ORACLE®
Private Cloud
Appliance

Migrating VMs from VMware vSphere to Oracle Private Cloud Appliance 2.3.1

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Introduction

Oracle Private Cloud Appliance is a cloud-ready, highly available and scalable compute IaaS platform. The integrated converged infrastructure solution is designed for rapid and cost-effective deployment of application and database workloads in a secure multi-tenant private cloud. Whether running any Linux, Oracle Solaris, or Microsoft Windows application, Oracle Private Cloud Appliance supports a large range of OS versions hosted in a converged server, network, and storage environment to enable fast application deployments in minutes rather than days. High performance, low-latency Oracle Fabric Interconnect and Oracle SDN software, allow automated configuration of the server and storage networks. The embedded Oracle Private Cloud Appliance controller software automates the installation, configuration, and management of all the infrastructure components at the push of a button.

Cloudbase is a company committed to cloud computing and interoperability that, in 2016, announced the release of their product Coriolis - Cloud Migration as a Service. Migrating existing Windows and Linux workloads between clouds is a necessity for a large number of use cases, especially while moving from traditional high-costs virtualization technologies like VMware vSphere to new modern virtualization technologies like Oracle VM Server, both on premises and in the cloud. Cloudbase Solutions ensures a seamless and fully automated migration of workloads between VMware and Oracle PCA with Coriolis. The emphasis is also on scalability and fault tolerance thanks to a well thought microservices architecture as shown in Figure 1.
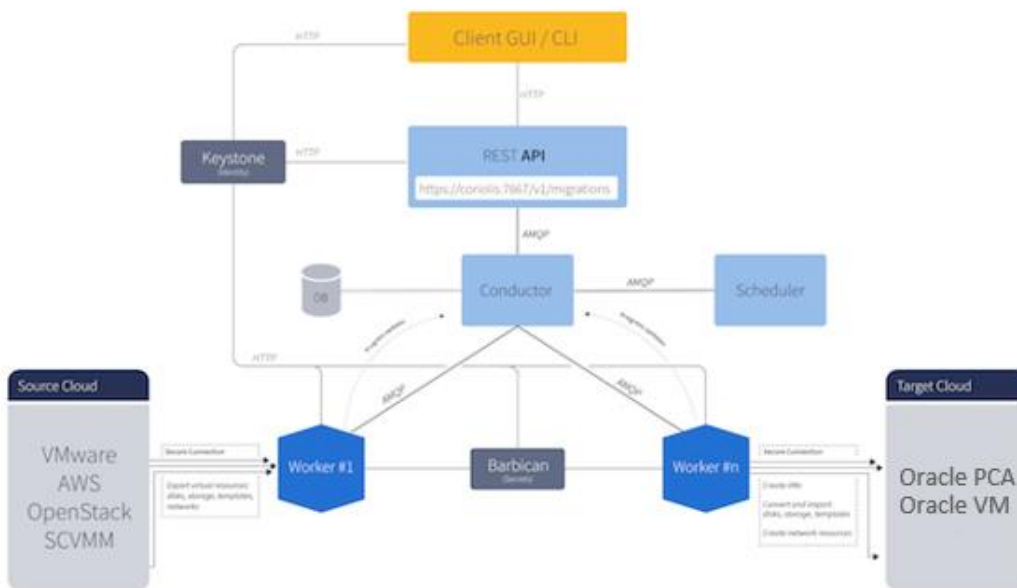

Figure 1. Architecture of Coriolis Cloud Migration Service

Environment

To migrate a running VM from VMware vSphere to Oracle PCA, you need:

» **Source of the VM.** VMware vSphere 4+
» **Target host for VM.** Oracle Private Cloud Appliance 2.3.1
» **Coriolis cloud migration solution VM.** Available from Cloudbase Solutions website

Install Coriolis VM on Oracle PCA

The first step is to set up the Coriolis cloud migration VM obtained as a Virtual Appliance (.ova file) from Cloudbase. To install it on PCA, follow these steps:

» Login to the OVM manager on PCA and select **Repositories** tab
» Select the desired repository and click on **Virtual Appliances**
» Click the **Import Virtual Appliance** button and provide the URL for the location of the Coriolis ova.
» Check the **Create VM box** and select the Server Pool location for creation of the VM.
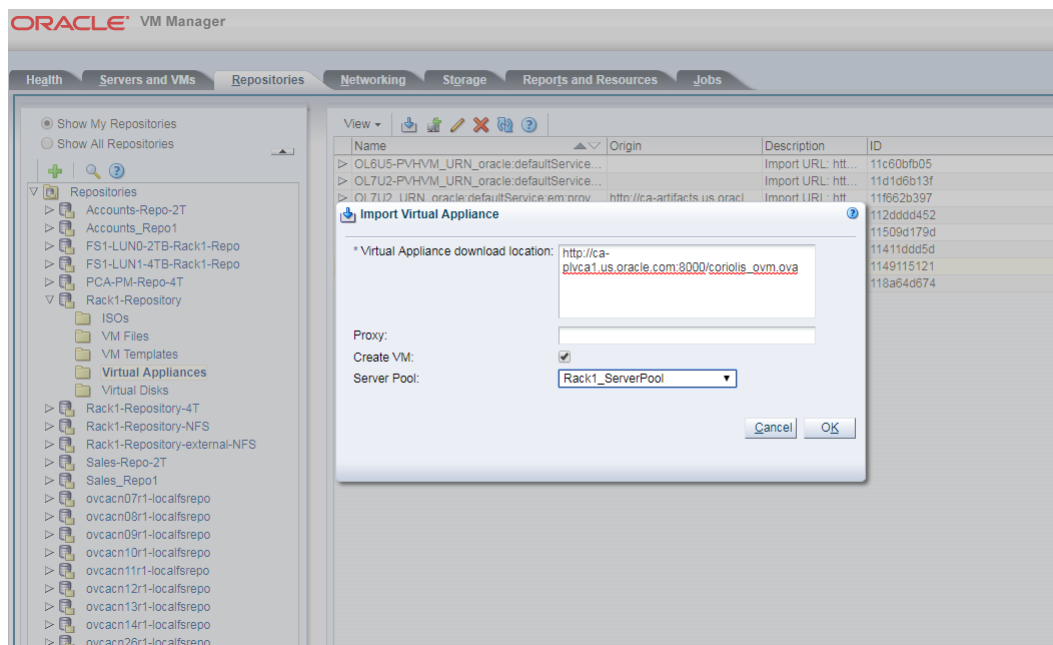
Figure 2. Creating the VM on PCA from the Coriolis Virtual Appliance

Edit the Network Settings for the VM

After the VM is created from the coriolis_ovm.ova, we need to edit its network settings to assign two network interfaces on the VM – one public and one private as shown in Figure 3.

» Click the **Servers and VMs** tab. In the navigation view, select the server pool where the coriolis VM was created.
» Select the VM and click **Edit Virtual Machine**. Edit the VM name in **Configuration** tab.
» Click **Networks** tab and assign one network interface to a public VLAN with DHCP. Assign the second network interface to a private network within the PCA.
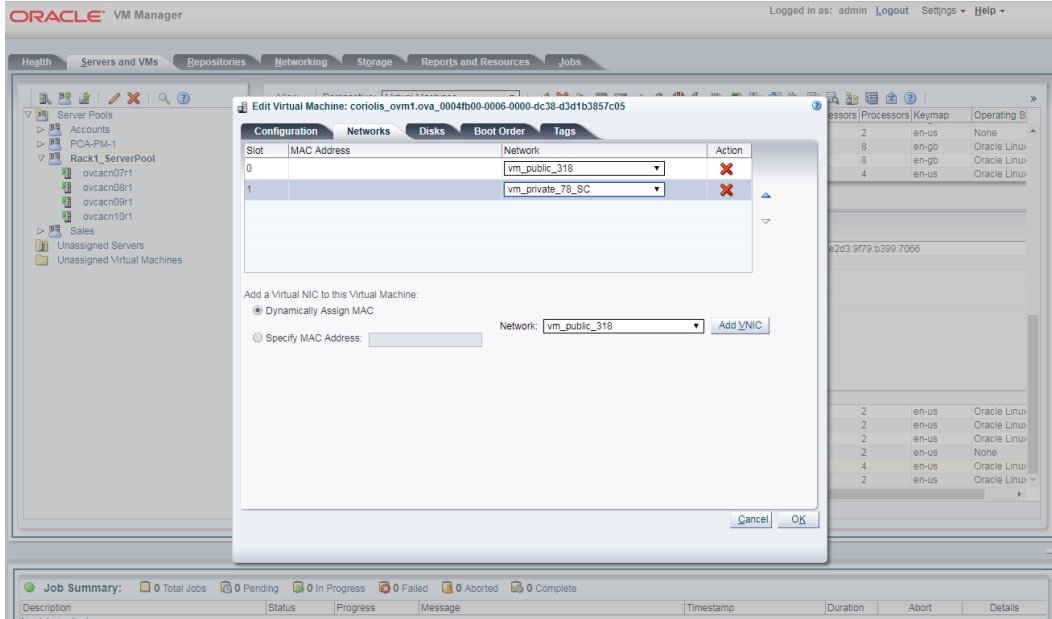» Click OK.

