-kvm-4.4  
  Description: systemvm-kvm-4.4  
  URL: [http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-kvm.qcow2.bz2](http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-kvm.qcow2.bz2)  
  Zone: Choose the zone where this hypervisor is used  
  Hypervisor: KVM  
  Format: QCOW2  
  OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
  Extractable: no  
  Password Enabled: no  
  Public: no  
  Featured: no  
  Routing: no |
| VMware     | Name: systemvm-vmware-4.4  
  Description: systemvm-vmware-4.4  
  URL: [http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-vmware.ova](http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-vmware.ova)  
  Zone: Choose the zone where this hypervisor is used  
  Hypervisor: VMware  
  Format: OVA  
  OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
  Extractable: no  
  Password Enabled: no  
  Public: no  
  Featured: no  
  Routing: no |

6. Watch the screen to be sure that the template downloads successfully and enters the **READY** state. Do not proceed until this is successful.

### 10.3 Database Preparation

1. Stop your management server or servers. Run this on all management server hosts:

   ```
   # service cloud-management stop
   ```

2. If you are running a usage server or usage servers, stop those as well:
# service cloud-usage stop

3. Make a backup of your MySQL database. If you run into any issues or need to roll back the upgrade, this will assist in debugging or restoring your existing environment. You’ll be prompted for your password.

   $ mysqldump -u root -p cloud > cloud-backup_'date '+%Y-%m-%d''.sql
   $ mysqldump -u root -p cloud_usage > cloud_usage-backup_'date '+%Y-%m-%d''.sql

4. Whether you’re upgrading a Red Hat/CentOS based system or Ubuntu based system, you’re going to need to stop the CloudStack management server before proceeding.

   # service cloud-management stop

5. If you have made changes to /etc/cloud/management/components.xml, you’ll need to carry these over manually to the new file, /etc/cloudstack/management/componentContext.xml. This is not done automatically. (If you’re unsure, we recommend making a backup of the original components.xml to be on the safe side.

6. After upgrading to 4.4, API clients are expected to send plain text passwords for login and user creation, instead of MD5 hash. Incase, api client changes are not acceptable, following changes are to be made for backward compatibility:

   Modify componentContext.xml, and make PlainTextUserAuthenticator as the default authenticator (1st entry in the userAuthenticators adapter list is default)

   <!-- Security adapters -->
   <bean id="userAuthenticators" class="com.cloud.utils.component.AdapterList">
   <property name="Adapters">
   <list>
   <ref bean="PlainTextUserAuthenticator"/>
   <ref bean="MD5UserAuthenticator"/>
   </list>
   </property>
   </bean>

   PlainTextUserAuthenticator works the same way MD5UserAuthenticator worked prior to 4.1.

## 10.4 Ubuntu

If you are using Ubuntu, follow this procedure to upgrade your packages. If not, skip to CentOS/RHEL.

**Note: Community Packages:** This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and APT repository, substitute your own URL for the ones used in these examples.

1. The first order of business will be to change the sources list for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

   Start by opening /etc/apt/sources.list.d/cloudstack.list on any systems that have CloudStack packages installed.

   This file should have one line, which contains:

   ```
   deb http://cloudstack.apt-get.eu/ubuntu precise 4.0
   
   We’ll change it to point to the new package repository:
   ```
deb http://cloudstack.apt-get.eu/ubuntu precise 4.4

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

2. Now update your apt package list:
   
   $ sudo apt-get update

3. Now that you have the repository configured, it's time to install the cloudstack-management package. This will pull in any other dependencies you need.
   
   $ sudo apt-get install cloudstack-management

4. You will need to manually install the cloudstack-agent package:
   
   $ sudo apt-get install cloudstack-agent

   During the installation of cloudstack-agent, APT will copy your agent.properties, log4j-cloud.xml, and environment.properties from /etc/cloud/agent to /etc/cloudstack/agent.

   When prompted whether you wish to keep your configuration, say Yes.

5. Verify that the file /etc/cloudstack/agent/environment.properties has a line that reads:
   
   paths.script=/usr/share/cloudstack-common

   If not, add the line.

6. Restart the agent:

   service cloud-agent stop
   killall jsvc
   service cloudstack-agent start

7. During the upgrade, log4j-cloud.xml was simply copied over, so the logs will continue to be added to /var/log/cloud/agent/agent.log. There’s nothing wrong with this, but if you prefer to be consistent, you can change this by copying over the sample configuration file:

   cd /etc/cloudstack/agent
   mv log4j-cloud.xml.dpkg-dist log4j-cloud.xml
   service cloudstack-agent restart

8. Once the agent is running, you can uninstall the old cloud-* packages from your system:

   sudo dpkg --purge cloud-agent

### 10.5 CentOS/RHEL

If you are using CentOS or RHEL, follow this procedure to upgrade your packages. If not, skip to step System-VMs and Virtual-Routers.

**Note:** Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and yum repository, substitute your own URL for the ones used in these examples.

1. The first order of business will be to change the yum repository for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)
Start by opening `/etc/yum.repos.d/cloudstack.repo` on any systems that have CloudStack packages installed.

This file should have content similar to the following:

```conf
[apache-cloudstack]
name=Apache CloudStack
baseurl=http://cloudstack.apt-get.eu/rhel/4.0/
enabled=1
gpgcheck=0
```

If you are using the community provided package repository, change the baseurl to `http://cloudstack.apt-get.eu/rhel/4.4/`

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

2. Now that you have the repository configured, it’s time to install the `cloudstack-management` package by upgrading the older `cloud-client` package.

   $ sudo yum upgrade cloud-client

3. For KVM hosts, you will need to upgrade the `cloud-agent` package, similarly installing the new version as `cloudstack-agent`.

   $ sudo yum upgrade cloud-agent

During the installation of `cloudstack-agent`, the RPM will copy your `agent.properties`, `log4j-cloud.xml`, and `environment.properties` from `/etc/cloud/agent` to `/etc/cloudstack/agent`.

4. Verify that the file `/etc/cloudstack/agent/environment.properties` has a line that reads:

   ```
   paths.script=/usr/share/cloudstack-common
   ```

   If not, add the line.

5. Restart the agent:

   ```
   service cloud-agent stop
   killall jsvc
   service cloudstack-agent start
   ```

### 10.6 Hypervisor: XenServer

(XenServer only) Copy vhd-utils file on CloudStack management servers.

Copy the file `vhd-utils` to `/usr/share/cloudstack-common/scripts/wm/hypervisor/xenserver`.

