cloud STACK | COLLABORATION CONFERENCE

VMware/KVM to CloudStack/KVM migration, tools and options within CloudStack

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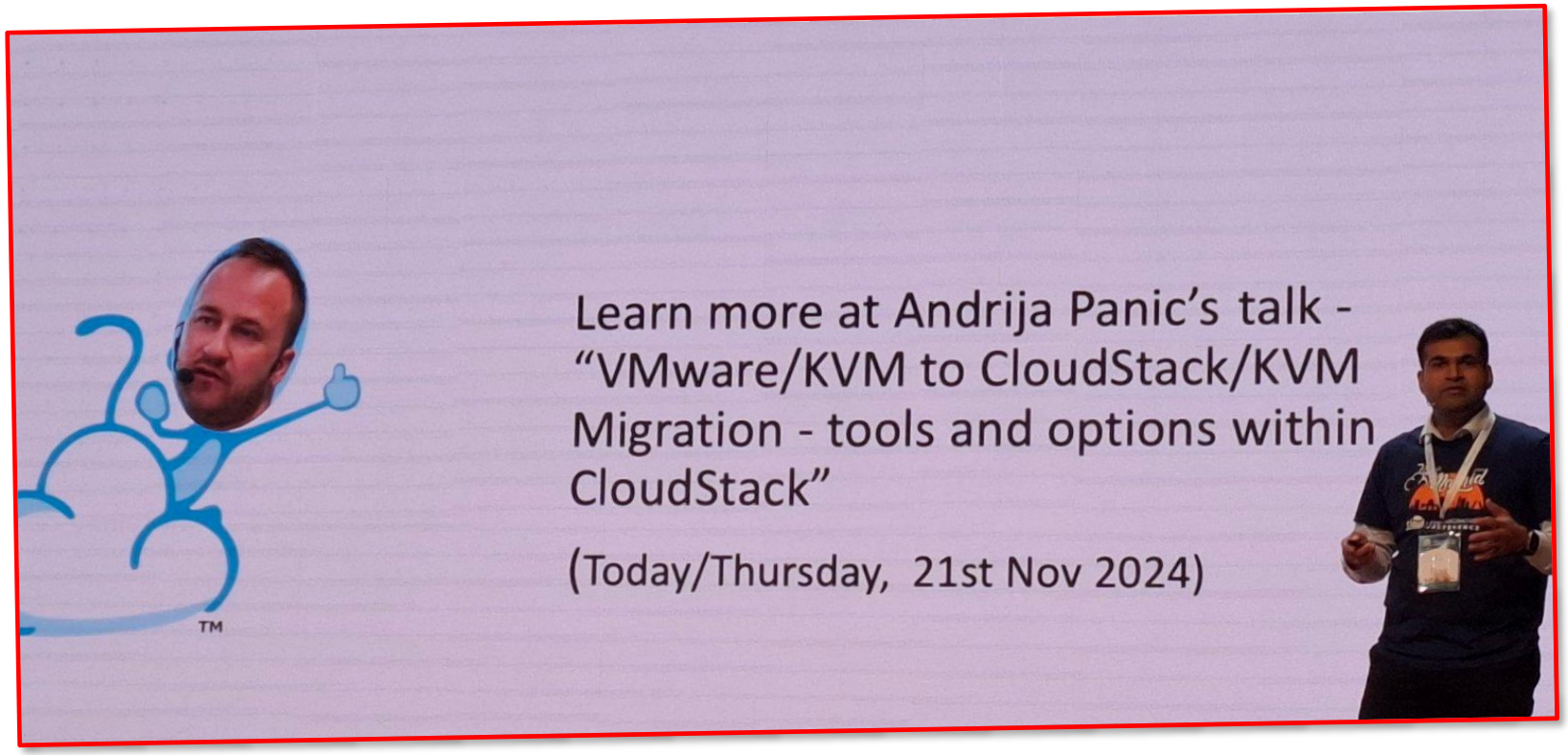
About me



(thx Rohit, we'll talk about this later…)

About me, myself and I

- Cloud Architect @ ShapeBlue
- IT, Cloud and virtualization for the last 17 years
- Involved with CloudStack since version 4.0.0-incubating (12 years now!)
- Apache CloudStack project committer and PMC member
- Father of 2 princesses
- Old-fashioned two/four-wheel petrol head (not an EV fan)
  - (I admire the technology, but prefer to drive IT, instead of letting IT driving me… wink, wink)

Features/tools/options

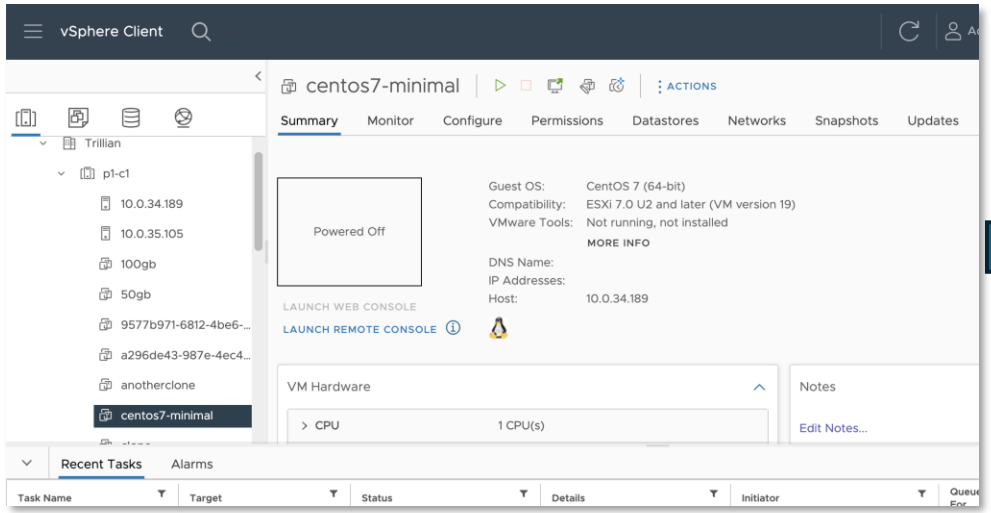
- Migrate VMware instances from VMware vSphere to CloudStack/KVM
- Migrate KVM instances from remote KVM hosts
- Create instance from an existing QCOW2 on Primary Storage
- Create DATA volume from an existing QCOW2 on Primary Storage
- Bonus:
  - Manage/unmanage VMware Instances
  - Manage/Unmanage KVM instances (experimental support)
  - Unmanage DATA volumes (KVM)

Linux KVM

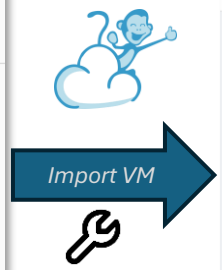
vmware®

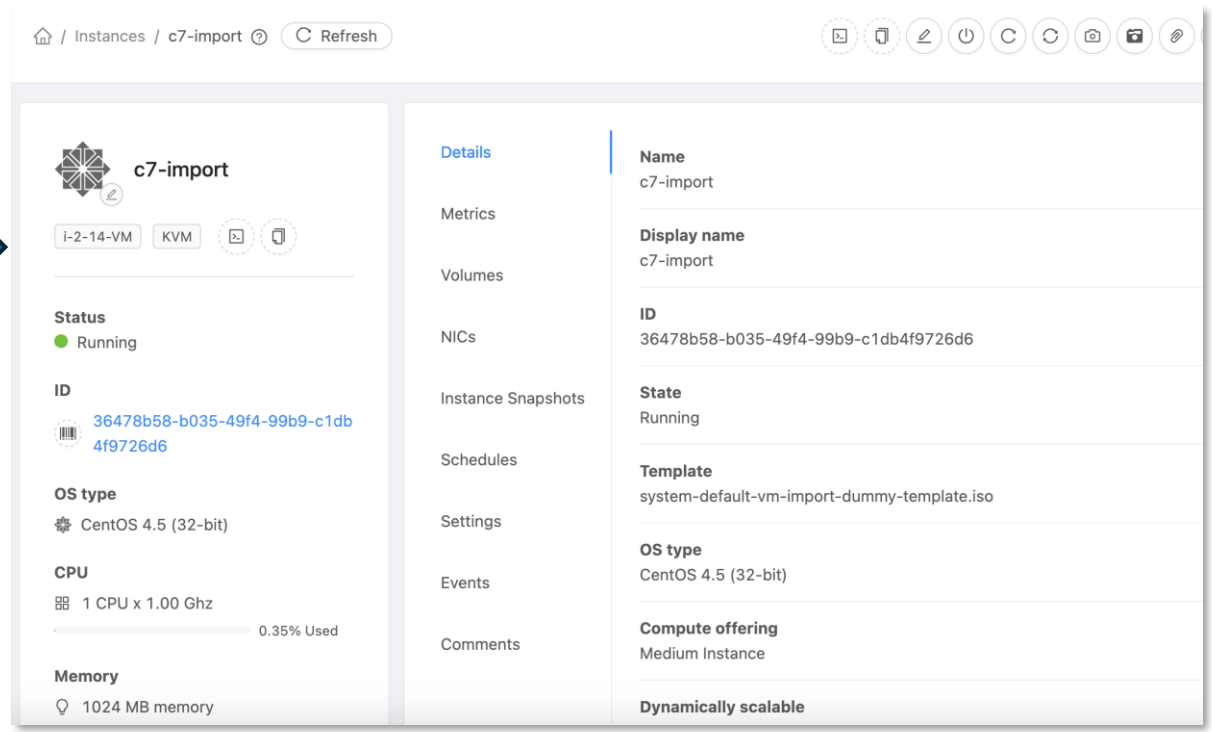
Migrating instances from VMware vSphere to KVM

