



Apache
cloudstack

STORAGE AND NETWORKING

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- Storage
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In Apache CloudStack, **primary and secondary storage** are two key components responsible for managing and storing data within the cloud infrastructure.

1.Primary Storage:

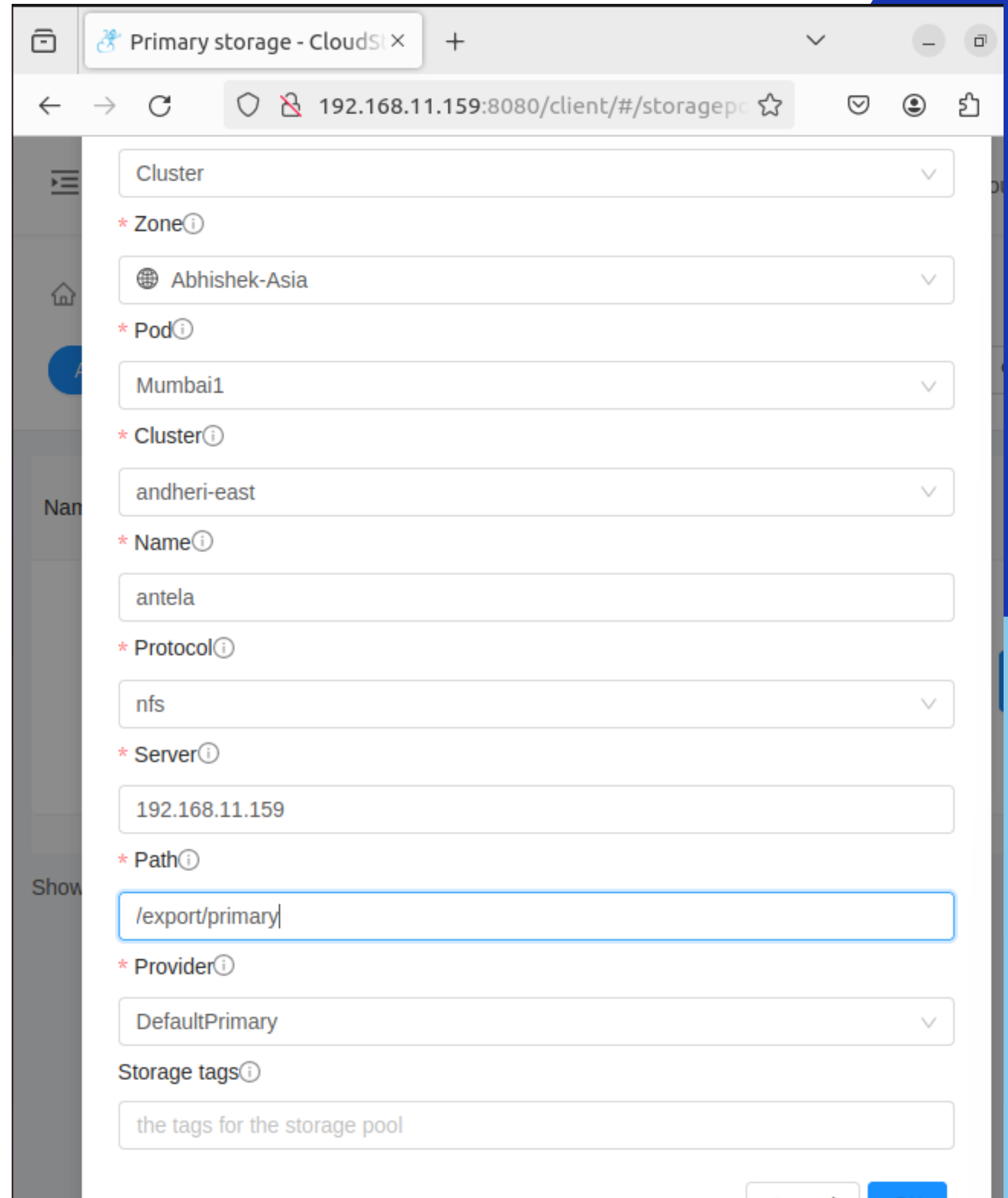
- 1. Role:** Primary storage is the storage system where the virtual machine disk images (VMDKs, VHDs) reside. It is **directly attached to the hypervisor hosts** and provides fast access to the virtual machine disks.
- 2. Usage:** When a virtual machine is created, its disk image is typically stored on the primary storage. During operation, the VM reads from and writes to its disk image on the primary storage.
- 3. Examples:** Primary storage can be provided by various storage technologies such as NFS (Network File System), iSCSI (Internet Small Computer System Interface), Fibre Channel, or local storage directly attached to the hypervisor hosts.
- 4. Characteristics:** Primary storage is often **high-performance, with low latency and high throughput**, suitable for hosting virtual machine disks that require fast access.

