



What's new in Apache CloudStack 4.17

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About Me

- **Senior Software Engineer @ ShapeBlue**
- **Apache CloudStack Committer and PMC member**
- **Release Manager for:**
 - CloudStack 4.16.0
 - CloudStack 4.17.0
- **Dad, husband, tennis and football (soccer) fan**

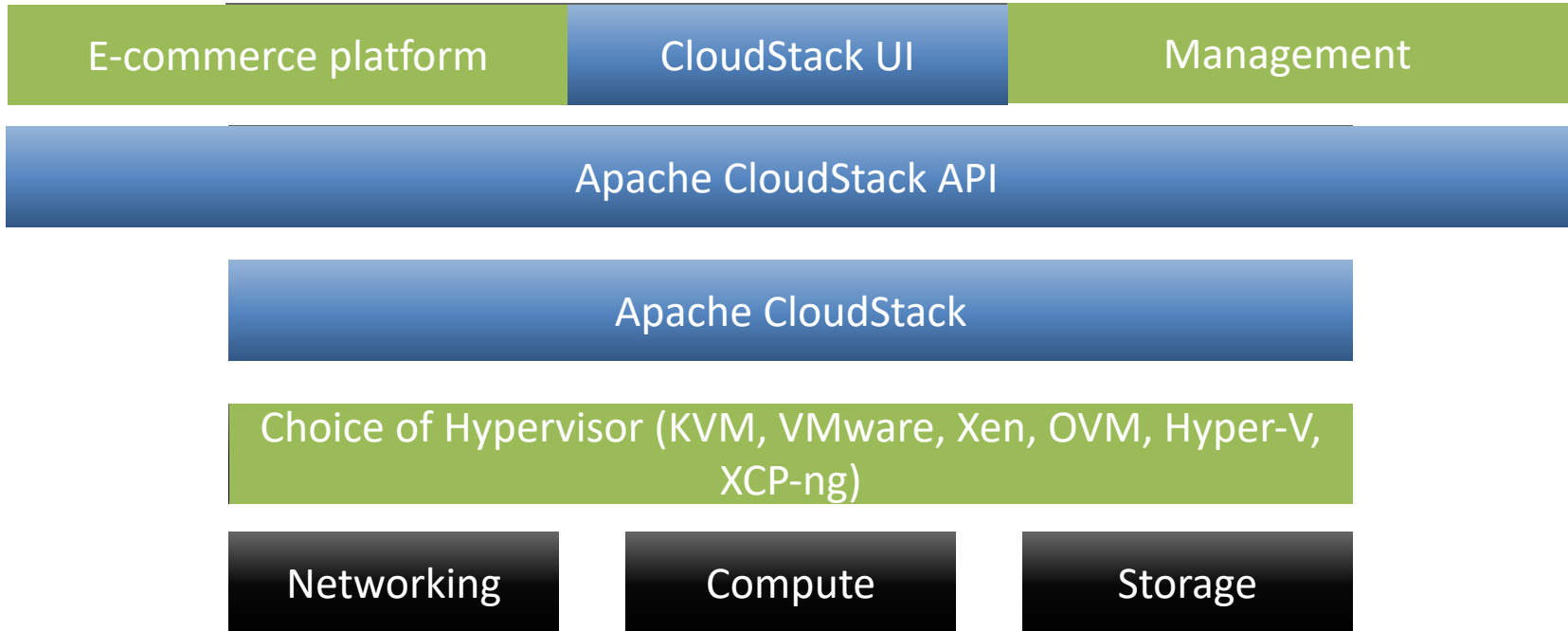


What is Apache CloudStack

- **Apache CloudStack is a scalable, multi-tenant, open-source, purpose-built, cloud orchestration platform for delivering turnkey Infrastructure-as-a-Service (IaaS) clouds.**



How to build an IaaS cloud



What can you do with CloudStack?

