



NetApp HCI Disaster Recovery with Cleondris

HCI

NetApp
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TR-4830: NetApp HCI Disaster Recovery with Cleondris

Michael White, NetApp

Overview of Business Continuity and Disaster Recovery

The business continuity and disaster recovery (BCDR) model is about getting people back to work. Disaster recovery focuses on bringing technology, such as an email server, back to life. Business continuity makes it possible for people to access that email server. Disaster recovery alone would mean that the technology is working, but nobody might be using it; BCDR means that people have started using the recovered technology.

Business Impact Assessment

It is hard to know what is required to make a tier 1 application work. It is usually obvious that authentication servers and DNS are important. But is there a database server somewhere too?

This information is critical because you need to package tier 1 applications so that they work in both a test failover and a real failover. An accounting firm can perform a business impact assessment (BIA) to provide you with all the necessary information to successfully protect your applications: for example, determining the required components, the application owner, and the best support person for the application.

Application Catalog

If you do not have a BIA, you can do a version of it yourself: an application catalog. It is often done in a spreadsheet with the following fields: application name, components, requirements, owner, support, support phone number, and sponsor or business application owner. Such a catalog is important and useful in protecting your applications. The help desk can sometimes help with an application catalog; they often have already started one.

What Not to Protect

There are applications that should not be protected. For example, you can easily and cheaply have a domain controller running as a virtual machine (VM) at your disaster recovery site, so there is no need to protect one. In fact, recovering a domain controller can cause issues during recovery. Monitoring software that is used in the production site does not necessarily work in the disaster recovery site if it is recovered there.

It is usually unnecessary to protect applications that can be protected with high availability. High availability is the best possible protection; its failover times are often less than a second. Therefore,

disaster recovery orchestration tools should not protect these applications, but high availability can. An example is the software in banks that support ATMs.

You can tell that you need to look at high-availability solutions for an application when an application owner has a 20-second recovery time objective (RTO). That RTO is beyond replication solutions.

Product Overview

The Cleondris HCI Control Center (HCC) adds disaster recovery capabilities to new and existing NetApp HCI deployments. It is fully integrated with the NetApp SolidFire storage engine and can protect any kind of data and applications. When a customer site fails, HCC can be used to recover all data at a secondary NetApp HCI site, including policy-based VM startup orchestration.

Setting up replication for multiple volumes can be time consuming and error prone when performed manually. HCC can help with its Replication Wizard. The wizard helps set up the replication correctly so that the servers can access the volumes if a disaster occurs. With HCC, the VMware environment can be started on the secondary system in a sandbox without affecting production. The VMs are started in an isolated network and a functional test is possible.

Installing Cleondris: NetApp HCI DR with Cleondris

Prerequisites

There are several things to have ready before you start with the installation.

This technical report assumes that you have your NetApp HCI infrastructure working at both your production site and your disaster recovery site.

- **DNS.** You should have DNS prepared for your HCC disaster recovery tool when you install it.
- **FQDN.** A fully qualified domain name for the disaster recovery tool should be prepared before installation.
- **IP address.** The IP will be part of the FQDN before it is put into DNS.
- **NTP.** You need a Network Time Protocol (NTP) server address. It can be either your own internal or external address, but it needs to be accessible.
- **Storage location.** When you install HCC, you must know which datastore it should be installed to.
- **vCenter Server service account.** You will need to have a service account created in vCenter Server on both the disaster recovery and production side for HCC to use. It does not require administrator-level permissions at the root level. If you like, you can find exactly what is required in the HCC user guide.
- **NetApp HCI service account.** You need a service account in your NetApp HCI storage for both the disaster recovery and production side for HCC to use. Full access is required.
- **Test network.** This network should be connected to all your hosts in the disaster recovery site, and

it should be isolated and nonrouting. This network is used to make sure applications work during a test failover. The built-in test network that is temporary only is a one-host network. Therefore, if your test failover has VMs scattered on multiple hosts, they will not be able to communicate. I recommend that you create a distributed port group in the disaster recovery site that spans all hosts but is isolated and nonrouting. Testing is important to success.

- **RTOs.** You should have RTOs approved by management for your application groups. Often it is 1 or 2 hours for tier 1 applications; for tier 4 applications, it can be as long as 12 hours. These decisions must be approved by management because they will determine how quickly things work after a critical outage. These times will determine replication schedules.
- **Application information.** You should know which application you need to protect first, and what it needs to work. For example, Microsoft Exchange needs a domain controller that has a role of Global Catalog to start. In my own experience, a customer said that they had one email server to protect. It did not test well, and when I investigated, I discovered the customer had 24 VMs that were part of the email application.

Download Information

You can download HCC from the [Cleondris site](#). When you buy it, you receive an email with a download link as well.

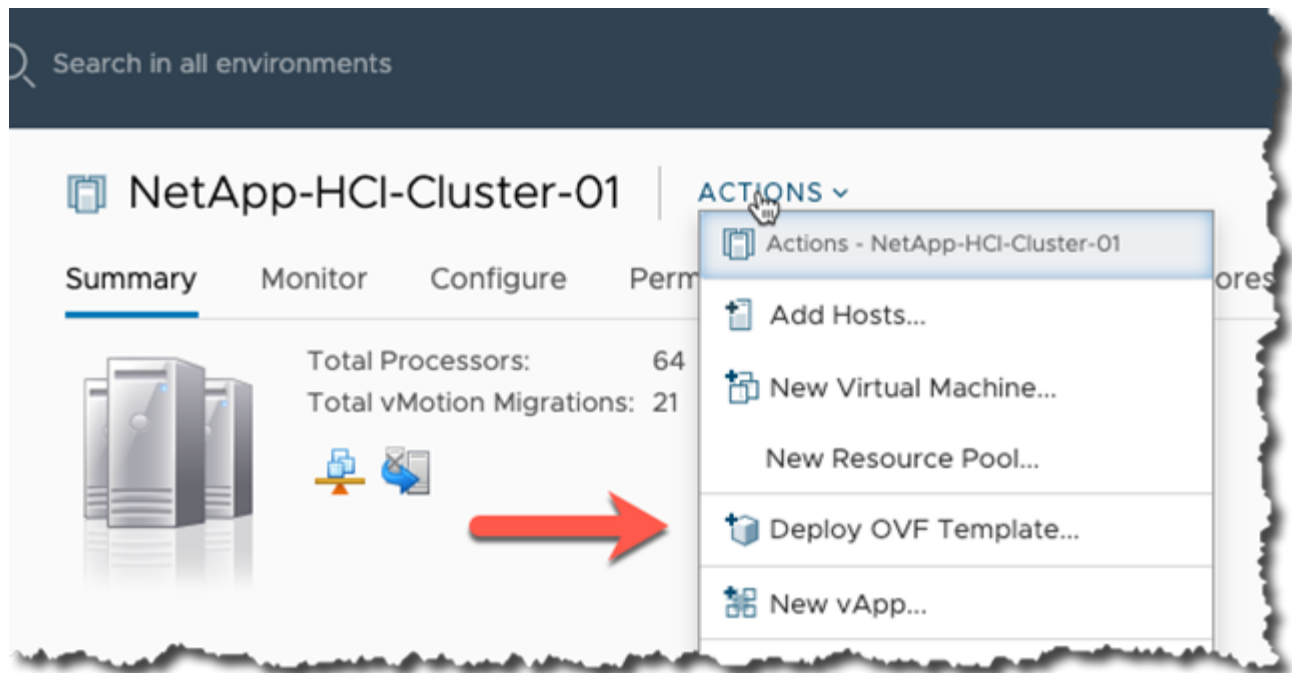
License

Your license will arrive in an email when you purchase or if you get a not-for-resale (NFR) version. You can get a trial license through the [Cleondris Support Portal](#).

