



CloudStack 3.0.2 Release Notes

For CloudStack Version 3.0.2

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Submitting Feedback and Getting Help

Open-source community

A variety of channels are available for getting help with CloudStack, from forums to IRC chat and more. For details, see <http://cloudstack.org/discuss/>.

Commercial customers

The CloudStack support team is available to help commercial customers plan and execute their installations. To contact the support team, log in to the support portal at <https://na6.salesforce.com/sserv/login.jsp?orgId=00D80000000LWom> using the account credentials you received when you purchased your support contract.

3.0.2

New Upgrade Path

Starting with CloudStack 3.0.2, existing CloudStack 2.2.x installations can be upgraded. See Upgrade from 2.2.x to 3.0.2 on page 29.

What's New in 3.0.2

CloudStack 3.0.2 includes no new product features. However, the following changes to the behavior of CloudStack were introduced in version 3.0.2.

CS-14588	When creating a VM in the CloudStack UI, the name of the VM specified will now directly affect its DNS name, unlike previous releases. DNS names can only be specified during creation. You can continue to modify the Display Name, but this will have no effect on the DNS name.
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Issues Fixed in 3.0.2

CS-13398	Pressing ESC while in any UI dialog will no longer freeze the UI
CS-14305	You can now upgrade the service offerings for system VMs.
CS-14333	Fixed an issue that prevented any users from upgrading their service offerings.
CS-14341	Fixed an issue where the order of the service/disk offerings were not being honored in the UI.

CS-14364	Ubuntu 10.04 nows works with the Quick Basic Install.
CS-14369	Quick Basic Install for KVM hypervisors can now be done on a single host.
CS-14372	Async Job timeout counter is now properly reset across calls.
CS-14406	Putting a host into maintenance will now properly live migrate the VM rather than stopping it.
CS-14433	Fixed an issue where System VMs were not correctly releasing their IP when destroyed.
CS-14441	VMWare: Networks labels are not correctly honored.
CS-14447	Registering an ISO/Template with "All Zones" will now correctly propagate the templates to all zones.
CS-14447	Deleting an account will now properly remove its associated Virtual Router.
CS-14512	The DeployVirtualMachine command will accept UUID for the "iptonetworklist" parameter.
CS-14542	Fixes issues with labeling networks for KVM.
CS-14593	Fixed an issue with where you hit a "EncryptionOperationNotPossibleException" when attempting to validate user credentials against a LDAP server.
CS-14614	Fixed issues with attempting to boot off of a CentOS 6.2 Live CD.
CS-14622	Fixed issues with dedicating public IP ranges to an account.
CS-8222	IP address usage records are now created for each day the IP address is assigned, in order to be consistent with virtual machine and storage usage records.

Known Issues in 3.0.2

CS-14103	Global settings such as *.network.device (for example, xen.guest.network.device) are not cleared during upgrade from 2.2.x to 3.0.x. If you had manually set the global configuration parameter *.network.device (for example, xen.guest.network.device) to a custom network label, you will need to set the network traffic labels manually each time you set up a new zone after upgrade.
CS-14201 (was 14430)	VMWare: Template sizes are being reported different depending on whether the primary storage is using iSCSI or NFS.
CS-14237 (was 14468)	Primary Storage GC cannot occur when the first host in a given cluster is not in an "Up" state.
CS-14275 (was 14506)	F5: Unable to properly remove a F5 device.
CS-14291 (was 14523)	The EIP/ELB network offering for basic zones do not support multiple NetScalers.
CS-14296 (was 14530)	OVM: Network traffic labels are not supported.
CS-14303 (was 14537)	IP addresses for a shared network is still being consumed even if no services are defined for that network.
CS-14655	<p>XenServer known issue: If using network bonding on XenServer 6.0.x along with the CloudStack XenServer Support Package (CSP), interfaces, IPs, and networking can fail after adding hosts to CloudStack and rebooting them. Workaround: patch each XenServer node, using the following steps. This patch is required only if using the CSP, and is a temporary requirement until XenServer issues the official hotfix for this issue. Before installing the CSP package, install the newer biosdevname rpm, selecting the correct patch for your version of XenServer: XenServer patch XS759 for XenServer 6.0.2 or XenServer patch XS753 for XenServer 6.0.0.</p> <ol style="list-style-type: none"> Download three files: <ul style="list-style-type: none"> http://download.cloud.com/releases/3.0.2/60-net.rules.template http://download.cloud.com/releases/3.0.2/net-rename-sideways.sh http://download.cloud.com/releases/3.0.2/biosdevname-0.3.7-1.xs753.i386.rpm (for XenServer 6.0.0) or http://download.cloud.com/releases/3.0.2/biosdevname-0.3.7-1.xs759.i386.rpm (for XenServer 6.0.2)

	<ol style="list-style-type: none"> 2. Run the following. Substitute the filename of the patch you are using: <pre>rpm -ivh <packageName>.rpm -force</pre> 3. Replace /etc/udev/scripts/net-rename-sideways.sh with the new version. 4. Replace /etc/sysconfig/network-scripts/interface-rename-data/60-net.rules.template with the newer version. 5. Delete /etc/udev/rules.d/60-net.rules.
CS-14756	<p>Installing KVM on RHEL 6.2 will result in unreliable network performance. Workaround: blacklist vhost-net. Edit /etc/modprobe.d/blacklist-kvm.conf and include vhost-net.</p>

API Changes from 3.0.1 to 3.0.2

New API command:

- changeServiceForSystemVm

Changes the service offering for a system VM (console proxy or secondary storage). The system VM must be in a "Stopped" state for this command to take effect.

3.0.1

New Software License

Starting with CloudStack 3.0.1, the CloudStack software license has changed from the GNU Public License Version 3 to the Apache License Version 2.0. For the text of the license, see <http://www.apache.org/licenses/LICENSE-2.0.txt>.

What's New in 3.0.1

CloudStack 3.0.1 includes no new product features. For a list of the major fixed items, see Issues Fixed in 3.0.1 on page 9.

The following changes to the behavior of CloudStack were introduced in version 3.0.1.