- **Self service of all resources – compute, storage and networking – with no requirements for highly skilled technical staff**
- **Automation of all provisioning and management through API**
- **Examples:**
 - Create Virtual Machines
 - All virtual machine lifecycle actions: start/stop/delete/storage/networking
 - Manage storage volumes
 - Create Isolated, Shared and Multi-Tiered Networks
 - Manage firewall and port-forwarding rules
 - Manage Network services such as Load Balancing, Static and Source NAT, VPNs, Global Load Balancing and Autoscaling



- Last Releases Information
- VR Zero Downtime upgrades and Live Patching
- IPv6 support for Isolated and VPC Networks
- StorPool Storage Plugin
- Self-service Network Improvements
- Multi-account Network Access
- Multiple SSH Keys



- Structured System Events
- Instance and Volumes migration improvements
- More flexible service offerings
- Server Status Report
- KVM multiple local storage
- Reserve and release Public Ips
- Support for Ubuntu 22.04 (4.17.1.0)



Last Releases Information

- 4.17.0.0 Released 7 June 2022
- 383 new features, improvements and bug fixes
- 16 major new features
- 4.17 is an LTS release
- EOL. Jan 2024

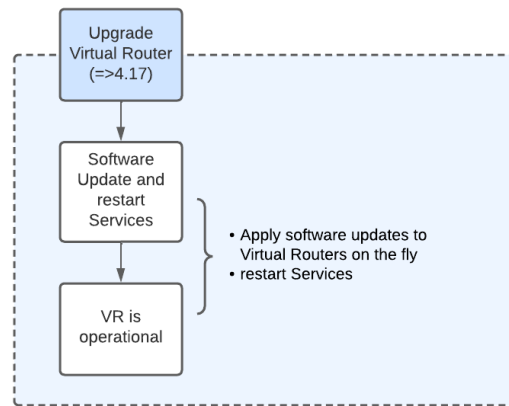
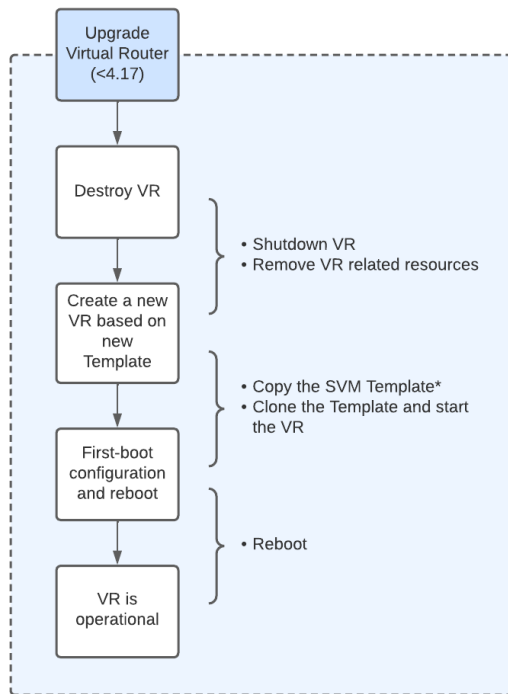
- 4.17.0.1 (and 4.16.1.1) Released [18 July 2022 \(CVE*\)](#)
- 4.17.1.0 Released 27 September 2022



*“Upgrading CloudStack is fast
and reliableexcept the
Virtual Routers”*



Zero Downtime upgrades and Virtual Router Live Patching



Zero Downtime upgrades and Virtual Router Live Patching

- No VR shutdown when CloudStack is upgraded
- VR Live patching instead of destroy/create and reboot during VR configuration
- Zero downtime when updating the VR
 - No TCP packets lost
 - Services restarted in ms
- No more long maintenance windows



Zero Downtime upgrades and Virtual Router Live Patching

- haproxy, apache2, dnsmasq Services will need to be re-started
- Restart <1s
- Network reprogramming may be affected by complexity of network (i.e number load balancers, firewall rules,etc on VR)

ACS Version	Upgrade Version	Live Patching Support	Reason / Comment
<=4.13	4.17+	No	Update in the openJDK version
4.14	4.17+	Yes	May notice some issue with remove access VPN due to older version of Strongswan
>=4.15	4.17+	Yes	N/A