Figure 3. Edit Network Settings for Virtual Machine

Connect to Coriolis VM

Power on the VM and connect to the console using Launch Console button ( ) in the PCA OVM Manager GUI or by using ssh from a terminal. The public IP of the VM can be obtained from the OVM Manager GUI by clicking on the Expand button next to the VM name as shown in Figure 4.
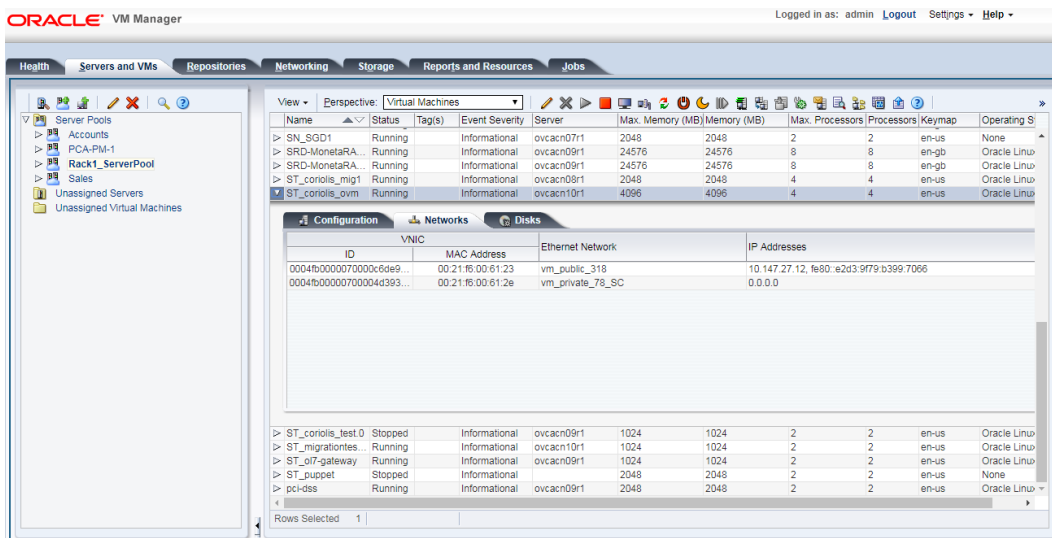

Figure 4. Retrieve public IP for Coriolis VM

Configuration for VMware vSphere: Enable Changed Block Tracking

Coriolis implements replicas to perform incremental copies of the content of the source VM disks on the target environment, which can be performed while the source VM is running. A replicated VM can then be migrated anytime, without any further access to the source infrastructure. In the case of VMware, replicas require that Change Block Tracking (CBT) is enabled on the VM configuration. CBT is used to perform incremental backups on VMware ESXi. CBT identifies and tracks block changes since the last backup and stores these changes in log form, thus reducing the backup times.

» Select the VM in vSphere host and click on **Edit Settings**
» Select '**VM Options**' tab and then click on Advanced
» Click on '**Edit Configuration**' button under Configuration parameters
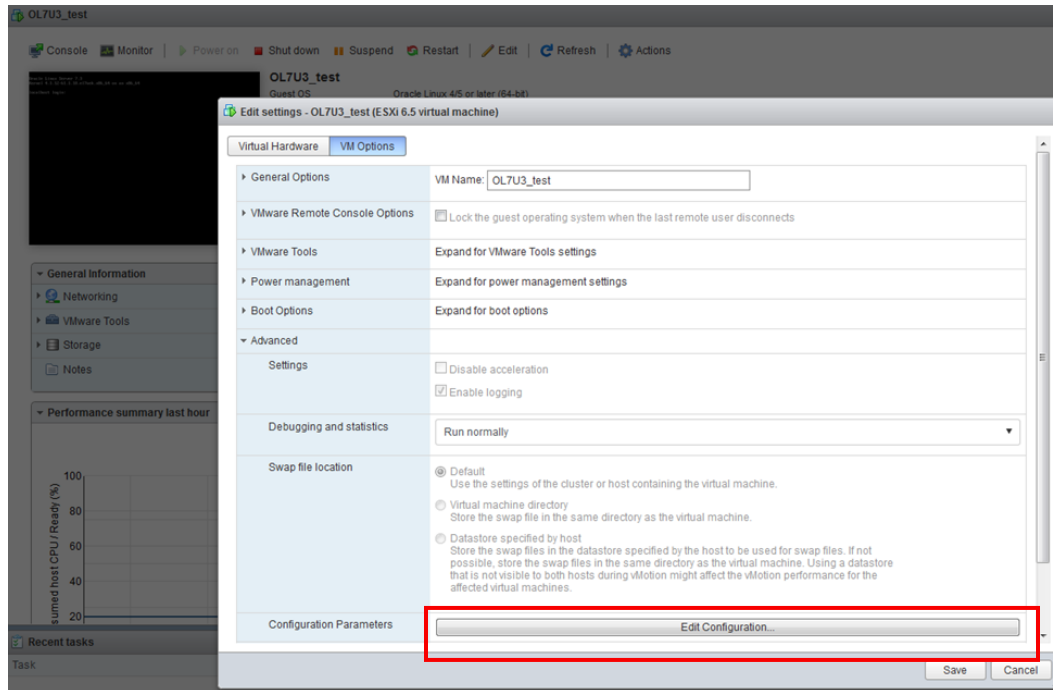
Figure 5. Edit Configuration for VM on VMware vSphere

» In an empty key field, type in **ctkEnabled** and set the value to **TRUE**
» In another empty Key field, type **scsi0:0.ctkEnabled** and set the value to **TRUE**
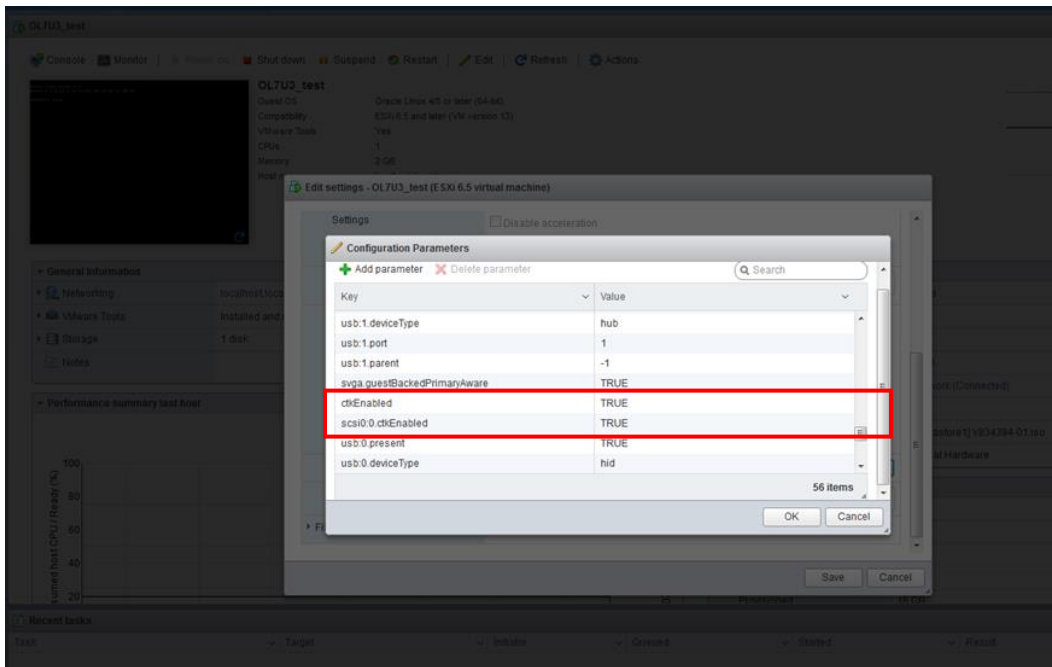
Figure 6. Enable Change Block Tracking on VMware

Oracle Linux Worker VM Template

Coriolis needs a VM template with a vanilla Oracle Linux 7 installation that will be used for instantiating temporary workers involved during the replica and migration steps. The template needs ovmd (Linux) installed in order for Coriolis to retrieve the assigned IP address via API. For the same purpose, a DHCP service is required in order to assign IPs to the temporary VMs, so modify the template settings to have an interface on the public network.