XenServer Version	XenServer 6.0.2 is now fully supported.
vSphere 5.0	CloudStack now fully supports VMWare vSphere 5.0.
KVM Basic Install	In the basic installation, which is one that follows the prompts in the guided tour, the use of the KVM hypervisor is now tested and officially supported in addition to XenServer.

<p>Adding a Zone</p>	<p>Some fields and controls in the Add Zone wizard are different than in 3.0.0. These changes will allow the first cluster and host to work properly immediately after you click "Enable" at the end of the Add Zone wizard:</p> <ul style="list-style-type: none"> • You must now choose the hypervisor before adding the first cluster. This applies only to the first cluster; you can still add clusters with different hypervisors later. • You can configure network traffic labels for the different traffic types. This fixes a known issue from release 3.0.0.
<p>14379</p>	<p>Port 8096, which allows API calls without authentication, is closed and disabled by default on any fresh 3.0.1 installations. You can enable 8096 (or another port) for this purpose as follows: After the first Management Server is installed and running, set the global configuration parameter <code>integration.api.port</code> to the desired port, and restart the Management Server. Then, on the Management Server host machine, create an iptables rule allowing access to that port.</p>

The following new error codes have been added. If one of the errors occurs, check the error string for more information:

- 4250 : "com.cloud.utils.exception.CloudRuntimeException"
- 4255 : "com.cloud.utils.exception.ExceptionUtil"
- 4260 : "com.cloud.utils.exception.ExecutionException"
- 4265 : "com.cloud.utils.exception.HypervisorVersionChangedException"
- 4270 : "com.cloud.utils.exception.RuntimeCloudException"
- 4275 : "com.cloud.exception.CloudException"
- 4280 : "com.cloud.exception.AccountLimitException"
- 4285 : "com.cloud.exception.AgentUnavailableException"
- 4290 : "com.cloud.exception.CloudAuthenticationException"
- 4295 : "com.cloud.exception.CloudExecutionException"
- 4300 : "com.cloud.exception.ConcurrentOperationException"
- 4305 : "com.cloud.exception.ConflictingNetworkSettingsException"
- 4310 : "com.cloud.exception.DiscoveredWithErrorException"
- 4315 : "com.cloud.exception.HAStateException"
- 4320 : "com.cloud.exception.InsufficientAddressCapacityException"
- 4325 : "com.cloud.exception.InsufficientCapacityException"
- 4330 : "com.cloud.exception.InsufficientNetworkCapacityException"
- 4335 : "com.cloud.exception.InsufficientServerCapacityException"
- 4340 : "com.cloud.exception.InsufficientStorageCapacityException"
- 4345 : "com.cloud.exception.InternalErrorException"
- 4350 : "com.cloud.exception.InvalidParameterValueException"
- 4355 : "com.cloud.exception.ManagementServerException"
- 4360 : "com.cloud.exception.NetworkRuleConflictException"
- 4365 : "com.cloud.exception.PermissionDeniedException"
- 4370 : "com.cloud.exception.ResourceAllocationException"
- 4375 : "com.cloud.exception.ResourceInUseException"

4380 : "com.cloud.exception.ResourceUnavailableException"
 4385 : "com.cloud.exception.StorageUnavailableException"
 4390 : "com.cloud.exception.UnsupportedServiceException"
 4395 : "com.cloud.exception.VirtualMachineMigrationException"
 4400 : "com.cloud.exception.AccountLimitException"
 4405 : "com.cloud.exception.AgentUnavailableException"
 4410 : "com.cloud.exception.CloudAuthenticationException"
 4415 : "com.cloud.exception.CloudException"
 4420 : "com.cloud.exception.CloudExecutionException"
 4425 : "com.cloud.exception.ConcurrentOperationException"
 4430 : "com.cloud.exception.ConflictingNetworkSettingsException"
 4435 : "com.cloud.exception.ConnectionException"
 4440 : "com.cloud.exception.DiscoveredWithErrorException"
 4445 : "com.cloud.exception.DiscoveryException"
 4450 : "com.cloud.exception.HAStateException"
 4455 : "com.cloud.exception.InsufficientAddressCapacityException"
 4460 : "com.cloud.exception.InsufficientCapacityException"
 4465 : "com.cloud.exception.InsufficientNetworkCapacityException"
 4470 : "com.cloud.exception.InsufficientServerCapacityException"
 4475 : "com.cloud.exception.InsufficientStorageCapacityException"
 4480 : "com.cloud.exception.InsufficientVirtualNetworkCapacityException"
 4485 : "com.cloud.exception.InternalErrorException"
 4490 : "com.cloud.exception.InvalidParameterValueException"
 4495 : "com.cloud.exception.ManagementServerException"
 4500 : "com.cloud.exception.NetworkRuleConflictException"
 4505 : "com.cloud.exception.PermissionDeniedException"
 4510 : "com.cloud.exception.ResourceAllocationException"
 4515 : "com.cloud.exception.ResourceInUseException"
 4520 : "com.cloud.exception.ResourceUnavailableException"
 4525 : "com.cloud.exception.StorageUnavailableException"
 4530 : "com.cloud.exception.UnsupportedServiceException"
 4535 : "com.cloud.exception.VirtualMachineMigrationException"

In addition, there is special error code for ServerApiException when it is thrown in a standalone manner when failing to detect any of the above standard exceptions:

9999 : "com.cloud.api.ServerApiException"

Issues Fixed in 3.0.1

<Many>	In the Add Zone wizard, added a step for configuring network traffic labels on the physical network(s).
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13313	The Add Zone wizard will now skip adding a ESXi host if the cluster is VMWare.
13899	NetScaler is no longer a selectable provider for static NAT network service.
13966	Fixed issue with not cleaning up instance when it fails to acquire an EIP address.
14016	NetScaler – Deleting a load balancer rule will no longer delete other load balancer rules pointing at the same private port.
14023	UI – You can now update SSL certificates on system VMs.
14042	Fixed issues where VMs are not able to access the public network when attached to an isolated guest network with source NAT enabled and a shared network.
14047	Login API no longer fails when using UUID for the domainId parameter.
14073	Zones will now be automatically be created as public zones and not dedicated to the ROOT domain.
14077	DestroyVirtualMachine API call will now work against VM when the VM's state is Starting.
14101	You can now specify the storage network when adding a basic zone.
14135	Windows 2003 is not reported as supported for XenServer.
14188	Fixed an issue where the pre-generated SSH keys are not properly updated to the system VMs.
14189	Fixed an issue where the secondary storage VM is not using the storage network to download templates.
14202	Non-bootable ISOs no longer show up in the Add Instance wizard.
14216	Fixed issues with KVM when adding multiple physical networks.
14239	Added ability for administrators to limit the number of guest networks.

