

Rubrik Technical Professional

Lab Guide

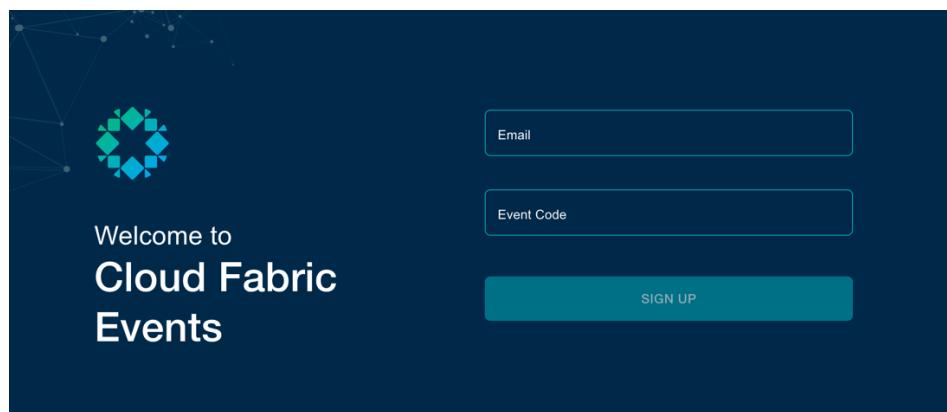
Rubrik Cloud Fabric (RCF)

Rubrik Cloud Fabrik (RCF) Labs is a virtual lab resource designed and hosted by Rubrik for functional demonstration of Rubrik CDM Solutions. This guide will walk you through the workflow about how to access, deploy and use the lab.

First task is to request and receive the login information.

From your browser of choice, please go to the link below and use your corporate email address and event code that has been provided to sign up.

<https://velocity.rcf.rubrik.com/#/signup>



You should see a notification that a magic link has been emailed to your email address.

- Note: this magic link it's an encrypted link which includes credentials that is needed to login to RCF.

Check your mailbox for an email from **RCF** with subject line of “Cloud Fabric Authentication”

Once you have the email, click on the link to access the lab

A screenshot of an email inbox. The top bar shows the subject "Cloud Fabric Authentication" and the recipient "rcf@rubrik.com via amazoneses.com". Below the subject, it says "to me". The main body of the email contains the following text:

RCF has received a request to send a magic link for the account [amir.khayatbashi@rubrik.com](#)
If you did not request this change, please disregard this email.
If you do wish to authenticate yourself, please click on this link :
[here](#) ← **Magic link**
Please do not share this with others.
If you need assistance, please view our help pages:
Thank you for using RCF

A red arrow points to the word "Magic link" in the email body.

By clicking on the link, a new tab will open in your browser and it will automatically log you in. You can also copy and paste this link to another browser or new windows to access the lab.

In Rubrik Cloud Fabric, based on your permission, you can see list of labs that are available to you.

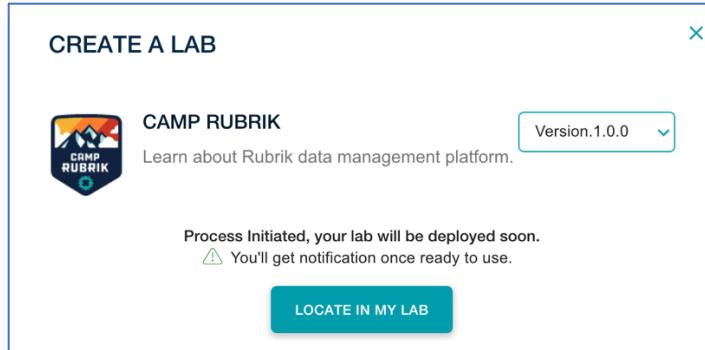
Choose the right lab assigned to you and click on **CREATE A LAB**

The image consists of two side-by-side screenshots of the Rubrik Cloud Fabric web interface. The left screenshot shows a list of labs under the 'LABS' heading, with one lab named 'CAMP RUBRIK' highlighted. This card provides a brief description: 'Learn about Rubrik data management platform.' Below the description are resource details: 9 VMs, 16 CPU, 752 GB Disk, and 64 GB Memory. The right screenshot is a detailed view of the 'CAMP RUBRIK' lab card. It includes a 'View Details' link, a 'CREATE A LAB' button, and the same resource details: 9 VMs, 16 CPU, 752 GB Disk, and 64 GB Memory.

Choose the version 5.1, name your lab and click on **START DEPLOYING**.

This process takes between 20-30 min before your lab is ready

The image shows a modal dialog box titled 'CREATE A LAB'. Inside the dialog, there is a card for 'CAMP RUBRIK' with the description 'Learn about Rubrik data management platform.' Below the card are resource details: 9 VMs, 16 CPU, 752 GB Disk, and 64 GB Memory. To the right of these details is a dropdown menu titled 'Select any version' with options 'v5.0' and 'v5.1'; a red arrow points to 'v5.1'. At the bottom of the dialog, there is a red box around the 'Instance Name *' input field, and a blue 'START DEPLOYING' button.



Refresh your browser and you will see your lab and the lab detail under **My Labs** view

Service	Connect From	External Url	Username	Password
AD1 RDP	Internal Url	e8aa0752-a0f0-48f3-87...	demo@rubrik.lab	*****
JUMP1 RDP	Internal Url	e8aa0752-a0f0-48f3-87...	demo@rubrik.lab	*****
SQL-S1 RDP	Internal Url	e8aa0752-a0f0-48f3-87...	demo@rubrik.lab	*****
VC1 RDP	Internal Url	e8aa0752-a0f0-48f3-87...	demo@rubrik.lab	*****

At this point your lab is ready to use, you can simply click on the monitor icon and open the console to access your lab within your browser

- Note: To use the clipboard copy and paste functionality in RCF console you need to press Ctrl+Alt+Shift/ Ctrl+Command+Shift which will slide out the clipboard snipping applet where you can then paste the items you wish to put on the remote desktop clipboard. To slide the snipping applet back away simply press ctrl+shift+alt again. Once you have done this, using ctrl+v will paste into the windows within the RDP session.
- Note: If you need to resize your browser, just change the size of your browser and refresh your page and that will automatically resize your session to fit your browser

In order to access the lab you can also use RDP protocol for logging into your jump box VM.

Depending on your system, click on the Mac or Win icon to copy the RDP link to your clipboard.

All Endpoints				
Service	Connect From	External Url	Username	Password
		Internal Url		
AD1 RDP		ebaa8752-af00-48f3-8771-... 10.0.1.2:3389	demo@rubrik.lab	*****
Win RDP JUMP1 RDP		ebaa8752-af00-48f3-8771-... 10.0.1.100:3389	demo@rubrik.lab	*****
Mac RDP SQL-S1 RDP		Click to copy Mac command 10.0.1.31:3389	demo@rubrik.lab	*****
VC1 RDP		ebaa8752-af00-48f3-8771-... 10.0.1.3:3389	demo@rubrik.lab	*****

Paste the link to either Terminal (Mac) or CMD (Win) and hit enter

```
Amir-Ks-mac:~ amirk$ open rdp://"full address=s:ebaa8752-af00-48f3-8771-f1363d0661c1-jump1rdp.rcf-labs-services.rubrik.com:37907&username=s:demo@rubrik.lab"
```

An RDP session will get launched automatedly and will prompt you for password

To get the password, click on the password section for JUMP1, then paste it to your RDP session

AD1 RDP		ebaa8752-af00-48f3-8771-... 10.0.1.2:3389	demo@rubrik.lab *****
JUMP1 RDP		ebaa8752-af00-48f3-8771-... 10.0.1.100:3389	demo@rubrik.lab *****
SQL-S1 RDP		ebaa8752-af00-48f3-8771-... 10.0.1.31:3389	Click to copy password *****
VC1 RDP		ebaa8752-af00-48f3-8771-... 10.0.1.3:3389	demo@rubrik.lab *****

At this point your RDP session will be connect and you have full access to the lab with option to copy and paste between your system and the jump box in the lab

Orienteering

Objective: Create and apply an SLA Domain

In this lab, you will perform the following tasks:

- Walkthrough the Rubrik UI
- Gain familiarity with the Rubrik Dashboard
- Create and apply an SLA Domain

The Rubrik Cloud Data Management (RCDM) platform is a software-defined system that distributes data, metadata, and tasks across the Rubrik cluster and public cloud for linear scalability and performance.