Migrating instances from VMware vSphere to KVM



Source VM on vSphere





Source VMware VM converted to run on KVM hosts and imported into CloudStack

Migrating instances from VMware vSphere to KVM

- Uses virt-v2v - industry-standard tool for the conversion (modifies storage driver inside the guest OS, executes other inside-the-OS modification – to ensure a bootable VM on KVM)
- Migration success (virt-v2v success) depends on the host and guest OS
- Best results on EL9-based KVM hosts (newer version of virt-v2v)
- Serious performance improvements in 4.19.1+ releases
- A few (simple) requirements for the whole process

(http://docs.cloudstack.apache.org/en/4.19.1.1/adminguide/virtual_machines.html#importing-virtual-machines-from-vmware-into-kvm)

Migrating instances from VMware vSphere to KVM

- Cloning the source vSphere VM (for multiple reasons)
- Using OVF Tool* on KVM host to export VM files from vSphere to a temp location
  - Can also use management server (“vmware guru” – code) to export a VM files
- Using virt-v2v to do the conversion
- A few setting:
  - Global setting “convert.vmware.instance.to.kvm.timeout”
    - Timeout (in hours) for the virt-v2v process on a KVM host
  - API parameter “forcemstoimportvmfiles”
    - Forces CloudStack to use management server to export VM file instead of KVM hosts
  - Can activate verbose virt-v2v output in the agent.properties

Migrating instances from VMware vSphere to KVM

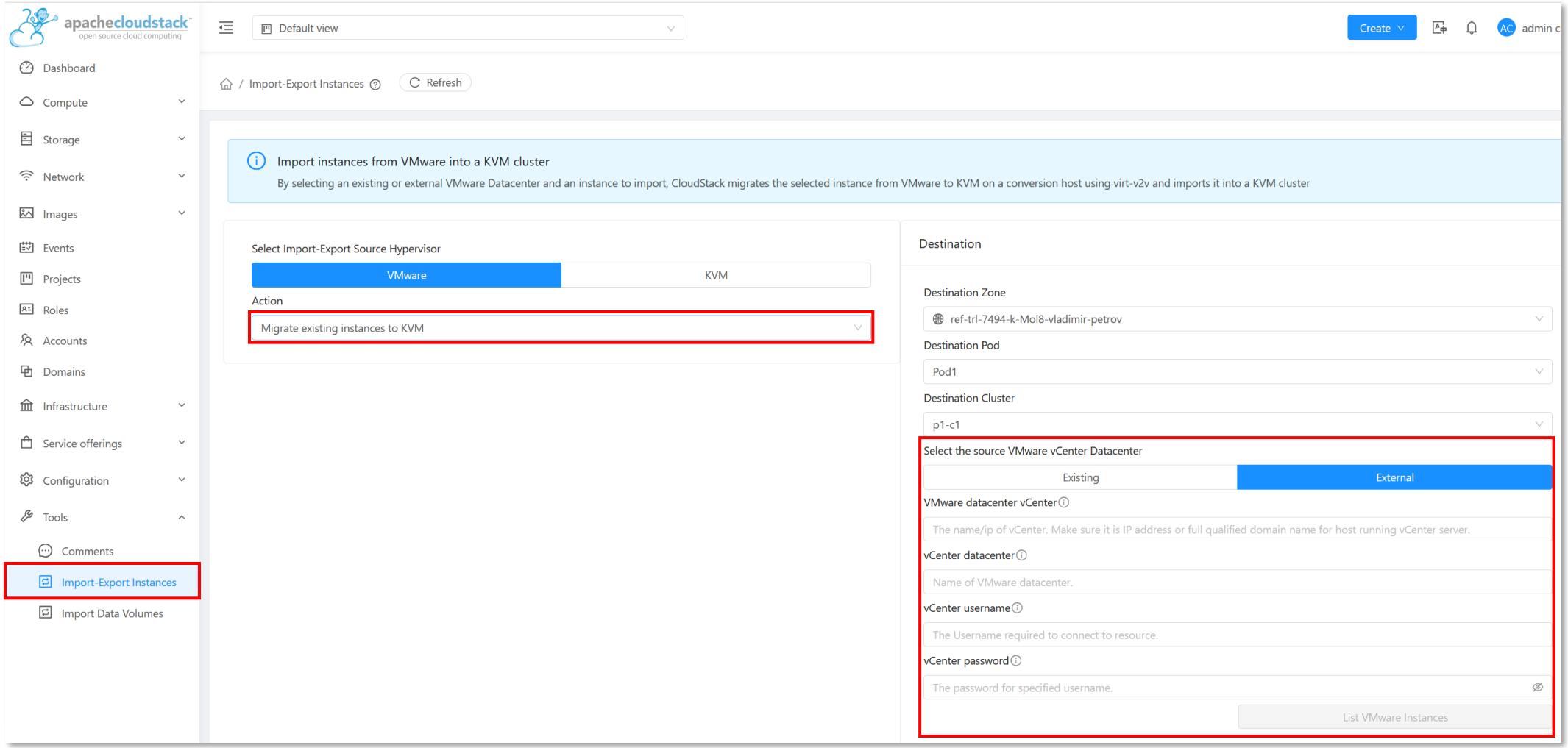
Ovftools preflight check / install (e.g.)

```
yum -y install libnsl
wget http://www....VMware-ovftool-4.6.0-21452615-lin.x86_64.zip
unzip VMware-ovftool-4.6.0-21452615-lin.x86_64.zip
ln -s <path_of_ovftool_binary> /usr/bin/ovftool (i.e. just make sure it's "in the path")
which ovftool
systemctl restart cloudtack-agent
```

```
public static final String OVF_EXPORT_SUPPORTED_CHECK_CMD = "ovftool --version";
    // ovftool --version => sample output: VMware ovftool 4.6.0 (build-21452615)
public static final String OVF_EXPORT_TOOl_GET_VERSION_CMD = "ovftool --version | awk '{print $3}'";
```

Details are store in the *host_details* table, and we loop through these hosts only

Demo: Migrating instances from VMware vSphere to KVM



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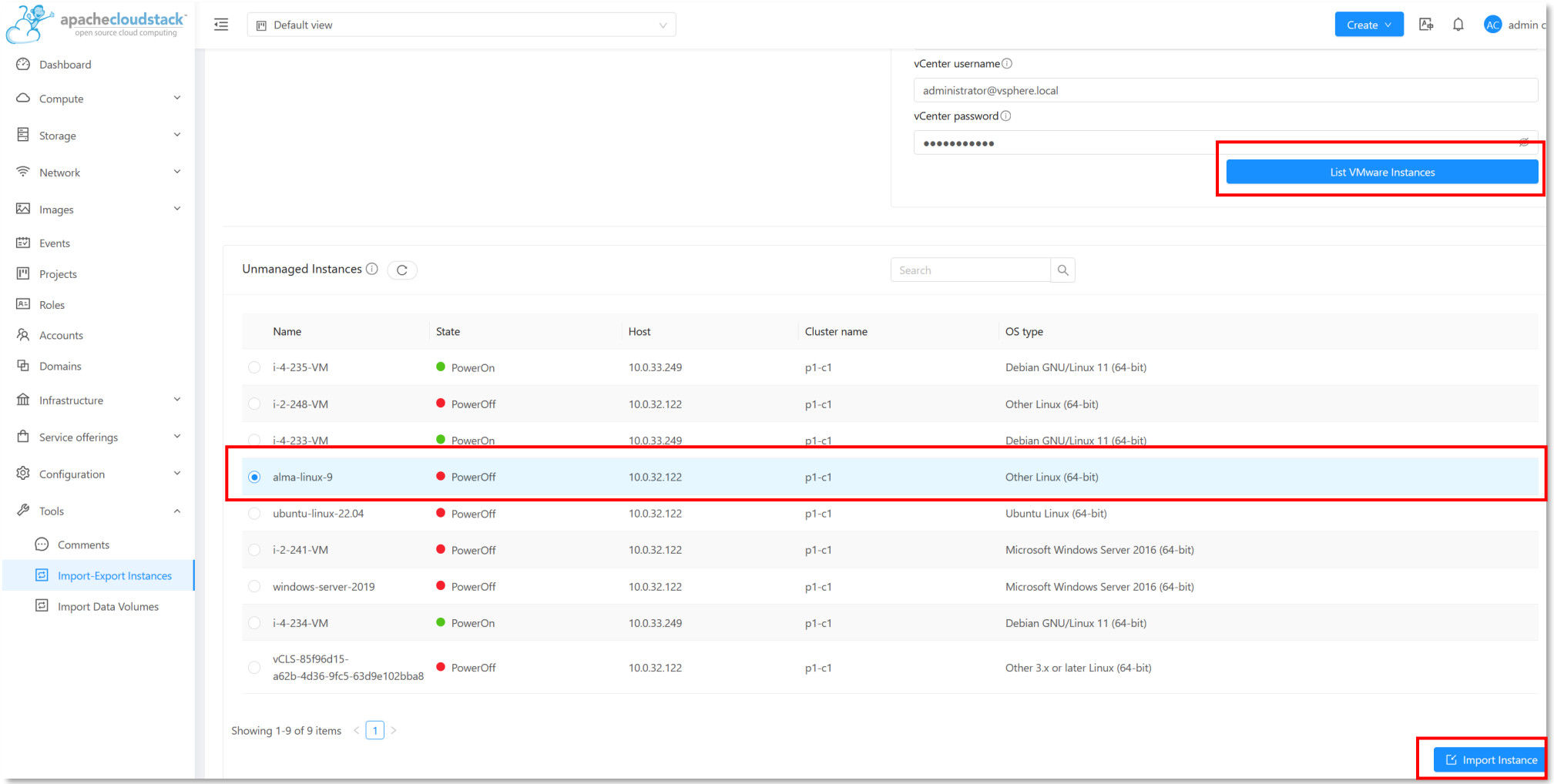