VR Zero Downtime upgrades and Live Patching

Home / Virtual Routers Refresh

<input type="checkbox"/>	Name	State	IP Address	Network Name	VPC	Redundant state	Template Version	Software Version	Host	Account	Zone	Requires Upgrade
<input type="checkbox"/>	r-6-VM	Running	10.0.55.45	test1		UNKNOWN	4.17.0	4.17.0.0	10.0.33.224	admin	ref-tr1-2882-v-M7-boris-stoyanov	No
<input type="checkbox"/>	r-5-VM	Running	10.0.55.44	test2		UNKNOWN	4.16.1	N/A	10.0.33.224	admin	ref-tr1-2882-v-M7-boris-stoyanov	Yes
<input type="checkbox"/>	r-4-VM	Running	10.0.55.43	test3		UNKNOWN	4.16.1	4.17.0.0	10.0.33.227	admin	ref-tr1-2882-v-M7-boris-stoyanov	No

Showing 1-3 of 3 items 1 / page 20

IPv6 support for Isolated and VPC Networks

The screenshot displays the CloudStack management console interface for a network named 'net6'. The network is configured as 'Isolated' with 'vlan://1022' and 'IPv4 + IPv6 (Dual Stack)'. The status is 'Implemented'. The network ID is 'c3d22bb2-5564-45bf-9440-65a5a1401964'. The network offering is 'dualstack'. The zone is 'pr5786-14021-vmware-67u3'. The account is 'admin'.

The 'IPv6 Firewall' configuration is shown in the 'Details' tab. The default egress policy is 'Deny', and outgoing traffic matching the following egress rules will be 'Allowed'.

Source CIDR	Destination CIDR	Traffic Type	Protocol	Start Port	End Port	Action	
<input type="text"/>	<input type="text"/>	Ingress	TCP	<input type="text"/>	<input type="text"/>	<input type="button" value="Add"/>	
<input type="checkbox"/>	Source CIDR	Destination CIDR	Traffic Type	Protocol	ICMP Type / Start Port	ICMP Code / End Port	Action
<input type="checkbox"/>	:::0	fd0c:c87e:9440:1000::/52	Egress	TCP	2288	2288	<input type="button" value="Remove"/>
<input type="checkbox"/>	:::0	:::0	Ingress	ICMP	-1	-1	<input type="button" value="Remove"/>

Total 2 items < 1 > 10 / page

- CloudStack Isolated and VPC Network now support IPv6
- The IPv6 addresses are configured directly in the VM NIC
- Dual stack is supported but IPv4 continue using NAT
- Supports only firewall configuration in this phase
- Uses static route in the VR to enable IPv6 traffic to the internet

IPv6 support for Isolated and VPC Networks

The screenshot displays the CloudStack management console interface for configuring a network. The main window shows the 'net6' network details, including its status (Implemented), ID (c3d22b62-5564-456f-9440-6505a1401964), and network offering (Dual Stack). A modal window titled 'Add Network Offering' is open, showing fields for Name, Description, Network Rate, Guest Type (Isolated, L2, Shared), and Internet Protocol (IPv4, IPv4 + IPv6 (Dual Stack)). A warning message states: 'WARNING: IPv6 supported networks use static routing and will require upstream routes to be configured manually.' The 'Add upstream IPv6 routes' section shows a route: 'fd17:ac56:1234:1a2b::/64 via 2005:1234:1000:a3ff:6c00:3'.

- Root admin register a /64 or bigger IPv6 prefix/range
- Users can assign a /64 IPv6 prefix/range creating isolated network or VPC tier
- SLAAC is supported and used, there is no DHCPv6 support
- All systemvms (ssvm, cpvm, VRs etc) with a public NIC should get automatic/SLAAC IPv6 address if zone has ipv6 /64 prefix dedicated/allocated.

- **To come in future releases**

Dynamic routing using BGP & OSPF

Support for further services (LB, port redirect, etc)



StorPool Integration

Add primary storage ? ×

Scope ?