14282	Fixed an issue where KVM is not able to reconnect the management server after a management server reboot.
14313	Fixed an issue with the JSON builder that prevented a template copy across zones from working properly.
14332	You can now delete a host.
14336	Login API now returns the account's UUID.
14392	You can now add public IP ranges even though you did not add zone VLANs.
14484	Fixed issues where new port forward could not be added if you created it, then deleted, and attempted to recreate the port forward again.
14492	System VMs now work if you have configured multiple physical networks across zones.
14515	Snapshots are now properly cleaned up.

Known Issues in 3.0.1

14430	VMWare: Template sizes are being reported different depending on whether the primary storage is using iSCSI or NFS.
14468	Primary Storage GC cannot occur when the first host in a given cluster is not in an "Up" state.
14506	F5: Unable to properly remove a F5 device.
14523	The EIP/ELB network offering for basic zones do not support multiple NetScalers.
14530	OVM: Network traffic labels are not supported.
14537	IP addresses for a shared network is still being consumed even if no services are defined for that network.

API Changes from 3.0.0 to 3.0.1

Added API Commands

- ldapRemove (Remove the LDAP context for this site.)

Changed API Commands

addHost	Changed request parameters: podid (old version - optional, new version - required)
assignVirtualMachine	New response field: instancename
attachIso	New response field: instancename
changeServiceForVirtualMachine	New response field: instancename
deployVirtualMachine	New response field: instancename
destroyVirtualMachine	New response field: instancename
detachIso	New response field: instancename
disableAccount	New response fields: networkavailable, networklimit, networktotal, projectavailable, projectlimit, projecttotal
enableAccount	New response fields: networkavailable, networklimit, networktotal, projectavailable, projectlimit, projecttotal
listAccounts	New response fields: networkavailable, networklimit, networktotal, projectavailable, projectlimit, projecttotal
listLoadBalancerRuleInstances	New response field: instancename
listOsCategories	New request parameter: name (optional)
listOsTypes	New request parameter: description (optional)
listSystemVms	New request parameter: storageid (optional)

listVirtualMachines	New response field: instancename
migrateVirtualMachine	New response field: instancename
rebootVirtualMachine	New response field: instancename
recoverVirtualMachine	New response field: instancename
resetPasswordForVirtualMachine	New response field: instancename
restoreVirtualMachine	New response field: instancename
startVirtualMachine	New request parameter: hostid (optional) New response field: instancename
stopVirtualMachine	New response field: instancename
updateAccount	New response fields: networkavailable, networklimit, networktotal, projectavailable, projectlimit, projecttotal
updateVirtualMachine	New response field: instancename

3.0.0

Overview of Major New Features in 3.0

CloudStack 3.0 is a major new release. It provides several new features compared to CloudStack 2.2.x. This section provides overviews of the new features. If you just want a quick list by bug number, see New Features in 3.0.0 on page 16.

Redesigned User Interface

The user interface of CloudStack has been redesigned to provide easier navigation as well as a more intuitive workflow. Graphical displays of the infrastructure topology have replaced drill-down lists as the main way to access the various CloudStack components such as zones, hosts, and networks. The main Dashboard now provides a more clear display of key information for managing the cloud. The end-user UI also benefits from this redesign, making it easier for users to manage their VMs and other resources. The new Project View lets users switch context from one set of resources to another, enabling a more efficient focus on the task at hand.

NetScaler Load Balancer

Citrix NetScaler is now supported as an external network element for load balancing. Set up an external load balancer when you want to provide load balancing through means other than CloudStack's provided virtual router.

The NetScaler can be set up in direct (outside the firewall) mode. It must be added before any load balancing rules are deployed on guest VMs in the zone.

Limitations: NetScaler can not yet be used as a firewall. It can not currently be set up in in-line mode (behind the firewall).

Sticky Session Policies for Load Balancer Rules

Sticky sessions are used in Web-based applications to ensure continued availability of information across the multiple requests in a user's session. For example, if a shopper is filling a cart, you need to remember what has been purchased so far. The concept of "stickiness" is also referred to as persistence, or maintaining state.

Any load balancer rule defined in CloudStack can have a stickiness policy. The policy consists of a name, stickiness method, and parameters. The stickiness method could be load balancer-generated cookie, application-generated cookie, or source-based. In the source-based method, the source IP address is used to identify the user and locate the user's stored data. In the other methods, cookies are used. The cookie generated by the load balancer or application is included in request and response URLs to create persistence. A variety of options are provided to control the exact behavior of cookies, such as how they are generated and whether they are cached.

Using an LDAP Server for User Authentication

In CloudStack 3.0, you can use an external LDAP server such as Microsoft Active Directory or ApacheDS for end-user authentication. Just map CloudStack accounts to the corresponding LDAP accounts using a query filter. The query filter is written using the query syntax of the particular LDAP server, and can include special wildcard characters provided by CloudStack for matching common values such as the user's email address and name. CloudStack will search the external LDAP directory tree starting at a specified base directory and return the distinguished name (DN) and password of the matching user. This information along with the given password is used to authenticate the user.

VM Storage Migration

The CloudStack administrator can move a virtual machine's root disk volume or any additional data disk from one storage pool to another in the same zone. You can use the storage migration feature to achieve some commonly desired administration goals, such as balancing the load on storage pools and increasing the reliability of virtual machines by moving them away from any storage pool that is experiencing issues. This functionality is supported in XenServer, KVM, and VMware.