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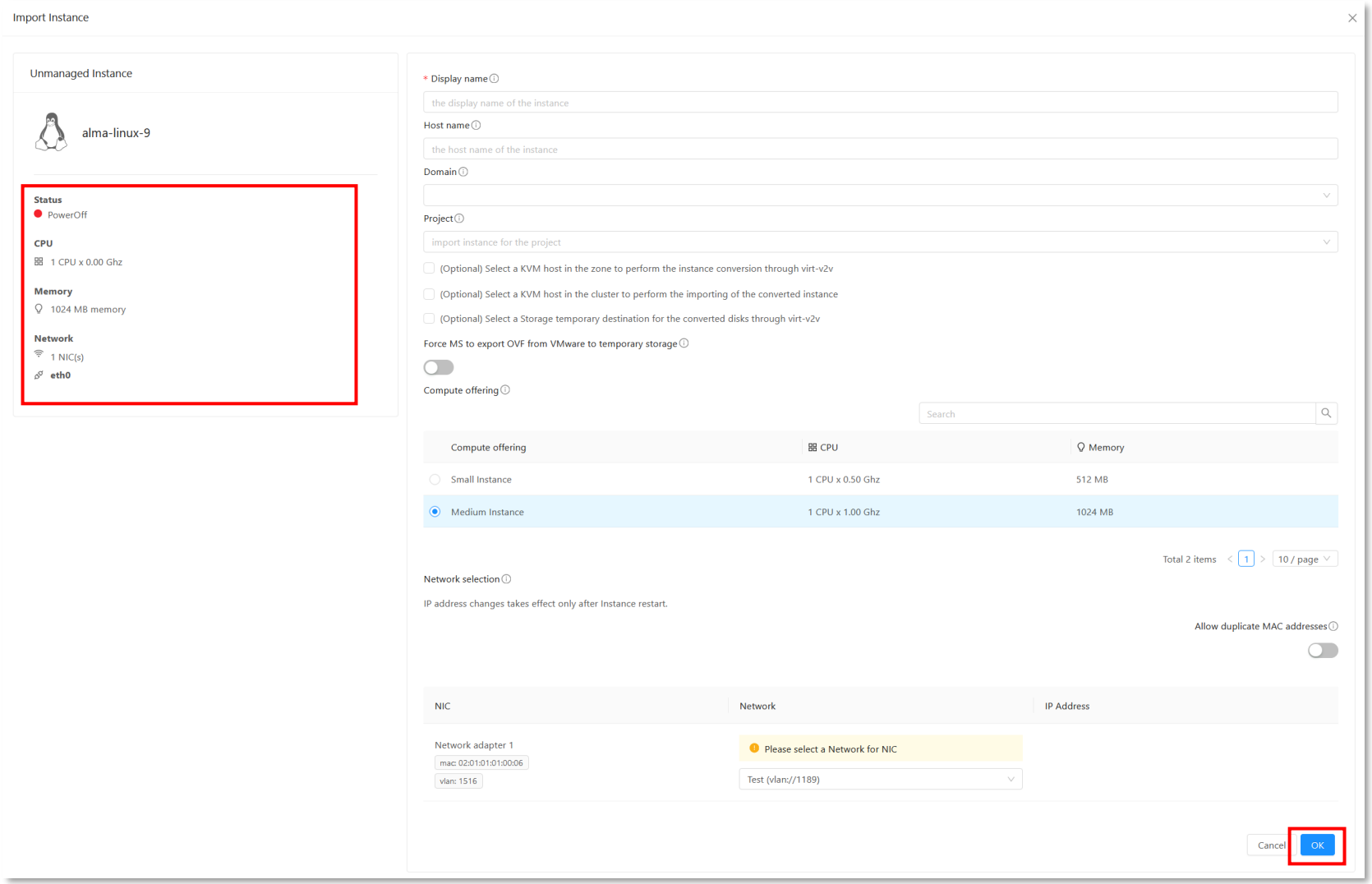


Migrating instances from VMware vSphere to KVM

Some gotchas:

- EL9 host have better success rate than Ubuntu hosts (newer virt-v2v)
  - Can have a production “Ubuntu cluster” but convert using e.g. EL9 hosts in another cluster (4.20)
- Make sure to configure UEFI/secure boot support for VMs on KVM hosts
  - Required for newer Windows Server installations
- Ubuntu version of virt-v2v might show an error about missing exe file:
  - `virt-v2v: error: One of rhsrvany.exe or pvvxsvc.exe is missing in /usr/share/virt-tools.`
  - Fix available here: https://github.com/rwmjones/rhsrvany
- If you are using vCloud director… things are getting exponentially “interesting“…
  - e.g. you need to move away from NSX networking to more “simple” networking

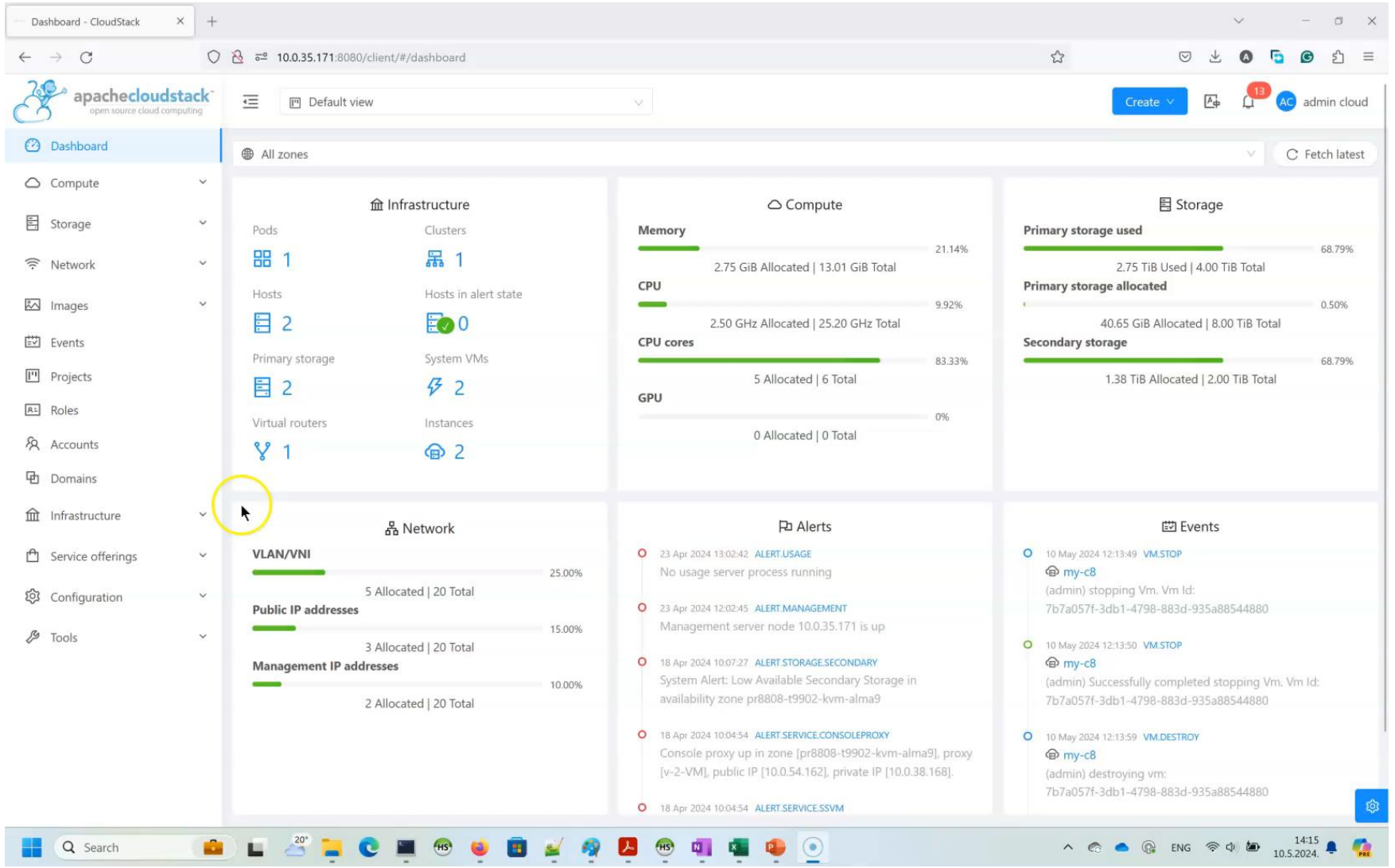
Migrating instances from remote KVM hosts