» Download the Oracle Linux 7 VM Template from https://cloudbase.it/downloads/OL7_template.tgz

» Click the **Repositories tab** and then choose the desired repository and **select VM Template**

» Click **Import VM Template button** (🔄) and enter the URL for VM Template location as shown in Figure 7.

» Click **OK**
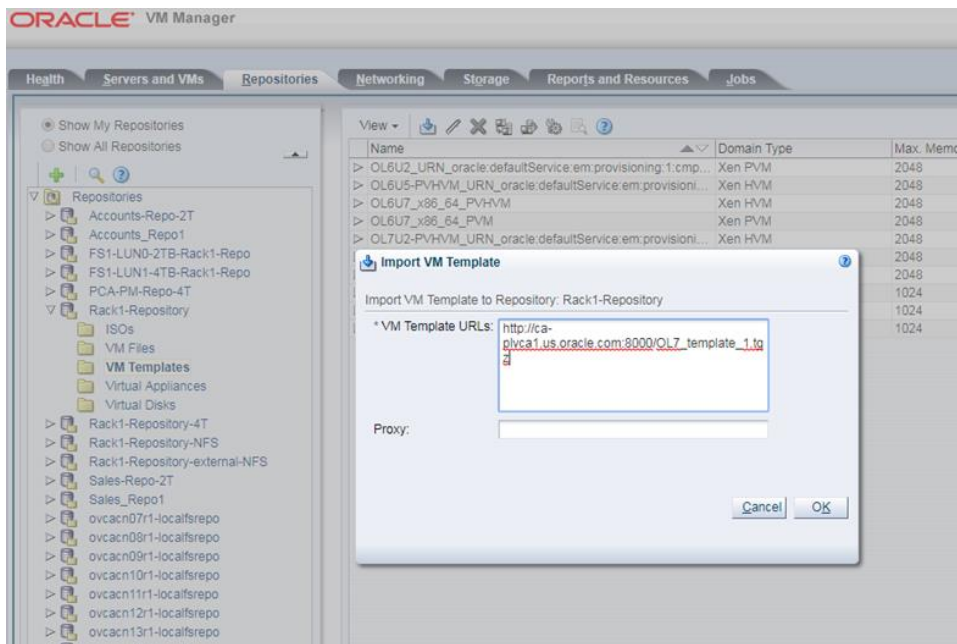
Figure 7. Import Worker VM Template to PCA

After importing the template to the desired repository, edit it to attach the template to a public network with DHCP access by following these steps:

» Click the **Repositories tab**. In the navigation tree, select the repository in which the template resides, then **VM Templates**. Select the template in the management pane and click **Edit VM Template**.

» Click on the **Networks tab** in Edit VM Template dialog box. Select the public VLAN to attach to the template, so that Coriolis is able to reach the temporary worker VMs created by cloning this VM template.

» Click OK
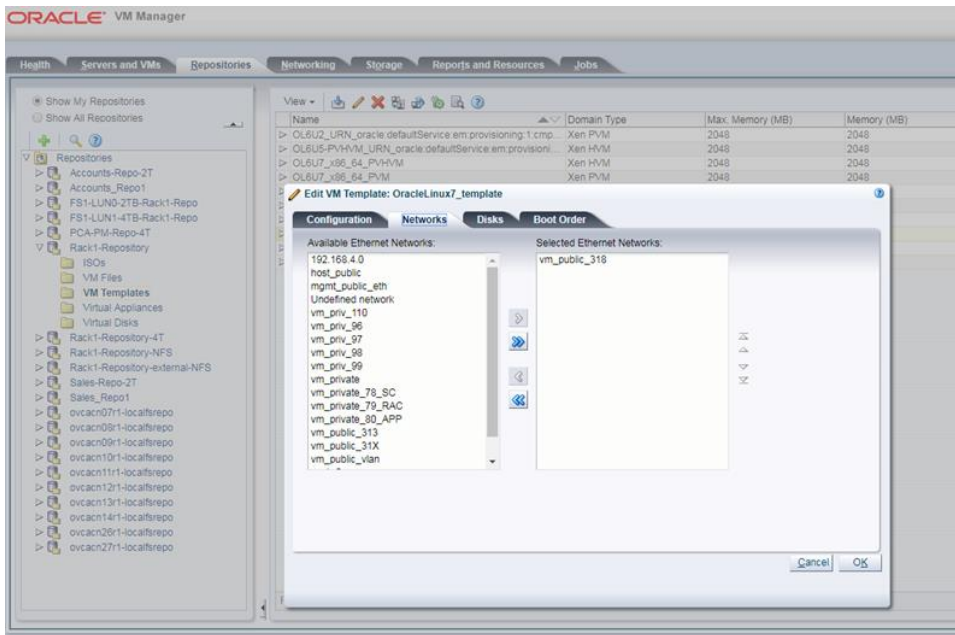
Figure 8. Edit Network Settings for Worker VM Template

Oracle VM Configuration on Coriolis VM

A few configuration changes are needed when using Oracle PCA as the target for VM migration with Coriolis.

» Connect to the Coriolis VM CLI using Console button in PCA OVM Manager console or ssh into the VM using credentials **root/Coriolis**

» Use an editor like vi to **edit /etc/coriolis/coriolis.conf** and replace the settings for oracle_vm_migration_provider section accordingly as shown in Figure 9.

The parameters refer to the VM templates location and login information, along with the network, pool and repository to be used when spawning the temporary VMs from VM template.
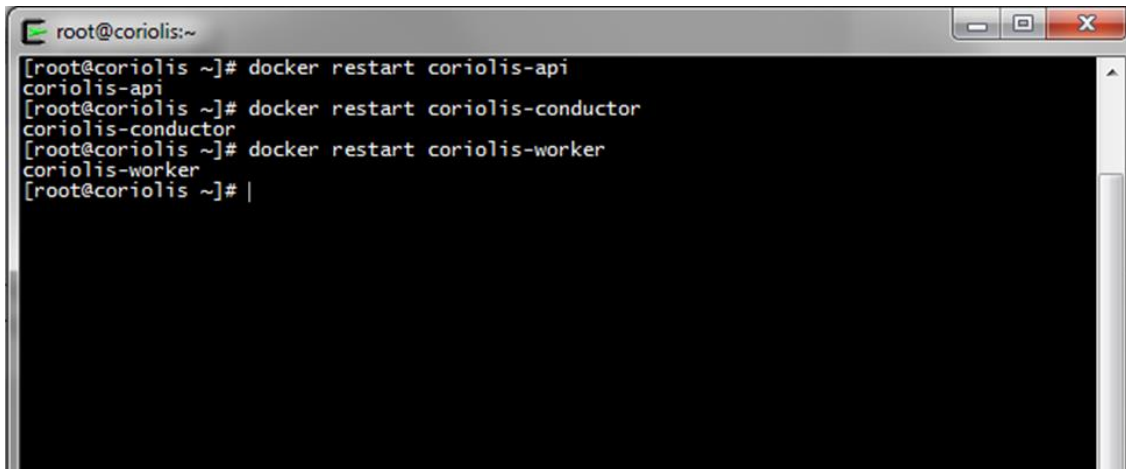
Note: The network specified in **migr_network_name** needs to be reachable by Coriolis and the temporary VMs cloned from the templates during a migration need to be able to access Internet resources via HTTP/HTTPS (e.g. yum repositories). You can specify the proxy settings in coriolis.conf file.

Figure 9. Edit /etc/coriolis/coriolis.conf file on the Coriolis VM

Restart Services

For ease of deployment, all Coriolis services are provided as Docker containers. We need to restart the services impacted by above configuration changes. Figure 10 shows the Docker containers that need to be restarted.
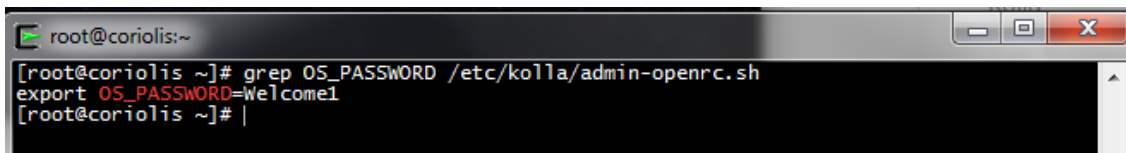
Figure 10. Restart Docker Containers affected by OVM configuration changes

Coriolis GUI

To begin working with the Coriolis UI, point a web browser to the IP address of your Coriolis VM. Login using the '**admin**' Username with password randomly generated during deployment.