Swift for Secondary Storage

In CloudStack 3.0, OpenStack Object Storage (Swift, <http://swift.openstack.org>) is supported for secondary storage. When using Swift, you configure Swift storage for the entire CloudStack, then set up NFS secondary storage for each zone. The NFS storage in each zone acts as a staging area through which all templates and other secondary storage data pass before being forwarded to Swift. The Swift storage acts as a cloud-wide resource, making templates and other data available to any zone in the cloud. There is no hierarchy in the Swift storage, just one Swift container per storage object. Any secondary storage in the whole cloud can pull a container from Swift at need – no more copying templates and snapshots from one zone to another. Everything is available everywhere.

Password and Key Encryption

CloudStack stores several sensitive passwords and secret keys that are used to provide security. Starting in CloudStack 3.0, these values are always automatically encrypted. These include the database secret key, database password, SSH keys, compute node root password, VPN password, user API secret key, and VNC password.

CloudStack 3.0 uses the Java Simplified Encryption (JASYPT) library. The data values are encrypted and decrypted using a database secret key. Of course, the database secret key itself can not be stored in the open – it must be encrypted. To read it, a second secret key must be provided from an external source during Management Server startup. This key can be provided in one of two ways: loaded from a file or provided by the CloudStack administrator. The encryption type, database secret key, and Management Server secret key are set by the administrator during CloudStack installation.

Security Group Egress Rules

Security groups can be used to control network traffic to and from VMs. A security group is a group of VMs that filter their incoming and outgoing traffic according to a set of rules, called ingress and egress rules. These rules filter network traffic according to the IP address that is attempting to communicate with the VM.

In addition to ingress rules that control incoming network traffic to VMs in a given security group, starting in CloudStack 3.0 you can also define egress rules to control outgoing network traffic. If no egress rules are specified, then all traffic will be allowed out. Once egress rules are specified, the following types of traffic are allowed out: traffic specified in egress rules; queries to DNS servers; and responses to any traffic that has been allowed in through an ingress rule. An egress rule can be specified either by CIDR to specify IP addresses, or by account to allow traffic from another security group.

Using Projects to Organize Users and Resources

In CloudStack 3.0, users can group themselves into projects so they can collaborate and share virtual resources. CloudStack tracks usage per project as well as per user, so the usage can be billed to either a user account or a project. For example, a private cloud within a software company might have all members of the QA department assigned to one project, so the company can track the resources used in testing while the project members can more easily isolate their efforts from other users of the same cloud. Per-project resource limits can be set.

You can configure CloudStack to allow any user to create a new project, or you can restrict that ability to just CloudStack administrators. CloudStack can be set up either so that you can add people directly to a project, or so that you have to send an invitation which the recipient must accept.

A user can be a member of any number of projects and can switch to a new Project View in the CloudStack UI to show only project-related information, such as project VMs, fellow project members, project-related alerts, and so on.

Providing Network Services for Users

People using cloud infrastructure have a variety of needs and preferences when it comes to the networking services provided by the cloud. Provisioning physical and virtual networks has always been supported in CloudStack. As a CloudStack 3.0 administrator, you can do the following additional things to set up networking for your users:

- Set up several different providers (also known as network elements) for the same service on a single physical network. For example, you can provide both Cisco and Juniper firewalls. You can have multiple instances of the same service provider in a network; for example, more than one Juniper SRX device.

- Bundle different types of network services into network offerings. When creating a new VM, the user chooses one of the available network offerings, and that determines which network services the VM can use. A network offering is a named set of network services, such as DHCP, source NAT, load balancing, firewall, VPN, port forwarding, and specific network service providers, such as Juniper SRX for the firewall. You can add new network offerings as time goes on so end users can upgrade to a better class of service on their network.
- Provide more ways for a network to be accessed by a user, such as through a project of which the user is a member.
- Set up two types of virtual networks: shared and isolated. An isolated network can be accessed only by virtual machines of a single account. A shared network can be accessed by virtual machines that belong to many different accounts. Network isolation on shared networks is accomplished using techniques such as security groups.
- More directly control the physical network, such as add/remove/update physical networks in a zone, configure VLANs on the physical network, specify properties like network speed, configure a name so the network can be recognized by hypervisors, configure the IP addresses trunked to a physical network, and specify what type of traffic is carried on the physical network (such as guest VM traffic vs. internal management traffic).

New Features in 3.0.0

4282	Added nonce support in API.
5510	Openstack Swift can now be used as an alternative to NFS storage for templates, ISO, and snapshots.
5822	All sensitive passwords are now properly encrypted in the database and any configuration files.
6745	UUIDs are now used in place of regular DB IDs. 3.0 API will support both.
6876	Netscaler MPX, VPX, and SDX is now supported.
7883	Templates, ISOs, Disk, and Service offerings can now be sorted to allow admins to more easily view them in the UI.
<Many>	Network as a Service feature.
8313	Basic LDAP authentication is now built in as an optional AUTH adapter.
8620	Projects feature.
8791	User dispersing allocator has now been added as an alternative algorithm for VM placement.

8962	Admins can now re-assign VM from one account to another.
9128	Network throttling is now controlled via network offerings.
9154	Redundant Router support has been added.
<Many>	Brand new 3.0 User Interface
9949	Users can now revert a VM to the original template it was created from.
<Many>	State management now included to pod and cluster level from the original host and zone level support.
10405	API Version annotation supported.
10588	XenServer 6.0 is now supported.
10617	Egress rules for security groups now supported.
10657	Capacity now has two levels of threshold support. One threshold is used to alert. The other is to disable resource allocation.
10792	Added ability for admins to set ingress rules that cannot be removed by user.
10796	Sticky session now supported for load balancers.
11303	Added support in login API call to take in a map of parameters that can be passed into the authenticators.
11173	VPN usage is now added as a new usage record.
11598	MTU for secondary storage is now configurable via Global configuration.
11689	Templates now have a SSH enabled flag similar to password enabled flag.
<Many>	vSphere 5.0 now has Beta support.