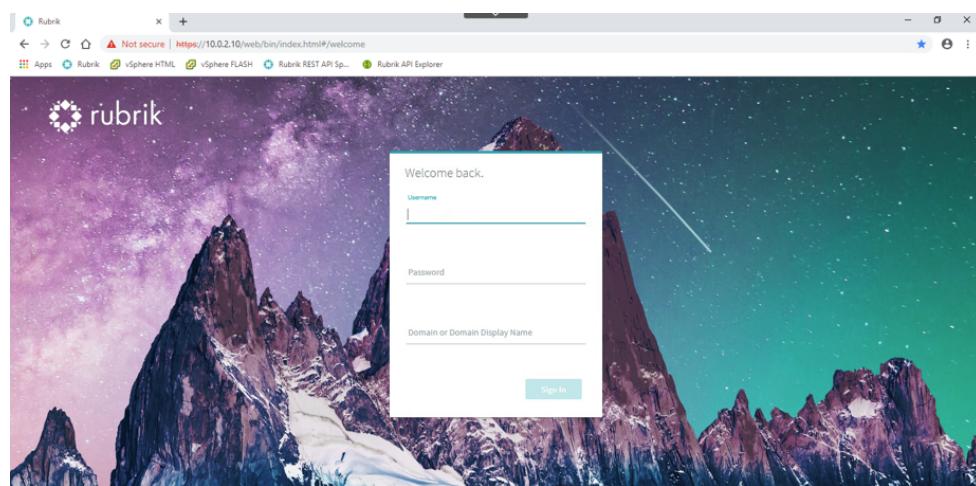
Getting Started

Once racked, the Rubrik system setup is easily and quickly completed in under an hour for virtual and physical environments. RCDM invokes multicast DNS protocols to automatically discover and self-configure each of the nodes within the cluster. The user assigns IP addresses to each of the nodes and login credentials for the environment to be managed by Rubrik. To expand cluster size, the user simply assigns new IP addresses through the management dashboard. To reduce cluster size, the user selects the nodes to remove. Thereafter, the cluster automatically self-adjusts and re-balances to deliver fault tolerance against node and disk failures.

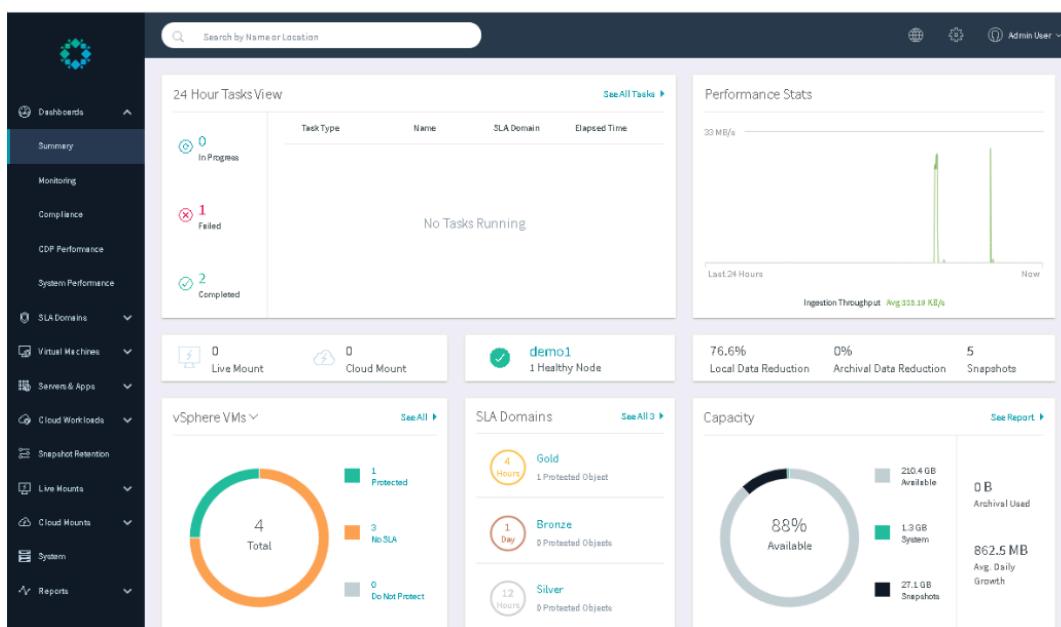
Dashboard Walkthrough

Rubrik's simple user interface is built on a RESTful API-driven framework with a HTML5 web user interface. To see it for yourself:

1. Log in to the Jump1 Host after clicking on the Ctrl-Alt-Del using the user demo@rubrik.lab and the password Welcome10!
2. Open up a web browser (Chrome) and access the Rubrik shortcut. Login using the user admin and password Welcome10!Rubrik



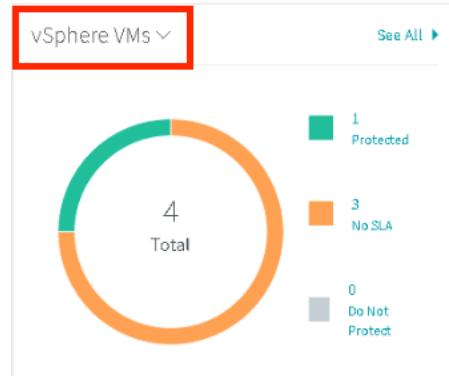
3. Once authenticated, the Rubrik UI will default to the Dashboard page.



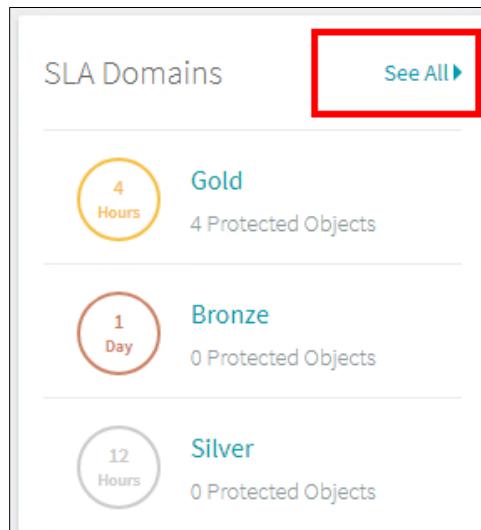
4. Let's explore the various Dashboard panes.

vSphere VMs - provides a high-level overview of how many vSphere objects are protected by an SLA Domain.

5. Click on **vSphere VMs** to show a dropdown box that allows you to select the various workload types to see protection overview.



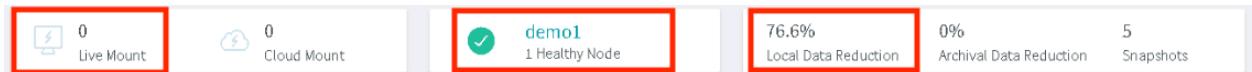
6. SLA Domains provides an overview of each SLA Domain and how many objects are being protected.



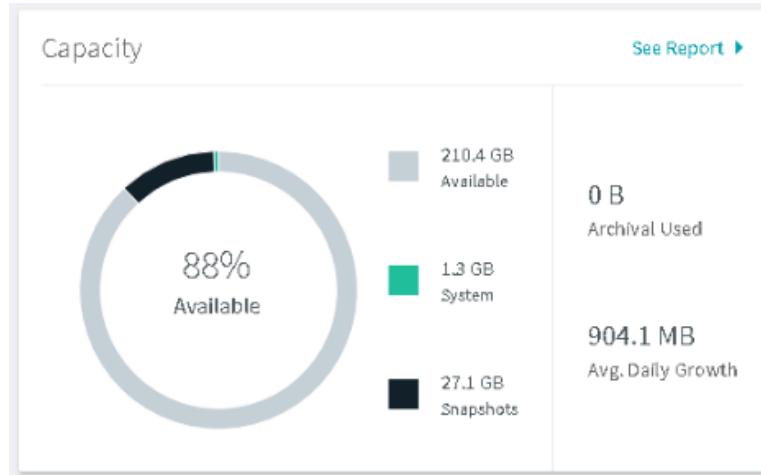
7. **Activity** pane lists all In Progress, Failed and Completed tasks and to get more detail you can click on **See All Tasks**.