### 10.7 System-VMs and Virtual-Routers

Once you’ve upgraded the packages on your management servers, you’ll need to restart the system VMs. Ensure that the admin port is set to 8096 by using the “integration.api.port” global parameter. This port is used by the `cloudsysvmmadm` script at the end of the upgrade procedure. For information about how to set this parameter, see Setting Global Configuration Parameters in the Installation Guide. Changing this parameter will require management server restart. Also make sure port 8096 is open in your local host firewall to do this.
There is a script that will do this for you, all you need to do is run the script and supply the IP address for your MySQL instance and your MySQL credentials:

```
# nohup cloudstack-sysvmadm -d IPAddress -u cloud -p password -a > sysvm.log 2>&1 &
```

You can monitor the log for progress. The process of restarting the system VMs can take an hour or more.

```
# tail -f sysvm.log
```

The output to `sysvm.log` will look something like this:

```
Stopping and starting 1 secondary storage vm(s)...
Done stopping and starting secondary storage vm(s)
Stopping and starting 1 console proxy vm(s)...
Done stopping and starting console proxy vm(s).
Stopping and starting 4 running routing vm(s)...
Done restarting router(s).
```
This section will guide you from Citrix CloudStack 3.0.x to Apache CloudStack 4.4.

If you run into any issues during upgrades, please feel free to ask questions on users@cloudstack.apache.org or dev@cloudstack.apache.org.

**Warning:** Depreciation of realhostip.com DNS and SSL certificate

The realhostip.com dynamic DNS resolution service is being retired this summer. In advance of that, CloudStack 4.3 and later no longer uses realhostip.com DNS domains or SSL certificates to encrypt Console Proxy or file copy communications.

Any steps that are hypervisor-specific will be called out with a note.

We recommend reading through this section once or twice before beginning your upgrade procedure, and working through it on a test system before working on a production system.

**Note:** The following upgrade instructions should be performed regardless of hypervisor type.

**Important:** Package Structure Changes: The package structure for CloudStack has changed significantly since the 3.0.x releases. If you’ve compiled your own packages, you’ll notice that the package names and the number of packages has changed. This is *not* a bug. However, this *does* mean that the procedure is not as simple as an `apt-get upgrade` or `yum update`, so please follow this section carefully.

11.1 Packages repository

Most users of CloudStack manage the installation and upgrades of CloudStack with one of Linux’s predominant package systems, RPM or APT. This guide assumes you’ll be using RPM and Yum (for Red Hat Enterprise Linux or CentOS), or APT and Debian packages (for Ubuntu).

Create RPM or Debian packages (as appropriate) and a repository from the 4.4 source, or check the Apache CloudStack downloads page at [http://cloudstack.apache.org/downloads.html](http://cloudstack.apache.org/downloads.html) for package repositories supplied by community members. You will need them for Ubuntu or CentOS/RHEL hosts upgrade.

Instructions for creating packages from the CloudStack source are in the CloudStack Installation Guide.

11.2 Update System-VM templates
Note: Upgrading pre-4.3 to 4.4.1 require 2 systemvm templates downloaded: the 4.3 and 4.4.

1. While running the existing 3.0.x system, log in to the UI as root administrator.
2. In the left navigation bar, click Templates.
3. In Select view, click Templates.
4. Register 4.3 systemvm template:
   (a) Click Register template.
       The Register template dialog box is displayed.
   (b) In the Register template dialog box, specify the following values (do not change these):
<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer  | Name: systemvm-xenserver-4.3  
Description: systemvm-xenserver-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: XenServer  
Format: VHD  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| KVM        | Name: systemvm-kvm-4.3  
Description: systemvm-kvm-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: KVM  
Format: QCOW2  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| VMware     | Name: systemvm-vmware-4.3  
Description: systemvm-vmware-4.3  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: VMware  
Format: OVA  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |

5. Register 4.4 systemvm template:

(a) Click Register template.

The Register template dialog box is displayed.

(b) In the Register template dialog box, specify the following values (do not change these):
<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer  | Name: systemvm-xenserver-4.4  
Description: systemvm-xenserver-4.4  
URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-xen.vhd.bz2  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: XenServer  
Format: VHD  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| KVM        | Name: systemvm-kvm-4.4  
Description: systemvm-kvm-4.4  
URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-kvm.qcow2.bz2  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: KVM  
Format: QCOW2  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |
| VMware     | Name: systemvm-vmware-4.4  
Description: systemvm-vmware-4.4  
URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-vmware.ova  
Zone: Choose the zone where this hypervisor is used  
Hypervisor: VMware  
Format: OVA  
OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
Extractable: no  
Password Enabled: no  
Public: no  
Featured: no  
Routing: no |

6. Watch the screen to be sure that the template downloads successfully and enters the READY state. Do not proceed until this is successful.

### 11.3 Upgrade Steps

1. (KVM on RHEL 6.0/6.1 only) If your existing CloudStack deployment includes one or more clusters of KVM hosts running RHEL 6.0 or RHEL 6.1, perform the following:
   
   (a) Ensure that you upgrade the operating system version on those hosts before upgrading CloudStack
To do that, change the yum repository for each system with CloudStack packages, that implies that all the Management Servers and any hosts that have the KVM agent.

(b) Open `/etc/yum.repos.d/cloudstack.repo` on any systems that have CloudStack packages installed.

(c) Edit as follows:

```
[upgrade]
name=rhel63
baseurl=url-of-your-rhel6.3-repo
enabled=1
gpgcheck=0
[apache CloudStack]
name= Apache CloudStack
baseurl= http://cloudstack.apt-get.eu/rhel/4.4/
enabled=1
gpgcheck=0
```

If you are using the community provided package repository, change the baseurl to `http://cloudstack.apt-get.eu/rhel/4.4/`

If you are using your own package repository, change this line to read as appropriate for your 4.4 repository.

(d) Now that you have the repository configured, upgrade the host operating system from RHEL 6.0 to 6.3:

```
# yum upgrade
```

2. Stop all Usage Servers if running. Run this on all Usage Server hosts.

```
# service cloud-usage stop
```

3. Stop the Management Servers. Run this on all Management Server hosts.

```
# service cloud-management stop
```

4. On the MySQL master, take a backup of the MySQL databases. We recommend performing this step even in test upgrades. If there is an issue, this will assist with debugging.

In the following commands, it is assumed that you have set the root password on the database, which is a CloudStack recommended best practice. Substitute your own MySQL root password.

```
$ mysqldump -u root -p cloud > cloud-backup_'date '+%Y-%m-%d''.sql
$ mysqldump -u root -p cloud_usage > cloud_usage-backup_'date '+%Y-%m-%d''.sql
```

5. Either build RPM/DEB packages as detailed in the Installation Guide, or use one of the community provided yum/apt repositories to gain access to the CloudStack binaries.