<Many>	RHEL/Centos 6.2 (KVM) is now supported.
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Issues Fixed in 3.0.0

<Many>	VM Sync has been improved so that VM state should be better reflected between Management Server and Hypervisor.
8150	Template delete events are now recorded after being expunged.
8870	IPs from "Direct-Tagged" networks (shared guest networks) are no longer counted as part of the total number of public IPs.
9036	Migrated VMs will now have their consumed resources reflected properly in the capacity reports.
9842	Network Usage time range aggregation has been improved.
10043	Restarting the Management Server will no longer change a host status from Maintenance to Up.
10067	Extractable attribute can now be edited by administrators.
10195	Added a new VM state of "Unknown" if the host state is in "Alert".
10217	Management Server install will now check for FQDN hostname instead of stopping with an error condition.
10292	UI will no longer allow attaching volumes from one hypervisor to another.
10307	Network Usage will now account for more than one virtual interface.
10354	VMware ISO attach and detach events are now correctly registered.
10362	Disabling VPN will now work correctly even if the virtual router is in a STOPPED state.
10674	Management Server will now alert if it hits a snapshot limit quota.

10779	Port Ranges now work in the UI.
10831	Adding Secondary Storage URL with double slashes will now work.
11056	DHCP issues with Debian/Ubuntu guest OS have been resolved.
11131	VM scheduler will no longer retry in the same zone if that zone has been declared as non-allocable.
11193	Management Server will now alert a link-local IP capacity issue.
<Many>	Added new Global configurations to set limits for the number of guest VMs per hypervisor.
11273	Management Server will no longer attempt to program security group rules for non-reachable hypervisors.
11284	Administrators can now add a Basic Zone without security group support.
11311	Improved listVirtualMachine API call performance.
11387	Public IP of the secondary storage VM will now be correctly returned to the pool after being expunged.
11492	Volume limits are now checked when deploying a new VM.
11542	Management Server will no longer allow same public IP ranged across zones.
11585	Multiple public VLANs are now correctly supported in VMware.
11616	Manual live migration of VMs for KVM is now supported.
11814	General guest VM options for VMware are now supported.
11838	Deleted VM template names can now be re-used.
11902	Added global configuration to allow different NIC drivers for VMware system VM.

11926	Installation of system template will now do mount point validation before proceeding.
<Many>	Many passwords are no longer logged in the Management Server logs.
<Many>	Secondary storage VM has been hardened.
12139	Added a way for Administrators to specify the default system template to use on a global or per zone basis.
12113	Improved re-try algorithm when attempting to copy a template from secondary to primary during failure scenarios.
12162	CreateLoadBalancer public ID was incorrectly published as optional. It is now required.
12192	State NFS handle are now correctly handled for KVM.
12290	Security Groups improvements.
12476	DHCP anti-spoofing fixes.
12481	Account ID is now returned as part of listAccount API.
12705	Source NAT is no longer configured on additional IP of a different network interface.
12782	Capacity now reflects hosts in maintenance mode.
12820	KVM: Attached disks are no longer removed after a VM reboot.
12877	Pagesize = -1 now works correctly.
12848	Removed notion of setting a default network when adding a shared network. Default networks are now specified during VM deployment.
12929	Added domain ID to all events.
13201	Added global configuration to allow administrator to specify default network device drivers for system VMs.

13315	Added BASIC auth http proxy for secondary storage VM.
13396	Escaped double-quotes in JSON responses.
13537	Templates created from snapshots now work with NFSv4.
13777	VMware snapshot errors are now handled better.

Known Issues in 3.0.0

11535	In-line mode for load balancer is not supported for all external devices.
12741	vSphere: maintenance mode will not live migrate system VM to another host.
12840	Capacity view is not available for pods or clusters.
13518	Security Groups are not supported in Advanced Networking.
<Many>	<p>F5 Known Issues:</p> <ul style="list-style-type: none"> • Unable to create load balancer rule for port 22. • No support for changing algorithm once rule has been created. • Source algorithm is not supported. Setting a rule to source will prevent other rules from being created properly. • Virtual router upgrades do not migrate all sticky session parameters correctly.
<Many>	<p>NetScaler Known Issues:</p> <ul style="list-style-type: none"> • When a VM from a load balancer rules is removed, it will also get removed for other load balancer rules of the same port. • Sticky session method "lbCookie" and "appCookie" do not work for any port other than 80. • Virtual router upgrades do not migrate all sticky session parameters correctly. • Once the public port 80 has been mapped to any private port, "A", no other public port can be mapped to that private port, "A".
13336	vSphere: cross cluster volume migration does not work properly.
13359	Programming F5/NetScaler rules can be better optimized.

<Many>	Network restart can fail under certain circumstances.
13883	Multiple NetScalers are not supported in Basic Networking.
13935	vSphere: detaching an ISO from a restored VM instance fails.
13963	vSphere: template download from templates created off of the root volume does not work properly.
<Many>	Disabling a pod or cluster does not prevent resource creation. Only zone level is supported right now.
14024	KVM: clustered LVM is not working properly.
<Many>	Bare metal host provisioning is not working properly.
<Many>	In the Add Zone wizard, there is no step for configuring network traffic labels on the physical network(s). Workaround: Don't enable the zone in the last step of the wizard. Enable the zone only after configuring traffic labels for each traffic type, on each physical network, on each hypervisor in the zone. Set up the labels on the hypervisor host, then configure matching labels through the CloudStack UI.

API Changes from 2.2.14 to 3.0

Change to Behavior of List Commands

There was a major change in how our List* API commands work in CloudStack 3.0 compared to 2.2.x. The rules below apply only for managed resources – those that belong to an account/domain/project. They are irrelevant for the List* commands displaying unmanaged (system) resources, such as hosts, clusters, and external network resources.

When no parameters are passed in to the call, the caller sees only resources owned by the caller (even when the caller is the administrator). Previously, the administrator saw everyone else's resources by default.

When accountName/domainId are passed in:

- The caller sees the resources dedicated to the account specified.
- If the call is executed by a regular user, the user is authorized to specify only the user's own account/domainId.
- If the caller is a domain administrator, CloudStack performs an authorization check to see whether the caller is permitted to view resources for the given account/domainId.