24 Hour Tasks View					See All Tasks ▶
	Task Type	Name	SLA Domain	Elapsed Time	
⌚ 1 In Progress	Backup	Win2016-vm1	Gold	00:00:56	
✗ 1 Failed					
✓ 2 Completed					

8. Towards the middle of the Dashboard, you can see the number of active Live Mounts, get a quick peek at the number of snapshots residing on this Rubrik cluster, percent data reduction using deduplication and compression, and amount of data archived and overall system status.



9. Looking at the bottom right of the Dashboard, in **Capacity** section you can see the details about specs used, available and much more of the Rubrik cluster as well as how much data has been archived and what has been the Daily Growth.



10. From the left-hand side menu, click on the **Monitoring** and **Completed** tab. You will see the list of all jobs that have successfully finished and you have the option to check the In Progress, Failed and Scheduled jobs.

Status	Task Type	Name	Location	SLA Domain	Activity Details	Start Time	End Time	End Date	Duration	Data Transferred	Throughput	Object Size
Success	Backup	Win2016-vm1	vc1.rubrik.lab	Gold	View	09:45:38 AM	09:47:31 AM	05/18/20	00:01:52	9.2 MB	1.83 Mbps	34.4 GB
Success	Backup	Win2016-vm1	vc1.rubrik.lab	Gold	View	09:35:40 AM	09:40:06 AM	05/18/20	00:04:27	6 GB	257.35 Mbps	34.4 GB
Success	Backup	Win2016-vm1	vc1.rubrik.lab	Gold	View	09:45:31 AM	09:48:36 AM	05/18/20	00:03:04	3 GB	198.64 Mbps	34.4 GB
Success	Backup	Win2016-vm1	vc1.rubrik.lab	Gold	View	01:45:28 AM	02:08:03 AM	05/18/20	00:22:37	34.4 GB	278.18 Mbps	34.4 GB

11. From the left-hand side menu, under **Dashboard**, you can check **Compliance**, **CDP** and **System Performance** as well.

SLA Domains

The SLA Domain unifies data protection policies under a single policy engine. It provides a configurable set of policies that can be applied to all objects protected by Rubrik, whether groups of virtual machines, applications, or hosts to achieve specific data protection objectives.

The SLA Domains feature represents an easy-to-configure container for data protection policies. The following table provides an overview of those policies.

Policy	Description
Snapshot, backup frequency, and retention	Directs the Rubrik cluster when to create point-in-time snapshots, backups of data sources, and how long to keep the data.
Replication	Directs the Rubrik cluster to send replicas of source snapshots and backups to a target Rubrik cluster. Also defines the maximum time to keep the replica.
Archiving	Directs the Rubrik cluster to move snapshot and backup data to a separate data storage system for long-term retention.

Rubrik provides Gold, Silver, and Bronze default SLA Domains that are ready for immediate use. Custom SLA Domains can be quickly and easily created to meet the data protection and retention requirements of different groups of virtual machines, applications, and file system hosts.

Create an SLA Domain

To create a Local SLA Domain:

1. On the left-hand navigation pane, select **SLA Domains > Local Domains**.

Trail Map:

Local Domain - an SLA Domain that is created on the local Rubrik cluster.

Remote Domain - an SLA Domain that was created on a Rubrik cluster other than the local Rubrik cluster. Remote SLA Domains appear on a local Rubrik cluster when the local Rubrik cluster is a replication target.

2. In the upper right-hand corner, click the blue + icon.

Name	Base Frequency	Object Count	Archival Location	Replication Target
Bronze	1 Day	0	None	None
Gold	4 Hours	4	None	None
Silver	12 Hours	0	None	None

3. Create an SLA Policy copying the areas in red, that resembles the following image:

Create SLA Domain

SLA Domain Name
Camp Rubrik

Advanced Configuration

Service Level Agreement
Choose how often we take snapshots and the length of time we keep them.

Take Snapshots:	Keep Snapshots:
Every (Hours) 4	For (Days) 1
Every (Days) 1	For (Days) 365
Every (Months)	For (Months)
Every (Years)	For (Years)

Local retention set to 1 year.

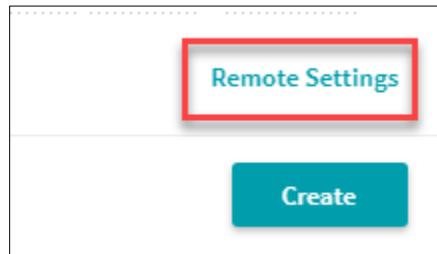
Snapshot Window

Take snapshots from: _____ : _____ to _____ : _____
 Take first full between: First Opportunity at _____

[Remote Settings](#)

[Cancel](#) [Create](#)

4. Select **Remote Settings** and continue to create the SLA Domain.



5. Turn on the **Archival** toggle and select from the dropdown box, NFS:myarchive. Change **Retention On Brik** as 60 days (you can use left/right arrows to fine tune).

Create SLA Domain

Remote Storage Configuration

Retention On Brik

0 60 days 1 year

Archival

NFS:myarchive Enable Instant Archive ?

Archival starts after 60 days and is retained on the archival location for 305 days.

Replication

A replication target has not been set up yet. Please [add a replication target](#) to configure retention.

SLA Domain Creation

The screenshot shows the 'Create SLA Domain' dialog box. Under 'Retention On Brik', a slider is set at 60 days. The 'Archival' toggle is on, and it is configured to NFS:myarchive. A note indicates archival starts after 60 days and is retained for 305 days. The 'Replication' section is empty. At the bottom are 'Cancel' and 'Create' buttons.

6. Press the **Create** button.

Apply an SLA Domain

Rather than manually creating a SLA Domain and applying per workload, an SLA Domain may be applied at a broad level - such as the management server [vCenter Server, System Center Virtual Machine Manager (SCVMM)], tags, folder, host, cluster, etc. - or granularly (per object) to achieve specific data protection objectives.

To do so:

1. In the web UI, on the left-side menu, click **Virtual Machines > vSphere VMs**. The vSphere VMs page appears, with the VMs tab selected.
2. Select **Clusters/Hosts**. The Clusters/Hosts tab appears.

Search by Name or Location

VMs Folders Clusters/Hosts Tags

Manage Protection

Name	Location	SLA Domain	Assignment	RBS Status
Centos-vm1	vc1.rubrik.lab/Ru...	No SLA	Unassigned	Unregistered
ubuntu14-vm1	vc1.rubrik.lab/Ru...	No SLA	Unassigned	Unregistered
Win10-vm1	vc1.rubrik.lab/Ru...	No SLA	Unassigned	Unregistered
Win2016-vm1	vc1.rubrik.lab/Ru...	Gold	Direct	Connected

3. Select the checkbox in front of the vCenter Server.

Notice that the **Manage Protection** button in the upper right-hand corner illuminates and is now clickable. Do not apply an SLA Domain at this time.

Search by Name

1 Object Selected

Filter SLA ▾ Filter Assignment ▾ Filter RBS Status ▾

Name	Virtual Machines	SLA Domain	Assignment	RBS Status
vc1.rubrik.lab	4	No SLA	Unassigned	--

To place a granular policy on an individual object:

4. Select the **VMs** tab. The **VMs** page appears. Above the column headers, there is a search box.
5. Search for your Linux virtual machine running on vSphere. Type in **ubuntu** in the **Search by Name** field to locate the assigned Linux VM. (**ubuntu14-vm1**)
6. Select the Linux virtual machine and click **Manage Protection**.

VMs Folders Clusters/Hosts

All VMs

Search by Name 1 Object Selected

Name Location SLA Domain Assignment

 ubuntu14-vm1 vc1.rubrik.lab/Rubrik1/Linux... Gold Direct

7. Search for the Camp Rubrik SLA Domain created in the previous selection.

Manage Protection

Assign an SLA Domain to ubuntu14-vm1.