Migrate KVM instance from remote KVM hosts

Can migrate from any remote KVM host, if requirements are met

- KVM host must be running libvirt
- Libvirt must allow tcp connections (listen_tcp=1, default port 16509)
- Instances must be in a stopped state
- SSH access allowed (port 22, used during volume copy process/SCP)
- Guest OS should be gracefully shut down
- (listVmsForImport API, importVm API)

Demo: Migrate KVM instance from remote KVM hosts



KVM: Create instance from an existing QCOW2 on Primary Storage

KVM: Create instance from an existing QCOW2 on Primary Storage

This feature enables an operator to create an Instance using an already-existing QCOW2 image on a Local/Shared Storage pool (NFS only)

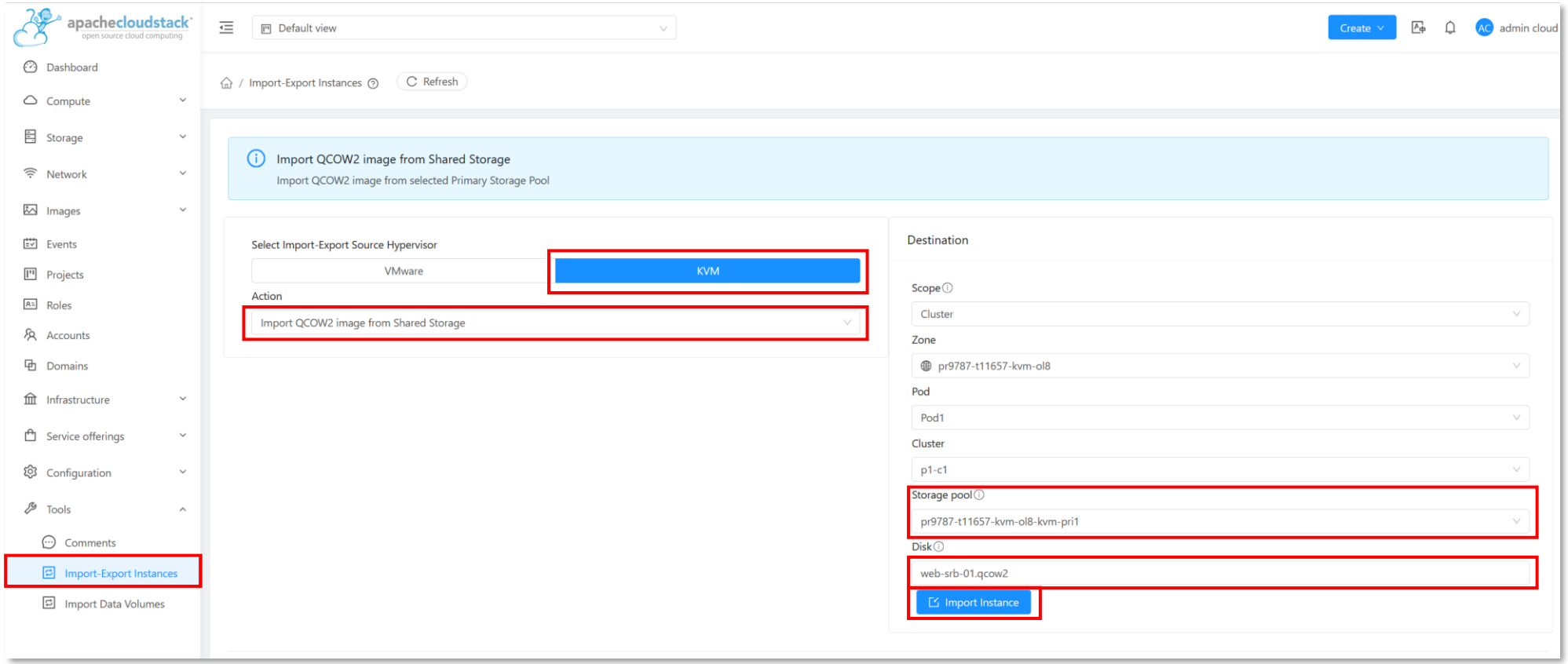
- QCOW2 files have to already exist on the chosen storage pool
- QCOW2 files are not moved/migrated in any way

The *importVm* API is utilized to create instances using existing QCOW2

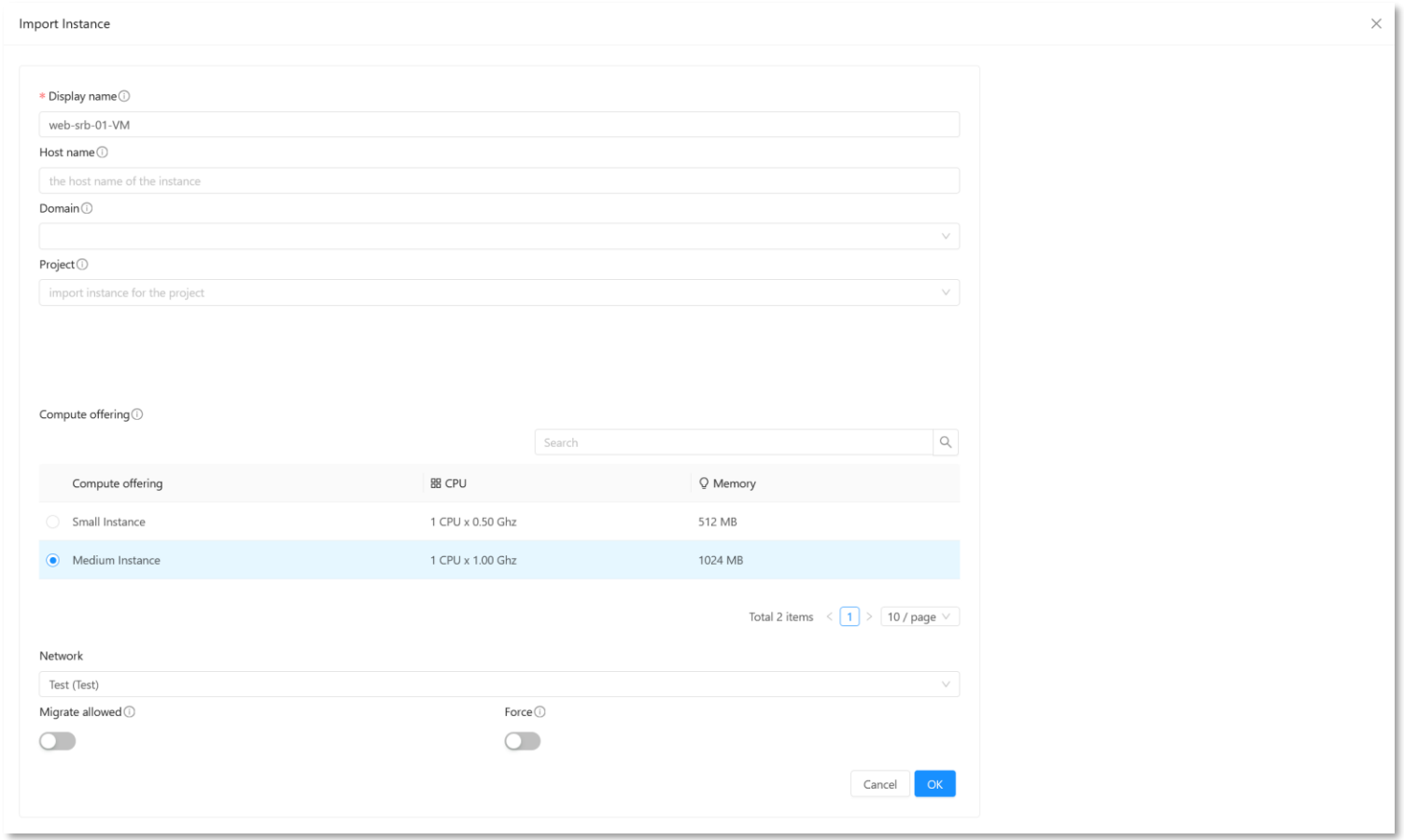
Limitations and checks in place:

- must be in the ‘root’ of the storage pool
- can’t have a backing file
- must be QCOW2 format
- may not be encrypted
- may not be in use by another VM / locked

Demo: KVM Create instance from an existing QCOW2



Demo: KVM Create instance from an existing QCOW2



The usual import Instance UI

KVM: Create DATA volume from an existing QCOW2 on Primary Storage

KVM: Create DATA volume from an existing QCOW2 on Primary Storage

This feature enables an operator to “create” (manage/import to) a volume in CloudStack, based on an existing QCOW2/RBD image

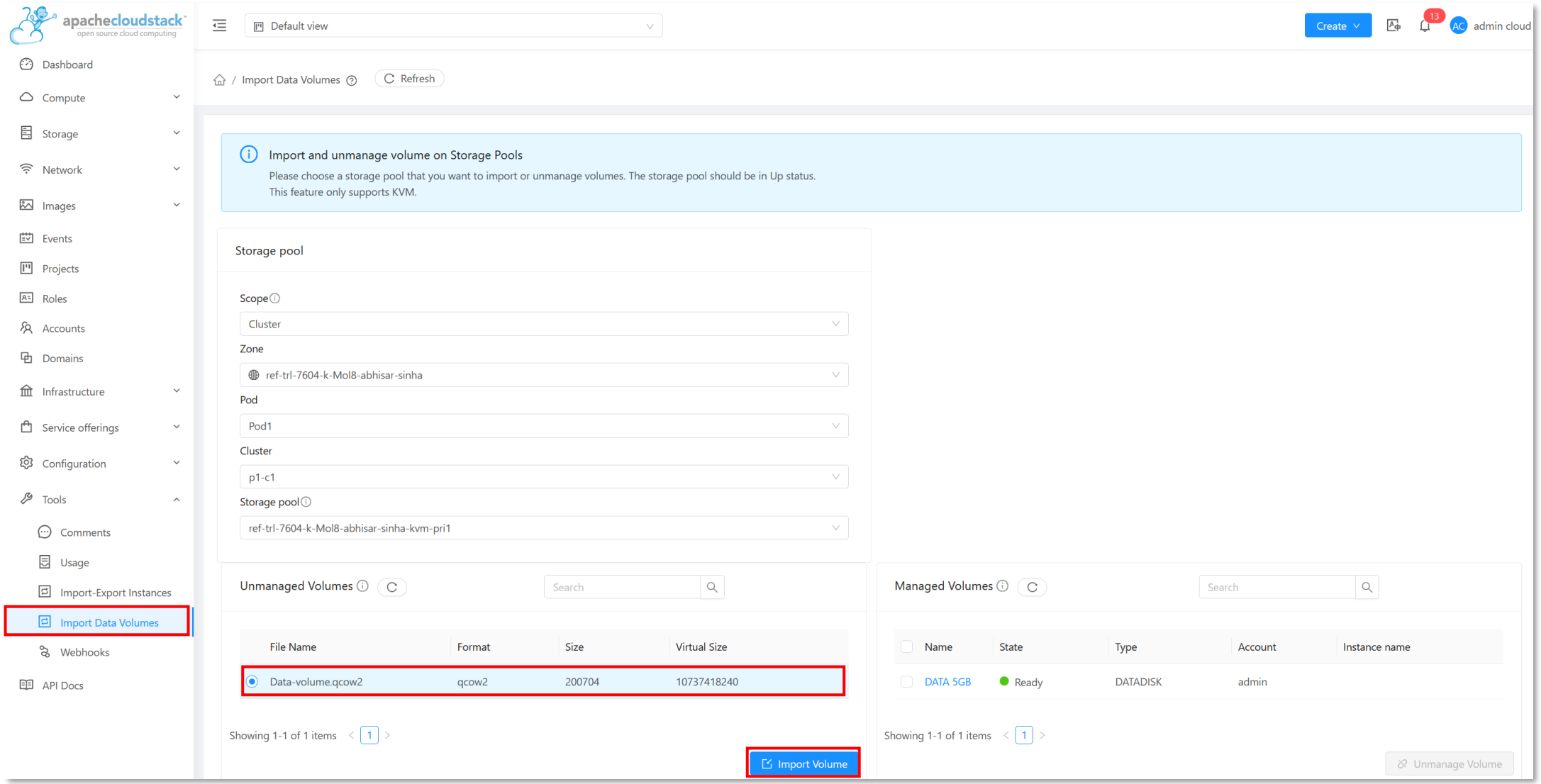
Supported storages:

- NFS
- Local
- CEPH

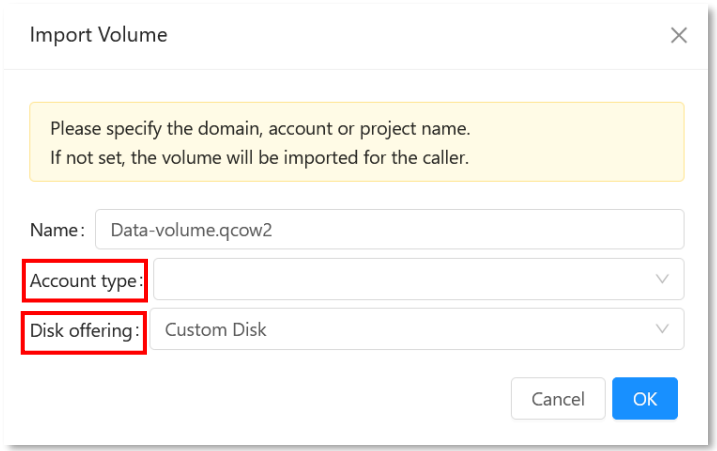
The volume to be imported must be placed in the root directory of the storage pool, format of the volume must be QCOW2 on NFS/Local storage, and RAW on CEPH storage.

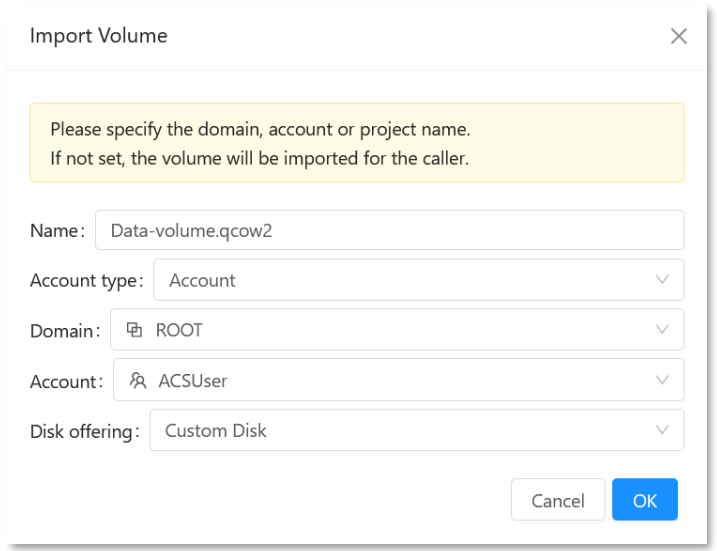
- The volume must not be encrypted, must not be locked, must not have a backing file.