Deployment

You download an OVF file, so it is deployed like many other things.

1. Start by using the Actions menu available at the cluster level.



2. Select the file.

Deploy OVF Template

1 Select an OVF template

2 Select a name and folder

3 Select a compute resource

4 Review details

5 Select storage

6 Ready to complete

Select an OVF template

Select an OVF template from remote URL or local file system

Enter a URL to download and install the OVF package from the Internet, or browse to a location accessible from your computer, such as a local hard drive, a network share, or a CD/DVD drive.

☐ URL

http | https://remoteserver-address/filetodeploy.ovf | .ova

☒ Local file

Choose Files cleondris-appliance-1705.ova

3. Name the appliance and select the location for it in the vCenter infrastructure.

Deploy OVF Template

✓ 1 Select an OVF template

2 Select a name and folder

3 Select a compute resource

4 Review details

5 Select storage









6 Ready to complete

Select a name and folder

Specify a unique name and target location

Virtual machine name:

Select a location for the virtual machine.

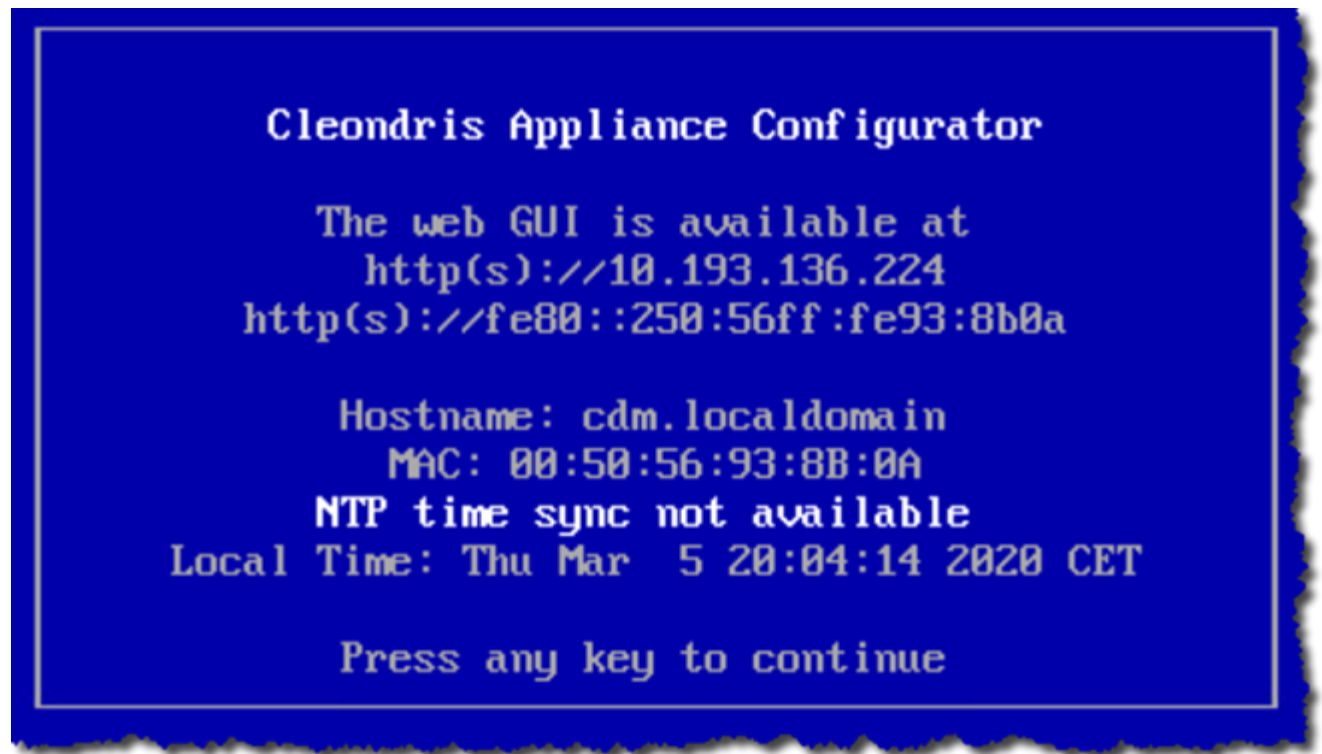
- ▼  sfps-cbacon-vcsa.rtp.openenglab.netapp.com
 - ▼  NetApp-HCI-Datacenter-01
 - >  Appliances
 - >  Backup
 - >  FinBot App
 - >  SQL
 - >  Templates
 - >  Windows

4. Select the Compute location.
5. Confirm the details.
6. Accept the license details.
7. Select the appropriate storage location.
8. Select the network that our appliance will work on.
9. Review the details again and click Finish.
10. Now wait for the appliance to be deployed, and then power it up. As it powers up, you might see a message saying that VMware tools are not installed. You can ignore this message; it will go away automatically.

Initial Configuration

To start the initial configuration, complete the following steps:

1. This phase involves doing the configuration in the Appliance Configurator, which is the VM console. So, after the appliance powers up, change to work in the console by using the VMware Remote Console (VMRC) or the HTML5 VMRC version. Look for a blue Cleondris screen.



2. Press any key to proceed, and configure the following:
 - The web administrator password
 - The network configuration: IP, DNS, and so on
 - The time zone
 - NTP
3. Select the Reboot and Activate Network/NTP Settings. You will see the appliance reboot. Afterward, do a ping test to confirm the FQDN and IP.

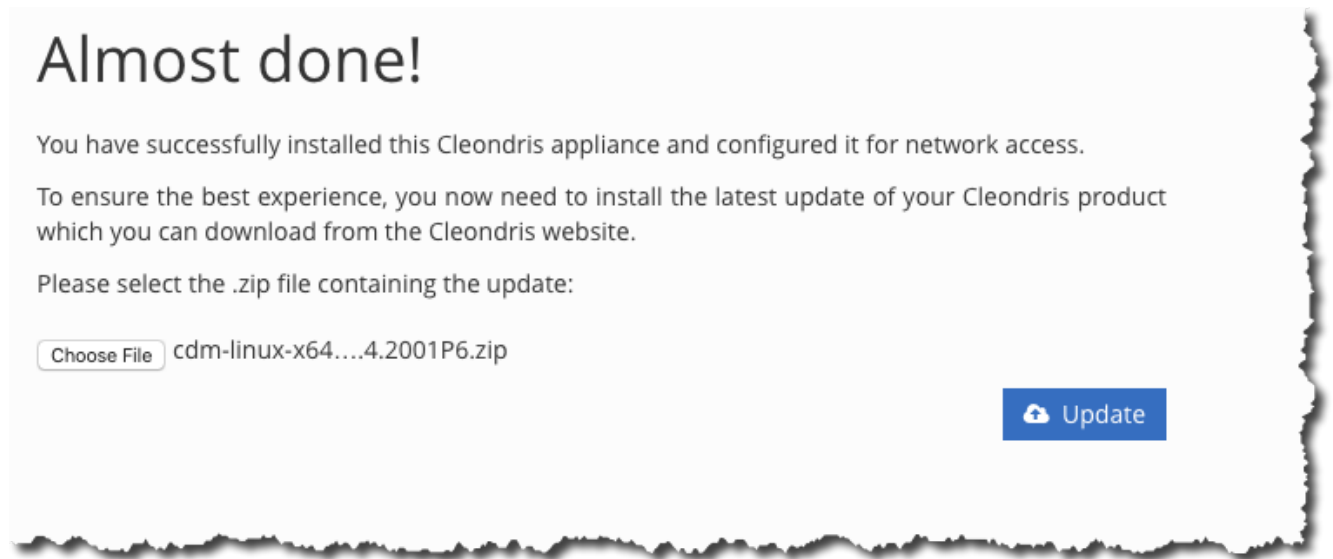
Patching Cleondris

To update your Cleondris product, complete the following steps:

1. When you first log in to the appliance, you see a screen like the following:



2. Click Choose File to select the update you downloaded from the Cleondris website.



3. Upload the patch. After the appliance reboots, the following login screen is displayed:



4. You can now see the new version and build information; confirming that the update was successful. Now you can continue with the configuration.