Search SLA domains

 Bronze

 Camp Rubrik

 Gold

 Silver

 Clear Existing Assignment
Assigns selected objects and their contents to SLA of the next higher level object.

 Do Not Protect
The selected objects will be excluded from all further SLA assignments.

Cancel Submit

8. Click Submit.

The VM will soon update to reflect it is protected by the selected SLA Domain.
You have now completed the Orienteering badge! Raise your hand so a Rubrik employee can get you the badge, answer any questions about this section, and give an overview of the next section.

Search & Rescue

Objective: Search and Recover Files

In this lab, you will perform the following tasks:

- Search for a VM
- Search for a file
- Recover a file via download

With Google-like search, Rubrik eliminates the file search complexity inherent in legacy solutions by introducing consumer-grade file search that delivers query results instantly.

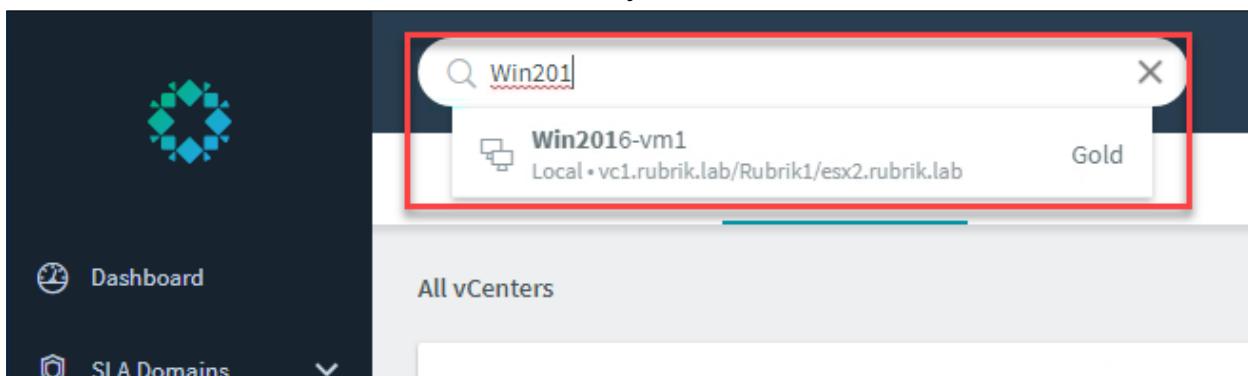
Getting Started

As you type your query, Rubrik expedites the query by displaying suggested search results with auto-complete functionality. The user can instantly locate specific versions of files across time and locations for all VMs, applications, and file systems - no matter where the data resides (on-premises or in the cloud).

File Recovery

To recover a file:

1. Search for your assigned Windows virtual machine running on vSphere. Type in "Win2016" to locate the Win2016-vm1 object



The **Overview** pane provides information regarding the object's location, configuration for CloudOn (if setup), the SLA Domain applied, oldest and newest snapshot, total snapshots, etc. This can vary depending on location and type of machine. On the right-hand side there is a

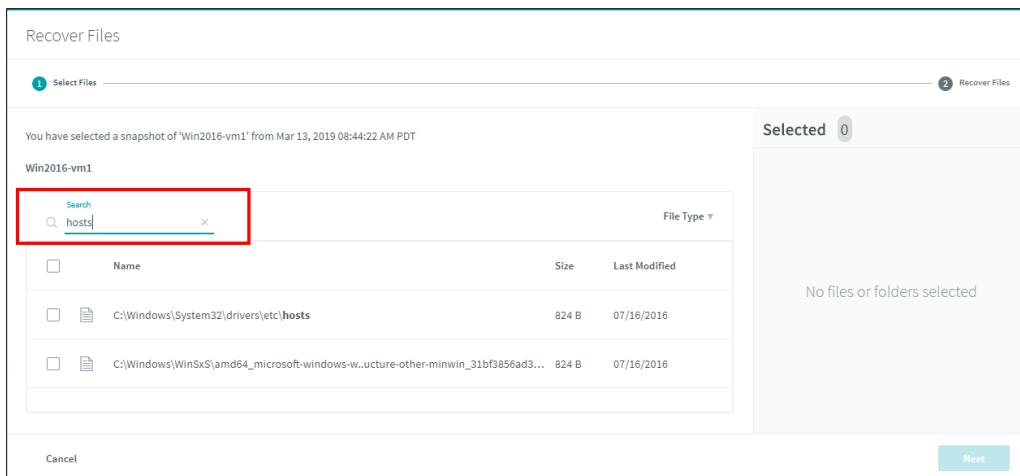
Snapshots calendar view. The next few steps will guide you on your journey to explore this more.

The screenshot shows the Rubrik Backup Service connected interface. On the left, the 'Overview' section displays details for 'vc1.rubrik.lab vCenter' and 'esx2.rubrik.lab Host'. It includes icons for 'Gold SLA Domain', 'Live Mounts' (0), 'Oldest Snapshot' (3/19 3:18 PM), and 'Total Snapshots' (21). On the right, the 'Snapshots' calendar view for March 2019 is shown. The calendar highlights specific dates with blue dots, indicating recovery points. The days of the week are labeled S, M, T, W, T, F, S. The dates from 1 to 31 are listed below the days. The month navigation buttons are labeled '< March 2019 >'.

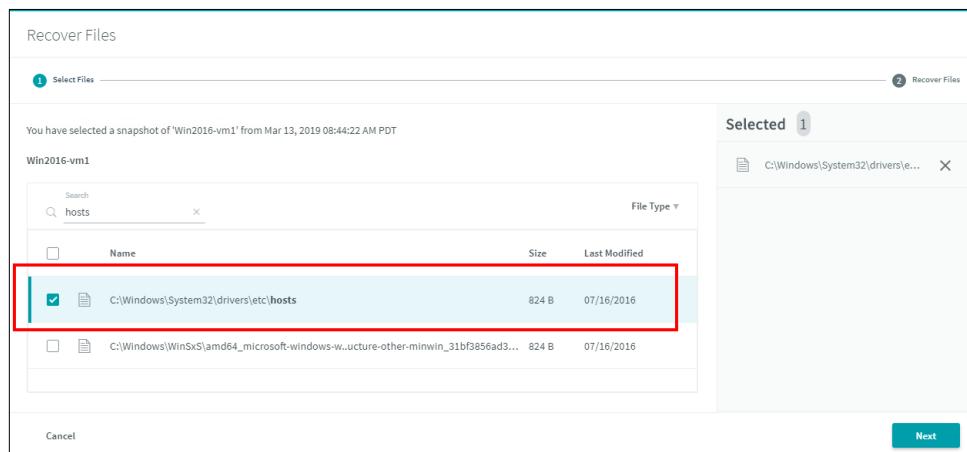
2. Select a date that has a blue dot by hovering over and then clicking on the blue dot (indicating there are recovery points from this day). You will see all available snapshots listed. An example screenshot below demonstrates all of the snapshots available for the selected VM. (Your date and number of snapshots might be different than the figure below)

The screenshot shows the 'Snapshots' interface for March 05, 2019. The calendar view is at the top, showing the date 'March 05, 2019'. Below it, a list of snapshots is displayed. Each snapshot entry includes a camera icon, the snapshot time (e.g., 3:18 PM, 11:18 PM), and an ellipsis icon (...).

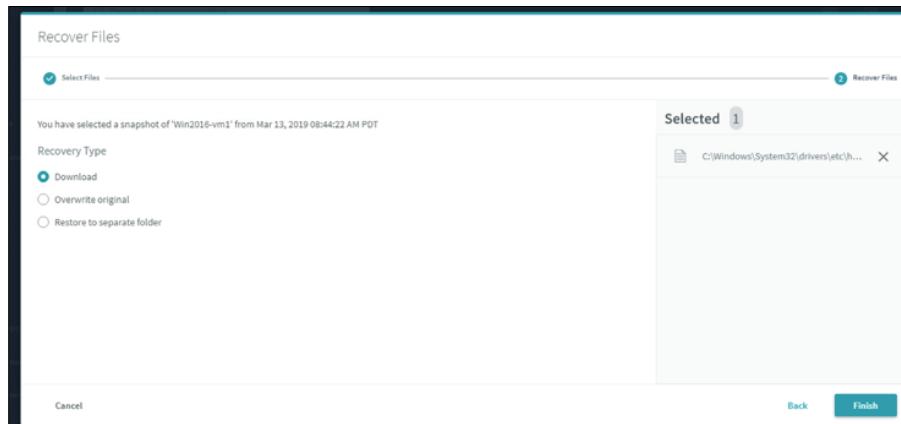
3. Select the ellipses icon (...) next to one of the snapshots.
4. Click **Recover Files**. Next type in the search bar the word "hosts". You will see two files shown.