Zone ▼

Hypervisor ?

KVM ▼

* Zone ?

ref-trl-3103-k-M7-marco-sinhoreli ▼

* Name ?

storpool01

* Protocol ?

custom ▼

* Provider ?

StorPool ▼

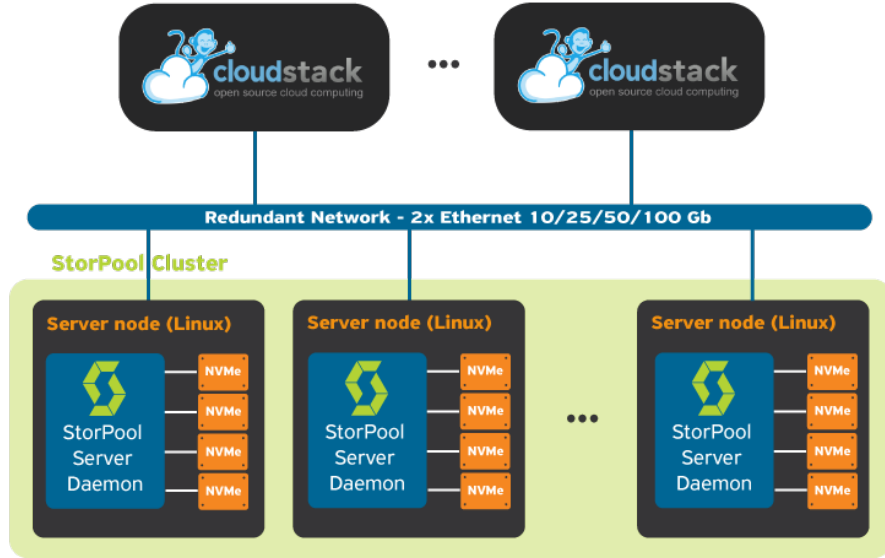
Managed ?

- StorPool Plugin for Apache CloudStack
- CloudStack can directly manage storage pools
- Provides block devices as raw disk images for KVM hosts
- Enable a range of VM operations for volumes and snapshots



StorPool
DISTRIBUTED STORAGE

StorPool Storage Plugin



- This integration enables users to operate natively StorPool storage for KVM hosts
- Enables operations like cloned provisioning, instant snapshots, thin provisioning, backup/DR and QoS policies per virtual disk and/or per Instance

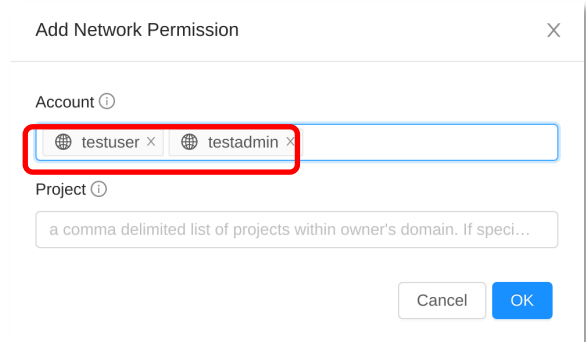
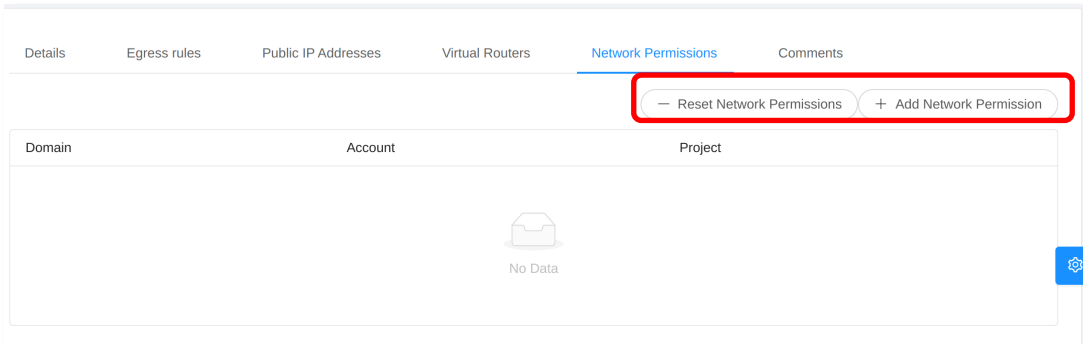
Self-service Network Improvements