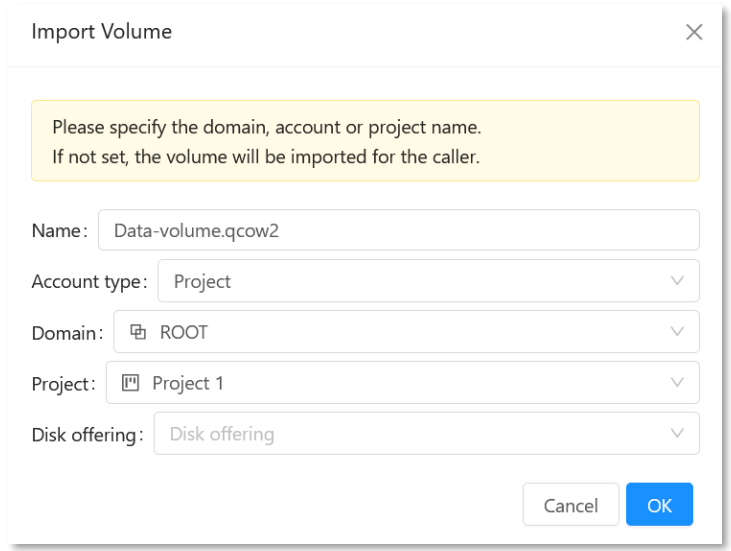
KVM: Create DATA volume from an existing QCOW2



KVM: Create DATA volume from an existing QCOW2







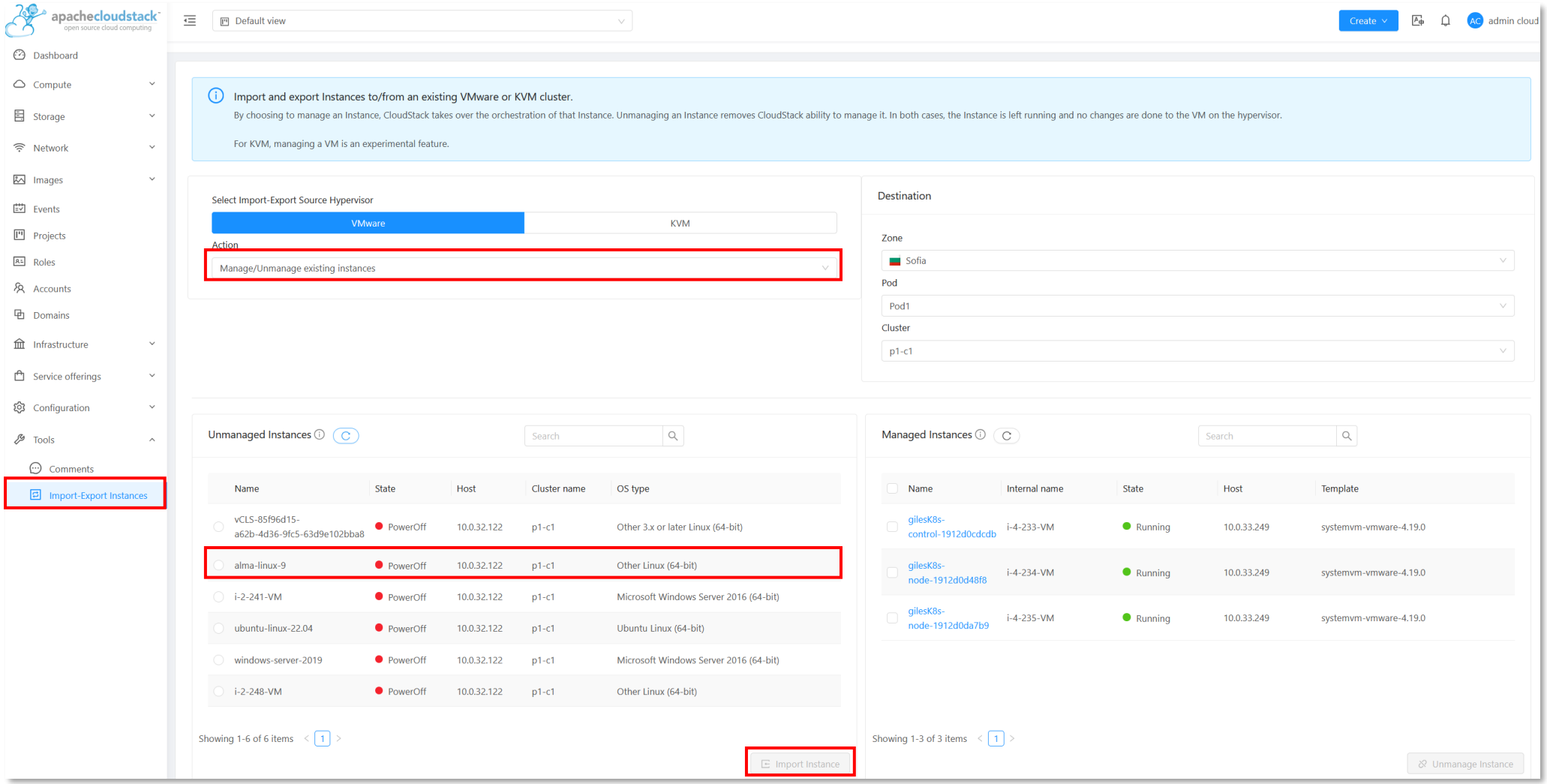
By default, the volume is imported for the caller (root admin) if Domain/Account/Project are not set.
By default, the volume is imported using the offering “Default Custom Offering for Volume Import” – but you can choose a different one.

Bonus tools and options

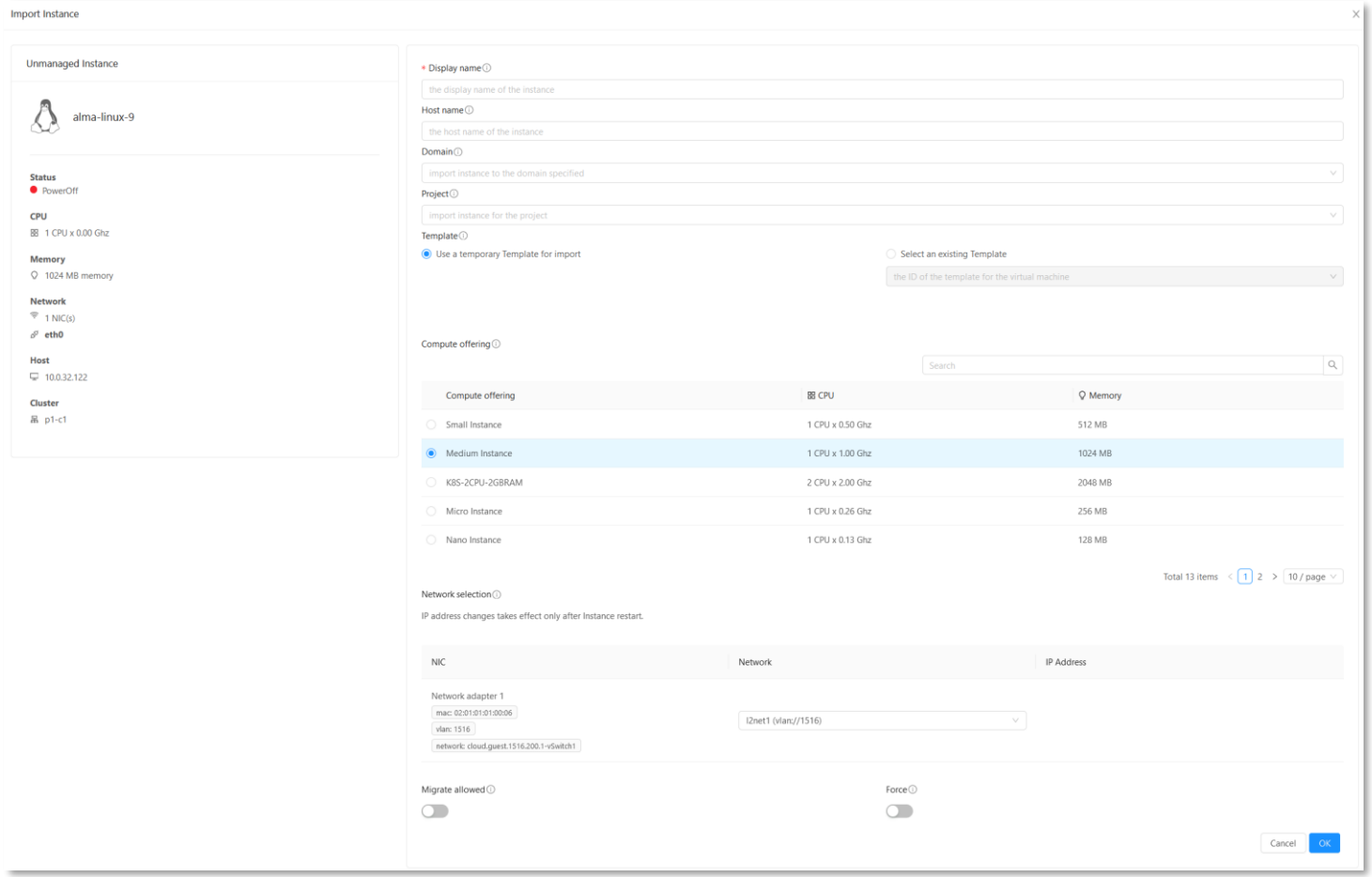
Not necessarily needed for a migration project, but good to know:

- Manage/Unmanage VMware Instances
- Manage/Unmanage KVM instances (experimental support)
- Unmanage DATA volumes (KVM only)