5. Click on the checkbox in front of the "C:\Windows\System32\drivers\etc\hosts" and then click Next.



6. There are three options shown. Download, Overwrite original, and Restore to Separate folder. Do not select any of the options at this time and click Cancel to exit the dialog.



Note:

Download - Rubrik cluster generates download links to use for file level restore (FLR) of files and folders, making it available to download locally to the user's device.

Overwrite original - files and folders restored directly to a guest file system of the protected workload whether a VM, physical server, or NAS share. This will overwrite the files on the machine existing

Restore to separate folder - files and folders restored to a folder of your choosing.

7. In the Rubrik UI, locate the Search by File Name in the Snapshots view and type in the word hosts to locate the file.

Name & Location	Snapshot Time	Versions
C:\Windows\WinSxS\amd64_microsoft-windows-w...	3/13/19, 8:44 AM	6
C:\Windows\System32\drivers\etc\hosts	3/13/19, 8:44 AM	6

8. Click on the C:\Windows\System32\drivers\etc\hosts. On the window that appears, choose a version of the file (screenshot below) and select the ellipses (...).

Choose Version

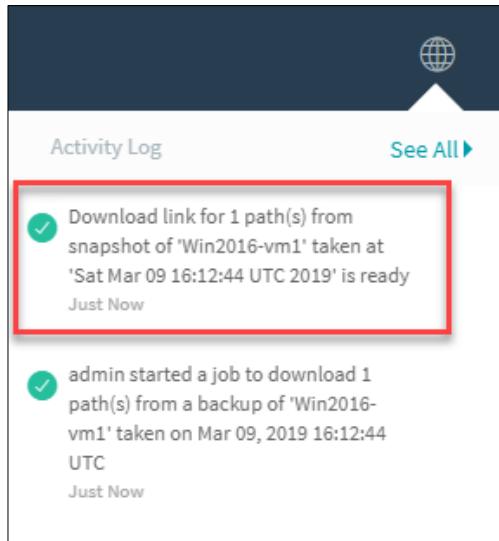
Please select a file version of C:\Windows\System32\drivers\etc\hosts.

Date	Action
03/09/2019 8:12 AM (Latest)	Download
03/09/2019 4:12 AM	...
03/09/2019 12:12 AM	...
02/09/2019 9:12 PM	...

Done

9. Choose **Download**.

This may take a few minutes. Click on the globe icon in the top right corner of the Rubrik UI to review the notification informing you that the file is ready to download. Click on that message (highlighted).



10. On the window that opens, click on the download link.

Status	Activity	Date	
✓	Download link for 1 path(s) from snapshot of 'Win2016-vm1' taken at 'Sat Mar 09 16:12:44 UTC 2019' is ready	3/09 11:58 am	

11. On your Jump1 host, browse to the Downloads folder to view hosts.

You have now completed the Search & Rescue badge! Raise your hand so a Rubrik employee can get you the badge, answer any questions about this section, and give an overview of the next section.

Life-Saving

Objective: Recover a VM

In this lab, you will perform the following tasks:

- Live Mount a VM
- Unmount a VM

Rubrik radically simplifies the recovery process of virtual machines.

Getting Started

By serving as an online repository for VM data during the recovery process, Rubrik eliminates the requirement to transfer data before recovery can begin. Live Mount provides a protected VM with rapid availability thus providing a seemingly magic near-zero Recovery Time Objective (RTO).

Trail Map:

Recovery Time Objective - defines how long it takes to recover data, which can be a single file or a complete data center. This is sometimes referred to as “how long can you afford to have a system offline?”.

Instant Recovery - replaces the source virtual machine with a fully functional point-in-time copy. The Rubrik cluster powers off and renames the source virtual machine and assigns the name of the source virtual machine to the recovered virtual machine. The recovered virtual machine is then powered on and the recovered virtual machine is connected to the source network. The Rubrik cluster is the datastore for the recovered virtual machine until it is Storage vMotioned to another datastore.

Live Mount - creates a new virtual machine from a point-in-time copy of the source virtual machine. The recovered virtual machine uses the Rubrik cluster as its datastore until it is Storage vMotioned to another datastore. The Rubrik cluster assigns a new name to the recovered virtual machine and powers it up. The source virtual machine runs in parallel.

Export - creates a new virtual machine from a point-in-time copy of the source virtual machine. The datastore of the selected Hyper-V host is the datastore for the recovered virtual machine. The Rubrik cluster assigns a new name to the recovered virtual machine and powers it up.

Live Mount

To Live Mount a VM:

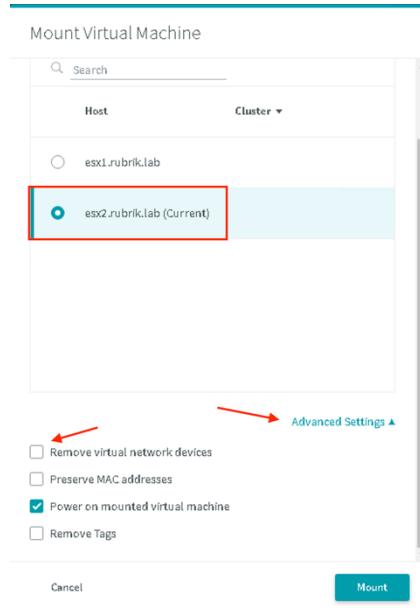
1. Using your assigned Windows 2016 Server (**Win2016-vm1**), select a snapshot by clicking on the blue dot on an available date.

The screenshot shows the Rubrik backup interface. In the top navigation bar, there is a search bar with "Win2016" and a dropdown menu showing "Win2016-vm1 Local > vc1.rubrik.lab/Rubrik1/ex2.rubrik.lab Gold". On the right, there are buttons for "Take On Demand Snapshot", "Manage Protection", and an ellipsis menu. The main area has two tabs: "Overview" and "Snapshots". The "Overview" tab shows "Rubrik Backup Service Connected" with green checkmarks next to "vc1.rubrik.lab vCenter" and "esx2.rubrik.lab Host". It also displays an "SLA Domain" section for "Gold" and "Live Mounts" status. The "Snapshots" tab shows a calendar for March 2019. A blue dot is placed on March 13, 2019, indicating the selected snapshot for live mounting.

2. Open the ellipsis (...) menu for the snapshot and choose Mount

This screenshot shows the same Rubrik interface as above, but with a different focus. A red box highlights the ellipsis menu icon in the top right corner of the calendar grid. A red arrow points from this menu to a callout box containing the "Mount Virtual Machine" option, which is the target for step 2. The rest of the interface remains consistent with the first screenshot, showing the Overview and Snapshots sections.

3. You have the option to mount the whole VM or individual virtual disks. Click **Virtual Machine** as the **Mount Type**
 4. The Mount Snapshot dialog box appears.
 5. Select an ESXi host for the virtual machine.
 6. Click on the Advanced Settings and make sure that **Remove virtual network device** is unchecked.
- Select this option when networking changes or issues prevent the virtual machine from starting.