6. If you are using Ubuntu, follow this procedure to upgrade your packages. If not, skip to step 8.

**Note: Community Packages:** This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and APT repository, substitute your own URL for the ones used in these examples.

(a) The first order of business will be to change the sources list for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

Start by opening `/etc/apt/sources.list.d/cloudstack.list` on any systems that have CloudStack packages installed.

This file should have one line, which contains:
deb http://cloudstack.apt-get.eu/ubuntu precise 4.0

We’ll change it to point to the new package repository:
deb http://cloudstack.apt-get.eu/ubuntu precise 4.4

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

(b) Now update your apt package list:
   $ sudo apt-get update

(c) Now that you have the repository configured, it’s time to install the cloudstack-management package. This will pull in any other dependencies you need.
   $ sudo apt-get install cloudstack-management

(d) You will need to manually install the cloudstack-agent package:
   $ sudo apt-get install cloudstack-agent

   During the installation of cloudstack-agent, APT will copy your agent.properties, log4j-cloud.xml, and environment.properties from /etc/cloud/agent to /etc/cloudstack/agent.

   When prompted whether you wish to keep your configuration, say Yes.

(e) Verify that the file /etc/cloudstack/agent/environment.properties has a line that reads:
   paths.script=/usr/share/cloudstack-common

   If not, add the line.

(f) Restart the agent:
   service cloud-agent stop
   killall jsvc
   service cloudstack-agent start

(g) During the upgrade, log4j-cloud.xml was simply copied over, so the logs will continue to be added to /var/log/cloud/agent/agent.log. There’s nothing wrong with this, but if you prefer to be consistent, you can change this by copying over the sample configuration file:
   cd /etc/cloudstack/agent
   mv log4j-cloud.xml.dpkg-dist log4j-cloud.xml
   service cloudstack-agent restart

(h) Once the agent is running, you can uninstall the old cloud-* packages from your system:
   sudo dpkg --purge cloud-agent

7. If you are using CentOS or RHEL, follow this procedure to upgrade your packages. If not, skip to step 9.

   **Note:** Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and yum repository, substitute your own URL for the ones used in these examples.

   (a) The first order of business will be to change the yum repository for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)
Start by opening `/etc/yum.repos.d/cloudstack.repo` on any systems that have CloudStack packages installed.

This file should have content similar to the following:

```plaintext
[apache-cloudstack]
name=Apache CloudStack
baseurl=http://cloudstack.apt-get.eu/rhel/4.0/
enabled=1
gpgcheck=0
```

If you are using the community provided package repository, change the baseurl to `http://cloudstack.apt-get.eu/rhel/4.4/`

If you're using your own package repository, change this line to read as appropriate for your 4.4 repository.

(b) Now that you have the repository configured, it's time to install the `cloudstack-management` package by upgrading the older `cloud-client` package.

```
$ sudo yum upgrade cloud-client
```

(c) For KVM hosts, you will need to upgrade the `cloud-agent` package, similarly installing the new version as `cloudstack-agent`.

```
$ sudo yum upgrade cloud-agent
```

During the installation of `cloudstack-agent`, the RPM will copy your `agent.properties`, `log4j-cloud.xml`, and `environment.properties` from `/etc/cloud/agent` to `/etc/cloudstack/agent`.

(d) Verify that the file `/etc/cloudstack/agent/environment.properties` has a line that reads:

```
paths.script=/usr/share/cloudstack-common
```

If not, add the line.

(e) Restart the agent:

```
service cloud-agent stop
killall jsvc
service cloudstack-agent start
```

8. If you have made changes to your copy of `/etc/cloud/management/components.xml` the changes will be preserved in the upgrade. However, you need to do the following steps to place these changes in a new version of the file which is compatible with version 4.x.x.

(a) Make a backup copy of `/etc/cloud/management/components.xml`. For example:

```
# mv /etc/cloud/management/components.xml /etc/cloud/management/components.xml-backup
```

(b) Copy `/etc/cloud/management/components.xml.rpmnew` to create a new `/etc/cloud/management/components.xml`:

```
# cp -ap /etc/cloud/management/components.xml.rpmnew /etc/cloud/management/components.xml
```

(c) Merge your changes from the backup file into the new `components.xml`.

```
# vi /etc/cloudstack/management/components.xml
```

**Note:** If you have more than one management server node, repeat the upgrade steps on each node.
9. After upgrading to 4.4, API clients are expected to send plain text passwords for login and user creation, instead of MD5 hash. Incase, api client changes are not acceptable, following changes are to be made for backward compatibility:

Modify componentContext.xml, and make PlainTextUserAuthenticator as the default authenticator (1st entry in the userAuthenticators adapter list is default)

```xml
<!-- Security adapters -->
<bean id="userAuthenticators" class="com.cloud.utils.component.AdapterList">
  <property name="Adapters">
    <list>
      <ref bean="PlainTextUserAuthenticator"/>
      <ref bean="MD5UserAuthenticator"/>
      <ref bean="LDAPUserAuthenticator"/>
    </list>
  </property>
</bean>
```

PlainTextUserAuthenticator works the same way MD5UserAuthenticator worked prior to 4.4

10. Start the first Management Server. Do not start any other Management Server nodes yet.

```bash
# service cloudstack-management start
```

Wait until the databases are upgraded. Ensure that the database upgrade is complete. After confirmation, start the other Management Servers one at a time by running the same command on each node.

**Note:** Failing to restart the Management Server indicates a problem in the upgrade. Having the Management Server restarted without any issues indicates that the upgrade is successfully completed.

11. Start all Usage Servers (if they were running on your previous version). Perform this on each Usage Server host.

```bash
# service cloudstack-usage start
```

12. Additional steps are required for each KVM host. These steps will not affect running guests in the cloud. These steps are required only for clouds using KVM as hosts and only on the KVM hosts.

(a) Configure a yum or apt repository containing the CloudStack packages as outlined in the Installation Guide.

(b) Stop the running agent.

```bash
# service cloud-agent stop
```

(c) Update the agent software with one of the following command sets as appropriate for your environment.

```bash
# yum update cloud-*
# apt-get update
# apt-get upgrade cloud-*
```


(e) Upgrade all the existing bridge names to new bridge names by running this script:

```bash
# cloudstack-agent-upgrade
```

(f) Install a libvirt hook with the following commands:
# mkdir /etc/libvirt/hooks
# cp /usr/share/cloudstack-agent/lib/libvirtqemuhook /etc/libvirt/hooks/qemu
# chmod +x /etc/libvirt/hooks/qemu

(g) Restart libvirtd.

    # service libvirtd restart

(h) Start the agent.

    # service cloudstack-agent start

(i) When the Management Server is up and running, log in to the CloudStack UI and restart the virtual router for proper functioning of all the features.