Software Used

This technical report uses the following software versions:

- vSphere 6.5 on production
- vSphere 6.7 U3 on DR
- NetApp Element 11.5 on production
- NetApp Element 12.0 on DR
- Cleondris HCC 8.0.2007 Build 20200707-1555 and 8.0.2007X2 build 20200709-1936.

Configuring Cleondris: NetApp HCI DR with Cleondris

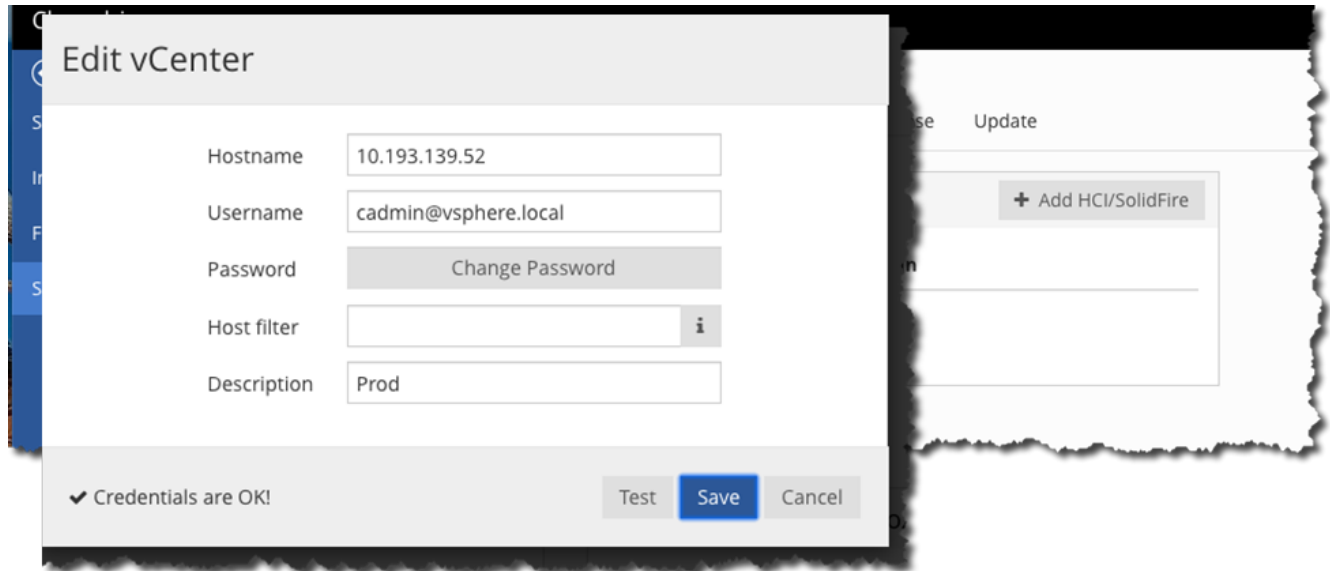
You now configure Cleondris to communicate with your vCenter Servers and storage. If you have logged out, returned, and log in again to start here, you are prompted for the following information:

1. Accept the EULA.
2. Copy and paste the license.
3. You are prompted to perform configuration, but skip this step for now. It is better to perform this configuration as detailed later in this paper.
4. When you log back in and see the green boxes, you must change to the Setup area.

Add vCenter Servers

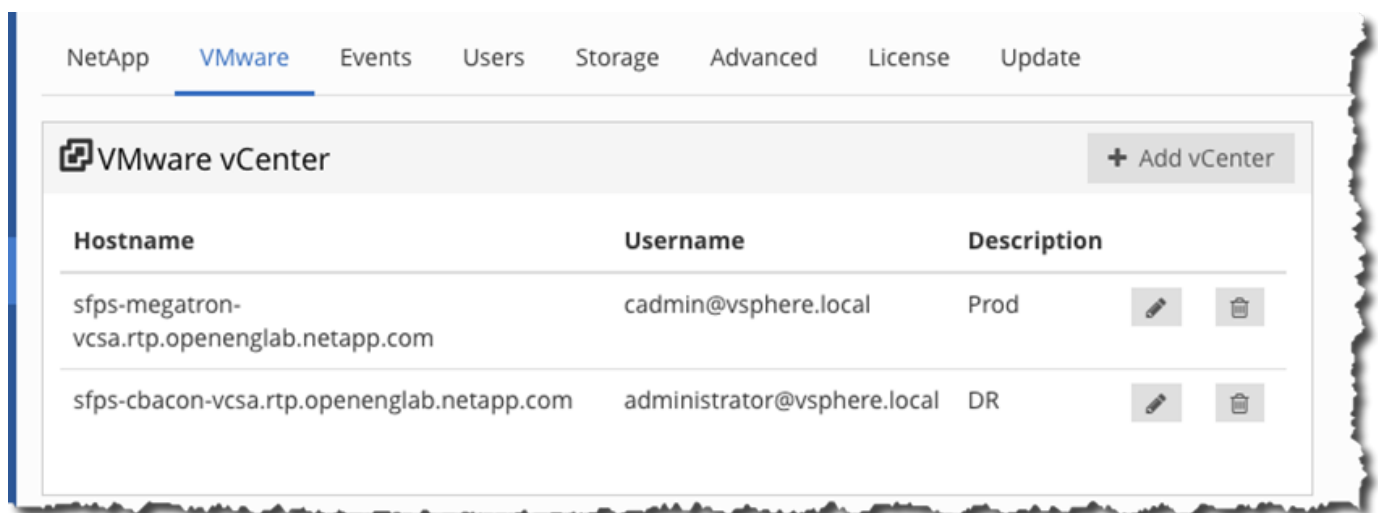
To add the vCenter Servers, complete the following steps:

1. Change to the VMware tab and add your two vCenter Servers. When you are defining them, add a good description and use the Test button.



This example uses an IP address instead of an FQDN. (This FQDN didn't work at first; I later found out that I had not entered the proper DNS information. After correcting the DNS information, the FQDN worked fine.) Also notice the description, which is useful.