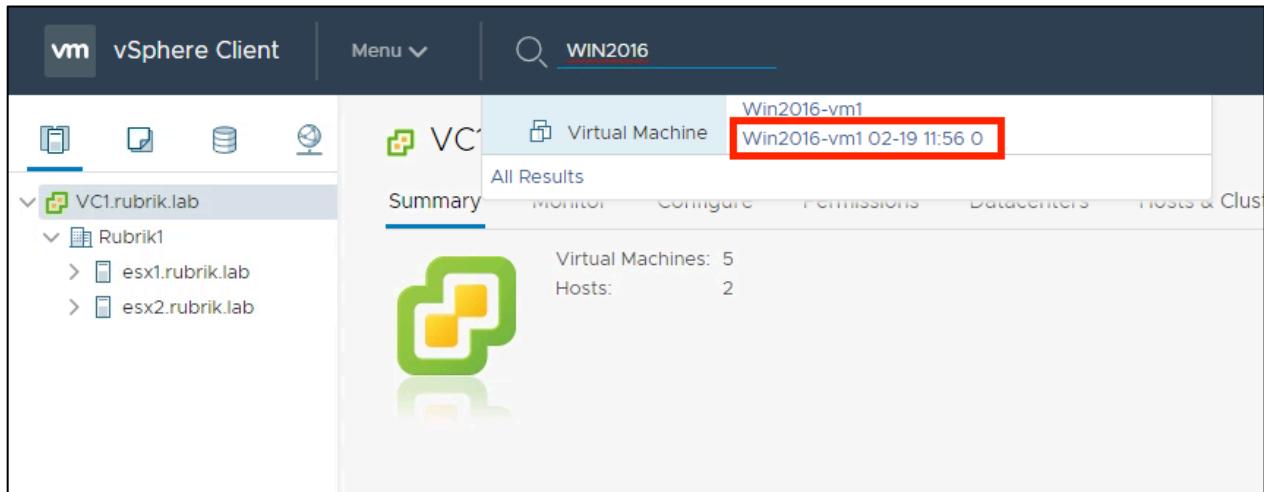
7. Click **Mount**.
- The Rubrik cluster mounts the snapshot on the selected ESXi host with a new name (name of the original VM and the date of the snapshot i.e. Win2016-vm1_03-05 23:18:0) and powers up the virtual machine. During the process, messages about the status appear in the Notifications page. The Rubrik cluster records the final result of the task in the Activity Log.
8. On the left-side menu, click **Live Mounts > vSphere VMs**.
 9. Locate your Windows virtual machine and wait for its **Status** to change to **Powered On**. This may take about a minute to appear.

Name	Status	Snapshot Time	Source
Win2016-vm1 03-05 23:18 0	Powered On	3/5/2019 11:18:30 PM	Win2016-vm1

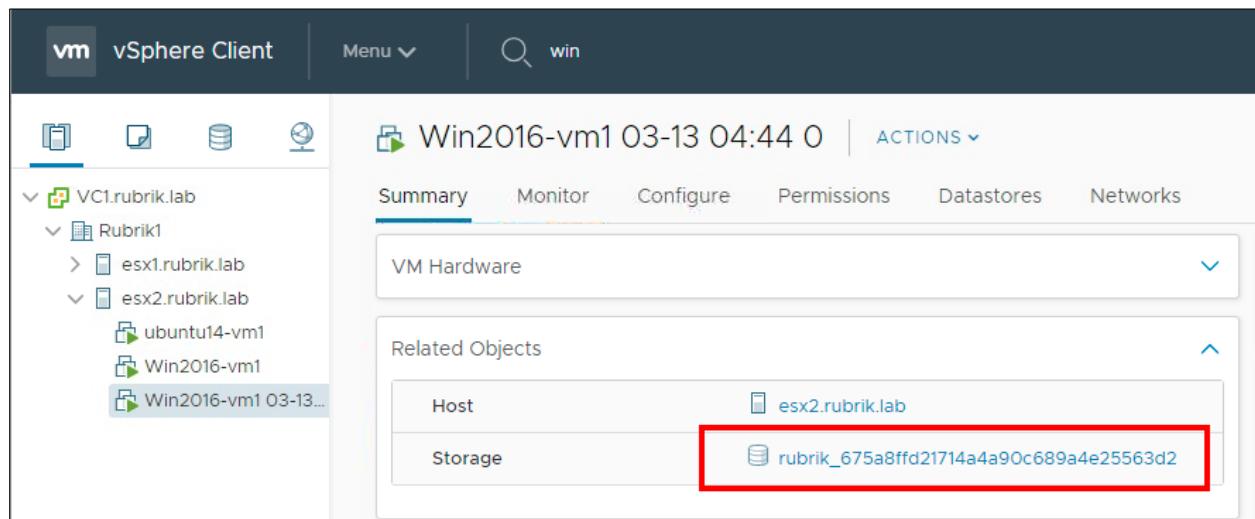
10. Open a new tab in the web browser and navigate to the vSphere HTML shortcut URL.

11. Login using the user [demo@rubrik.lab](#) and the password [Welcome10!](#).

12. Use the search function in the top center to locate your new VM (original name and the snapshot time/date stamp) in vCenter Server.

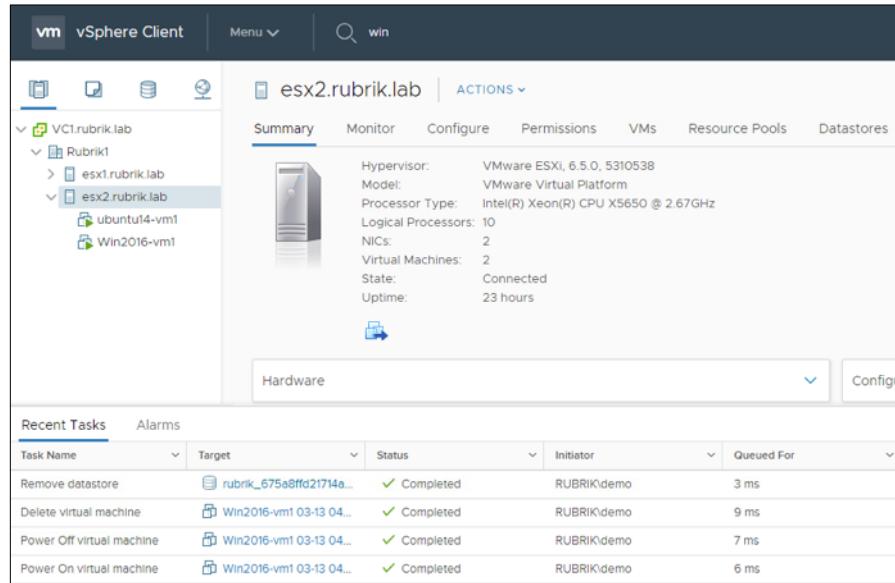


13. On the **Summary** tab of the VM, scroll down until you locate the **Related Objects** pane. Notice the **Storage** on which the VM is running. It is recommended to Storage vMotion the VM files to primary storage if it is desired to keep the VM running long-term.



14. Switch back to the Rubrik UI tab and navigate to **Live Mounts > vSphere VMs**.

15. Locate your virtual machine and click the ellipses (...). Click **Unmount** and then **Unmount** again once the dialog appears.
16. You will see that the Live Mount VM is removed from the vSphere Web Client view and the temporary Rubrik NFS datastore has also been removed.



Trail Map:

The Rubrik cluster sets the protection state of the Live Mount recovered virtual machine to Do Not Protect. To protect the new virtual machine, add it to an SLA Domain, or remove the individual assignment of Do Not Protect to permit it to inherit protection.

What if you could instantiate an environment that looked exactly like production (minus a few hours) automatically through APIs and push code into that environment to test?

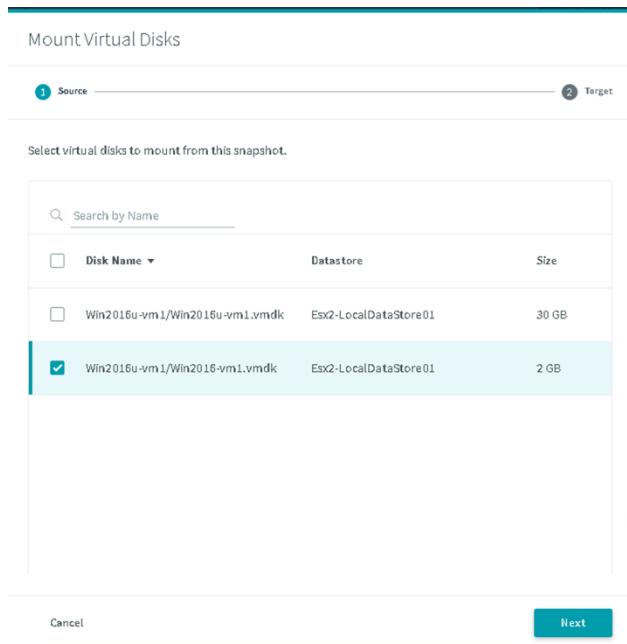
With Rubrik, you can. Build isolated environments and leverage the Live Mount feature to instantiate identical environments in moments. You can also test an application upgrade, failure scenario, or other use cases using your backup storage. When you are done, you simply throw it away.