2.Secondary Storage:

- 1. Role:** Secondary storage is **used for storing system templates, ISO images, snapshots, and backups** within the CloudStack infrastructure.
- 2. Usage:** System templates (pre-configured operating system images) and ISO images (installation media) are stored on secondary storage and can be used to create new virtual machines. Snapshots and backups of virtual machine disks may also be stored on secondary storage for data protection and disaster recovery purposes.
- 3. Examples:** Secondary storage can be implemented using file-based storage systems such as NFS or object storage systems like Amazon S3 or local storage accessible to the CloudStack management server.
- 4. Characteristics:** Secondary storage is often **optimized for capacity rather than performance**, as it typically stores large amounts of data such as templates, ISOs, snapshots, and backups.

ADD PRIMARY STORAGE

- Primary storage can be accessed by either iSCSI or NFS. Additionally, direct attached storage may be used for primary storage. Secondary storage is always accessed using NFS.
- Give name of the zone pod and cluster accordingly
- Protocol is NFS as you have created disk in linux with that protocol
- Server will be your management server's ip as your storage is also on same area.
- Give path of the storage partition created earlier while installing



The screenshot shows the 'Primary storage' configuration page in the CloudStack web interface. The browser address bar shows the URL '192.168.11.159:8080/client/#/storagepc'. The form contains the following fields:

- Cluster**: A dropdown menu.
- * Zone**: A dropdown menu with the value 'Abhishek-Asia'.
- * Pod**: A dropdown menu with the value 'Mumbai1'.
- * Cluster**: A dropdown menu with the value 'andheri-east'.
- * Name**: A text input field with the value 'antela'.
- * Protocol**: A dropdown menu with the value 'nfs'.
- * Server**: A text input field with the value '192.168.11.159'.
- * Path**: A text input field with the value '/export/primary'.
- * Provider**: A dropdown menu with the value 'DefaultPrimary'.
- Storage tags**: A text input field with the value 'the tags for the storage pool'.

ADDING PRIMARY STORAGE

1. Log in to the CloudStack Management Interface:

1. Open a web browser and navigate to the CloudStack management interface URL.
2. Log in using your administrator credentials.

2. Navigate to the Storage tab:

1. Once logged in, go to the "**Infrastructure**" or "**Storage**" section of the CloudStack management interface.
2. Click on the "Primary Storage" tab or similar.

3. Add Primary Storage:

1. Look for an option to add new primary storage. This is typically labeled as "**Add Primary Storage**" or "**Add Storage Pool**".
2. Fill out the necessary details, including:
 1. Name: A descriptive name for the storage pool.
 2. Zone: Select the zone where the storage pool will be available.
 3. Storage Type: Choose the appropriate storage type (e.g., NFS, iSCSI, Fibre Channel).
 4. Server: Specify the hostname or IP address of the storage server.
 5. Path: For NFS or other file-based storage, specify the NFS share path. For iSCSI, specify the target iSCSI address.
 6. Authentication: If required, provide authentication details for accessing the storage.
 7. Capacity: Set the total capacity of the storage pool.

ADD SECONDARY STORAGE

- Files can be listed at a path on a secondary storage using `listImageStoreObjects` command or via UI under “Browser” tab for a secondary storage. Depending on the hypervisor, files and directories on a primary storage will get associated with the cloudstack resources like snapshots, volumes, templates, and ISOs.
- Provider is NFS as you have created disk in linux with that protocol
- Server will be your management server’s ip as your storage is also on same area.
- Give path of the storage partition created earlier while installing

Add secondary storage ?