VMware: Manage Instance

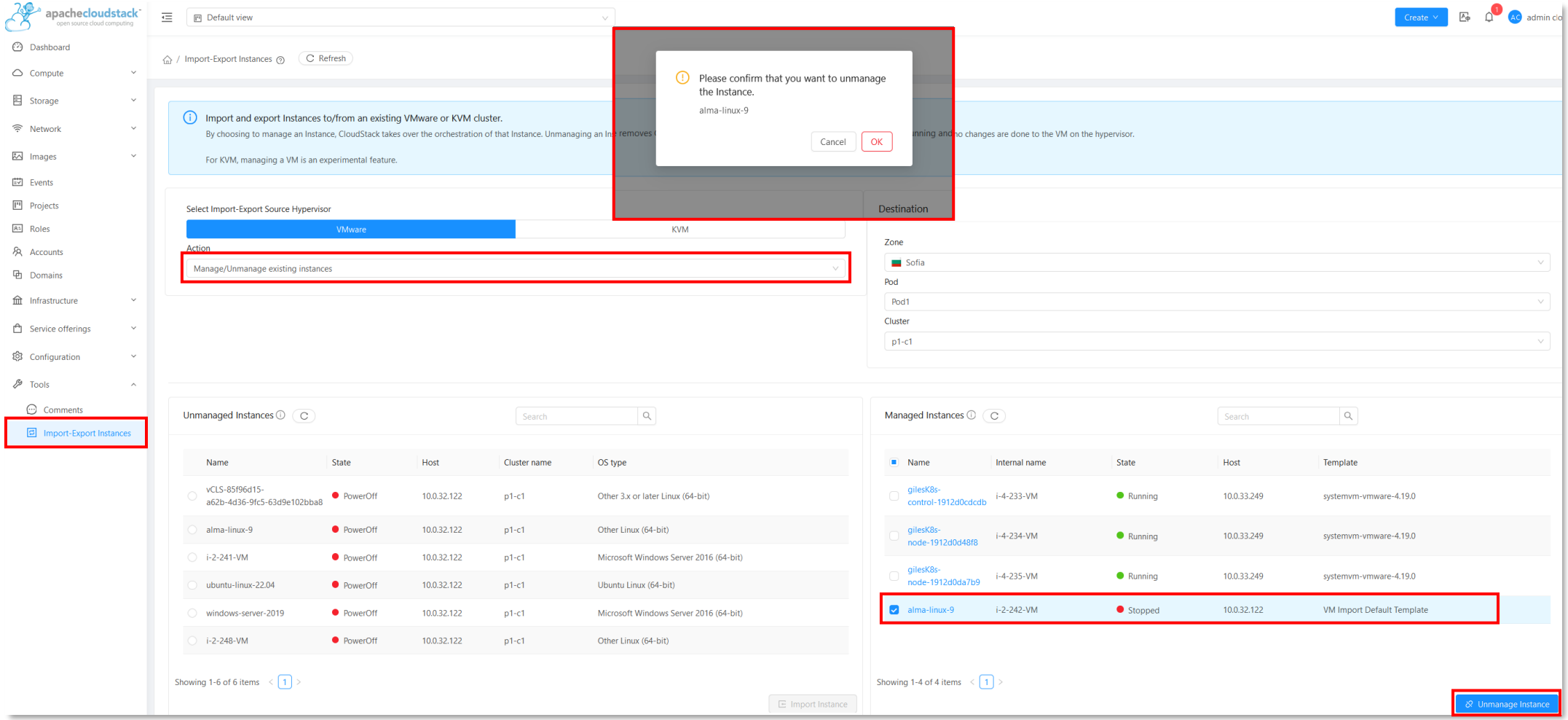


VMware: Manage Instance

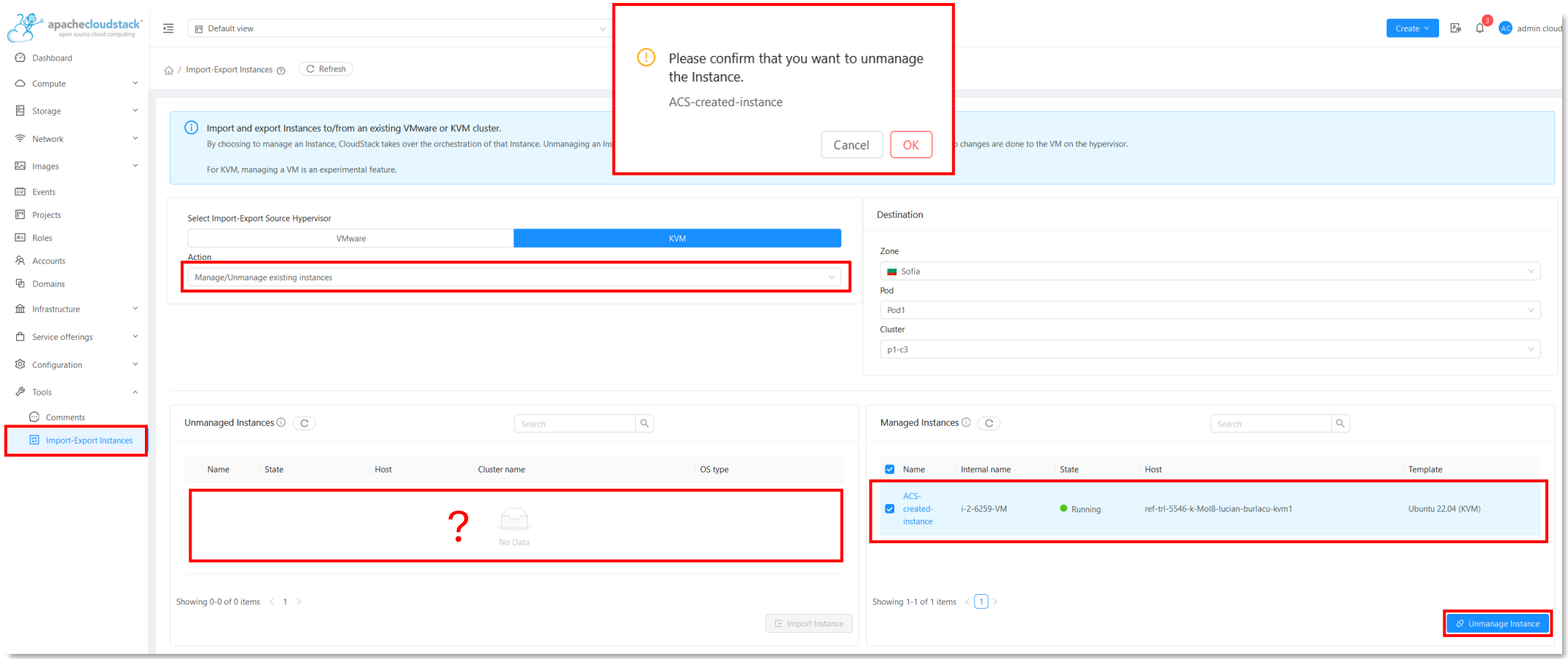


The usual import Instance UI

VMware: Unmanage Instance



KVM: Unmanage Instance



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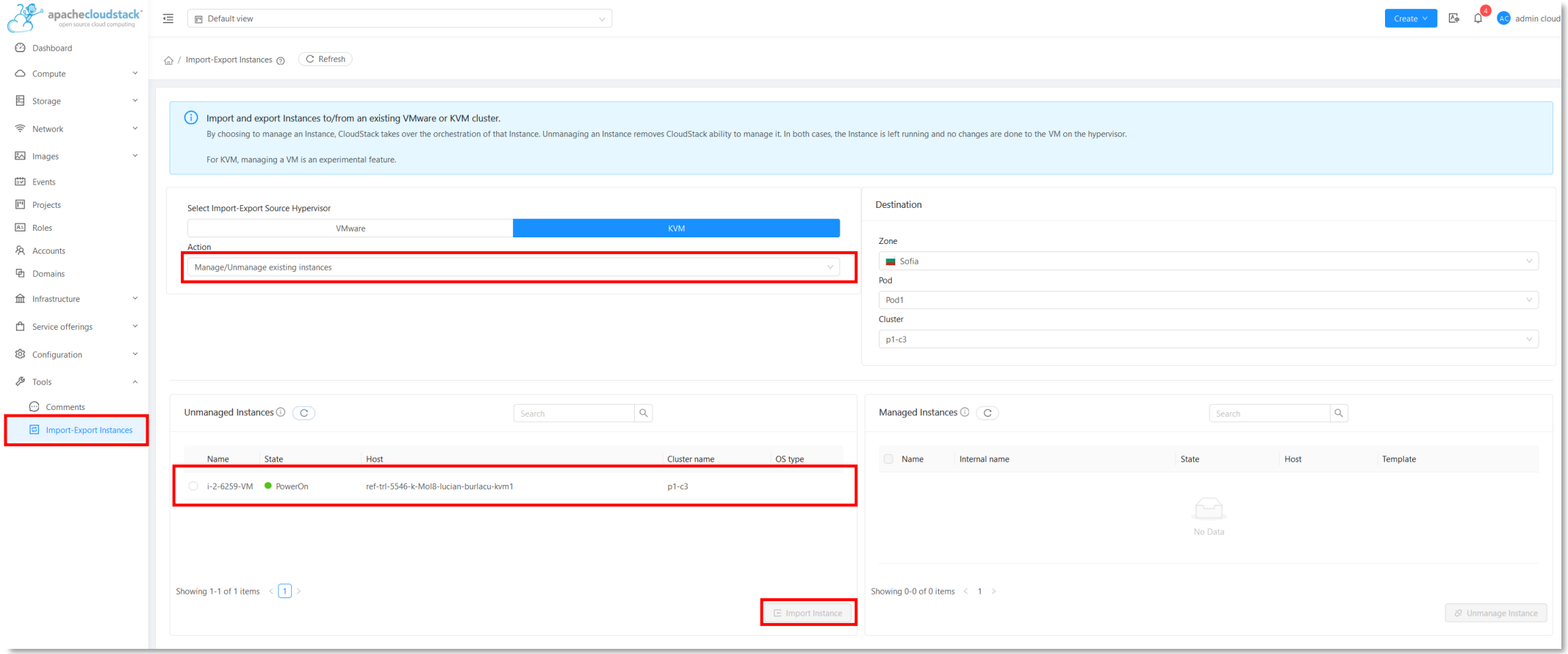