To retrieve the password, SSH into the Coriolis VM (default: **root/Coriolis**) and run:

```
[root@coriolis ~]# grep OS_PASSWORD /etc/kola/admin-openrc.sh
```


Figure 11. Retrieve admin password for Coriolis VM
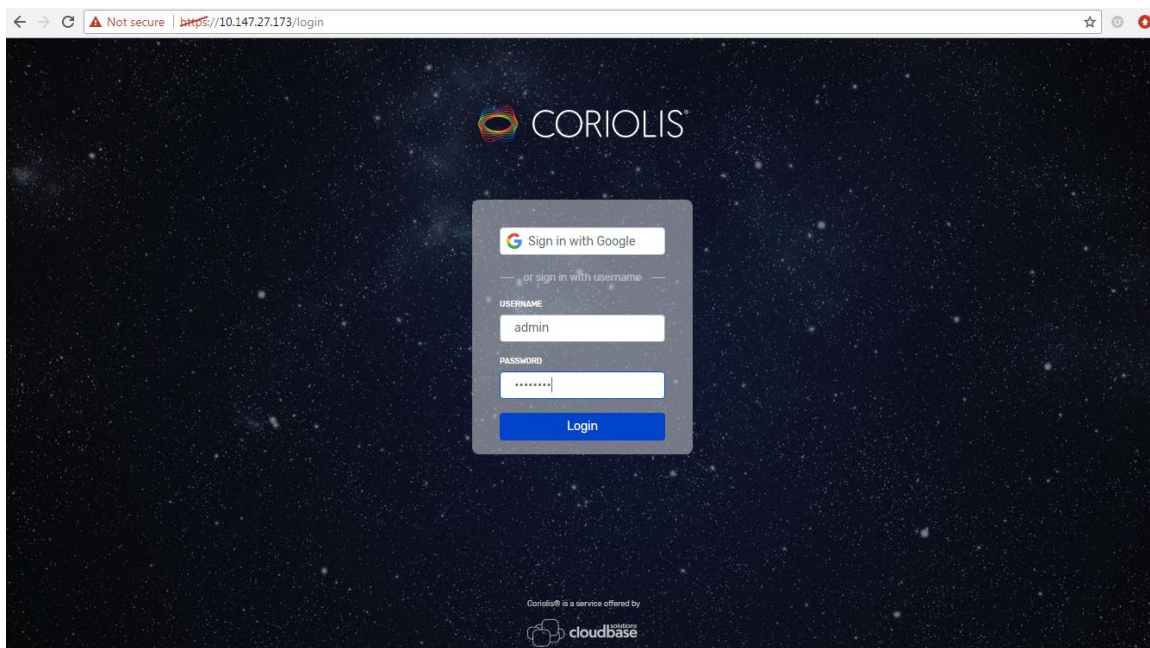
Figure 12. Login screen for Coriolis VM GUI

Create Endpoints for Oracle PCA and vSphere

Endpoints contain the cloud connection details (hostname, credentials, etc) that Coriolis stores in order to access the source and target cloud environments. Credentials are encrypted and managed by Barbican for security purposes. For VM migration, we need an endpoint for Oracle PCA and one endpoint for VMware vSphere.

Create cloud endpoint for PCA

» Click on **Cloud Endpoints.**
» Click on **New**. All the cloud endpoint options currently installed are displayed as shown in Figure 13.
» Choose **Oracle VM Server** from the list. Select or enter the following in the Add Cloud Endpoint dialog box shown in Figure 14.
   » **Endpoint name.** A name to identify the cloud endpoint
   » **Description.** A description for the endpoint
   » **Username:** The username for Oracle VM Manager on PCA
   » **Password:** The password for logging into the Oracle VM Manager on PCA
   » **Host:** The Virtual IP between the two management nodes on PCA
   » **Port:** 7002 is the default port for accessing Oracle VM Manager
   » **Allow Untrusted:** Yes
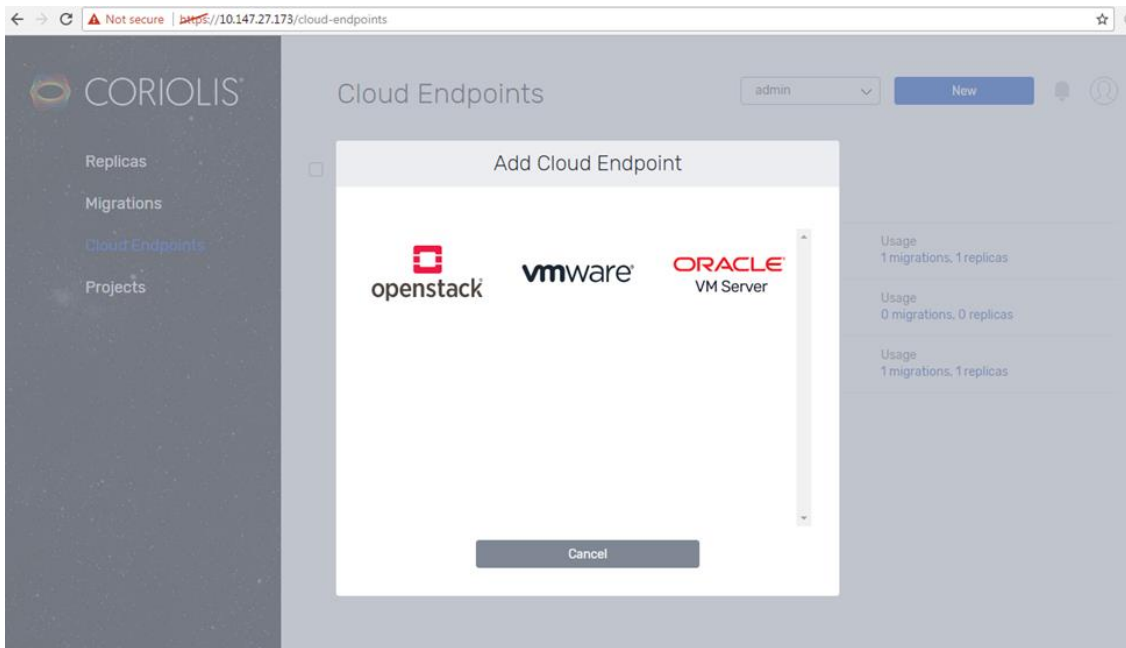
Figure 13. Add Cloud Endpoint dialog box
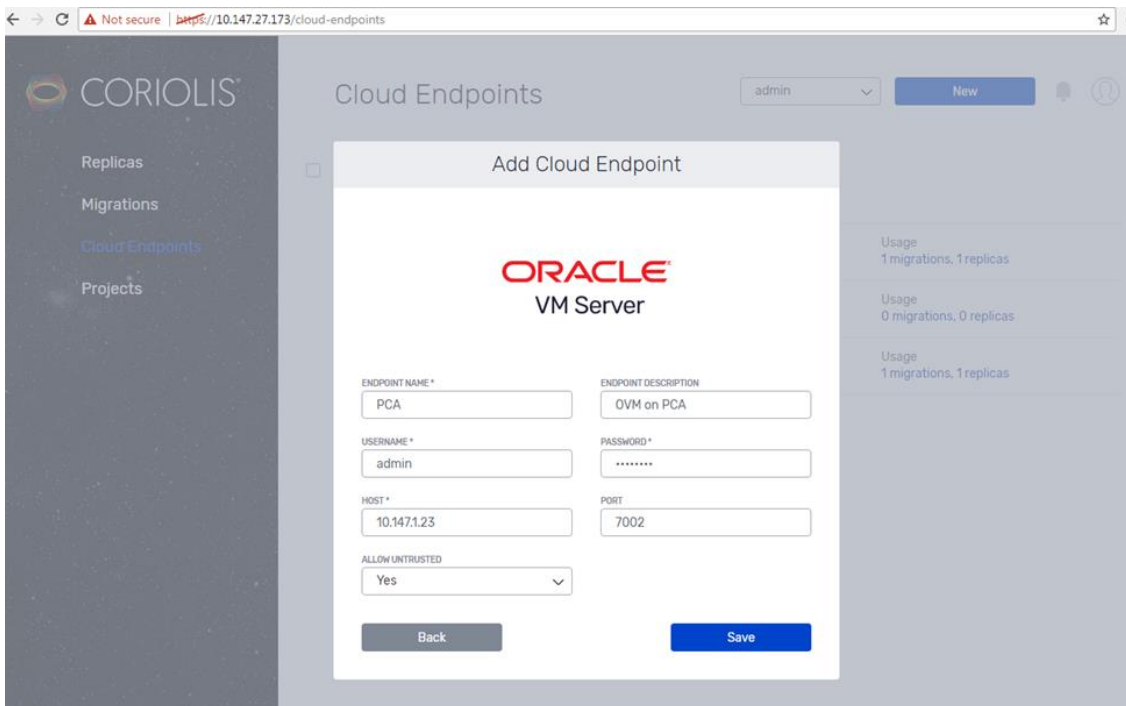
Figure 14. Create Oracle VM Server endpoint for PCA