- Enable regular users to create Shared Networks and Private Gateways
- Remove the need to ask to admin to create these resources
- Also, users can associate existing Isolated, VPC tier or L2 Networks as Shared Network or VPC Private Gateway
- The Shared Network Offering must be set to *specifyvlan=false* to enable users to create Shared Network without specified VLAN

The screenshot displays the 'Add Network Offering' dialog box in the AWS Management Console. The dialog is open to the 'Shared' tab. The 'Name' field is 'Shared-novlan', the 'Description' is 'Shared network without specified vlan', and the 'Guest Type' is 'Shared'. The 'Specify VLAN' toggle is turned off. The 'Network Offering' dropdown is set to 'Shared network without specified vlan'. The 'Associated Network' dropdown is set to 'Associated Network'. The 'IPv4 Gateway' is '10.11.101.254' and the 'Netmask' is '255.255.255.0'. The 'IPv4 Start IP' is '10.11.101.10' and the 'IPv4 End IP' is '10.11.101.20'.

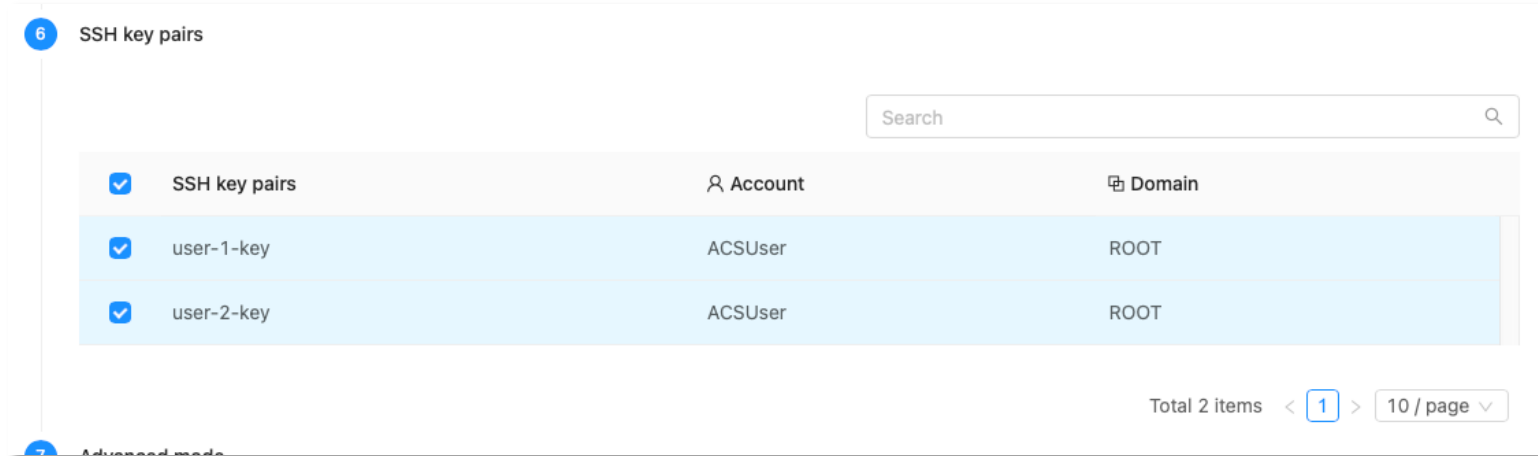
Multi-account Network Access

- This new feature enables users to share their own Networks with Accounts when in the same Domain
- Reduces the application overhead when accessing resources from an application hosted in different Account Networks, reducing the number of hops
- Note: administration of the network can only be performed by the original Account.