2. After both vCenter Servers are done, the screen displays them.

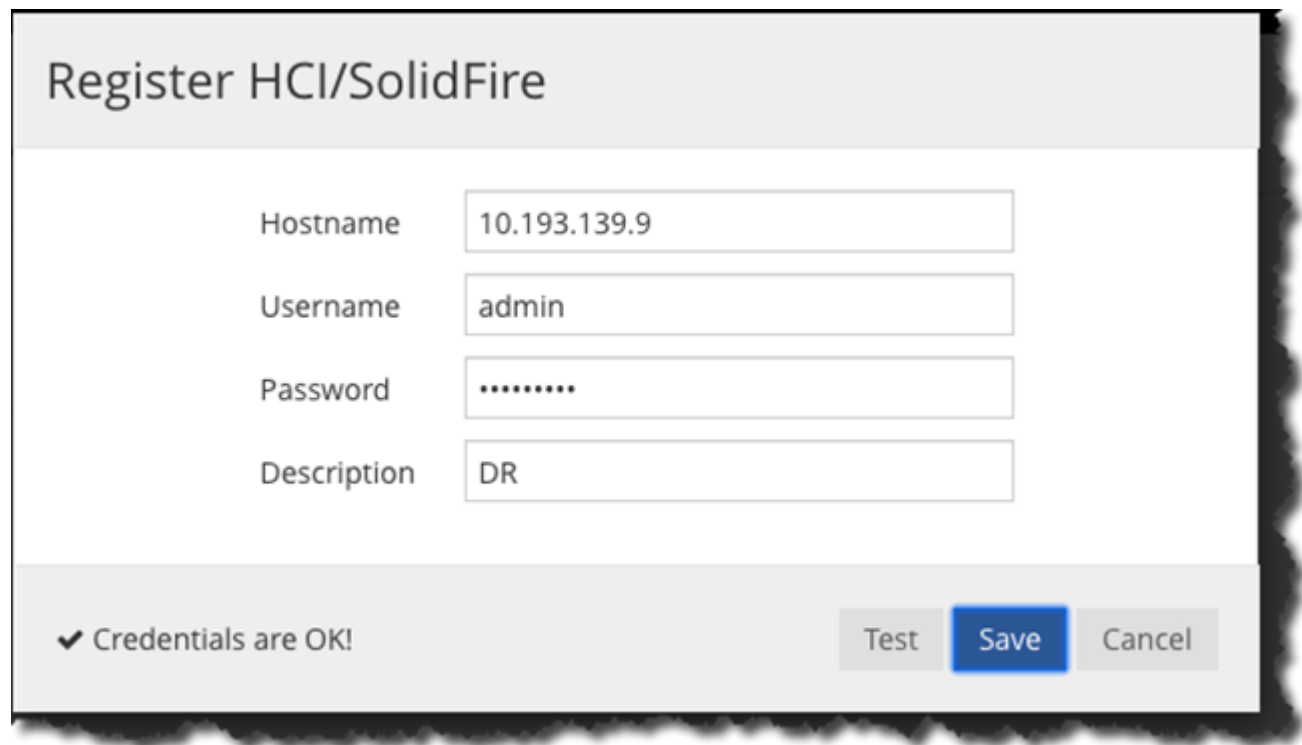


Add NetApp HCI Clusters

To add the NetApp HCI clusters, complete the following steps:

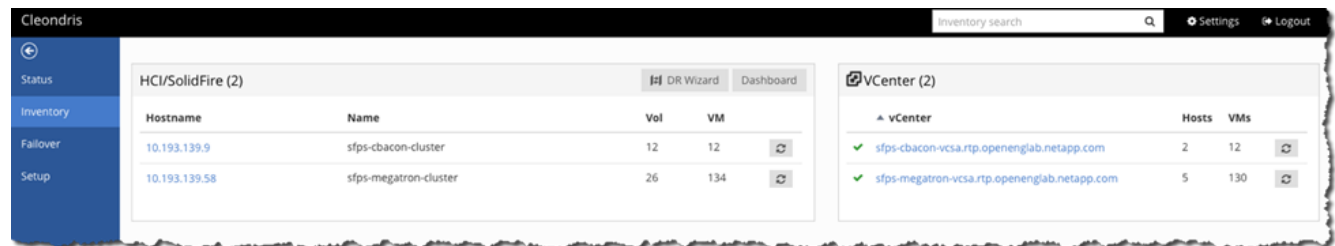
1. Change to the NetApp tab and add your production and disaster recovery storage. Again, add a

good description and use the Test button.



The image shows a 'Register HCI/SolidFire' form. It has four input fields: Hostname (10.193.139.9), Username (admin), Password (masked with dots), and Description (DR). At the bottom, there is a status message '✓ Credentials are OK!' and three buttons: 'Test', 'Save' (highlighted in blue), and 'Cancel'.

2. When you have added your storage and vCenter Servers, change to the Inventory view so that you can see the results of your configuration.



The screenshot shows the 'Inventory' view in the Cleondris interface. It displays two main sections: 'HCI/SolidFire (2)' and 'vCenter (2)'. The 'HCI/SolidFire' section contains a table with columns: Hostname, Name, Vol, and VM. The 'vCenter' section contains a table with columns: Hosts and VMs.

HCI/SolidFire (2)			
Hostname	Name	Vol	VM
10.193.139.9	sfps-cbacon-cluster	12	12
10.193.139.58	sfps-megatron-cluster	26	134

vCenter (2)	
	Hosts VMs
✓ sfps-cbacon-vcsa.rtp.openenglab.netapp.com	2 12
✓ sfps-megatron-vcsa.rtp.openenglab.netapp.com	5 130

Here you can see the number of objects, which is a good way to confirm that things are working.

Replication

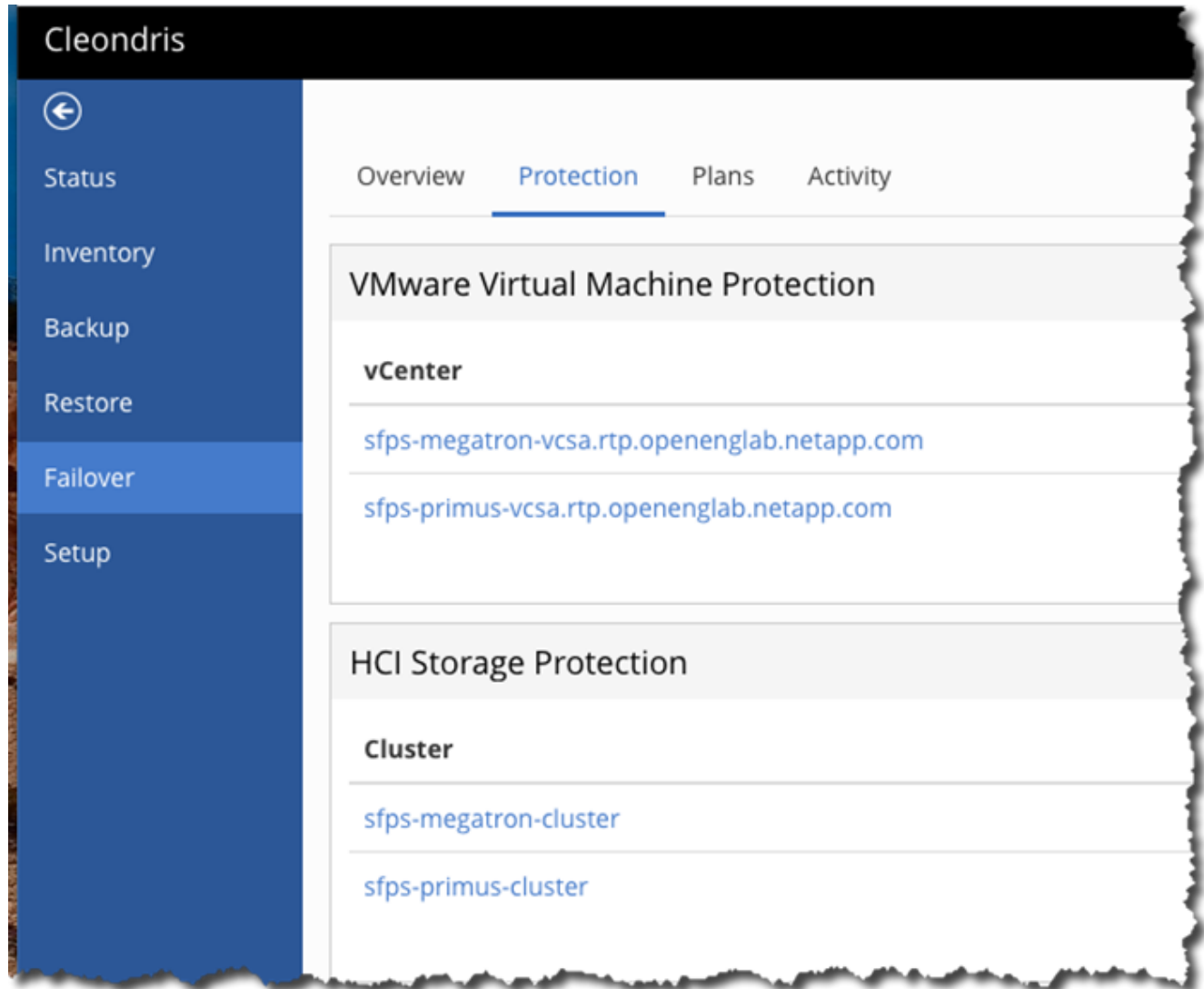
You can use HCC to enable replication between your two sites. This allows us to stay in the HCC UI and decide what volumes to replicate.