» Click **Save.** This will create the endpoint and trigger an endpoint validation by attempting a connection to the Oracle VM Manager as shown in Figure 15.
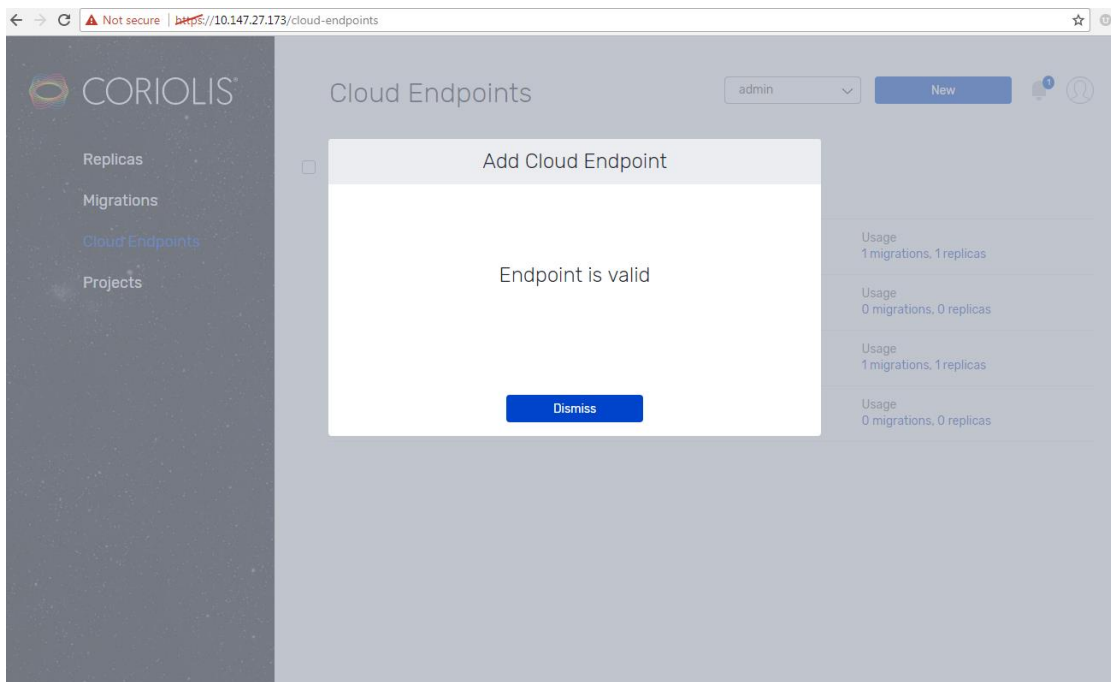
Figure 15. Validation of the cloud endpoint for PCA

Create cloud endpoint for VMware vSphere

Repeat the above procedure, this time choosing **VMware** from the Add Cloud Endpoint list**.** Then provide the required information in the Add Cloud Endpoint dialog box as shown in Figure 16.
Click **Save** to create the endpoint and trigger the connection validation.
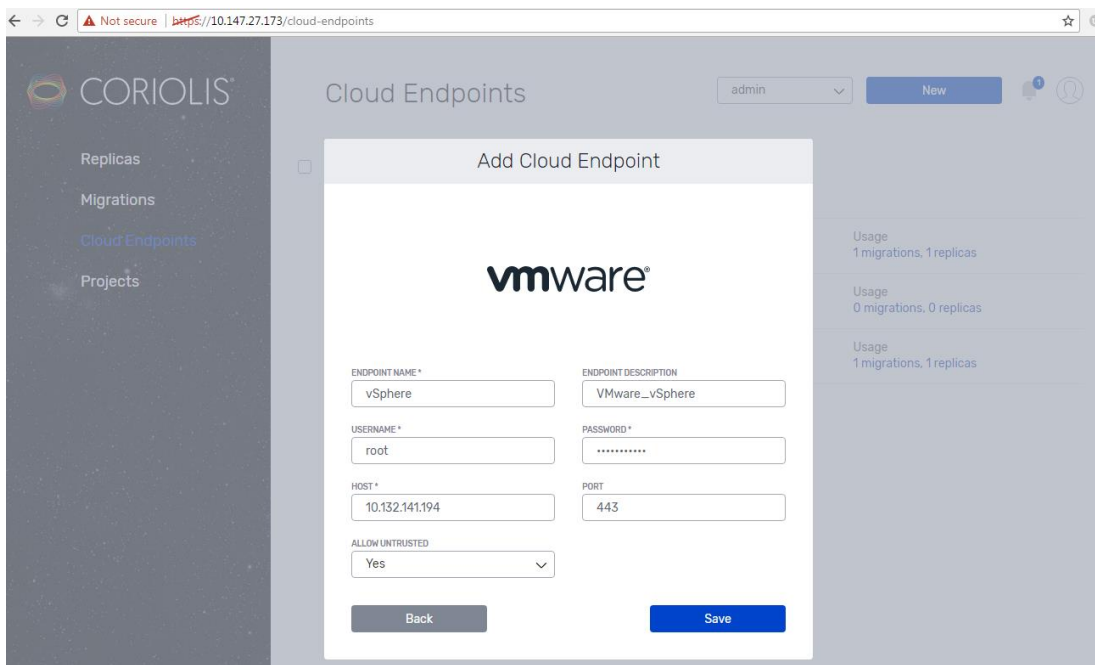
Figure 16. Add cloud endpoint for VMware vSphere

Perform the Replica Creation

A Coriolis replica is obtained by incrementally copying the VM data from source to the target without affecting any running workloads. A replica can then be migrated to the target cloud. To create a replica, follow these steps:

» Click on the **Replicas** tab and select **New**.

» Choose **Coriolis Replica** under Migration Options and click **Next**.
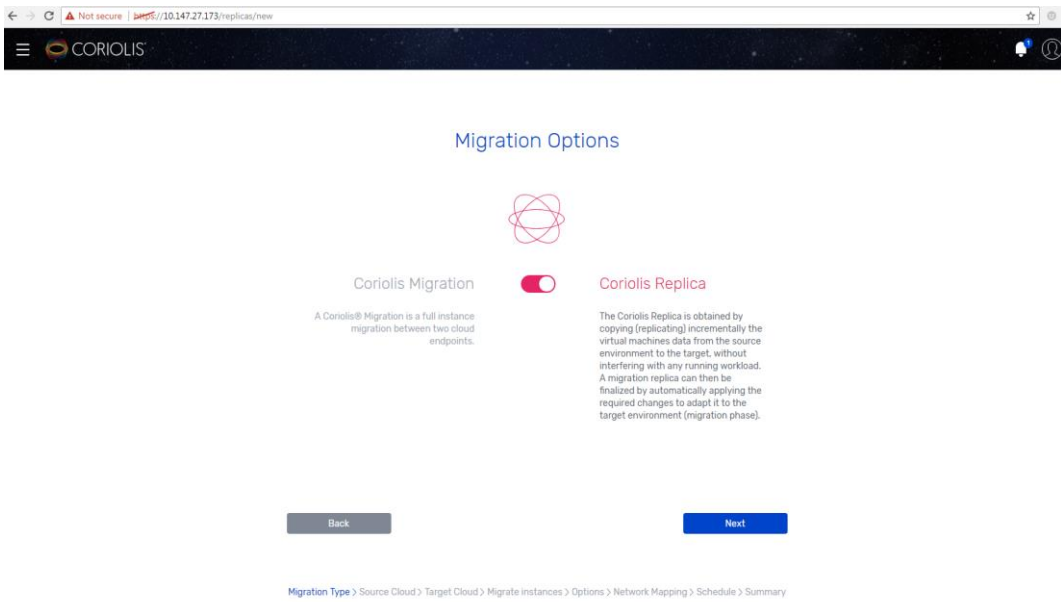
Figure 17. Creating a Replica

» In **Select your source cloud screen**, choose your **vSphere cloud endpoint** from the VMware drop down list as shown in Figure 18. Click **Next.**
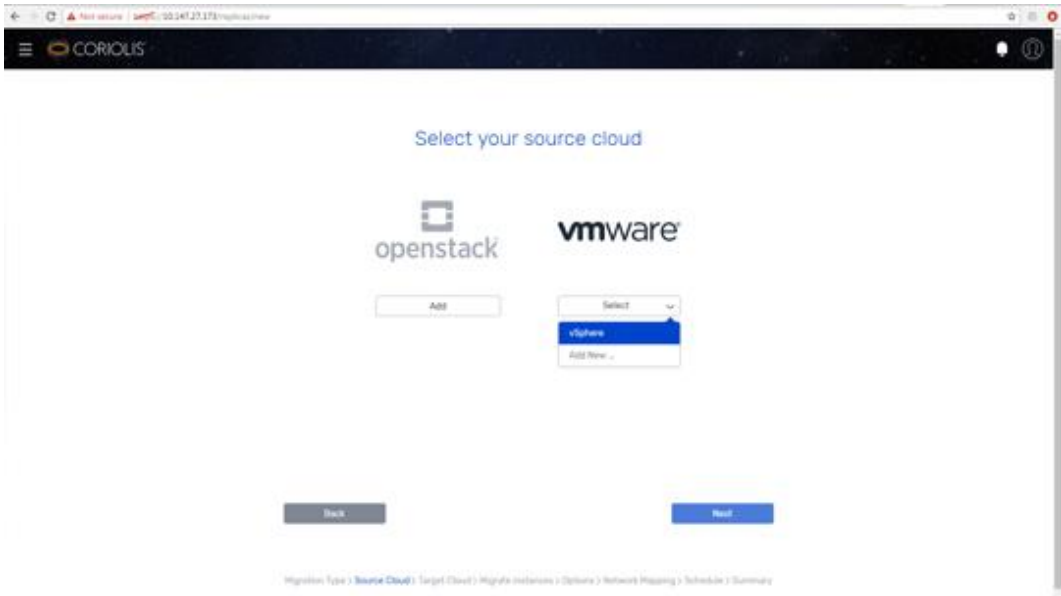
Figure 18. Select the source cloud as VMware