When projectId is passed in, only resources belonging to that project are listed.

When domainId is passed in, the call returns only resources belonging to the domain specified. To see the resources of subdomains, use the parameter isRecursive=true. Again, the regular user can see only resources owned by that user, the root administrator can list anything, and a domain administrator is authorized to see only resources of the administrator's own domain and subdomains.

To see all resources the caller is authorized to see, except for Project resources, use the parameter listAll=true.

To see all Project resources the caller is authorized to see, use the parameter projectId=-1.

There is one API command that doesn't fall under the rules above completely: the listTemplates command. This command has its own flags defining the list rules, as shown in the following table.

listTemplates Flag	Description
Featured	Returns templates that have been marked as featured and public
Self	Returns templates that have been registered or created by the calling user
selfexecutable	Same as self, but only returns templates that are ready to be deployed with
sharedexecutable	Ready templates that have been granted to the calling user by another user
executable	Templates that are owned by the calling user, or public templates, that can be used to deploy a new VM
community	Returns templates that have been marked as public but not featured
All	Returns all templates (only usable by admins)

The CloudStack UI on a general view will display all resources that the logged-in user is authorized to see, except for project resources. To see the project resources, select the project view.

Removed API commands

- createConfiguration (Adds configuration value)
- configureSimulator (Configures simulator)

Added API commands

- assignVirtualMachine (Move a user VM to another user under same domain.)
- restoreVirtualMachine (Restore a VM to original template or specific snapshot)
- createLBStickinessPolicy (Creates a Load Balancer stickiness policy)

- deleteLBStickinessPolicy (Deletes a LB stickiness policy.)
- listLBStickinessPolicies (Lists LBStickiness policies.)
- ldapConfig (Configure the LDAP context for this site.)
- addSwift (Adds Swift.)
- listSwifts (List Swift.)
- migrateVolume (Migrate volume)
- updateStoragePool (Updates a storage pool.)
- authorizeSecurityGroupEgress (Authorizes a particular egress rule for this security group)
- revokeSecurityGroupEgress (Deletes a particular egress rule from this security group)
- createNetworkOffering (Creates a network offering.)
- deleteNetworkOffering (Deletes a network offering.)
- createProject (Creates a project)
- deleteProject (Deletes a project)
- updateProject (Updates a project)
- activateProject (Activates a project)
- suspendProject (Suspends a project)
- listProjects (Lists projects and provides detailed information for listed projects)
- addAccountToProject (Adds account to a project)
- deleteAccountFromProject (Deletes account from the project)
- listProjectAccounts (Lists project's accounts)
- listProjectInvitations (Lists projects and provides detailed information for listed projects)
- updateProjectInvitation (Accepts or declines project invitation)
- deleteProjectInvitation (Accepts or declines project invitation)
- updateHypervisorCapabilities (Updates a hypervisor capabilities.)
- listHypervisorCapabilities (Lists all hypervisor capabilities.)
- createPhysicalNetwork (Creates a physical network)
- deletePhysicalNetwork (Deletes a Physical Network.)
- listPhysicalNetworks (Lists physical networks)
- updatePhysicalNetwork (Updates a physical network)

- listSupportedNetworkServices (Lists all network services provided by CloudStack or for the given Provider.)
- addNetworkServiceProvider (Adds a network serviceProvider to a physical network)
- deleteNetworkServiceProvider (Deletes a Network Service Provider.)
- listNetworkServiceProviders (Lists network serviceproviders for a given physical network.)
- updateNetworkServiceProvider (Updates a network serviceProvider of a physical network)
- addTrafficType (Adds traffic type to a physical network)
- deleteTrafficType (Deletes traffic type of a physical network)
- listTrafficTypes (Lists traffic types of a given physical network.)
- updateTrafficType (Updates traffic type of a physical network)
- listTrafficTypeImplementors (Lists implementors of implementor of a network traffic type or implementors of all network traffic types)
- createStorageNetworkIpRange (Creates a Storage network IP range.)
- deleteStorageNetworkIpRange (Deletes a storage network IP Range.)
- listStorageNetworkIpRange (List a storage network IP range.)
- updateStorageNetworkIpRange (Update a Storage network IP range, only allowed when no IPs in this range have been allocated.)
- listUsageTypes (List Usage Types)
- addF5LoadBalancer (Adds a F5 BigIP load balancer device)
- configureF5LoadBalancer (configures a F5 load balancer device)
- deleteF5LoadBalancer (delete a F5 load balancer device)
- listF5LoadBalancers (lists F5 load balancer devices)
- listF5LoadBalancerNetworks (lists network that are using a F5 load balancer device)
- addSrxFirewall (Adds a SRX firewall device)
- deleteSrxFirewall (delete a SRX firewall device)
- configureSrxFirewall (Configures a SRX firewall device)
- listSrxFirewalls (lists SRX firewall devices in a physical network)
- listSrxFirewallNetworks (lists network that are using SRX firewall device)
- addNetscalerLoadBalancer (Adds a netscaler load balancer device)
- deleteNetscalerLoadBalancer (delete a netscaler load balancer device)
- configureNetscalerLoadBalancer (configures a netscaler load balancer device)

- listNetscalerLoadBalancers (lists netscaler load balancer devices)
- listNetscalerLoadBalancerNetworks (lists network that are using a netscaler load balancer device)
- createVirtualRouterElement (Create a virtual router element.)
- configureVirtualRouterElement (Configures a virtual router element.)
- listVirtualRouterElements (Lists all available virtual router elements.)

Upgrade Instructions

Before Upgrading

Starting in 3.0.2, the usage record format for IP addresses is the same as the rest of the usage types (see bug CS-8222). Instead of a single record with the assignment and release dates, separate records will be generated per aggregation period with start/end dates. After upgrading to 3.0.2, any existing IP address usage records in the old format will no longer be available.

Before upgrading, be sure to query your IPAddress usage records and process them.