13. Log in to the CloudStack UI as administrator, and check the status of the hosts. All hosts should come to Up state (except those that you know to be offline). You may need to wait 20 or 30 minutes, depending on the number of hosts.

**Note:** Troubleshooting: If login fails, clear your browser cache and reload the page.

Do not proceed to the next step until the hosts show in Up state.

14. If you are upgrading from 3.0.x, perform the following:

   (a) Ensure that the admin port is set to 8096 by using the “integration.api.port” global parameter.

       This port is used by the cloud-sysvmadm script at the end of the upgrade procedure. For information about how to set this parameter, see “Setting Global Configuration Parameters” in the Installation Guide.

   (b) Restart the Management Server.

       **Note:** If you don’t want the admin port to remain open, you can set it to null after the upgrade is done and restart the management server.

15. Run the `cloudstack-sysvmadm` script to stop, then start, all Secondary Storage VMs, Console Proxy VMs, and virtual routers. Run the script once on each management server. Substitute your own IP address of the MySQL instance, the MySQL user to connect as, and the password to use for that user. In addition to those parameters, provide the -c and -r arguments. For example:

    # nohup cloudstack-sysvmadm -d 192.168.1.5 -u cloud -p password -c -r > sysvm.log 2>&1 &
    # tail -f sysvm.log

    This might take up to an hour or more to run, depending on the number of accounts in the system.

16. If needed, upgrade all Citrix XenServer hypervisor hosts in your cloud to a version supported by CloudStack 4.4. The supported versions are XenServer 5.6 SP2 and 6.0.2. Instructions for upgrade can be found in the CloudStack 4.4 Installation Guide under “Upgrading XenServer Versions.”

17. Now apply the XenServer hotfix XS602E003 (and any other needed hotfixes) to XenServer v6.0.2 hypervisor hosts.

   (a) Disconnect the XenServer cluster from CloudStack.

       In the left navigation bar of the CloudStack UI, select Infrastructure. Under Clusters, click View All. Select the XenServer cluster and click Actions - Unmanage.

       This may fail if there are hosts not in one of the states Up, Down, Disconnected, or Alert. You may need to fix that before unmanaging this cluster.

**11.3. Upgrade Steps**
Wait until the status of the cluster has reached Unmanaged. Use the CloudStack UI to check on the status. When the cluster is in the unmanaged state, there is no connection to the hosts in the cluster.

(b) To clean up the VLAN, log in to one XenServer host and run:

```
/opt/xensource/bin/cloud-clean-vlan.sh
```

(c) Now prepare the upgrade by running the following on one XenServer host:

```
/opt/xensource/bin/cloud-prepare-upgrade.sh
```

If you see a message like “can’t eject CD”, log in to the VM and unmount the CD, then run this script again.

(d) Upload the hotfix to the XenServer hosts. Always start with the Xen pool master, then the slaves. Using your favorite file copy utility (e.g. WinSCP), copy the hotfixes to the host. Place them in a temporary folder such as /tmp.

On the Xen pool master, upload the hotfix with this command:

```
xe patch-upload file-name=XS602E003.xsupdate
```

Make a note of the output from this command, which is a UUID for the hotfix file. You’ll need it in another step later.

**Note:** (Optional) If you are applying other hotfixes as well, you can repeat the commands in this section with the appropriate hotfix number. For example, XS602E004.xsupdate.

(e) Manually live migrate all VMs on this host to another host. First, get a list of the VMs on this host:

```
# xe vm-list
```

Then use this command to migrate each VM. Replace the example host name and VM name with your own:

```
# xe vm-migrate live=true host=host-name vm=`VM-name`
```

**Note:** **Troubleshooting:** If you see a message like “You attempted an operation on a VM which requires PV drivers to be installed but the drivers were not detected,” run:

```
/opt/xensource/bin/make_migratable.sh b6cf79c8-02ee-050b-922f-49583d9f1a14.
```

(f) Apply the hotfix. First, get the UUID of this host:

```
# xe host-list
```

Then use the following command to apply the hotfix. Replace the example host UUID with the current host ID, and replace the hotfix UUID with the output from the patch-upload command you ran on this machine earlier. You can also get the hotfix UUID by running xe patch-list.

```
xe patch-apply host-uuid=host-uuid uuid=hotfix-uuid
```

(g) Copy the following files from the CloudStack Management Server to the host.

<table>
<thead>
<tr>
<th>Copy from here...</th>
<th>...to here</th>
</tr>
</thead>
<tbody>
<tr>
<td>/usr/lib64/cloud/common /scripts/vm/hypervisor/</td>
<td>/opt/xensource/sm/NFSSR.py</td>
</tr>
<tr>
<td>xenserver/xenserver60/N FSSR.py</td>
<td>/opt/xensource/bin/setupxenserver.sh</td>
</tr>
<tr>
<td>/usr/lib64/cloud/common /scripts/vm/hypervisor/</td>
<td>/opt/xensource/bin/make_migratable.sh</td>
</tr>
<tr>
<td>xenserver/setupxenserver r.sh</td>
<td></td>
</tr>
<tr>
<td>/usr/lib64/cloud/common /scripts/vm/hypervisor/</td>
<td></td>
</tr>
<tr>
<td>xenserver/make_migratable ble.sh</td>
<td></td>
</tr>
</tbody>
</table>
(h) (Only for hotfixes XS602E005 and XS602E007) You need to apply a new Cloud Support Pack.

- Download the CSP software onto the XenServer host from one of the following links:
  


- Extract the file:

  ```
  # tar xf xenserver-cloud-supp.tgz
  ```

- Run the following script:

  ```
  # xe-install-supplemental-pack xenserver-cloud-supp.iso
  ```

- If the XenServer host is part of a zone that uses basic networking, disable Open vSwitch (OVS):

  ```
  # xe-switch-network-backend bridge
  ```

(i) Reboot this XenServer host.

(j) Run the following:

```bash
/opt/xensource/bin/setupxenserver.sh
```

**Note:** If the message “mv: cannot stat '/etc/cron.daily/logrotate': No such file or directory” appears, you can safely ignore it.

(k) Run the following:

```bash
for pbd in `xe pbd-list currently-attached=false | grep ^uuid | awk '{print $NF}'`; do xe pbd
```

(l) On each slave host in the Xen pool, repeat these steps, starting from “manually live migrate VMs.”

**Note:** **Troubleshooting Tip:** If passwords which you know to be valid appear not to work after upgrade, or other UI issues are seen, try clearing your browser cache and reloading the UI page.
Upgrade Instruction from 2.2.14

This section will guide you from pre-Apache versions of Citrix CloudStack 2.2.14 version to Apache CloudStack 4.4. If you run into any issues during upgrades, please feel free to ask questions on users@cloudstack.apache.org or dev@cloudstack.apache.org.