Important: If a replicated volume contains VMs that are in two plans, only the first plan that fails over works because it will disable replication on that volume.

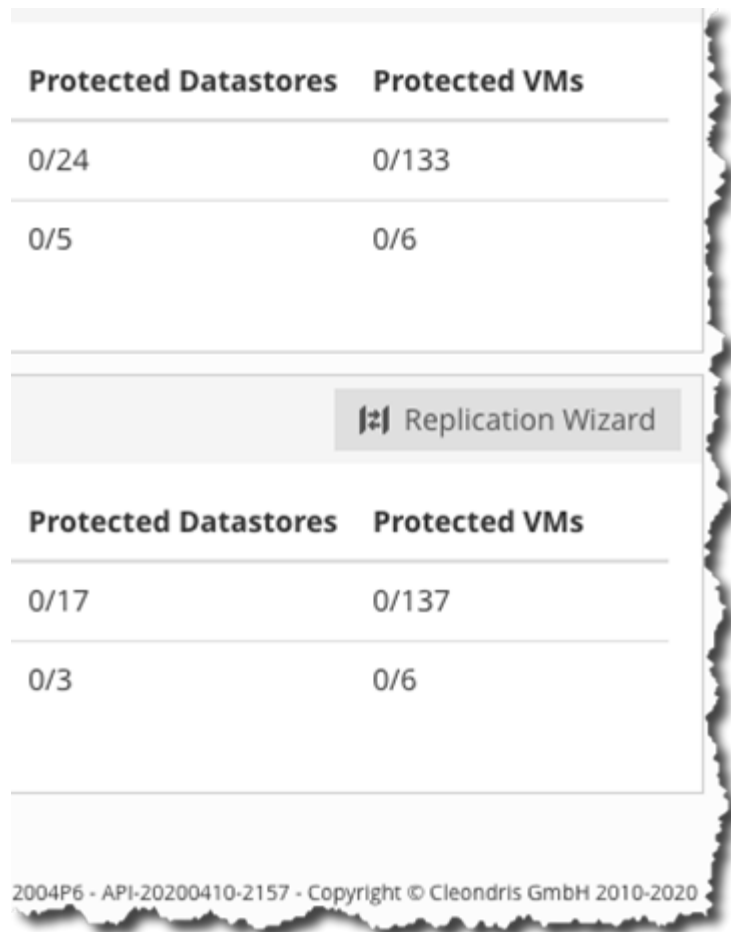
I recommend that each tier 1 application have its own volume. Tier 4 applications can all be on one volume, but there should be only one failover plan.

Disaster Recovery Pairing: NetApp HCI DR with Cleondris

1. Display the Failover page.
2. On the diagram of your vCenter Servers and storage, select the Protection tab.



The far side of the screen displays some useful information, such as how many protected VMs you have. (In this example, none right now.) You can also access the Replication Wizard here.



This wizard makes the replication setup easy.

HCI Replication Wizard

Source VolumesDestinationvCenterPreview

Select the cluster you want to protect:

Cluster:

	ID	Type	Name
<input type="checkbox"/>	1	Primary	NetApp-HCI-Datastore-01
<input type="checkbox"/>	2	Primary	NetApp-HCI-Datastore-02
<input type="checkbox"/>	3	Primary	NetApp-HCI-Select-Install
<input type="checkbox"/>	4	Primary	NetApp-HCI-Select-Data-01
<input type="checkbox"/>	5	Primary	NetApp-HCI-Select-Data-02
<input type="checkbox"/>	6	Primary	NetApp-HCI-Select-Data-03
<input type="checkbox"/>	7	Primary	NetApp-HCI-Select-Data-04
<input type="checkbox"/>	8	Primary	INFRASTRUCTURE
<input type="checkbox"/>	12	Primary	DESKTOP02
<input checked="" type="checkbox"/>	15	Primary	DESKTOP03
<input type="checkbox"/>	16	Primary	DESKTOP04
<input type="checkbox"/>	569	Primary	workload-db-mongo-1

3. You can select the volumes that are important to you, but also make sure that you have the proper vCenter Server selected at the top in the cluster field.

At the far right, you see the pairing type, and only Sync is allowed or supported.

After you click Next, the destination area is displayed.

The screenshot shows the 'Destination' tab of the 'HCI Replication Wizard'. The 'Cluster' dropdown is set to 'sfps-primus-cluster', the 'Account' dropdown is set to 'NetApp-HCI', and the 'Volume Postfix' field is empty. The 'Source Volumes' tab is also visible on the left.

HCI Replication Wizard

Source Volumes Destination vCenter Preview

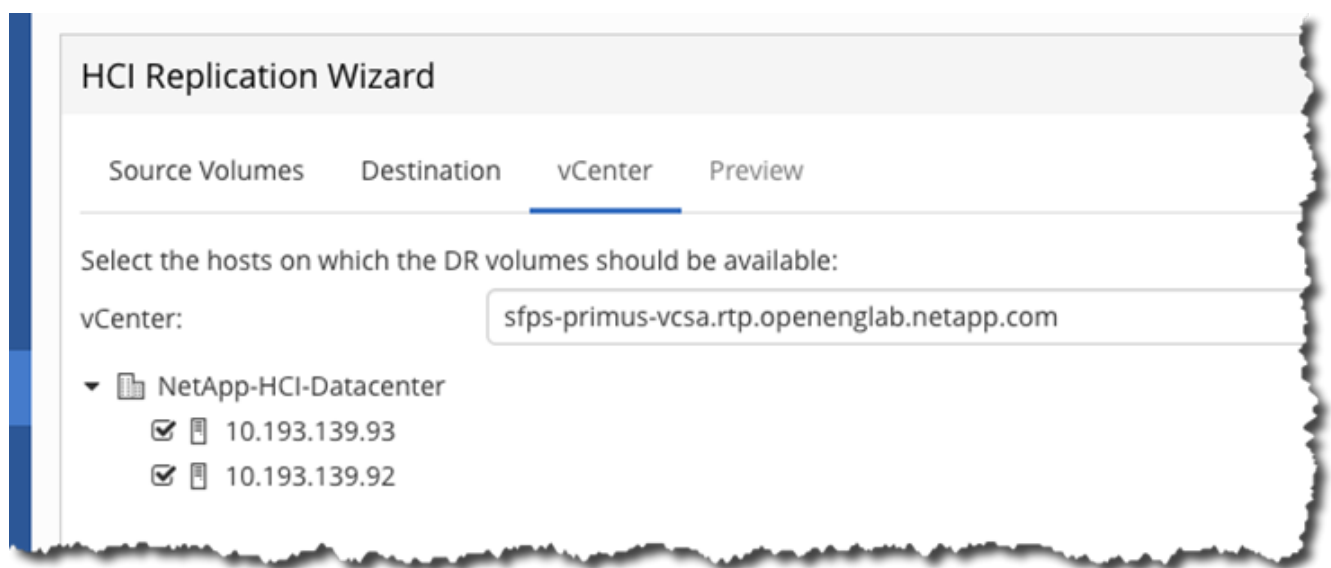
Select the destination cluster:

Cluster: sfps-primus-cluster

Account: NetApp-HCI

Volume Postfix: i

4. The default information is normally right, but it's still worth checking. Then click Next.

The screenshot shows the 'vCenter' tab of the 'HCI Replication Wizard'. The 'vCenter' field is set to 'sfps-primus-vcsa.rtp.openenglab.netapp.com'. Under the 'NetApp-HCI-Datacenter' dropdown, two hosts are listed with checkboxes: '10.193.139.93' and '10.193.139.92', both of which are checked. The 'Destination' tab is also visible on the left.

HCI Replication Wizard

Source Volumes Destination vCenter Preview

Select the hosts on which the DR volumes should be available:

vCenter: sfps-primus-vcsa.rtp.openenglab.netapp.com

▼ NetApp-HCI-Datacenter

- ☒ 10.193.139.93
- ☒ 10.193.139.92

It is important to make sure that the disaster recovery site vCenter Server is displayed and that all hosts are selected. After that is complete, use the Preview button.

5. Next you see a summary. You can click Create DR to set the volume pairing and start replication.

Depending on your settings, replication might take a while. I suggest that you wait overnight.

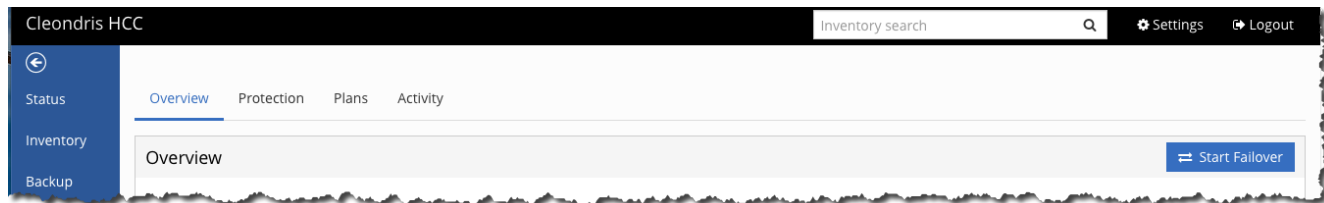
Failover: NetApp HCI DR with Cleondris

Test Failover

A test failover is important, because it proves to you, your application owner, your manager, and the BCDR people that your disaster recovery plan works.

To test failover, complete the following steps:

1. From the Failover page, click Start Failover.



2. On the Failover page, you have some choices to make.

A screenshot of the 'Failover' configuration page. It features five dropdown menus for configuration: 'Failover Plan' (MultiTier), 'Source HCI Cluster' (sfps-megatron-cluster), 'Destination HCI Cluster' (sfps-primus-cluster), 'Destination vCenter' (sfps-megatron-vcsa.rtp.openenglab.netapp.com), and 'Destination Datacenter' (NetApp-HCI-Datacenter). The 'Destination vCenter' dropdown is highlighted with a blue border. At the bottom right, there are 'Preview' and 'Cancel' buttons.

Carefully specify the plan, where the VMs came from, and where they are going to be recovered.

From: sfps-megatron-cluster To: sfps-primus-cluster ⚠ 3 VMs not included in this plan will lose protection

Plan	Priority	Name	Datastore	Source Volume	Destination Volume	Current vCenter	Destination vCenter
MultiTier	1	taxdb	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com
MultiTier	1	crmdb	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com
MultiTier	1	FinRptdb	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com
MultiTier	2	crmA	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com
MultiTier	2	FinRptA	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com
MultiTier	2	taxA	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com
MultiTier	3	taxW	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com
MultiTier	3	crmW	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com
MultiTier	3	FinRptW	DESKTOP03	DESKTOP03 ID: 15	DESKTOP03 ID: 138	sfps-megatron-vcsa.rtp.openenglabs.netapp.com	sfps-megatron-vcsa.rtp.openenglabs.netapp.com

Failover to Sandbox Start Cancel

The screen displays a list of the VMs that are in the plan. In this example, a warning at the top right says that three VMs are not included. That means there are three VMs we did not make part of the plan in the replicated volume.

If you see a red X in the first column on the left, you can click it and learn what the problem is.

- At the bottom right of the screen, you must choose whether to test the failover (Failover to Sandbox) or start a real failover. In this example, we select Failover to Sandbox.

Cleondris HCC Inventory search Settings Logout

Overview Protection Plans **Activity**

Failover Plan Execution Show Historical

Id	Description	User	Plan	Date	Status
2	Sandbox failover using plan Mass	admin	Mass	2020-04-14 13:21	Running

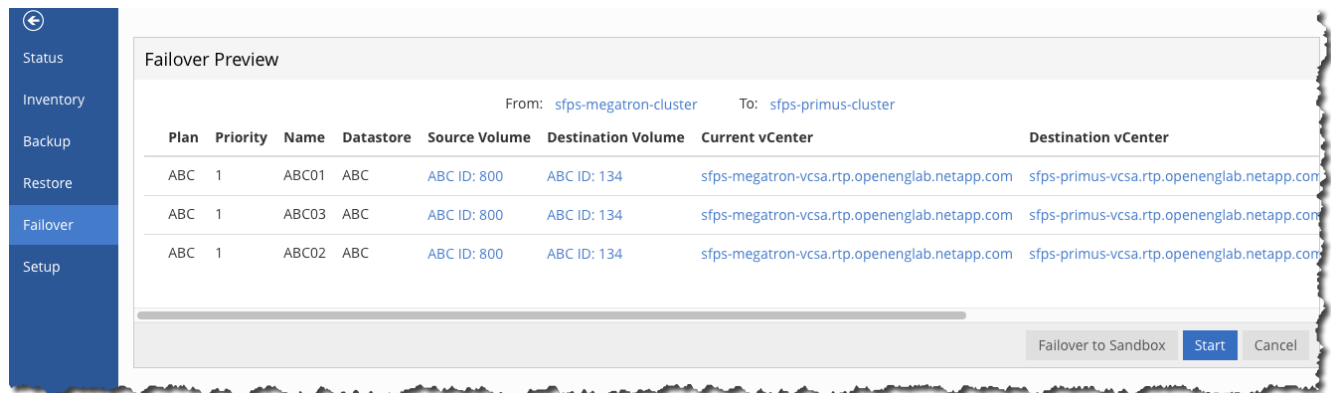
8.0.2004P6 - API-20200410-2157 - Copyright © Cleondris GmbH 2010-2020

- A summary now lists plans in action. For more information, use the magnifying glass in the far left (described in “Monitoring,” later in this document).