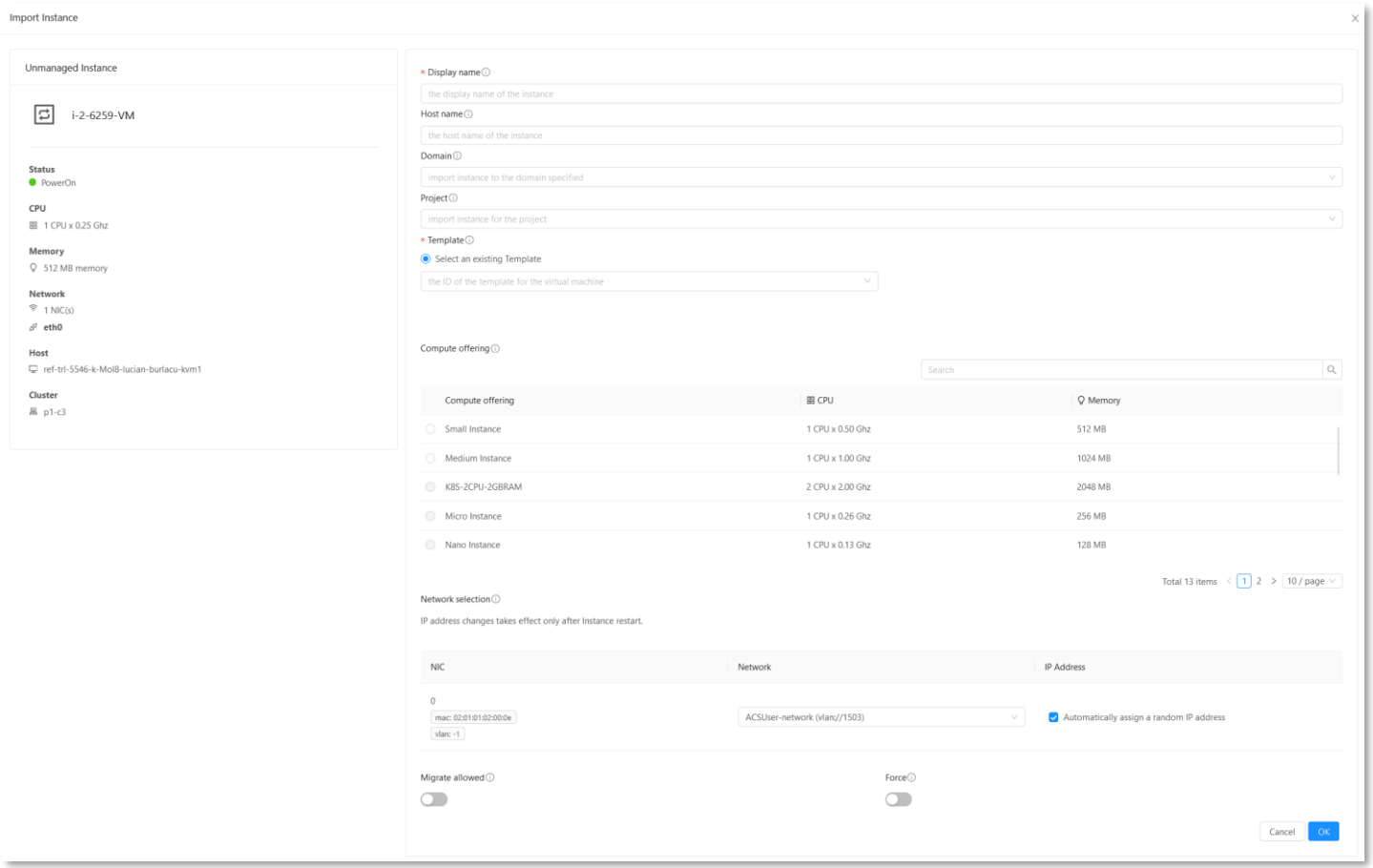
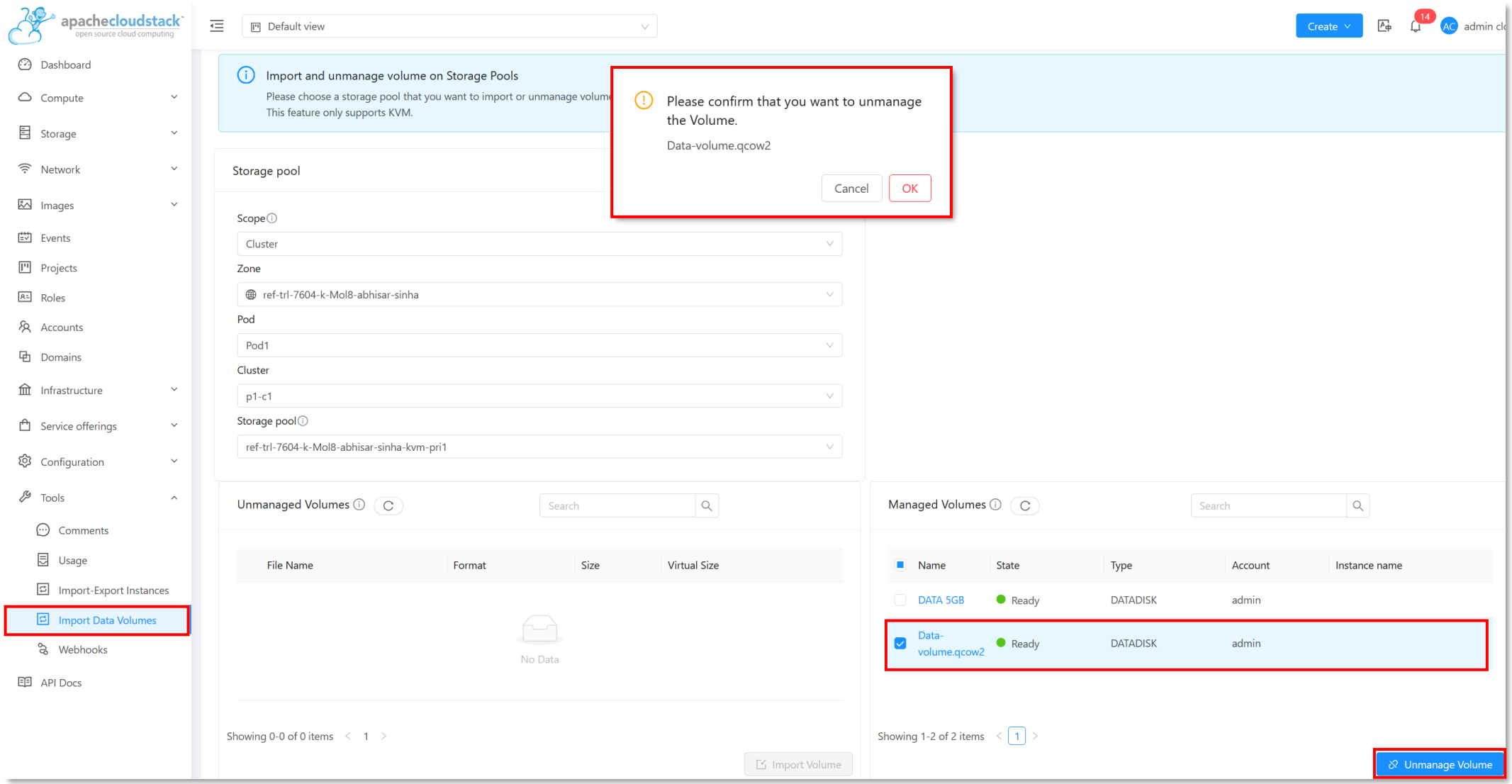


KVM: Manage Instance



The usual import Instance UI

Unmanage DATA volume (KVM only)



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Questions?

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Thank you!

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