» In **Select Your Target Cloud**, choose the **PCA endpoint** from Oracle VM Server drop down list as shown in Figure 19. Click **Next**
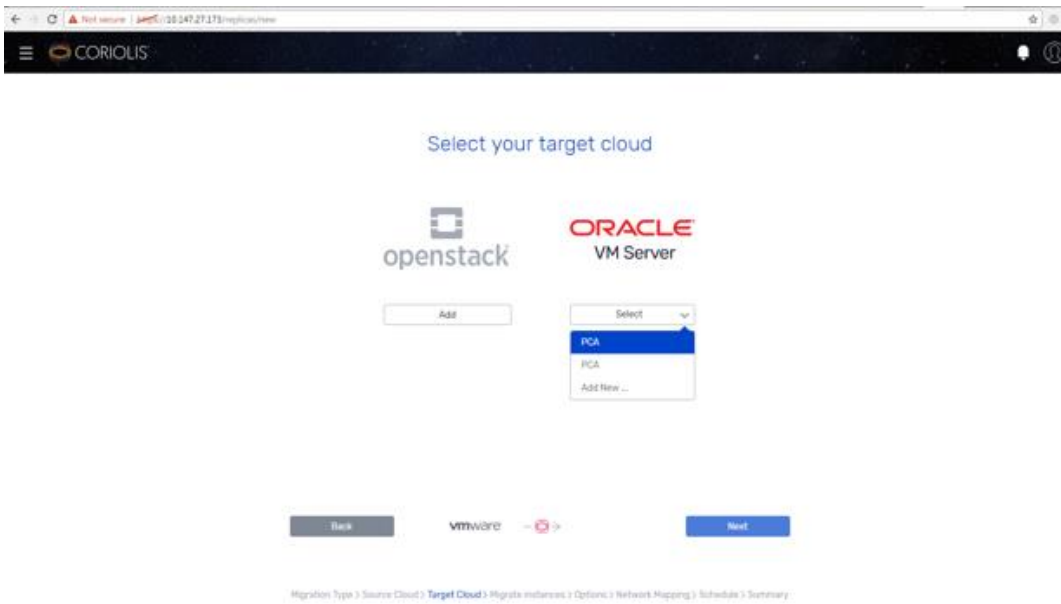
Figure 19. Select the endpoint for PCA as the target cloud

» All the VMs present at the source cloud (VMware) are displayed. Select the VM(s) that you want to migrate to Oracle PCA and click **Next**.
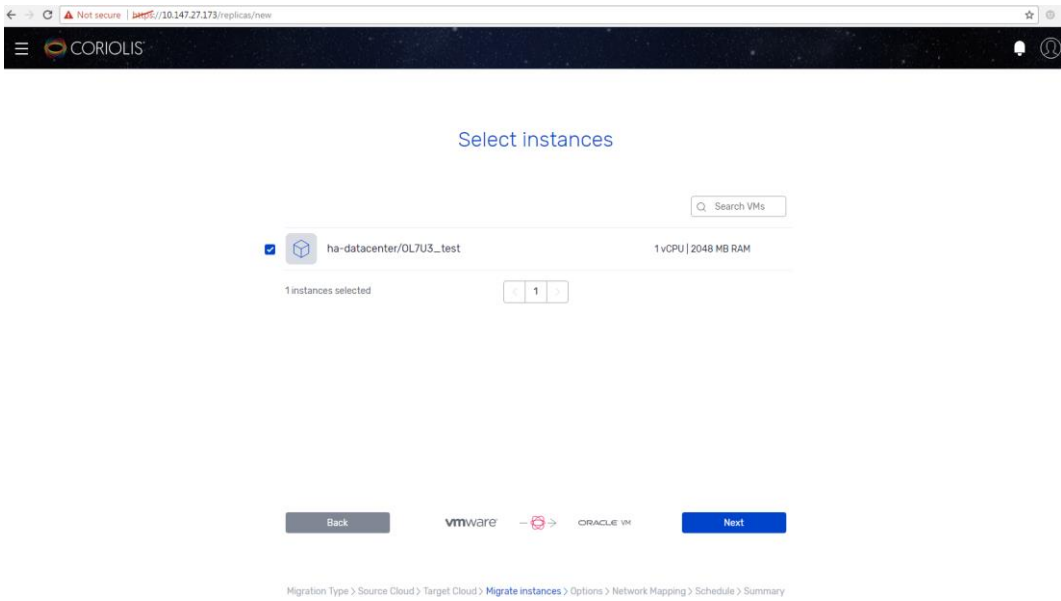
Figure 20. Select the VMs to be migrated from VMware to PCA

» Select the PCA specific options starting with the **Server Pool** where the selected VM(s) are to be migrated. Click **Next**.
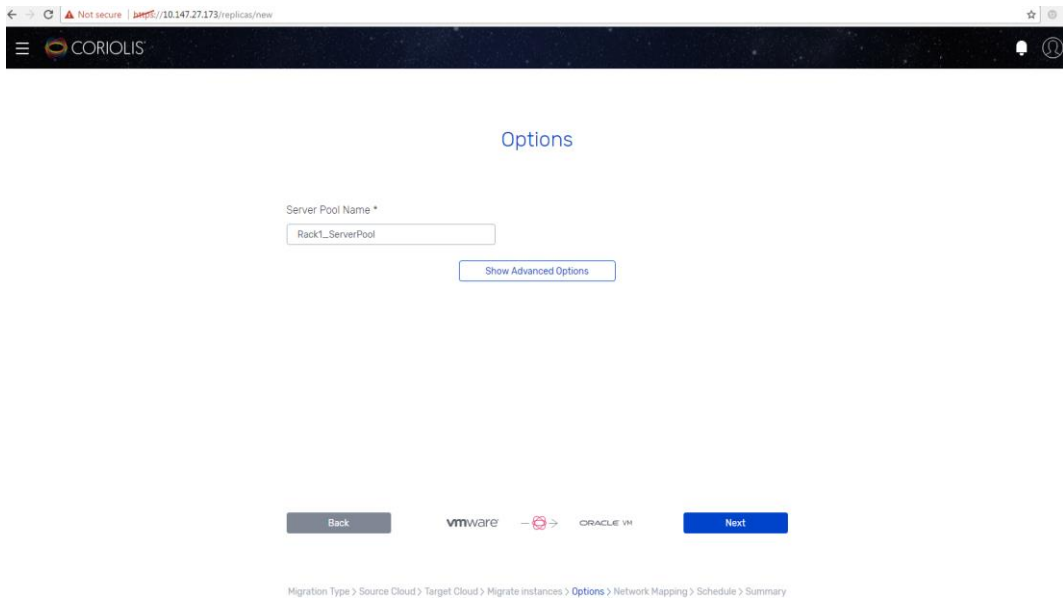
Figure 21. Select the Server Pool on PCA for migrating the VM