Warning: Depreciation of realhostip.com DNS and SSL certificate
The realhostip.com dynamic DNS resolution service is being retired this summer. In advance of that, CloudStack 4.3 and later no longer uses realhostip.com DNS domains or SSL certificates to encrypt Console Proxy or file copy communications.

Any steps that are hypervisor-specific will be called out with a note.

We recommend reading through this section once or twice before beginning your upgrade procedure, and working through it on a test system before working on a production system.

Note: The following upgrade instructions should be performed regardless of hypervisor type.

Important: Package Structure Changes: The package structure for CloudStack has changed significantly since the 2.2.14 releases. If you’ve compiled your own packages, you’ll notice that the package names and the number of packages has changed. This is not a bug. However, this does mean that the procedure is not as simple as an apt-get upgrade or yum update, so please follow this section carefully.

1. Ensure that you query your IP address usage records and process them; for example, issue invoices for any usage that you have not yet billed users for.

   Starting in 3.0.2, the usage record format for IP addresses is the same as the rest of the usage types. Instead of a single record with the assignment and release dates, separate records are generated per aggregation period with start and end dates. After upgrading to 4.4, any existing IP address usage records in the old format will no longer be available.

2. If you are using version 2.2.0 - 2.2.13, first upgrade to 2.2.14 by using the instructions in the 2.2.14 Release Notes.

   Warning: KVM Hosts: If KVM hypervisor is used in your cloud, be sure you completed the step to insert a valid username and password into the host_details table on each KVM node as described in the 2.2.14 Release Notes. This step is critical, as the database will be encrypted after the upgrade to 4.4.
12.1 Update System-VM templates

Note: Upgrading pre-4.3 to 4.4.1 require 2 systemvm templates downloaded: the 4.3 and 4.4.

1. While running the existing 2.2.14 system, log in to the UI as root administrator.
2. In the left navigation bar, click Templates.
3. In Select view, click Templates.
4. Register 4.3 systemvm template:
   (a) Click Register template.
       The Register template dialog box is displayed.
   (b) In the Register template dialog box, specify the following values (do not change these):
### Hypervisor Description

<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Name</th>
<th>Description</th>
<th>URL</th>
<th>Zone</th>
<th>Hypervisor</th>
<th>Format</th>
<th>OS Type</th>
<th>Extractable</th>
<th>Password Enabled</th>
<th>Public</th>
<th>Featured</th>
<th>Routing</th>
</tr>
</thead>
<tbody>
<tr>
<td>XenServer</td>
<td>systemvm-xenserver-4.3</td>
<td>systemvm-xenserver-4.3</td>
<td><a href="http://download.cloud.com/templates/4.3/systemvm64template-2014-06-23-master-xen.vhd.bz2">http://download.cloud.com/templates/4.3/systemvm64template-2014-06-23-master-xen.vhd.bz2</a></td>
<td>Choose the zone where this hypervisor is used</td>
<td>XenServer</td>
<td>VHD</td>
<td>Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>KVM</td>
<td>systemvm-kvm-4.3</td>
<td>systemvm-kvm-4.3</td>
<td><a href="http://download.cloud.com/templates/4.3/systemvm64template-2014-06-23-master-kvm.qcow2.bz2">http://download.cloud.com/templates/4.3/systemvm64template-2014-06-23-master-kvm.qcow2.bz2</a></td>
<td>Choose the zone where this hypervisor is used</td>
<td>KVM</td>
<td>QCOW2</td>
<td>Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>VMware</td>
<td>systemvm-vmware-4.3</td>
<td>systemvm-vmware-4.3</td>
<td><a href="http://download.cloud.com/templates/4.3/systemvm64template-2014-06-23-master-vmware.ova">http://download.cloud.com/templates/4.3/systemvm64template-2014-06-23-master-vmware.ova</a></td>
<td>Choose the zone where this hypervisor is used</td>
<td>VMware</td>
<td>OVA</td>
<td>Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
</tbody>
</table>

5. **Register 4.4 systemvm template:**

   (a) Click Register template.

      The Register template dialog box is displayed.

   (b) In the Register template dialog box, specify the following values (do not change these):
CloudStack Release Notes Documentation, Release 4.4.1

<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Description</th>
</tr>
</thead>
</table>
| XenServer  | Name: systemvm-xenserver-4.4  
             Description: systemvm-xenserver-4.4  
             URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-xen.vhd.bz2  
             Zone: Choose the zone where this hypervisor is used  
             Hypervisor: XenServer  
             Format: VHD  
             OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
             Extractable: no  
             Password Enabled: no  
             Public: no  
             Featured: no  
             Routing: no |
| KVM        | Name: systemvm-kvm-4.4  
             Description: systemvm-kvm-4.4  
             URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-kvm.qcow2.bz2  
             Zone: Choose the zone where this hypervisor is used  
             Hypervisor: KVM  
             Format: QCOW2  
             OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
             Extractable: no  
             Password Enabled: no  
             Public: no  
             Featured: no  
             Routing: no |
| VMware     | Name: systemvm-vmware-4.4  
             Description: systemvm-vmware-4.4  
             URL: http://cloudstack.apt-get.eu/systemvm/4.4/systemvm64template-4.4.1-7-vmware.ova  
             Zone: Choose the zone where this hypervisor is used  
             Hypervisor: VMware  
             Format: OVA  
             OS Type: Debian GNU/Linux 7.0 (64-bit) (or the highest Debian release number available in the dropdown)  
             Extractable: no  
             Password Enabled: no  
             Public: no  
             Featured: no  
             Routing: no |

6. Watch the screen to be sure that the template downloads successfully and enters the READY state. Do not proceed until this is successful.

7. **WARNING**: If you use more than one type of hypervisor in your cloud, be sure you have repeated these steps to download the system VM template for each hypervisor type. Otherwise, the upgrade will fail.
12.2 Upgrade Steps

1. (KVM on RHEL 6.0/6.1 only) If your existing CloudStack deployment includes one or more clusters of KVM hosts running RHEL 6.0 or RHEL 6.1, perform the following:

   (a) Ensure that you upgrade the operating system version on those hosts before upgrading CloudStack.

      To do that, change the yum repository for each system with CloudStack packages, that implies that all the Management Servers and any hosts that have the KVM agent.

   (b) Open /etc/yum.repos.d/cloudstack.repo on any systems that have CloudStack packages installed.