Upgrade from 3.0.x to 3.0.2

Perform the following to upgrade from CloudStack 3.0.0 or 3.0.1 to CloudStack 3.0.2.

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

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

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

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

3. 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<mysql_password> cloud > cloud-backup.dmp  
# mysqldump -u root -p<mysql_password> cloud_usage > cloud-usage-backup.dmp
```

4. The resource count table may have duplicate entries which will cause the upgrade to fail. You need to drop those duplicate entries for the same resource type before starting the upgrade. Enter mysql, then run the following command:

```
mysql>delete from cloud.resource_count;
```

Exit mysql. You will generate a new resource count table later, in step 11.

- Download the CloudStack Management Server version 3.0.2 onto each host where it will run from one of the following links. If your operating system is CentOS, use the download file for RHEL.
 - Open-source community: [http://sourceforge.net/projects/cloudstack/files/CloudStack Acton/](http://sourceforge.net/projects/cloudstack/files/CloudStack%20Acton/)
 - Commercial customers: <https://www.citrix.com/English/ss/downloads/>
Commercial customers will need a [MyCitrix account](#).
- Upgrade the CloudStack packages. You should have a file in the form of "CloudStack-3.0.2-N-OSVERSION.tar.gz". Untar the file and then run the install.sh script inside it. Replace the file and directory names below with those you are using:

```
# tar xzf CloudStack-3.0.2-N-OSVERSION.tar.gz
# cd CloudStack-3.0.2-N-OSVERSION
# ./install.sh
```

You should see a few messages as the installer prepares, followed by a list of choices.

- Choose "U" to upgrade the packages.

```
> U
```

- Repeat steps 5 - 7 on each management server node.
- Edit the file schema-301to302.sql. This file can be found under the cloud/setup directory. The exact location may vary depending on your operating system, but a typical path is /usr/share/cloud/setup/db/schema-301to302.sql. Comment out the following line:

```
DROP INDEX `i_host__allocation_state` ON `cloud`.`host`
```

- Start one Management Server. Do not start the other Management Servers.

```
# service cloud-management start
```

- When the UI becomes accessible (at <http://<your.management.server.ip>:8080/client>), log in with the user ID "admin" and password "password." Click Domains, then click the ROOT domain. Click the Update Resource Count button. This will refresh the resource count and generate the table deleted in step 4.



- Start the other Management Servers. Perform this on each Management Server host.

```
# service cloud-management start
```

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

```
# service cloud-usage start
```

14. (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.

On each KVM host:

- a. Copy the CloudStack 3.0.2 .tgz download to the host, untar it, and cd into the resulting directory.
- b. Stop the running agent.

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

- c. Update the agent software.

```
# ./install.sh
```

Choose "U" to update the packages.

- d. Start the agent.

```
# service cloud-agent start
```

- e. Insert a valid username and password into the host_details table for each KVM node. Substitute your own host ID, username, and password in the commands below and submit them to the MySQL server:

```
insert into cloud.host_details (host_id, name, value) VALUES (the-id-of-host,
"username", the-actual-host-user-name)

insert into cloud.host_details (host_id, name, value) VALUES (the-id-of-host,
"password", the-actual-host-password)
```

15. In the CloudStack Administrator UI, 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 Up state. If the hosts do not come to the Up state, contact support.
16. Stop, then start, all Secondary Storage VMs, Console Proxy VMs, and virtual routers. A script is provided to implement this. Run the script once on one management server. The script requires the 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 "-a" argument. For example:

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

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

17. To verify the upgrade was successful, you can run the following commands.

- a. Check for CloudStack packages.

```
# rpm -qa | grep -i cloud
```

The expected output is like the following:

```
cloud-core-3.0.2-1.el6.x86_64
cloud-client-ui-3.0.2-1.el6.x86_64
cloud-utils-3.0.2-1.el6.x86_64
cloud-python-3.0.2-1.el6.x86_64
cloud-server-3.0.2-1.el6.x86_64
cloud-agent-scripts-3.0.2-1.el6.x86_64
cloud-client-3.0.2-1.el6.x86_64
cloud-deps-3.0.2-1.el6.x86_64
cloud-setup-3.0.2-1.el6.x86_64
```

- b. Start MySQL and get the CloudStack version.

```
mysql> select * from cloud.version order by id desc limit 1;
```

The expected output is like the following:

```
+-----+-----+-----+-----+
| id | version | updated          | step      |
+-----+-----+-----+-----+
| 2 | 3.0.2 | 2012-04-23 06:42:06 | Complete |
+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

Upgrade from 2.2.x to 3.0.2

1. If you are using CloudStack 2.2.0 - 2.2.13, first upgrade to 2.2.14 using the instructions in the 2.2.14 Release Notes.

WARNING: (KVM only) 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 3.0.2.
2. While running the 2.2.14 system, log in to the CloudStack UI as root administrator.
3. Using the CloudStack UI, add a new System VM template for each hypervisor type that is used in your cloud. In each CloudStack zone, add a system VM template for each hypervisor used in that zone.

Depending on the hypervisor, you MUST use the following values in all input fields (do not change these):

XenServer:

- Name: systemvm-xenserver-3.0.0
- Display Text: systemvm-xenserver-3.0.0
- URL: <http://download.cloud.com/templates/acton/acton-systemvm-02062012.vhd.bz2>
- Zone: Choose the zone where this hypervisor is used
- OS Type: Debian GNU/Linux 5.0 (32-bit)
- Hypervisor: XenServer
- Format: VHD
- Password Enabled: no
- Public: no
- Featured: no

KVM:

- Name: systemvm-kvm-3.0.0
- Display Text: systemvm-kvm-3.0.0
- URL: <http://download.cloud.com/templates/acton/acton-systemvm-02062012.qcow2.bz2>
- Zone: Choose the zone where this hypervisor is used
- OS Type: Debian GNU/Linux 5.0 (32-bit)
- Hypervisor: KVM
- Format: QCOW2
- Password Enabled: no
- Public: no
- Featured: no

VMware:

- Name: systemvm-vmware-3.0.0
- Display Text: systemvm-vmware-3.0.00
- URL: <http://download.cloud.com/templates/acton/acton-systemvm-02062012.ova>
- Zone: Choose the zone where this hypervisor is used
- OS Type: Debian GNU/Linux 5.0 (32-bit)
- Hypervisor: VMware
- Format: OVA
- Password Enabled: no
- Public: no
- Featured: no

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

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.