Multiple SSH Keys

- Enable users to add multiple SSH Keys for Instances
- No need to edit ~/.ssh/Authorized_keys to include new users
- Simplifies security management when managing users access to the Virtual Machines

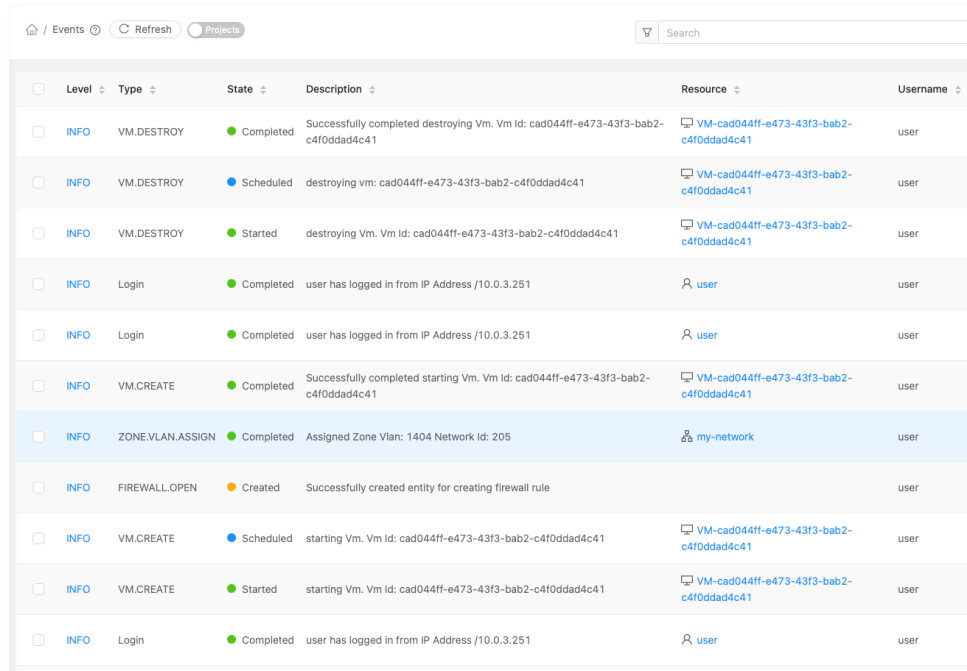


The screenshot shows the AWS IAM console interface for managing SSH key pairs. The page title is "SSH key pairs" with a search bar at the top right. Below the search bar is a table with three rows, each representing an SSH key pair. The first row is a header row with columns for "SSH key pairs", "Account", and "Domain". The second and third rows are data rows for "user-1-key" and "user-2-key", both associated with the "ACSUser" account and the "ROOT" domain. At the bottom right of the table, it indicates "Total 2 items" and "10 / page".

SSH key pairs	Account	Domain
user-1-key	ACSUser	ROOT
user-2-key	ACSUser	ROOT

Structured System Events

- Simplify the traceability and auditability of user operations
- Allows events to be searched, sorted and filtered
- Events specific to each object in UI
- Easy to navigate from the event to the related object
- Accessible through the API, being able to integrate with 3rd party systems.
- Event descriptions maintained for backwards compatibility



The screenshot displays a web interface for viewing system events. At the top, there are navigation elements: a home icon, 'Events', a refresh button, and a 'Projects' dropdown. A search bar is located on the right. Below the navigation is a table with columns for checkboxes, Level, Type, State, Description, Resource, and Username. The table contains 12 rows of event data, including VM destruction, login, and VM creation events.