» In the **Network Mapping**, for each network used by the VM(s) on VMware, you need to select a matching network on the PCA target. This is where the VMs will be connected after being migrated. Click **Next**.
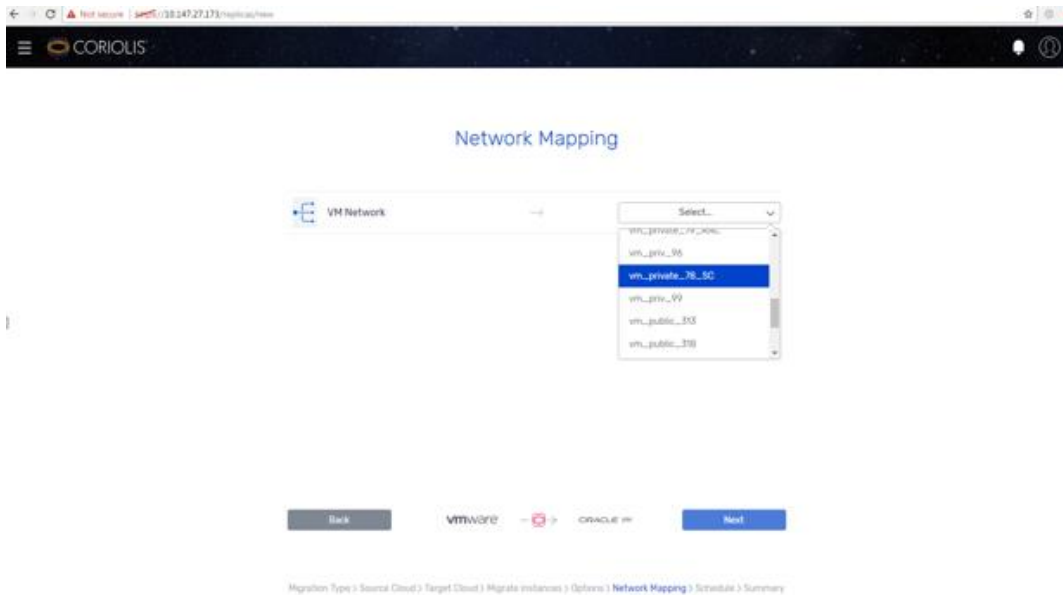
Figure 22. Select networks on PCA corresponding to each network used by the VM on VMware

» Select **Execute Now** and Click **Next**.
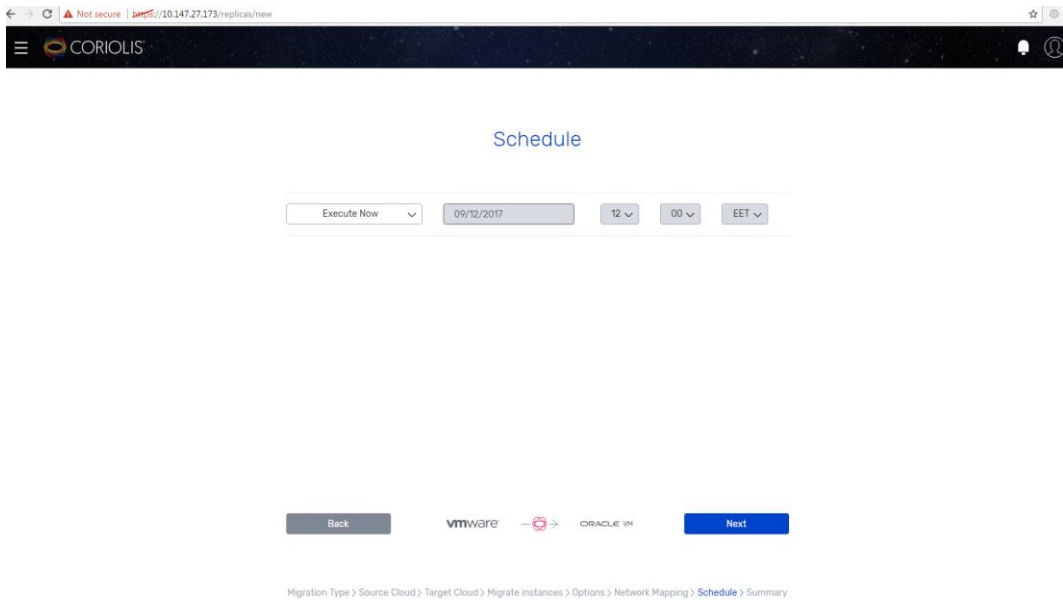
Figure 23. Schedule the Replica creation process

» Review the Summary and Click **Finish** to start Replica creation process.
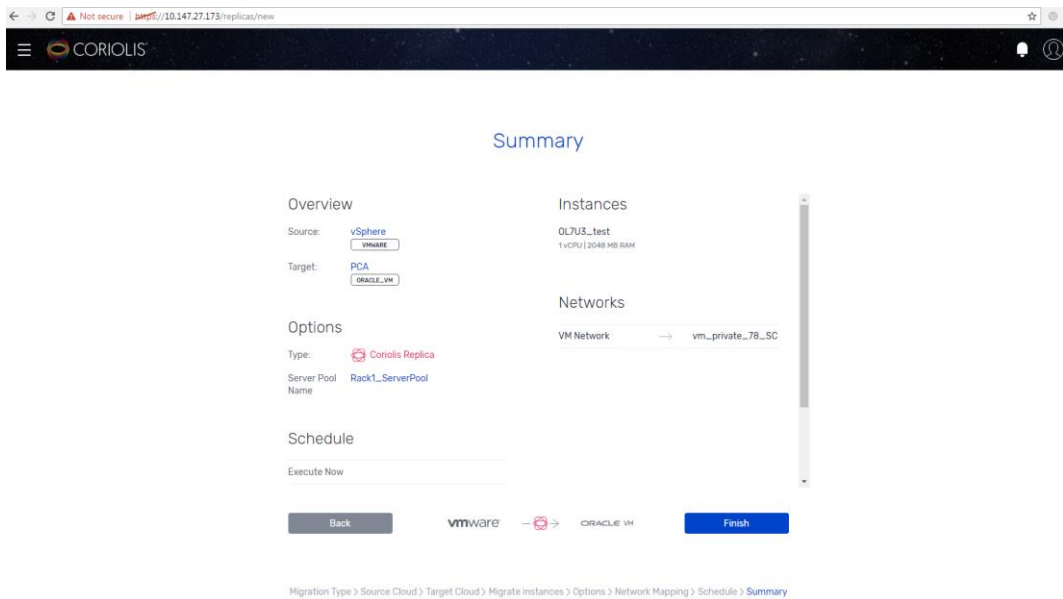
Figure 24. View summary of all settings for Replica creation

Coriolis begins executing the replica as shown in Figure 25.
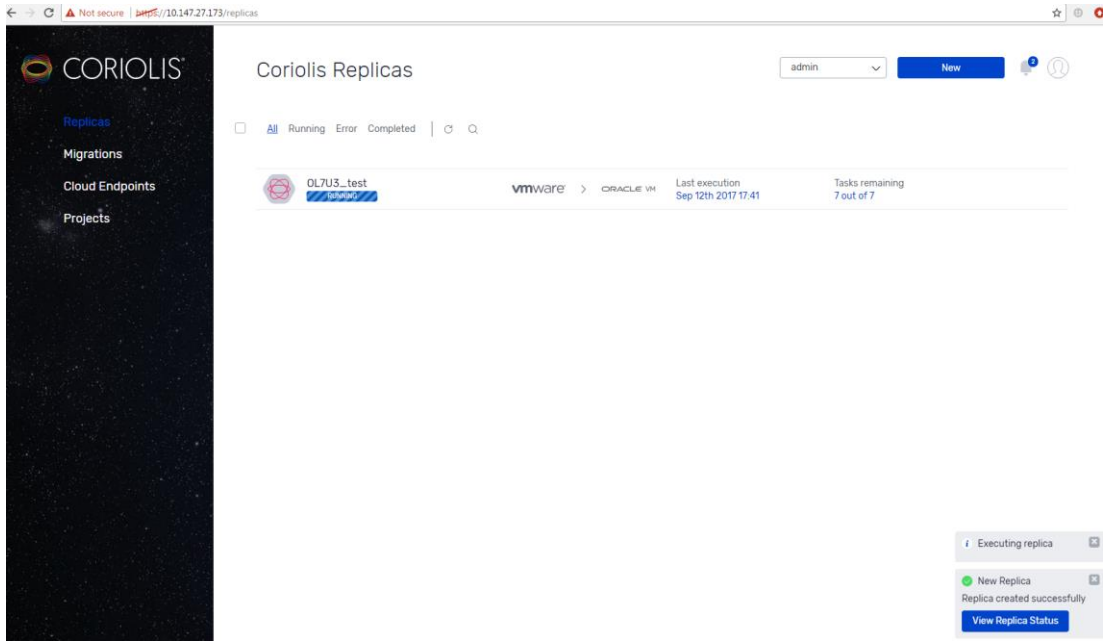
Figure 25. Executing the Replica