X

Name

Rel

Provider

NFS

* Zone

Abhishek-Asia

* Server

192.168.11.159

* Path

/export/secondary

Cancel

OK

ADDING SOCONDARY STORAGE

1.Log in to the CloudStack Management Interface:

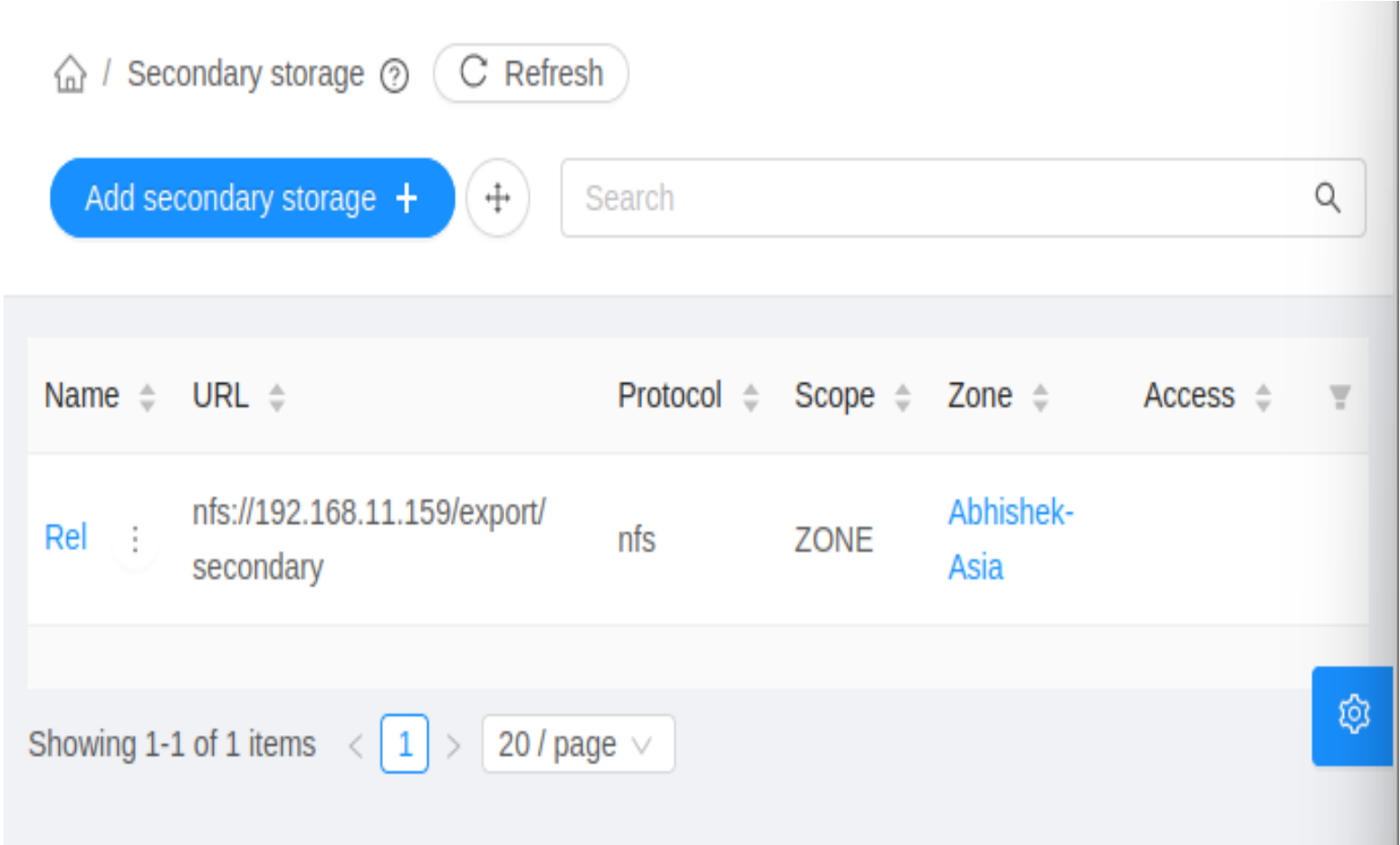
- 1. Open a web browser and navigate to the CloudStack management interface URL.
- 2. Log in using your administrator credentials.

2.Navigate to the Storage tab:

- 1. Once logged in, go to the "Infrastructure" or "Storage" section of the CloudStack management interface.
- 2. Click on the "Secondary Storage" tab or similar.