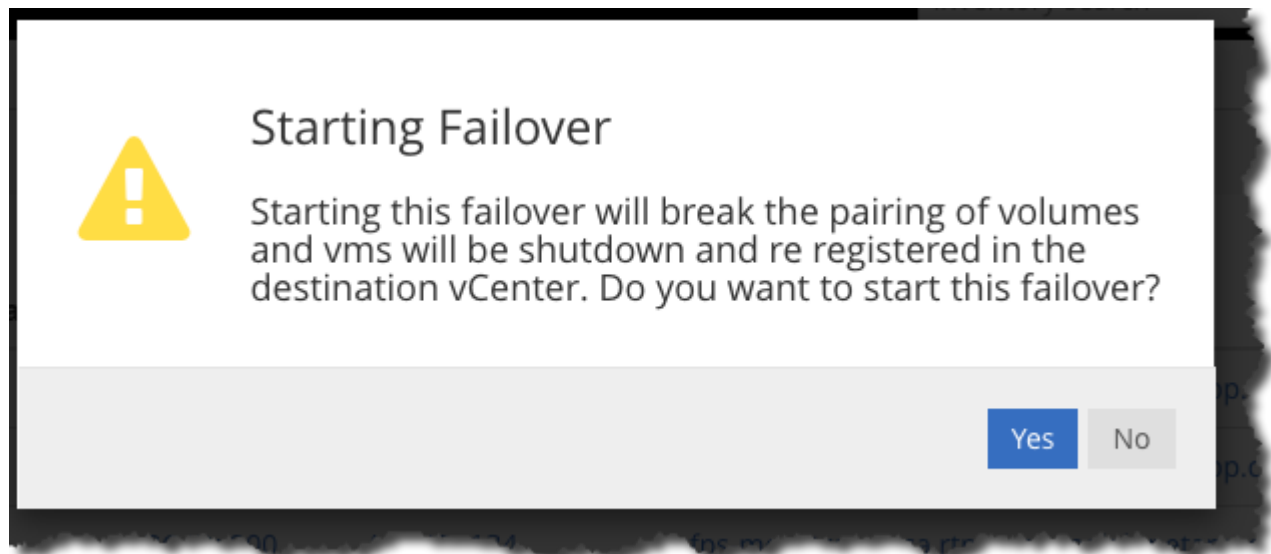
Running Failover

At first, the failover is the same as the test failover. But the procedure changes when you arrive at the point shown here:

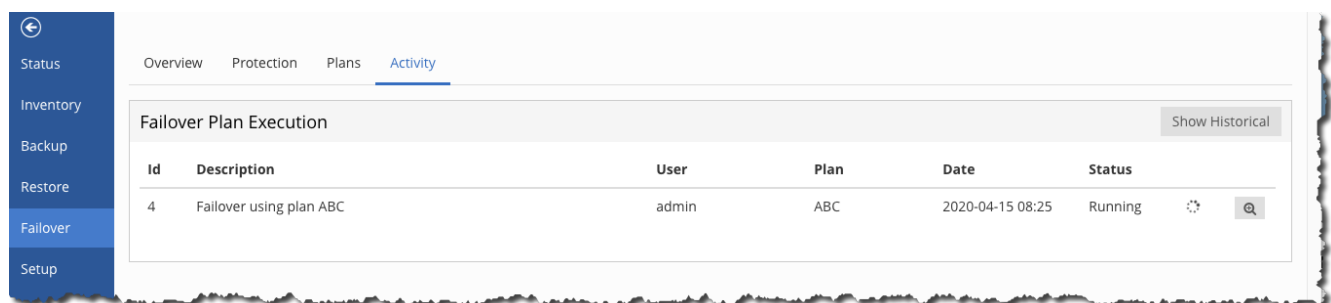
- Instead of selecting the Failover to Sandbox option, select Start.



2. Select Yes.

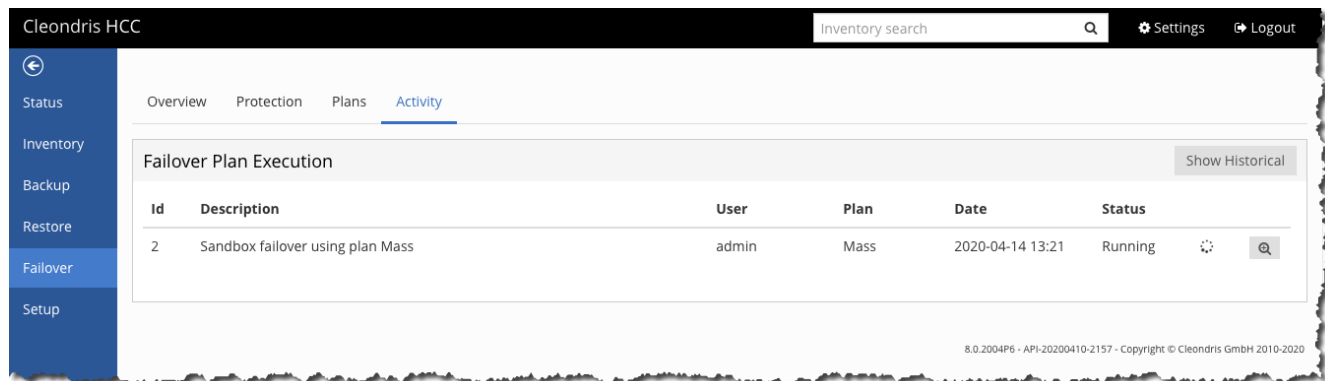


3. The screen shows that this is a failover, and it is running. For more information, use the magnifying glass (discussed in the “Monitoring” section).