But wait....There's more!!! What if there is only data that you need to retrieve on a single drive on the VM? Instead of Live Mounting a full VM, with Rubrik's CDM 5.0 you now have the ability to mount a single drive as a VMDK to another VM.

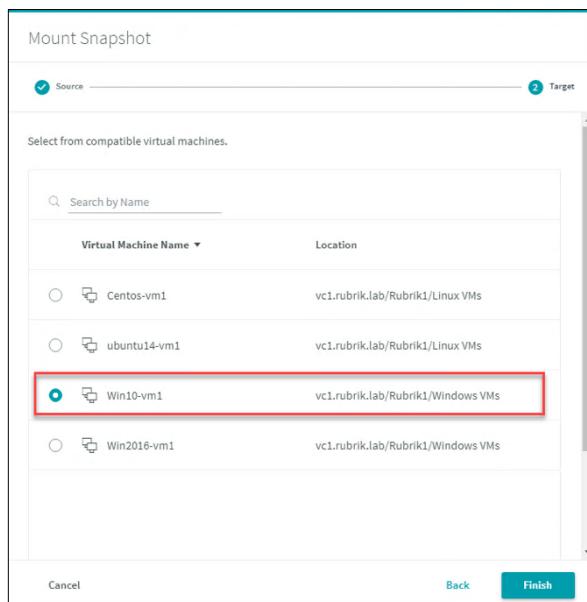
To Live Mount a Virtual Disk:

1. Using your assigned Windows 2016 Server (**Win2016-vm1**), select a snapshot by clicking on the blue dot on an available date. (**Virtual Machines > vSphere VMs**)

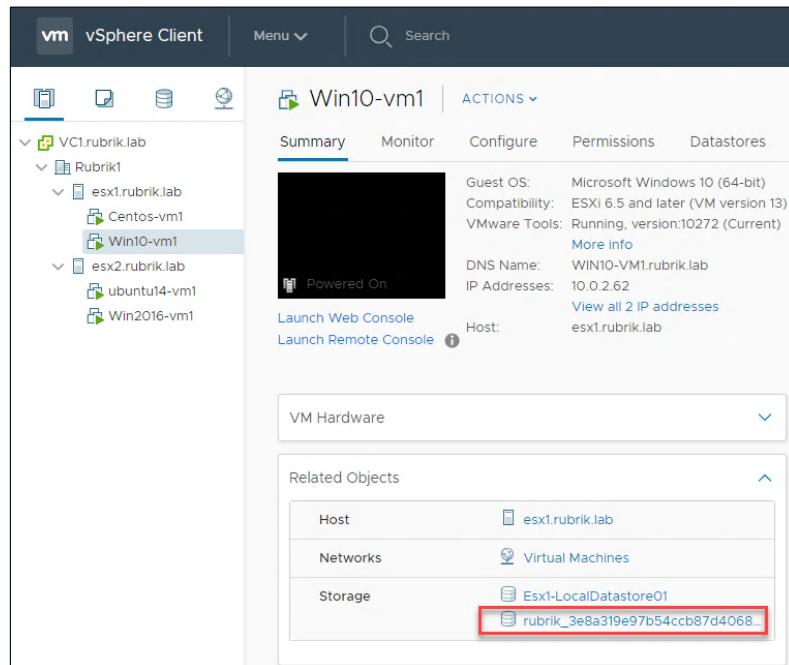
2. Open the ellipsis (...) menu for the snapshot date chosen.
3. Choose Mount
4. Instead of normally selecting the Virtual Machine option, which mounts the whole VM, select the **Mount Virtual Disks** option.
5. You have additional options now shown. Namely, the VMDKs that are attached to the VM. Select the checkbox in front of the 2GB drive.



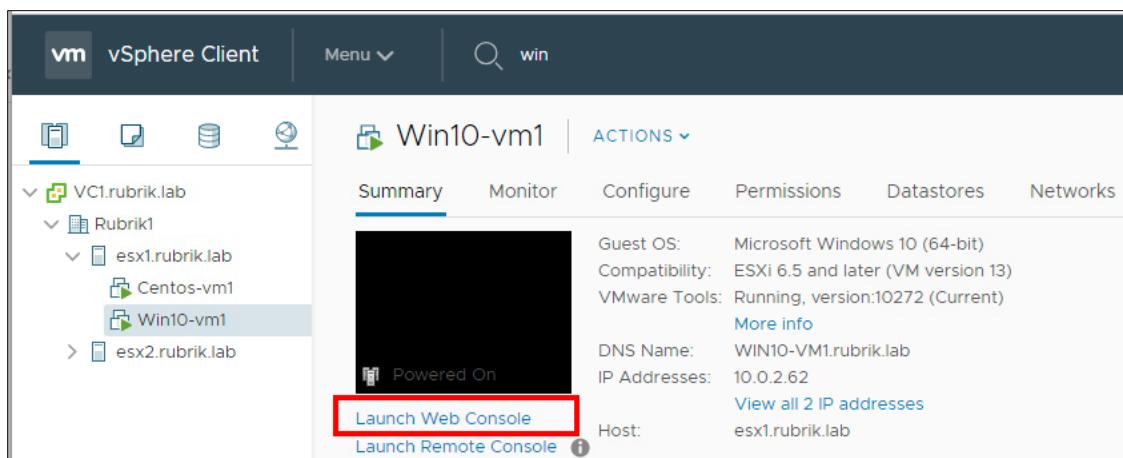
6. After clicking on Next, you have the option of choosing any of your VM's to mount the disk on. Select the radio button in front of the Win10-vm1 virtual machine and click Finish.



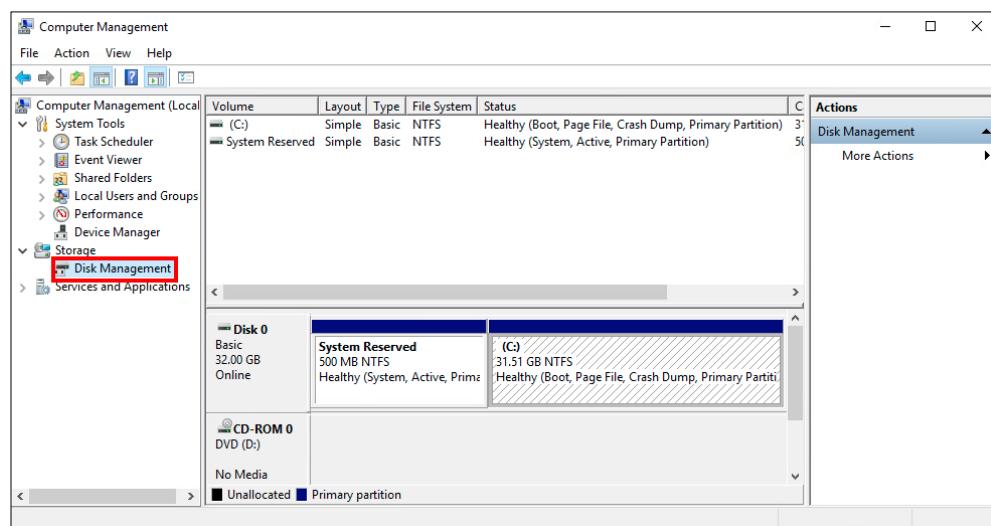
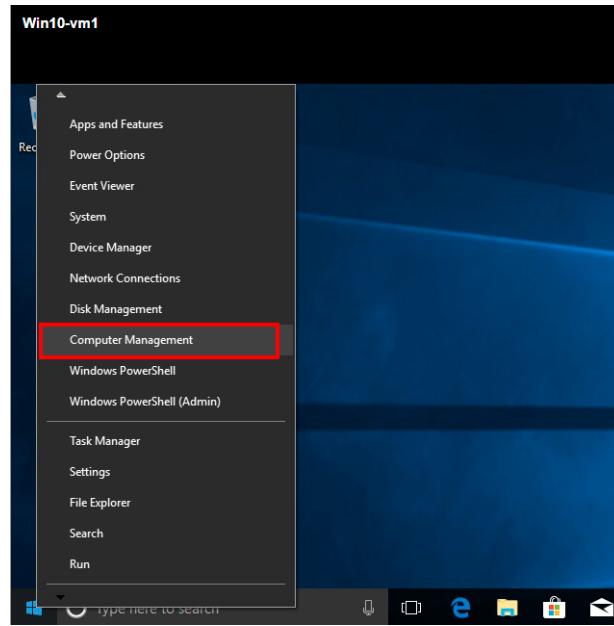
- This will live mount the VMDK to the Windows 10 VM. You can check this by opening up the HTML5 vSphere client from the Chrome bookmark bar.
- After logging into the vSphere client, click on the Win10-vm1 and look at the Related Objects to see the Rubrik NFS storage mounted.



