CloudStack Features

For CloudStack Version 3.0

Revised February 16, 2012

© 2011, 2012 Citrix Systems, Inc. All rights reserved. Specifications are subject to change without notice. Citrix Systems, Inc., the Citrix logo, Citrix XenServer, Citrix XenCenter, and CloudStack are trademarks or registered trademarks of Citrix Systems, Inc. All other brands or products are trademarks or registered trademarks of their respective holders.

# What Is CloudStack?

CloudStack™ is an open source software platform that pools computing resources to build public, private, and hybrid Infrastructure as a Service (IaaS) clouds. CloudStack manages the network, storage, and compute nodes that make up a cloud infrastructure. Use CloudStack to deploy, manage, and configure cloud computing environments.

Typical users are service providers and enterprises. With CloudStack, you can:

* Set up an on-demand, elastic cloud computing service. Service providers can sell self‑service virtual machine instances, storage volumes, and networking configurations over the Internet.
* Set up an on-premise private cloud for use by employees. Rather than managing virtual machines in the same way as physical machines, with CloudStack an enterprise can offer self-service virtual machines to users without involving IT departments.



# What Can CloudStack Do?

**Multiple Hypervisor Support**

CloudStack works with a variety of hypervisors. A single cloud deployment can contain multiple hypervisor implementations. You have the complete freedom to choose the right hypervisor for your workload. CloudStack is designed to work with open source Xen and KVM hypervisors as well as enterprise-grade hypervisors such as Citrix XenServer, VMware vSphere, and Oracle VM (OVM).

**Massively Scalable Infrastructure Management**

CloudStack can manage tens of thousands of servers installed in multiple geographically distributed datacenters. The centralized management server scales linearly, eliminating the need for intermediate cluster-level management servers. No single component failure can cause cloud-wide outage. Periodic maintenance of the management server can be performed without affecting the functioning of virtual machines running in the cloud.

**Automatic Configuration Management**

CloudStack automatically configures each guest virtual machine’s networking and storage settings.

CloudStack internally manages a pool of virtual appliances to support the cloud itself. These appliances offer services such as firewalling, routing, DHCP, VPN access, console proxy, storage access, and storage replication. The extensive use of virtual appliances greatly simplifies the installation, configuration, and on-going management of a cloud deployment.

**Graphical User Interface**

CloudStack offers an administrator's Web interface, used for provisioning and managing the cloud, as well as an end-user's Web interface, used for running VMs and managing VM templates. The UI can be customized to reflect the desired service provider or enterprise look and feel.

**API and Extensibility**

CloudStack provides an API that gives programmatic access to all the management features available in the UI. The API is maintained and documented. This API enables the creation of command line tools and new user interfaces to suit particular needs. See the Developer’s Guide and API Reference, both available at <http://docs.cloud.com/CloudStack_Documentation>.

The CloudStack platform pluggable allocation architecture allows the creation of new types of allocators for the selection of storage and Hosts. See the Allocator Implementation Guide (<http://docs.cloud.com/CloudStack_Documentation/Allocator_Implementation_Guide>).

**High Availability**

The CloudStack platform has a number of features to increase the availability of the system. The Management Server itself may be deployed in a multi-node installation where the servers are load balanced. MySQL may be configured to use replication to provide for a manual failover in the event of database loss. For the Hosts, the CloudStack platform supports NIC bonding and the use of separate networks for storage as well as iSCSI Multipath.

# Cloud Infrastructure

* **Software and Hardware.** A CloudStack installation consists of two parts: the CloudStack Management Server software and the cloud infrastructure that it manages, including resources such as hosts, storage devices, and IP addresses.
* **Networking models.** CloudStack offers two types of networking scenario: basic and advanced. Basic networking provides AWS-style networking with a single network where guest isolation can be provided through layer-3 means such as security groups (IP address source filtering). Advanced networking is for more sophisticated topologies and provides flexibility in defining virtual guest networks.
* **Physical Network Management.** A physical network is the actual network hardware and wiring in a zone. A zone can have multiple physical networks. CloudStack lets administrators add/remove/update physical networks, configure VLANs, add firewalls and load balancers, configure IP addresses, set network speed, and set the type of traffic carried on the physical network (guest VM traffic, Internet traffic, CloudStack internal traffic, and more).
* **Virtual Networks.** A virtual network is a logical construct that enables multi-tenancy on a single physical network. In CloudStack, a virtual network can be shared or 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.
* **Storage.** CloudStack works with iSCSI and NFS servers, local disk storage, and OpenStack Object Storage (Swift).
* **Security.** CloudStack uses SSH keys, an API secret key, VPN passwords, a CloudStack database password, and compute node root passwords to ensure security. All these sensitive passwords and secret keys are automatically encrypted.

# User Services

In addition to the physical and logical infrastructure of your cloud, and the CloudStack software and servers, you also need a layer of user services so that people can actually make use of the cloud.

* **End-user UI.** Users can view and manage their VMs and other resources.
* **Virtual Machines.** Hosts in a CloudStack deployment run hypervisor software and provide the computing resources to run guest virtual machines for end users. Guest VMs can communicate with each other using shared infrastructure with the security and user perception that the guests have a private LAN. End users and administrators can stop, start, reboot, and destroy VMs. Ingress and egress rules can be defined to control network traffic to and from the VMs.
* **Offerings.** A user creating a new virtual machine instance can make a variety of choices about its characteristics and capabilities. CloudStack provides several ways for cloud administrators to present users with choices when creating a new instance, including VM templates to determine the OS and other installed apps, data disk size, CPU speed, network features, and more.
* **Usage Tracking.** Commercial clouds can record what services and resources users are consuming and charge them for that usage.
* **Projects.** CloudStack 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.
* **LDAP Authentication.** An external LDAP server such as Microsoft Active Directory or ApacheDS can be used for end-user authentication.
* **Network Management.** End users can acquire IP addresses from the available pool, create firewall rules and load balancer rules, and create new guest networks.