   (c) Edit as follows:

      ```
      [upgrade]
      name=rhel63
      baseurl=url-of-your-rhel6.3-repo
      enabled=1
      gpgcheck=0
      [apache CloudStack]
      name= Apache CloudStack
      baseurl= http://cloudstack.apt-get.eu/rhel/4.4/
      enabled=1
      gpgcheck=0
      ```

      If you are using the community provided package repository, change the baseurl to http://cloudstack.apt-get.eu/rhel/4.4/

      If you are using your own package repository, change this line to read as appropriate for your 4.4 repository.

   (d) Now that you have the repository configured, upgrade the host operating system from RHEL 6.0 to 6.3:

      ```
      # yum upgrade
      ```

2. Stop all Usage Servers if running. Run this on all Usage Server hosts.

   ```
   # service cloud-usage stop
   ```

3. Stop the Management Servers. Run this on all Management Server hosts.

   ```
   # service cloud-management stop
   ```

4. On the MySQL master, take a backup of the MySQL databases. We recommend performing this step even in test upgrades. If there is an issue, this will assist with debugging.

   In the following commands, it is assumed that you have set the root password on the database, which is a CloudStack recommended best practice. Substitute your own MySQL root password.

   ```
   $ mysqldump -u root -p cloud > cloud-backup_'date '+%Y-%m-%d''.sql
   $ mysqldump -u root -p cloud_usage > cloud_usage-backup_'date '+%Y-%m-%d''.sql
   ```

5. Either build RPM/DEB packages as detailed in the Installation Guide, or use one of the community provided yum/apt repositories to gain access to the CloudStack binaries.

6. If you are using Ubuntu, follow this procedure to upgrade your packages. If not, skip to step 13.

   **Note:** Community Packages: This section assumes you’re using the community supplied packages for CloudStack. If you’ve created your own packages and APT repository, substitute your own URL for the ones used in these examples.
(a) The first order of business will be to change the sources list for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

Start by opening `/etc/apt/sources.list.d/cloudstack.list` on any systems that have CloudStack packages installed.

This file should have one line, which contains:

```
deb http://cloudstack.apt-get.eu/ubuntu precise 4.0
```

We’ll change it to point to the new package repository:

```
deb http://cloudstack.apt-get.eu/ubuntu precise 4.4
```

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

(b) Now update your apt package list:

```
$ sudo apt-get update
```

(c) Now that you have the repository configured, it’s time to install the `cloudstack-management` package. This will pull in any other dependencies you need.

```
$ sudo apt-get install cloudstack-management
```

(d) On KVM hosts, you will need to manually install the `cloudstack-agent` package:

```
$ sudo apt-get install cloudstack-agent
```

During the installation of `cloudstack-agent`, APT will copy your `agent.properties`, `log4j-cloud.xml`, and `environment.properties` from `/etc/cloud/agent` to `/etc/cloudstack/agent`.

When prompted whether you wish to keep your configuration, say Yes.

(e) Verify that the file `/etc/cloudstack/agent/environment.properties` has a line that reads:

```
paths.script=/usr/share/cloudstack-common
```

If not, add the line.

(f) Restart the agent:

```
service cloud-agent stop
killall jsvc
service cloudstack-agent start
```

(g) During the upgrade, `log4j-cloud.xml` was simply copied over, so the logs will continue to be added to `/var/log/cloud/agent/agent.log`. There’s nothing wrong with this, but if you prefer to be consistent, you can change this by copying over the sample configuration file:

```
cd /etc/cloudstack/agent
mv log4j-cloud.xml.dpkg-dist log4j-cloud.xml
service cloudstack-agent restart
```

(h) Once the agent is running, you can uninstall the old cloud-* packages from your system:

```
sudo dpkg --purge cloud-agent
```

7. If you are using CentOS or RHEL, follow this procedure to upgrade your packages. If not, skip to step 14.

**Note:** Community Packages: This section assumes you’re using the community supplied packages for Cloud-
Stack. If you’ve created your own packages and yum repository, substitute your own URL for the ones used in these examples.

(a) The first order of business will be to change the yum repository for each system with CloudStack packages. This means all management servers, and any hosts that have the KVM agent. (No changes should be necessary for hosts that are running VMware or Xen.)

Start by opening `/etc/yum.repos.d/cloudstack.repo` on any systems that have CloudStack packages installed.

This file should have content similar to the following:

```
[apache-cloudstack]
name=Apache CloudStack
baseurl=http://cloudstack.apt-get.eu/rhel/4.0/
enabled=1
gpgcheck=0
```

If you are using the community provided package repository, change the baseurl to `http://cloudstack.apt-get.eu/rhel/4.4/`

If you’re using your own package repository, change this line to read as appropriate for your 4.4 repository.

(b) Now that you have the repository configured, it’s time to install the `cloudstack-management` package by upgrading the older `cloud-client` package.

```
$ sudo yum upgrade cloud-client
```

(c) For KVM hosts, you will need to upgrade the `cloud-agent` package, similarly installing the new version as `cloudstack-agent`.

```
$ sudo yum upgrade cloud-agent
```

During the installation of `cloudstack-agent`, the RPM will copy your `agent.properties`, `log4j-cloud.xml`, and `environment.properties` from `/etc/cloud/agent` to `/etc/cloudstack/agent`.

(d) Verify that the file `/etc/cloudstack/agent/environment.properties` has a line that reads:

```
paths.script=/usr/share/cloudstack-common
```

If not, add the line.

(e) Restart the agent:

```
service cloud-agent stop
killall jsvc
service cloudstack-agent start
```

8. If you have made changes to your existing copy of the file `components.xml` in your previous-version CloudStack installation, the changes will be preserved in the upgrade. However, you need to do the following steps to place these changes in a new version of the file which is compatible with version 4.0.0-incubating.

**Note:** How will you know whether you need to do this? If the upgrade output in the previous step included a message like the following, then some custom content was found in your old `components.xml`, and you need to merge the two files:

```
warning: /etc/cloud/management/components.xml created as /etc/cloud/management/components.xml.rpmnew
```
(a) Make a backup copy of your /etc/cloud/management/components.xml file. For example:

```
# mv /etc/cloud/management/components.xml /etc/cloud/management/components.xml-backup
```

(b) Copy /etc/cloud/management/components.xml.rpmnew to create a new /etc/cloud/management/components.xml:

```
# cp -ap /etc/cloud/management/components.xml.rpmnew /etc/cloud/management/components.xml
```

(c) Merge your changes from the backup file into the new components.xml file.

```
# vi /etc/cloudstack/management/components.xml
```

9. After upgrading to 4.4, API clients are expected to send plain text passwords for login and user creation, instead of MD5 hash. If API client changes are not acceptable, following changes are to be made for backward compatibility:

Modify componentContext.xml, and make PlainTextUserAuthenticator as the default authenticator (1st entry in the userAuthenticators adapter list is default)

```
<!-- Security adapters -->
<bean id="userAuthenticators" class="com.cloud.utils.component.AdapterList">
    <property name="Adapters">
        <list>
            <ref bean="PlainTextUserAuthenticator"/>
            <ref bean="MD5UserAuthenticator"/>
            <ref bean="LDAPUserAuthenticator"/>
        </list>
    </property>
</bean>
```

PlainTextUserAuthenticator works the same way MD5UserAuthenticator worked prior to 4.2.