<input type="checkbox"/>	Level	Type	State	Description	Resource	Username
<input type="checkbox"/>	INFO	VM.DESTROY	Completed	Successfully completed destroying Vm. Vm id: cad044ff-e473-43f3-bab2-c4f0ddad4c41	VM-cad044ff-e473-43f3-bab2-c4f0ddad4c41	user
<input type="checkbox"/>	INFO	VM.DESTROY	Scheduled	destroying vm: cad044ff-e473-43f3-bab2-c4f0ddad4c41	VM-cad044ff-e473-43f3-bab2-c4f0ddad4c41	user
<input type="checkbox"/>	INFO	VM.DESTROY	Started	destroying Vm. Vm id: cad044ff-e473-43f3-bab2-c4f0ddad4c41	VM-cad044ff-e473-43f3-bab2-c4f0ddad4c41	user
<input type="checkbox"/>	INFO	Login	Completed	user has logged in from IP Address /10.0.3.251	user	user
<input type="checkbox"/>	INFO	Login	Completed	user has logged in from IP Address /10.0.3.251	user	user
<input type="checkbox"/>	INFO	VM.CREATE	Completed	Successfully completed starting Vm. Vm id: cad044ff-e473-43f3-bab2-c4f0ddad4c41	VM-cad044ff-e473-43f3-bab2-c4f0ddad4c41	user
<input type="checkbox"/>	INFO	ZONE.VLAN.ASSIGN	Completed	Assigned Zone Vlan: 1404 Network id: 205	my-network	user
<input type="checkbox"/>	INFO	FIREWALL.OPEN	Created	Successfully created entity for creating firewall rule		user
<input type="checkbox"/>	INFO	VM.CREATE	Scheduled	starting Vm. Vm id: cad044ff-e473-43f3-bab2-c4f0ddad4c41	VM-cad044ff-e473-43f3-bab2-c4f0ddad4c41	user
<input type="checkbox"/>	INFO	VM.CREATE	Started	starting Vm. Vm id: cad044ff-e473-43f3-bab2-c4f0ddad4c41	VM-cad044ff-e473-43f3-bab2-c4f0ddad4c41	user
<input type="checkbox"/>	INFO	Login	Completed	user has logged in from IP Address /10.0.3.251	user	user

More flexible service offerings

- Before 4.17, ROOT Volumes and Disk Offerings were decoupled
- Redefines the relationship between the Service Offerings used for Instance Root Disks
- Enables users to change the Root Volume characteristics based on Disk Offering
- The existing model is still fully supported if required
- Increases the Service Providers offerings, considering that in most cases, users only use the ROOT Volume in their Instances.

The screenshot displays the CloudStack management console interface. It is divided into two main sections: 'Compute Offering' and 'Disk Offering'. Both sections include a search bar and a table of offerings.

Compute Offering Table:

Compute Offering	CPU	Memory
<input checked="" type="radio"/> Small Instance	1 CPU x 0.50 Ghz	512 MB
<input type="radio"/> Medium Instance	1 CPU x 1.00 Ghz	1024 MB
<input type="radio"/> Tiny Instance	1 CPU x 0.10 Ghz	128 MB
<input type="radio"/> Tiny Instance	1 CPU x 0.10 Ghz	128 MB
<input type="radio"/> Tiny Instance	1 CPU x 0.10 Ghz	128 MB

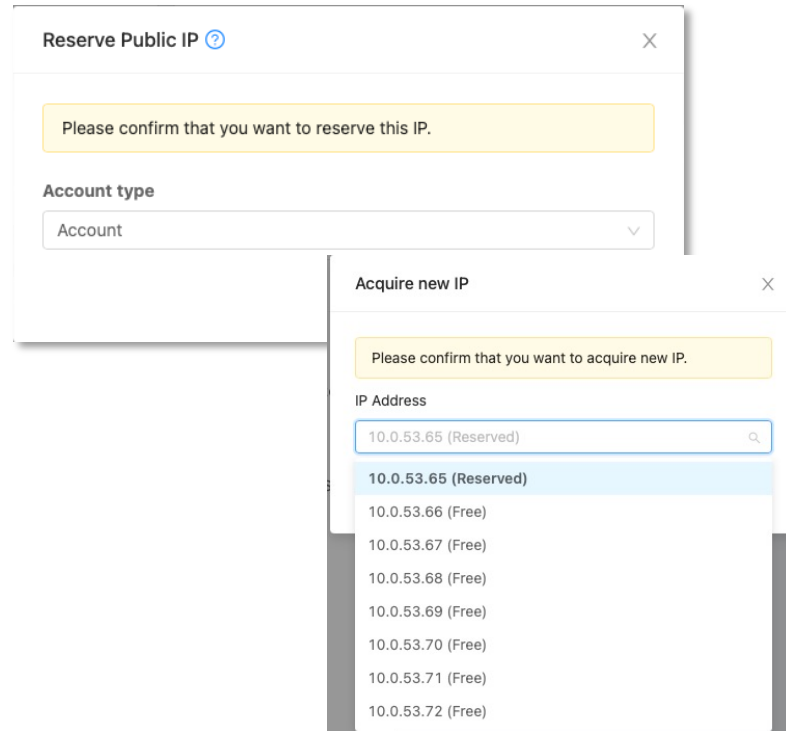
Override Root Disk Offering:

Disk Offering Table:

Disk Offering	Disk Size (in GB)	Min IOPS / Max IOPS
<input type="radio"/> Small	5 GB	-
<input type="radio"/> Medium	20 GB	-
<input type="radio"/> Large	100 GB	-
<input type="radio"/> Custom	Custom Disk Size	-
<input type="radio"/> Disk offering	1 GB	-

Reserve and release Public IPs

- Users can now reserve Public IPs
- The reserved Public IP is locked for the user to be used later in their networks
- Allows users to register the IP on the DNS server even before they are allocated to a network



Server Status Report

- Gives admins the ability to see the status/health Management Servers Usage Server Database Server
- Available in the UI and API for integration/monitoring purposes

Management servers / ref-tri-3103-k-M7-marco-sinhorelli-mgmt1.sofia.shapeblue.com

Refresh

ref-tri-3103-k-M7-marco-sinhorelli-mgmt1.sofia.shapeblue.com

4.17.0.0-SNAPSHOT

Status
● Up

ID
215b45fc-7343-4ac8-b810-6189e33e944d

Collection time
06 Jun 2022 10:42:49

A Usage Server is installed locally
true

The db runs locally
true

Last Management Server start time
18 May 2022 12:42:17

Last stop time for this management server
18 May 2022 12:42:16

Boot time of the management server machine
18 May 2022 12:35:36

Version
4.17.0.0-SNAPSHOT

Log file information
/var/log/cloudstack/management/management-server.log using: 18M on disk /dev/mapper/centos-root mounted on / (21% full)

Total CPU capacity for all cores in MHz
4200

1, 5 and 15 minute load averages
[0.03, 0.04, 0.05]

DB/Usage server Refresh

Database Statistics		Usage Server Statistics	
Name	Value	Name	Value
collectiontime	06 Jun 2022 10:41:48	collectiontime	06 Jun 2022 10:42:11
hostname	10.0.33.127	hostname	ref-tri-3103-k-M7-marco-sinhorelli-mgmt1/10.0.33.127
connection attempts since start	1364	state	Up
uptime in seconds	1634720	lastheartbeat	06 Jun 2022 10:42:09
version	5.5.68-MariaDB	lastsuccessfuljob	06 Jun 2022 01:59:59
versioncomment	MariaDB Server		
queries	75833285		
queries/second over the latest stats collection period	132		
queries/seconds-2	42		
queries/seconds-3	71		

Note: Only the usage server that owns the active usage job is shown here.

Other New features

- **Multiple local storage for KVM hosts**
- **Improvements to Instance and volume migration**
- **Support for Ubuntu 22.04 on management server and KVM hosts (since 4.17.1.0)**



Resources

- **Download CloudStack 4.17**
<https://cloudstack.apache.org/downloads.html>
- **Documentation**
<https://docs.cloudstack.apache.org/en/4.17.1.0/>
- **What's New Blog:** <https://blogs.apache.org/cloudstack/entry/what-s-new-in-apache1>
- **Mailing lists**
<https://cloudstack.apache.org/mailling-lists.html>



Thank you!

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