To view the progress of replica creation process, click on the **Replica name** and select **Executions** as shown in Figure 26.
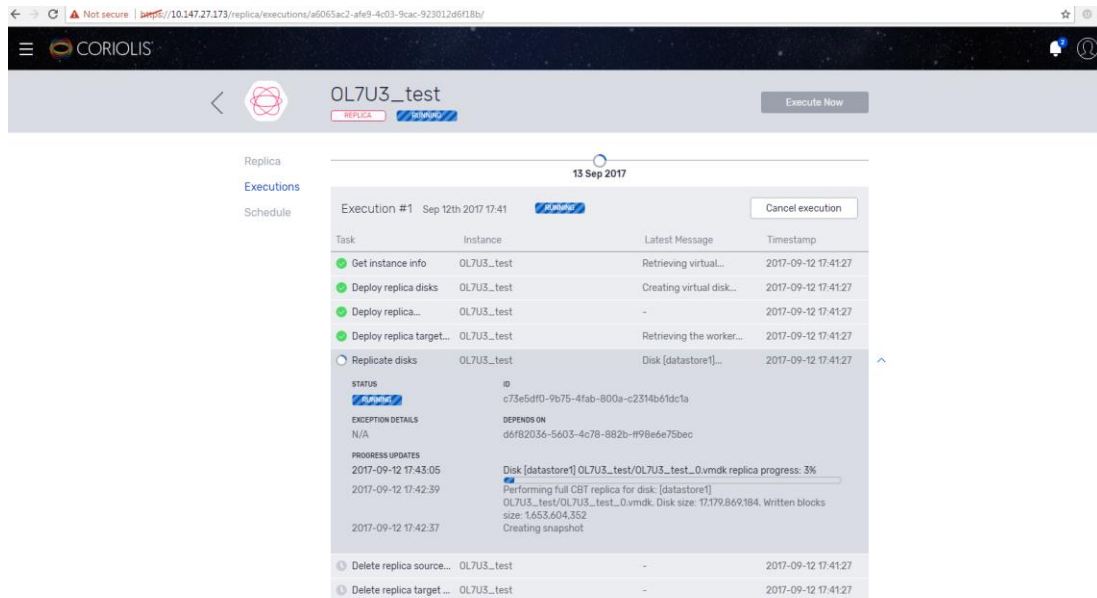
Figure 26. Executions tab shows the progress of Replica creation process
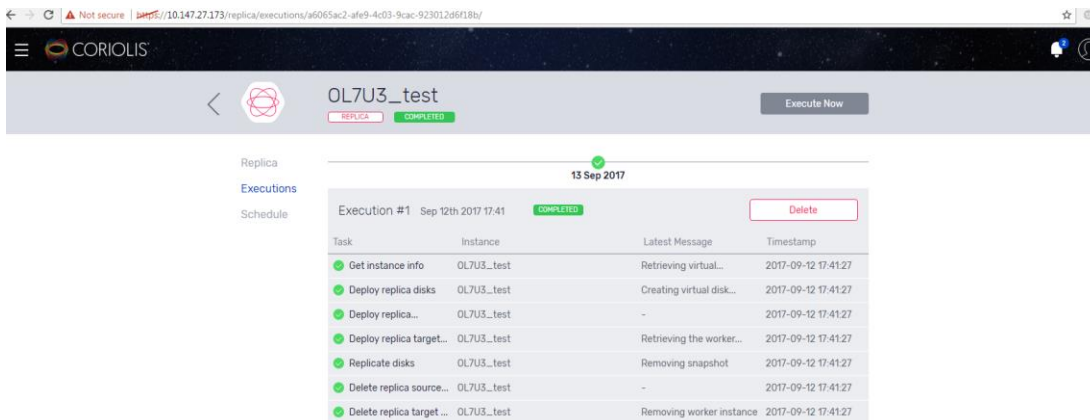
Figure 27. Replica creation complete

Note: Once completed, the replica can be executed incrementally multiple times to update the replicated content.

Migrate the VM from the Replica

» Once the replica creation is complete, click on Migrate Replica in Replica details tab to begin the migration process to PCA, as shown in Fig 28.
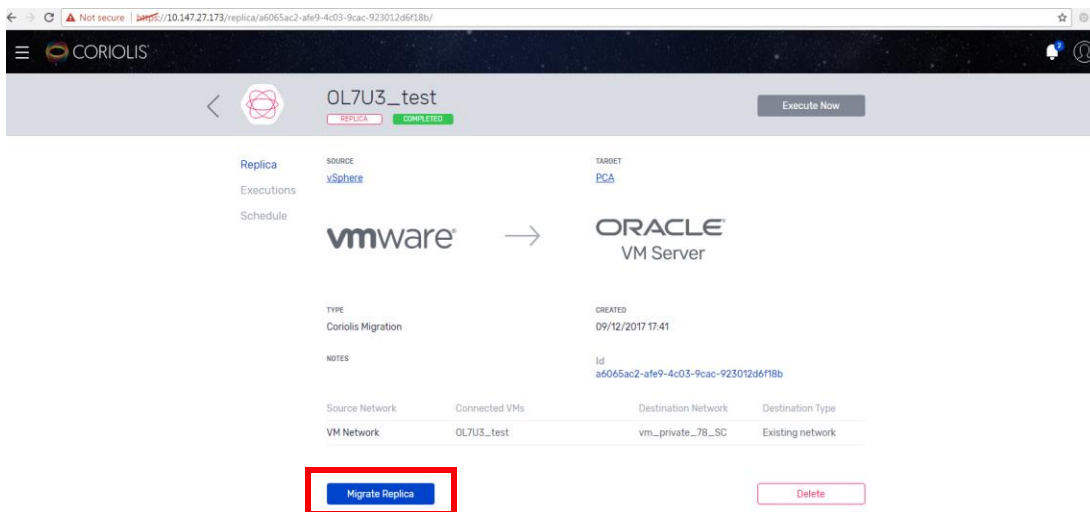
Figure 28. Start the migration process by clicking Migrate Replica button

» Click on **View Migration Status** button in the popup on the right. Click **Tasks** to view the progress of migration process to PCA as shown in Figure 29.

Figure 29. View progress of Migration process in the Tasks tab

Figure 30. VM Migration complete

Upon completion of the migration process, we can see that the migrated VM 'OL7U3_test' is running in the desired tenant group on Oracle PCA as shown in Figure 31.
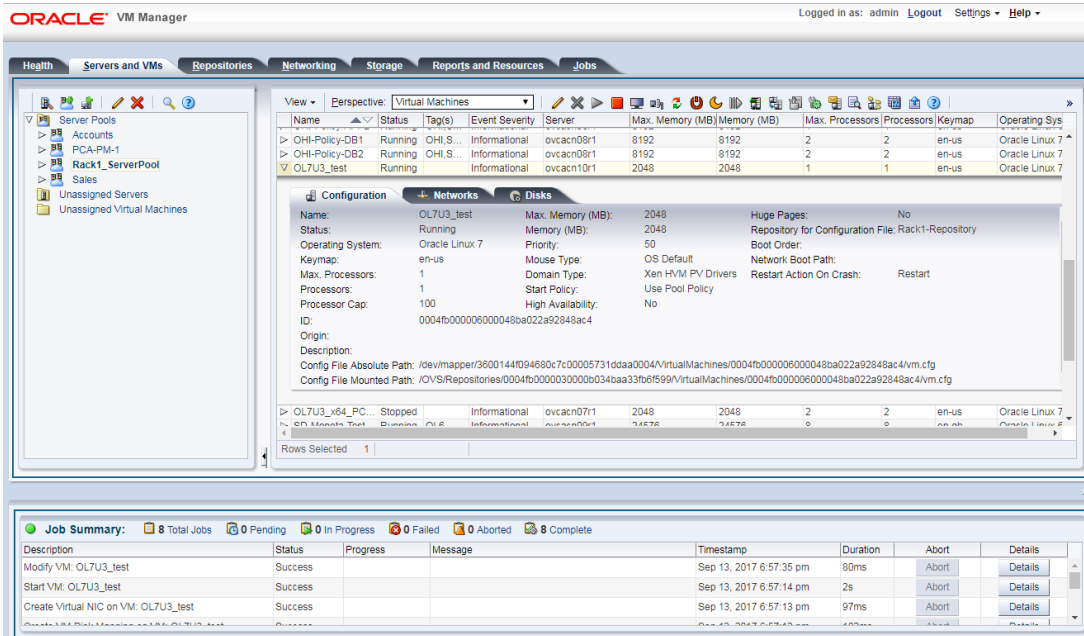

Figure 31. OVM Manager on PCA shows the new VM 'OL7U3_test' running on PCA

Conclusion

Private Cloud Appliance is an Oracle Engineered System designed to provide a private cloud infrastructure for Oracle and non-Oracle workloads. The Oracle private cloud model is simple: it's the exact same technology on-premises and in the public cloud, providing you with choice and flexibility.

Cloudbase Coriolis provides a scalable and fault tolerant cloud migration solution based on a microservices architecture. Migrating hundreds of VMs with multiple tenants in parallel is no problem. This solution reliably solves the use case of moving from traditional high-costs virtualization technologies like VMware vSphere to new modern virtualization technologies like Oracle VM Server.

More Information

Find out more about Cloudbase Coriolis here.

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Integrated Cloud Applications & Platform Services

White Paper Migrating VMs from VMware vSphere to Oracle Private Cloud Appliance 2.3.1
October 2017
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