10. If you have made changes to your existing copy of the /etc/cloud/management/db.properties file in your previous-version CloudStack installation, the changes will be preserved in the upgrade. However, you need to do the following steps to place these changes in a new version of the file which is compatible with this version.

(a) Make a backup copy of your file /etc/cloud/management/db.properties. For example:

```
# mv /etc/cloud/management/db.properties /etc/cloud/management/db.properties-backup
```

(b) Copy /etc/cloud/management/db.properties.rpmnew to create a new /etc/cloud/management/db.properties:

```
# cp -ap /etc/cloud/management/db.properties.rpmnew etc/cloud/management/db.properties
```

(c) Merge your changes from the backup file into the new db.properties file.

```
# vi /etc/cloudstack/management/db.properties
```

11. On the management server node, run the following command. It is recommended that you use the command-line flags to provide your own encryption keys. See Password and Key Encryption in the Installation Guide.

```
# cloudstack-setup-encryption -e encryption_type -m management_server_key -k database_key
```

When used without arguments, as in the following example, the default encryption type and keys will be used:

- (Optional) For encryption_type, use file or web to indicate the technique used to pass in the database encryption password. Default: file.
• (Optional) For management_server_key, substitute the default key that is used to encrypt confidential parameters in the properties file. Default: password. It is highly recommended that you replace this with a more secure value.

• (Optional) For database_key, substitute the default key that is used to encrypt confidential parameters in the CloudStack database. Default: password. It is highly recommended that you replace this with a more secure value.

12. Repeat steps 10 - 14 on every management server node. If you provided your own encryption key in step 14, use the same key on all other management servers.

13. Start the first Management Server. Do not start any other Management Server nodes yet.

    # service cloudstack-management start

    Wait until the databases are upgraded. Ensure that the database upgrade is complete. You should see a message like “Complete! Done.” After confirmation, start the other Management Servers one at a time by running the same command on each node.

14. Start all Usage Servers (if they were running on your previous version). Perform this on each Usage Server host.

    # service cloudstack-usage start

15. (KVM only) Perform the following additional steps on each KVM host.

    These steps will not affect running guests in the cloud. These steps are required only for clouds using KVM as hosts and only on the KVM hosts.

    (a) Configure your CloudStack package repositories as outlined in the Installation Guide

    (b) Stop the running agent.

        # service cloud-agent stop

    (c) Update the agent software with one of the following command sets as appropriate.

        # yum update cloud-*

        # apt-get update

        # apt-get upgrade cloud-*

    (d) Copy the contents of the agent.properties file to the new agent.properties file by using the following command


    (e) Upgrade all the existing bridge names to new bridge names by running this script:

        # cloudstack-agent-upgrade

    (f) Install a libvirt hook with the following commands:

        # mkdir /etc/libvirt/hooks

        # cp /usr/share/cloudstack-agent/lib/libvirtqemuhook /etc/libvirt/hooks/qemu

        # chmod +x /etc/libvirt/hooks/qemu

    (g) Restart libvirtd.

        # service libvirtd restart

    (h) Start the agent.

12.2. Upgrade Steps
# service cloudstack-agent start

(i) When the Management Server is up and running, log in to the CloudStack UI and restart the virtual router for proper functioning of all the features.

16. Log in to the CloudStack UI as admin, and check the status of the hosts. All hosts should come to Up state (except those that you know to be offline). You may need to wait 20 or 30 minutes, depending on the number of hosts.

Do not proceed to the next step until the hosts show in the Up state. If the hosts do not come to the Up state, contact support.

17. Run the following script to stop, then start, all Secondary Storage VMs, Console Proxy VMs, and virtual routers.

(a) Run the command once on one management server. Substitute your own IP address of the MySQL instance, the MySQL user to connect as, and the password to use for that user. In addition to those parameters, provide the “-c” and “-r” arguments. For example:

```
# nohup cloudstack-sysvmadm -d 192.168.1.5 -u cloud -p password -c -r > sysvm.log 2>&1 &
# tail -f sysvm.log
```

This might take up to an hour or more to run, depending on the number of accounts in the system.

(b) After the script terminates, check the log to verify correct execution:

```
# tail -f sysvm.log
```

The content should be like the following:

```
Stopping and starting 1 secondary storage vm(s)...
Done stopping and starting secondary storage vm(s)
Stopping and starting 1 console proxy vm(s)...
Done stopping and starting console proxy vm(s).
Stopping and starting 4 running routing vm(s)...
Done restarting router(s).
```

18. If you would like additional confirmation that the new system VM templates were correctly applied when these system VMs were rebooted, SSH into the System VM and check the version.

Use one of the following techniques, depending on the hypervisor.

**XenServer or KVM:**

SSH in by using the link local IP address of the system VM. For example, in the command below, substitute your own path to the private key used to log in to the system VM and your own link local IP.

Run the following commands on the XenServer or KVM host on which the system VM is present:

```
# ssh -i private-key-path link-local-ip -p 3922
# cat /etc/cloudstack-release
```

The output should be like the following:

```
Cloudstack Release 4.0.0-incubating Mon Oct 9 15:10:04 PST 2012
```

**ESXi:**

SSH in using the private IP address of the system VM. For example, in the command below, substitute your own path to the private key used to log in to the system VM and your own private IP.

Run the following commands on the Management Server:
12.2. Upgrade Steps

# ssh -i private-key-path private-ip -p 3922
# cat /etc/cloudstack-release

The output should be like the following:

Cloudstack Release 4.0.0-incubating Mon Oct 9 15:10:04 PST 2012

19. If needed, upgrade all Citrix XenServer hypervisor hosts in your cloud to a version supported by CloudStack 4.0.0-incubating. The supported versions are XenServer 5.6 SP2 and 6.0.2. Instructions for upgrade can be found in the CloudStack 4.0.0-incubating Installation Guide.

20. Apply the XenServer hotfix XS602E003 (and any other needed hotfixes) to XenServer v6.0.2 hypervisor hosts.

(a) Disconnect the XenServer cluster from CloudStack.

In the left navigation bar of the CloudStack UI, select Infrastructure. Under Clusters, click View All. Select the XenServer cluster and click Actions - Unmanage.

This may fail if there are hosts not in one of the states Up, Down, Disconnected, or Alert. You may need to fix that before unmanaging this cluster.