3.Add Secondary Storage:

- 1. Look for an option to add new secondary storage. This is typically labeled as "Add Secondary Storage" or "Add Image Store".
- 2. Fill out the necessary details, including:
 - 1.Name: A descriptive name for the secondary storage repository.
 - 2.Zone: Select the zone where the secondary storage repository will be available.
 - 3.Protocol: Choose the appropriate protocol for accessing the secondary storage. This could be NFS, S3, Swift, or local storage accessible to the CloudStack management server.
 - 4.URL: Provide the URL or path to access the secondary storage repository. This will vary depending on the chosen protocol.
 - 5.Provider: If applicable (for S3 or Swift), specify the storage provider information.
 - 6.Capacity: Set the total capacity of the secondary storage repository.



TEMPLATES AND ISO

01

BRAND GUIDELINES 2025

TEMPLATES

In the context of Apache CloudStack, a template refers to a pre-configured virtual machine image that serves as a blueprint for creating new virtual machines. Templates contain an operating system (such as Linux or Windows) along with any additional software, configurations, and settings that are pre-installed and pre-configured. Each Template is associated with a particular type of hypervisor, which is specified when the Template is added to CloudStack.

```
/usr/share/cloudstack-  
common/scripts/storage/secondary/cloud-install-sys-  
tmplt -m /mnt/secondary -u http://cloudstack.apt-  
get.eu/systemvm/4.11/systemvmtemplate-4.11.1-  
kvm.qcow2.bz2 -h kvm -F
```



Default view



/ Templates ?

Refresh

Projects

All



Name

State

OS type

SystemVM Template (KVM)

Ready

Debian GNU/Linux 5.0 (64-bit)

CentOS 5.5(64-bit) no GUI (KVM)

Ready

CentOS 5.5 (64-bit)