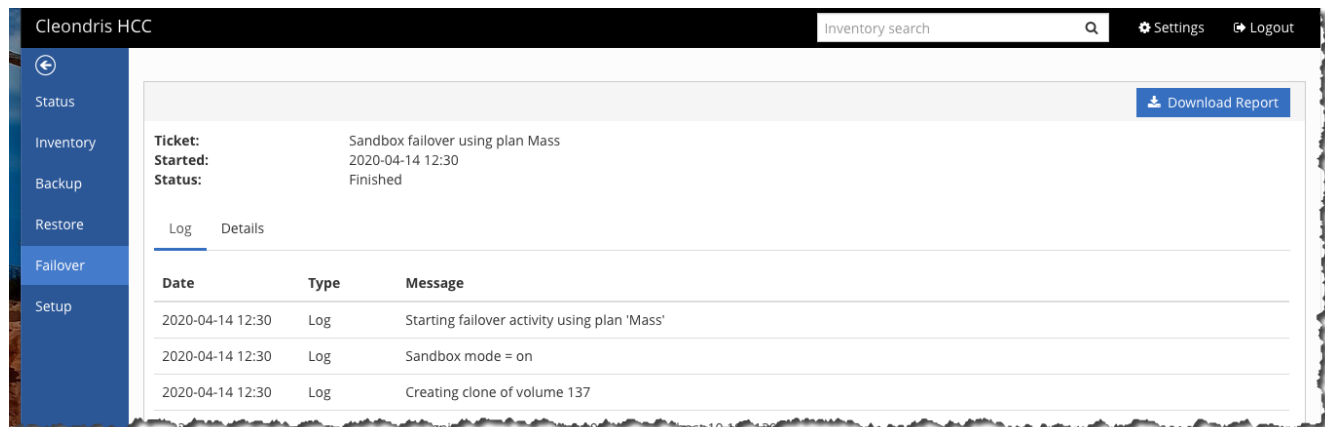


Monitoring During a Failover

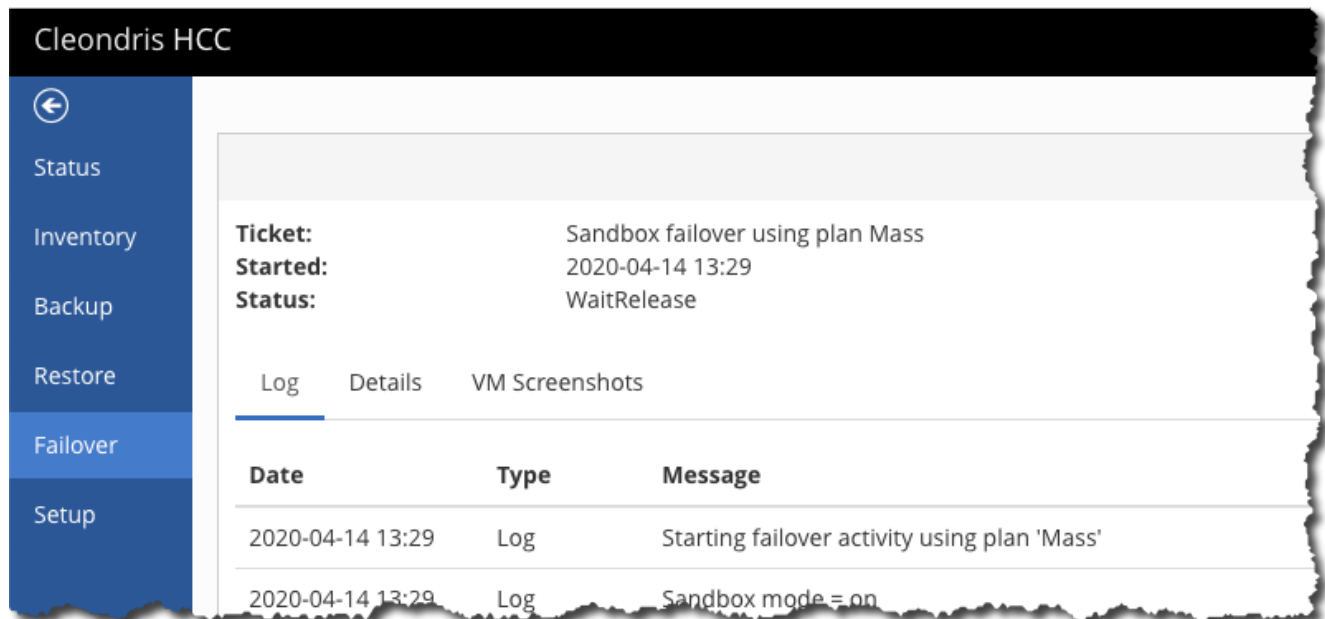
1. When a failover or a test failover is running, you can monitor it by using the magnifying glass at the far right.



2. Click the magnifying glass to see much more detail.



3. As the failover or test failover progresses, a VM Screenshots option appears.



Sometimes it is useful to see the screenshots to confirm that the VM is running. It is not logged in, so you cannot tell if the applications are running, but at least you know that the VM is.

Looking at History When No Failover Is Running

To view past tests or failovers, click the Show Historical button on the Activity tab. Use the magnifying glass for more detail.

The screenshot shows the Cleondris HCC interface. The top navigation bar includes 'Inventory search', 'Settings', and 'Logout'. The left sidebar lists 'Status', 'Inventory', 'Backup', 'Restore', 'Failover', and 'Setup'. The main content area has tabs for 'Overview', 'Protection', 'Plans', and 'Activity'. Under the 'Activity' tab, there is a section titled 'Failover Plan Execution' with a 'Show Historical' button. Below this is a table with the following data:

Id	Description	User	Plan	Date	Status
2	Sandbox failover using plan Mass	admin	Mass	2020-04-14 13:21	Running

At the bottom right, there is a small text string: '8.0.2004P6 - API-20200410-2157 - Copyright © Cleondris GmbH 2010-2020'.

The screenshot shows the Cleondris HCC interface. The top navigation bar includes 'Inventory search', 'Settings', and 'Logout'. The left sidebar lists 'Status', 'Inventory', 'Backup', 'Restore', 'Failover', and 'Setup'. The main content area has tabs for 'Overview', 'Protection', 'Plans', and 'Activity'. Under the 'Activity' tab, there is a section titled 'Failover Plan Execution' with a 'Hide Historical' button. Below this is a table with the following data:

Id	Description	User	Plan	Date	Status
2	Sandbox failover using plan Mass	admin	Mass	2020-04-14 13:21	Running
1	Sandbox failover using plan Mass	admin	Mass	2020-04-14 12:30	Finished

At the bottom right, there is a small text string: '8.0.2004P6 - API-20200410-2157 - Copyright © Cleondris GmbH 2010-2020'.

You can also download a report with the details.

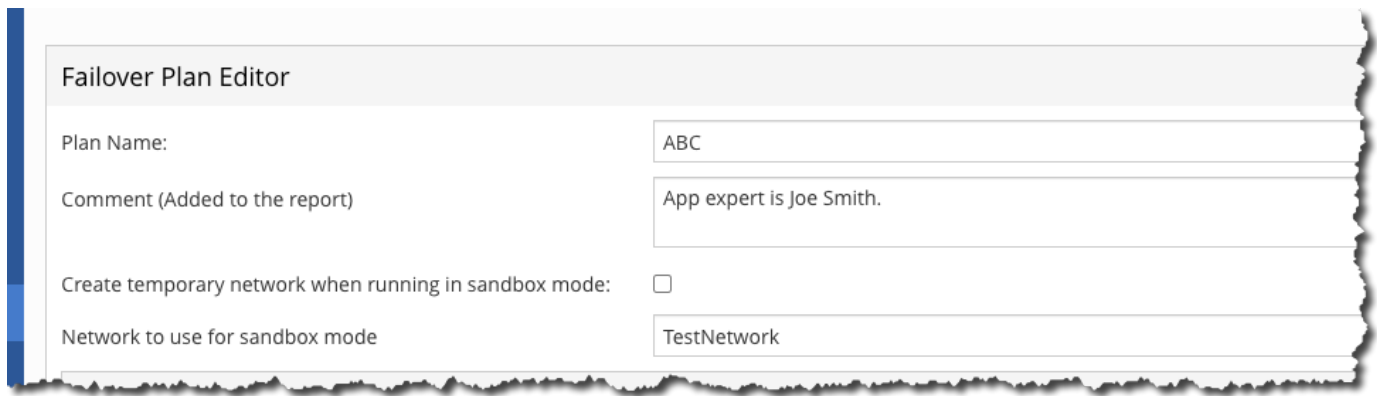
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Date	Type	Message
2020-04-14 12:30	Log	Starting failover activity using plan 'Mass'
2020-04-14 12:30	Log	Sandbox mode = on
2020-04-14 12:30	Log	Creating clone of volume 137

At the bottom right, there is a small text string: '8.0.2004P6 - API-20200410-2157 - Copyright © Cleondris GmbH 2010-2020'.

These reports have various uses: for example, to prove to an application owner that you tested the failover of that application. Also, the report can provide details that might help you troubleshoot a failed failover.

You can add text to a report by adding the text to the plan in the comment field.



Failover Plan Editor

Plan Name:	ABC
Comment (Added to the report)	App expert is Joe Smith.
Create temporary network when running in sandbox mode:	<input type="checkbox"/>
Network to use for sandbox mode	TestNetwork

Where to Find Additional Information: NetApp HCI DR with Cleondris

To learn more about the information that is described in this document, review the following websites:

- NetApp HCI Documentation Center
<https://docs.netapp.com/hci/index.jsp>
- NetApp HCI Documentation Resources page
<https://www.netapp.com/us/documentation/hci.aspx>
- NetApp Product Documentation
<https://www.netapp.com/us/documentation/index.aspx>
- Cleondris HCC product page
<https://www.cleondris.com/en/hci-control-center.xhtml>
- Cleondris Support Portal
<https://support.cleondris.com/>

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