Wait until the status of the cluster has reached Unmanaged. Use the CloudStack UI to check on the status.

When the cluster is in the unmanaged state, there is no connection to the hosts in the cluster.

(b) To clean up the VLAN, log in to one XenServer host and run:

```
/opt/xensource/bin/cloud-clean-vlan.sh
```

(c) Prepare the upgrade by running the following on one XenServer host:

```
/opt/xensource/bin/cloud-prepare-upgrade.sh
```

If you see a message like “can’t eject CD”, log in to the VM and umount the CD, then run this script again.

(d) Upload the hotfix to the XenServer hosts. Always start with the Xen pool master, then the slaves. Using your favorite file copy utility (e.g. WinSCP), copy the hotfixes to the host. Place them in a temporary folder such as /root or /tmp.

On the Xen pool master, upload the hotfix with this command:

```
xe patch-upload file-name=XS602E003.xsupdate
```

Make a note of the output from this command, which is a UUID for the hotfix file. You’ll need it in another step later.

**Note:** (Optional) If you are applying other hotfixes as well, you can repeat the commands in this section with the appropriate hotfix number. For example, XS602E004.xsupdate.

(e) Manually live migrate all VMs on this host to another host. First, get a list of the VMs on this host:

```
# xe vm-list
```

Then use this command to migrate each VM. Replace the example host name and VM name with your own:

```
# xe vm-migrate live=true host=host-name vm=VM-name
```

**Note:** **Troubleshooting:** If you see a message like “You attempted an operation on a VM which requires PV drivers to be installed but the drivers were not detected,” run:

```
/opt/xensource/bin/make_migratable.sh b6cf79c8-02ee-050b-922f-49583d9f1a14.
```
(f) Apply the hotfix. First, get the UUID of this host:

```
# xe host-list
```

Then use the following command to apply the hotfix. Replace the example host UUID with the current host ID, and replace the hotfix UUID with the output from the patch-upload command you ran on this machine earlier. You can also get the hotfix UUID by running `xe patch-list`.

```
xe patch-apply host-uuid=host-uuid uuid="hotfix-uuid"
```

(g) Copy the following files from the CloudStack Management Server to the host.

<table>
<thead>
<tr>
<th>Copy from here...</th>
<th>...to here</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/usr/share/cloudstack -common/scripts/vm/hyprvisor/xenserver/xenser ver60/NFSSR.py</code></td>
<td><code>/opt/xensource/sm/NFSSR.py</code></td>
</tr>
<tr>
<td><code>/usr/share/cloudstack -common/scripts/vm/hyprvisor/xenserver/xenser ver60/NFSSR.py</code></td>
<td><code>/opt/xensource/bin/setupxenserver.sh</code></td>
</tr>
<tr>
<td><code>/usr/lib64/cloudstack -common/scripts/vm/hyprvisor/xenserver/make_migratable.sh</code></td>
<td><code>/opt/xensource/bin/make_migratable.sh</code></td>
</tr>
</tbody>
</table>

(h) (Only for hotfixes XS602E005 and XS602E007) You need to apply a new Cloud Support Pack.

- Download the CSP software onto the XenServer host from one of the following links:

- Extract the file:
  ```
  # tar xf xenserver-cloud-supp.tgz
  ```

- Run the following script:
  ```
  # xe-install-supplemental-pack xenserver-cloud-supp.iso
  ```

- If the XenServer host is part of a zone that uses basic networking, disable Open vSwitch (OVS):
  ```
  # xe-switch-network-backend bridge
  ```

(i) Reboot this XenServer host.

(j) Run the following:

```
/opt/xensource/bin/setupxenserver.sh
```

**Note:** If the message “mv: cannot stat ‘/etc/cron.daily/logrotate’: No such file or directory” appears, you can safely ignore it.

(k) Run the following:

```
`for pbd in `xe pbd-list currently-attached=false` | grep ‘uuid’ | awk ‘{print $NF}’`; do xe pbd-plug uuid=$pbd; done
```

(l) On each slave host in the Xen pool, repeat these steps, starting from “manually live migrate VMs.”
Validate 4.4 source code tarball

1. Perform the following to verify the artifacts:

   (a) (optional) Install GPG keys if needed:
   
   $ sudo apt-get install gpg

   (b) Import the GPG keys stored in the source distribution’s KEYS file:

   $ gpg --import KEYS

   Alternatively, download the signing keys, the IDs found in the KEYS file, individually by using a keyserver. For example:

   $ gpg --recv-keys CC56CEA8

   (c) Verify signatures and hash files:

   $ gpg --verify apache-cloudstack-4.4-src.tar.bz2.asc
   $ gpg --print-md MD5 apache-cloudstack-4.4-src.tar.bz2 | diff - apache-cloudstack-4.4-src.tar.bz2.md5
   $ gpg --print-md SHA512 apache-cloudstack-4.4-src.tar.bz2 | diff - apache-cloudstack-4.4-src.tar.bz2.sha

   Each of these commands should return no output. Any output from them implies that there is a difference between the hash you generated locally and the hash that has been pulled from the server.

   (d) Get the commit hash from the VOTE email.

      For example: 4cd60f3d1683a3445c3248f48ae064fb573db2a1. The value changes between releases.

   (e) Create two new temporary directories:

      $ mkdir /tmp/cloudstack/git
      $ mkdir /tmp/cloudstack/tree

   (f) Check out the 4.4 branch:

      $ cd /tmp/cloudstack/git
      $ git archive --format=tar --prefix=/tmp/cloudstack/tree/ <commit-hash> | tar Pxf -

   (g) Unpack the release artifact:

      $ cd /tmp/cloudstack
      $ tar xvfj apache-cloudstack-4.4-src.tar.bz2
(h) Compare the contents of the release artifact with the contents pulled from the repo:

```
$ diff -r /tmp/cloudstack/apache-cloudstack-4.4-src /tmp/cloudstack/tree
```

Ensure that content is the same.

(i) Verify the Code License Headers:

```
$ cd /tmp/cloudstack/apache-cloudstack-4.4-src
$ mvn --projects='org.apache.cloudstack:cloudstack' org.apache.rat:apache-rat-plugin:0.8:check
```

The build fails if any non-compliant files are present that are not specifically excluded from the ASF license header requirement. You can optionally review the target/rat.txt file after the run completes. Passing the build implies that RAT certifies that the files are compliant and this test is passed.
Apache CloudStack uses Jira to track its issues. All new features and bugs for 4.4.1 have been tracked in Jira, and have a standard naming convention of “CLOUDSTACK-NNNN” where “NNNN” is the issue number.

For the list of known issues, see Known Issues in 4.4.1.

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