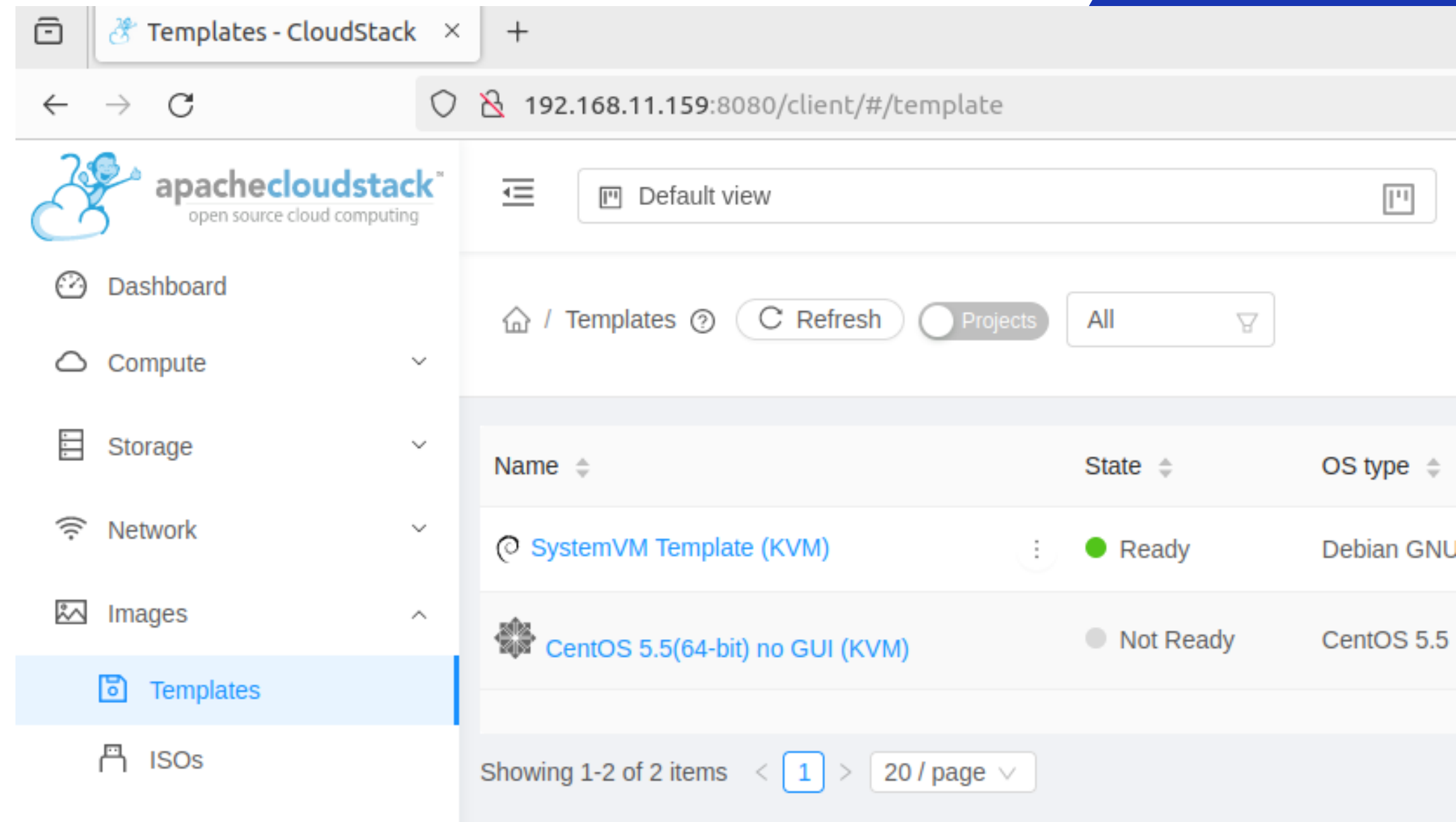
Showing 1-2 of 2 items

1

20 / page

TEMPLATES

- Log in to the CloudStack management interface.
- Navigate to the "Image" section.
- Click Template
- Click on "Register Template" or a similar option to start the template registration process.
- Fill out the registration form, providing details such as the template name, description, format, URL (if the template is hosted externally), and any required tags or metadata.
- Upload the template disk image file (or provide the URL if the template is hosted externally).
- Once the template registration is complete, CloudStack will begin importing the template disk image into its secondary storage repository.



ISO



CloudStack supports ISOs and their attachment to Guest Instances. An ISO is a read-only file that has an ISO/CD-ROM style file system. Users can upload their own ISOs and mount them on their Guest Instances.

ISOs are uploaded based on a URL.

A very light weight iso can be from core linux
<http://tinycorelinux.net/15.x/x86/release/Core-current.iso>



Default view



/ ISOs ?

Refresh

Projects

All



Name

State

OS type



vmware-tools.iso



Ready

CentOS 4.5 (32-bit)



xs-tools.iso



Ready

CentOS 4.5 (32-bit)



Core linux



Ready

Debian GNU/Linux 9 (32-bit)

ADD ISO

1. Log in to the CloudStack Management Interface:

1. Open a web browser and navigate to the CloudStack management interface URL.
2. Log in using your administrator credentials.

2. Navigate to the Images->"ISOs" Section:

1. Once logged in, go to the "ISOs" section of the CloudStack management interface.

3. Upload the ISO File:

1. Look for an option to upload a new ISO file. This is typically labeled as "Register ISO" or "Upload ISO".
2. Fill out the necessary details, including:
 1. Name: A descriptive name for the ISO file.
 2. Description: Additional information about the ISO file.
 3. URL: If the ISO file is hosted externally, you can provide the URL to the file.
 4. Direct Download: Alternatively, you can upload the ISO file directly from your local machine.

3. Click on the "Upload" or "Register" button to initiate the upload process.

192.168.11.159:8080/client/#/iso

Default view

/ ISOs ? Refresh

Name

vmware-tools.iso

xs-tools.iso

Showing 1-2 of 2 items < 1 > 20 /

Register ISO ?

* URL ⓘ

the URL to where the ISO is currently being hosted

* Name ⓘ

the name of the ISO

* Description ⓘ

the display text of the ISO. This is usually used for display purposes.

Direct download ⓘ

☐

* Zone ⓘ

☐ All zones

Bootable ⓘ

☒

* OS type ⓘ

☐ AlmaLinux 8.3

Userdata ⓘ

the ID of the userdata that has to ...

Userdata link policy ⓘ

an optional override policy

Extractable ⓘ

☐

SERVICE OFFERINGS

In Apache CloudStack, service offerings are predefined configurations that specify the parameters of various cloud services provided by the CloudStack infrastructure. These offerings allow users to select the appropriate configuration for the services they want to deploy, such as storage, networking, and other ancillary services.

Here are the key components of service offerings in Apache CloudStack:

1.Storage Service Offerings:

1. Storage service offerings define the parameters of storage resources available to virtual machines. This includes options for primary storage (where virtual machine disks are stored) and secondary storage (for storing system templates, ISO images, snapshots, and backups).
2. Parameters may include storage type (e.g., NFS, iSCSI), capacity, performance characteristics, redundancy levels, and other storage-related configurations.