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

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

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

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

7. 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<mysql_password> cloud > cloud-backup.dmp
# mysqldump -u root -p<mysql_password> cloud_usage > cloud-usage-backup.dmp
```

8. The resource count table may have duplicate entries which will cause the upgrade to fail. You need to drop those duplicate entries for the same resource type before starting the upgrade. Enter mysql, then run the following command:

```
mysql> delete from cloud.resource_count;
```

Exit mysql. You will generate a new resource count table later, in step 17.

9. Download the CloudStack Management Server version 3.0.2 onto each host where it will run from one of the following links. If your operating system is CentOS, use the download file for RHEL.

- Open-source community: [http://sourceforge.net/projects/cloudstack/files/CloudStack Acton/](http://sourceforge.net/projects/cloudstack/files/CloudStack%20Acton/)
- Commercial customers: <https://www.citrix.com/English/ss/downloads/>

You will need a [MyCitrix account](#).

10. Upgrade the CloudStack packages. You should have a file in the form of "CloudStack-3.0.2-N-OSVERSION.tar.gz". Untar the file and then run the install.sh script inside it. Replace the file and directory names below with your own:

```
# tar xzf CloudStack-3.0.2-N-OSVERSION.tar.gz
# cd CloudStack-3.0.2-N-OSVERSION
# ./install.sh
```

You should see a few messages as the installer prepares, followed by a list of choices.

11. Choose "U" to upgrade the packages.

```
> U
```

12. 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 3.0.2.

- a. Make a backup copy of your file /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 override /etc/cloud/management/components.xml:

```
# cp /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/cloud/management/components.xml
```

13. If you have made changes to your existing copy of the file /etc/cloud/management/db.properties 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 3.0.2. Repeat this step on every management server node.

- 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 override /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/cloud/management/db.properties
```

14. 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 on page 15.
 - (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 CloudStack 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.

```
# cloud-setup-encryption -e <encryption_type> -m <management_server_key> -k
<database_key>
```

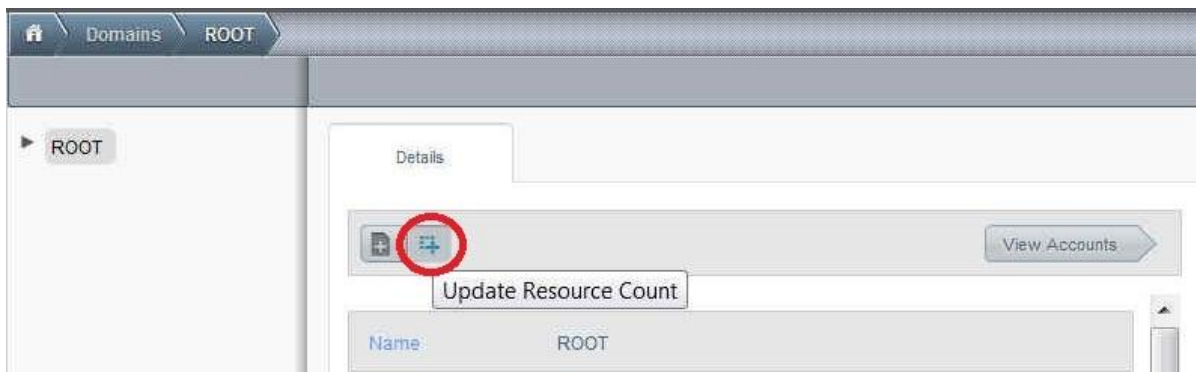
When used without arguments, as in the following example, the default encryption type and keys will be used:

```
# cloud-setup-encryption
```

15. Repeat steps 9 - 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.
16. Start one Management Server. Do not start the other Management Servers yet.

```
# service cloud-management start
```

17. When the UI becomes accessible (at `http://<your.management.server.ip>:8080/client`), log in with the user ID "admin" and your root administrator password. Click Domains, then click the ROOT domain. Click the Update Resource Count button. This will refresh the resource count and generate the table deleted in step 8.



18. Start the other Management Servers by running this command on each Management Server host:

```
# service cloud-management start
```

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

```
# service cloud-usage start
```

20. In the CloudStack Administrator UI, check the status of the hosts. All hosts should come to Up state (except for those that you know to be offline). You may need to wait 20 or 30 minutes depending on the number of hosts you have. Do not proceed to the next step until the hosts show in Up state. If the hosts do not come to the Up state, contact support.

21. Run the following command to stop, then start, all Secondary Storage VMs, Console Proxy VMs, and virtual routers. Run the command once on one management server. Provide the IP address of the MySQL instance, the MySQL user name, and the database password for that user. In addition to those parameters, provide the "-a" argument.

For example:

```
# nohup cloud-sysvmadm -d 192.168.1.5 -u cloud -p password -a > sysvm.log 2>&1 &
```

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

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).
```

22. 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:

- o SSH in 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.

```
# ssh -i <private-key-path> <link-local-ip> -p 3922
```

- o Run the following command on the XenServer or KVM host on which the system VM is present:

```
# cat /etc/cloudstack-release
```

The output should be like the following:

```
Cloudstack Release 3.0 Mon May 7 15:10:04 PST 2012
```

ESXi:

- o 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.

```
ssh -i <private-key-path> <private-ip> -p 3922
```

- o Run the following command on the Management Server:

```
# cat /etc/cloudstack-release
```

The output should be like the following:

```
Cloudstack Release 3.0 Mon May 7 15:10:04 PST 2012
```

Upgrade from 2.1.x to 3.0.2

Direct upgrades from CloudStack 2.1.0 - 2.1.10 to 3.0.2 are not supported. CloudStack must first be upgraded to version 2.2.14. For information on how to upgrade from 2.1.x to 2.2.14, see the CloudStack 2.2.14 Release Notes.