2.Network Service Offerings:

1. Network service offerings specify the parameters of networking resources available to virtual machines. This includes options for configuring network interfaces, IP address allocation, VLANs, security groups, and other networking features.
2. Parameters may include network speed, bandwidth allocation, isolation mechanisms (such as VLANs or VXLANs), and QoS (Quality of Service) settings.

3.Compute Service Offerings:

1. Compute service offerings define the parameters of compute resources allocated to virtual machine instances. This includes options for CPU, memory, and other compute-related configurations.
2. Parameters may include the number of virtual CPUs (vCPUs), memory size, CPU speed, CPU architecture (e.g., 32-bit or 64-bit), and other compute-related settings.

4.Other Service Offerings:

1. CloudStack supports additional service offerings for other ancillary services such as firewall, load balancing, VPC, DNS, and other infrastructure services.
2. These service offerings define the parameters and configurations of these additional services, allowing users to select the appropriate settings when deploying virtual machines or configuring network infrastructure.

 Infrastructure

 Service offerings

 Compute offerings

 System offerings

 Disk offerings

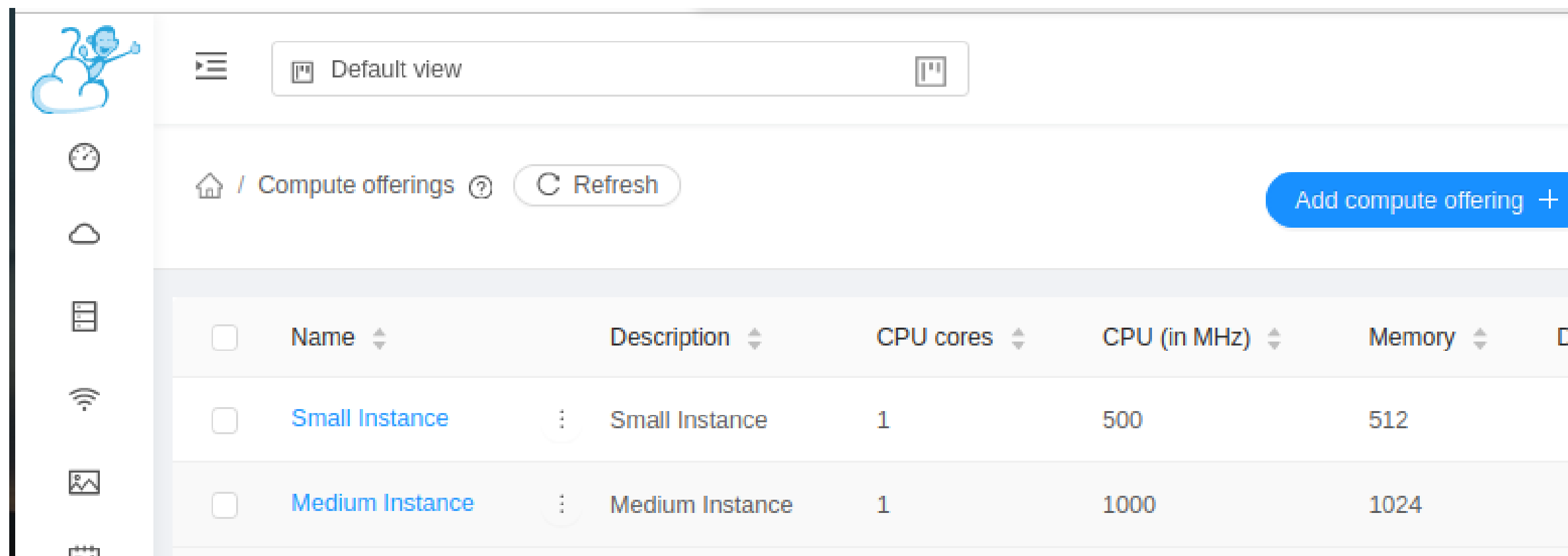
 Network offerings

 VPC offerings

COMPUTE OFFERINGS

A service offering is a set of virtual hardware features such as CPU core count and speed, memory, and disk size. The CloudStack administrator can set up various offerings, and then end users choose from the available offerings when they create a new Instance. Based on the user's selected offering, CloudStack emits usage records that can be integrated with billing systems. Compute offerings may be “fixed”, “custom constrained” or “custom unconstrained”.

For the ease we will not create any compute offerings further

The screenshot shows the CloudStack web interface for managing compute offerings. On the left is a sidebar with navigation icons. The main header includes a 'Default view' toggle and a breadcrumb path 'Home / Compute offerings'. A 'Refresh' button and an 'Add compute offering +' button are also present. Below this is a table with columns for Name, Description, CPU cores, CPU (in MHz), Memory, and Disk size. Two offerings are listed: 'Small Instance' and 'Medium Instance', both with 1 CPU core and 500 MHz CPU speed. The 'Small Instance' has 512 MB of memory, and the 'Medium Instance' has 1024 MB of memory. Each row has a checkbox on the left and a three-dot menu icon on the right.

<input type="checkbox"/>	Name ↕	Description ↕	CPU cores ↕	CPU (in MHz) ↕	Memory ↕	Disk size ↕
<input type="checkbox"/>	Small Instance	⋮ Small Instance	1	500	512	
<input type="checkbox"/>	Medium Instance	⋮ Medium Instance	1	1000	1024	

DISK OFFERINGS

For a disk offering requires to create a disk menu for users

- **Custom Disk Size:** If checked, the user can set their own disk size. If not checked, the root administrator must define a value in Disk Size.
- **Disk Size:** Appears only if Custom Disk Size is not selected. Define the volume size in GB (2^{30} 1GB = 1,073,741,824 Bytes).
- **Provisioning type:** The type of disk that should be allocated. Valid values are thin, sparse, fat. When using the VMWare hypervisor, these values are mapped to the following vSphere disk provisioning types:
 - **thin: Thin Provision**
 - **sparse: Thick Provision Lazy Zeroed**
 - **fat: Thick Provision Eager Zeroed**

Add disk offering ?

X

* Name ⓘ

name of the disk offering

* Description ⓘ

alternate display text of the disk offering

Storage type ⓘ

Shared

Local

Provisioning type ⓘ

Thin provisioning

Sparse provisioning

Fat provisioning

Encrypt ⓘ

Disk size strictness ⓘ

Custom disk size ⓘ

QoS type

None

Hypervisor

Storage

Write-cache Type ⓘ

No disk cache

Write-back disk caching

Write-through

NETWORK OFFERINGS

- Network Rate. Allowed data transfer rate in MB per second.
- Guest Type. Choose whether the guest network is isolated or shared.
- Persistent. Indicate whether the guest network is persistent or not. The network that you can provision without having to deploy an instance on it is termed persistent network.
- Specify VLAN. Indicate whether a VLAN could be specified when this offering is used. If you select this option and later use this network offering while creating a VPC Network Tier or an isolated network, you will be able to specify a VLAN ID for the network you create.

Add network offering ?



* Name ⓘ

the name of the network offering

* Description ⓘ

the display text of the network offering

Network rate (Mb/s) ⓘ

data transfer rate in megabits per second allowed

Guest type ⓘ

Isolated

L2

Shared

Internet protocol ⓘ

Please refer documentation for creating IPv6 enabled network/VPC offering [IPv6 support in CloudStack - Isolated networks and VPC tiers](#)

IPv4

IPv4 + IPv6 (Dual Stack)

Specify VLAN ⓘ



VPC ⓘ



Promiscuous mode ⓘ

None

Accept

Reject

MAC address changes ⓘ

None

Accept

Reject

Persistent ⓘ



Forged transmits ⓘ

None

Accept

Reject

MAC learning ⓘ

None

Accept

Reject

**CREATE
INSTANCE**



New instance

1 Select deployment infrastructure

A zone typically corresponds to a single datacenter. Multiple zones help make the cloud more reliable by providing physical isolation and redundancy.

* Zone

z1

Pod

p1

Cluster

c1

Host

cloud

2 Template/ISO

Templates

ISOs

Search

OS image that can be used to boot VMs.

Featured

Community

My templates

Shared

CentOS 5.5(64-bit) no GUI (KVM)

Total 1 items < 1 > 10 / page

Instances in the context of Apache CloudStack refer to virtual machines (VMs) that are created and managed within the cloud infrastructure. These instances run on the hypervisor hosts managed by CloudStack.

- To create an instance
- select your desired zone, pod, cluster and host.
- Templates or ISO is your choice

2

Template/ISO

Templates

ISOs

Search

Disc image containing data or bootable media for OS.

Featured

Community

My templates

Shared

☒

Core linux cmd

Total 1 items < 1 > 10 / page

Hypervisor

KVM

3

Compute offering

Search

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

- As you can see your added ISOs go to my templates tab
- Compute offerings created go into 3 part, so you can create a different one as you like



- Disk offerings are added to part 4 and can be chosen as desired

4

Disk size

Total 2 items < 1 > 10 / page v

Search

	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	-

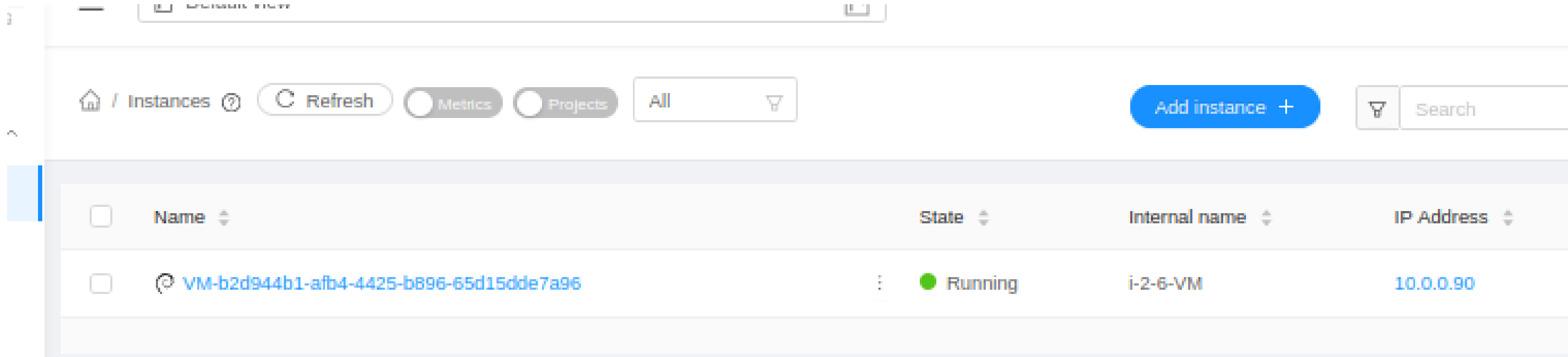
Total 4 items < 1 > 10 / page v



- For network offering you can create an isolated network as given.
- For a new machine it is recommended to have an isolated network

<input type="text" value="abc"/>	
* Zone ⓘ	
<input type="text" value="Abhishek-Asia"/>	
Domain ⓘ	
<input type="text" value="ROOT"/>	
Account ⓘ	
<input type="text" value="admin"/>	
Network domain ⓘ	
<input type="text" value="100"/>	
* Network offering ⓘ	
<input type="text" value="Offering for Isolated networks with no Source Nat service"/>	
VLAN/VNI ⓘ	
<input type="text" value="20"/>	
External Id ⓘ	
<input type="text" value="ID of the network in an external system."/>	
Gateway ⓘ	
<input type="text" value="10.0.6.1"/>	
Netmask ⓘ	
<input type="text" value="255.0.0.0"/>	
IPv4 start IP ⓘ	
<input type="text" value="10.0.7.1"/>	
End IP ⓘ	
<input type="text" value="10.0.7.20"/>	
DNS 1 ⓘ	DNS 2 ⓘ
<input type="text" value="the first IPv4 DNS for the network"/>	<input type="text" value="the second IPv4 DNS for the network"/>

- After this you can click launch instance without adding any other details and it will work for you.



The screenshot shows a web interface for managing cloud instances. At the top, there's a navigation bar with a home icon, the text "/ Instances", a help icon, a "Refresh" button, and two toggle switches for "Metrics" and "Projects". To the right of these are a dropdown menu currently set to "All", a filter icon, a blue "Add instance +" button, and a search bar with a filter icon and the text "Search". Below the navigation bar is a table with four columns: "Name", "State", "Internal name", and "IP Address". Each column header has a small sort icon. The table contains one data row with the following values: a checkbox, a name starting with a copyright symbol and a long alphanumeric string, a state of "Running" with a green dot, an internal name "i-2-6-VM", and an IP address "10.0.0.90".

<input type="checkbox"/>	Name	State	Internal name	IP Address
<input type="checkbox"/>	© VM-b2d944b1-afb4-4425-b896-65d15dde7a96	● Running	i-2-6-VM	10.0.0.90