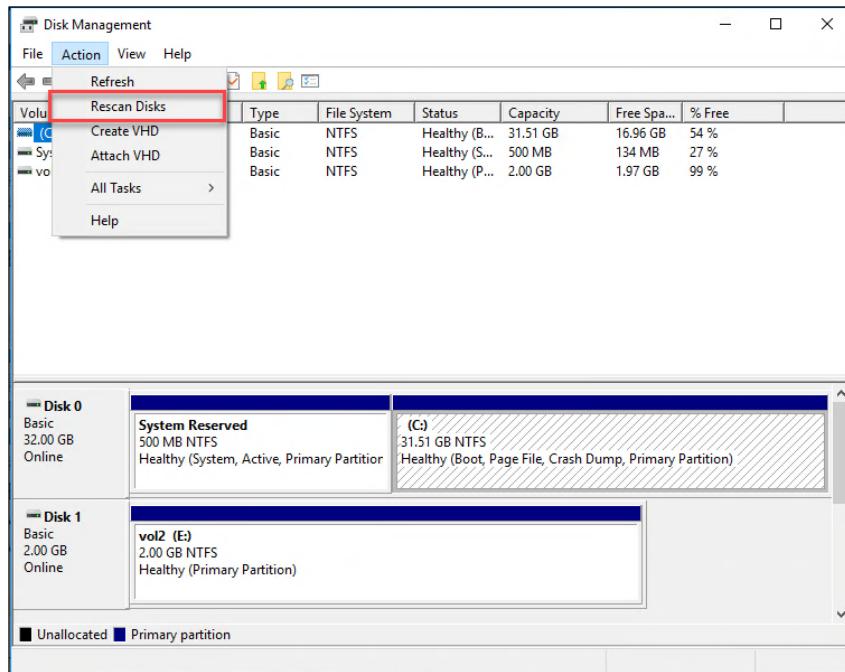
- To see that the virtual disk is added to the VM, click on Launch Web Console. You may need to login using the username DemoRubrik and Welcome10! Password.



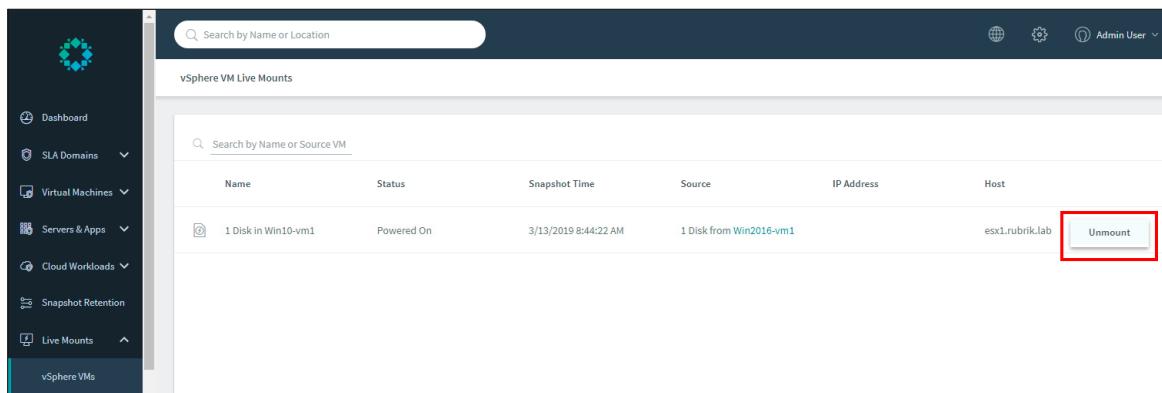
- Right click on the Windows Start Menu and select Computer Management. Click on Disk Management under Storage to open up the Windows Disk Management screen.



11. If you don't see a Vol2, you may need to refresh the disks. You can do that by clicking on Action and then Rescan Disks.



12. You should now see the Disk 1 show up. This is your VMDK Rubrik mounted.
13. You can return to Windows Explorer to verify that the new Drive (vol2 E:) has appeared.
14. Using Windows Explorer, navigate into the e:\logos folder on the disk and make sure you can see the Rubrik logos.
15. Close out of the VM tab and the vSphere web client. And under **Live Mounts > vSphere VMs** in the Rubrik UI, click on the ellipsis for the Disk and select Unmount and confirm.



You have now completed the Life-Saving badge! Raise your hand so a Rubrik employee can get you the badge, answer any questions about this section, and give an overview of the next section.

Exploration

Objective: Work with Filesets and Unmanaged Objects

In this lab, you will perform the following tasks:

- Locate Rubrik Backup Service
- Navigate Unmanaged Objects

This section will provide you the opportunity to explore the Rubrik Backup Service as well as Unmanaged Objects.

Getting Started

Every good explorer needs a set of tools to navigate the mountainous terrain of files and folders. Rubrik provides filesets as a simple tool for organizing and protecting your files and folders whether on Linux, Windows, AIX, Solaris hosts and servers, or NAS shares. Rubrik filesets are purpose-built for quickly locating and recovering your critical files or folders when urgency strikes. Your adventure as an explorer will continue as you navigate through the valley of unmanaged objects.

Rubrik Backup Service

The Rubrik Backup Service provides the Rubrik cluster with the ability to manage SQL Server and Oracle databases, as well as physical Windows, Linux, AIX, and Solaris workloads. Rubrik can backup Linux and Windows virtual machines at a more granular level than via a VM level backup.

The Rubrik Backup Service software can be downloaded directly from the Rubrik cluster, or the software can be downloaded once and copied to the appropriate server as needed.

Trail Map:

The Rubrik Backup Service software can only be used with the Rubrik cluster from which the software is obtained. Each Rubrik cluster generates a copy of the Rubrik Backup Service software that includes authentication and encryption information specific to that Rubrik cluster. This method ensures that the Rubrik cluster and a hosted deployment of the Rubrik Backup Service can reliably authenticate each other and encrypt data-in-flight.

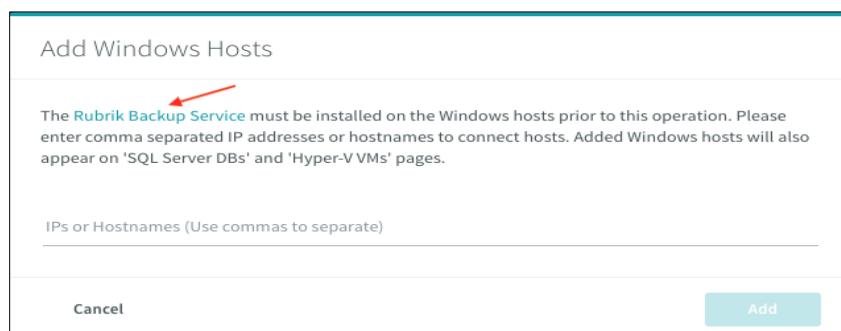
After upgrading the Rubrik cluster software, the Rubrik cluster automatically upgrades the Rubrik Backup Service software on all protected server hosts. Upgrades do NOT require a reboot or a server restart.

The Rubrik Backup Service must run as an account that is a member of the Administrators group of the Windows Server host. On Linux or Unix machines you will need to install with root level access.

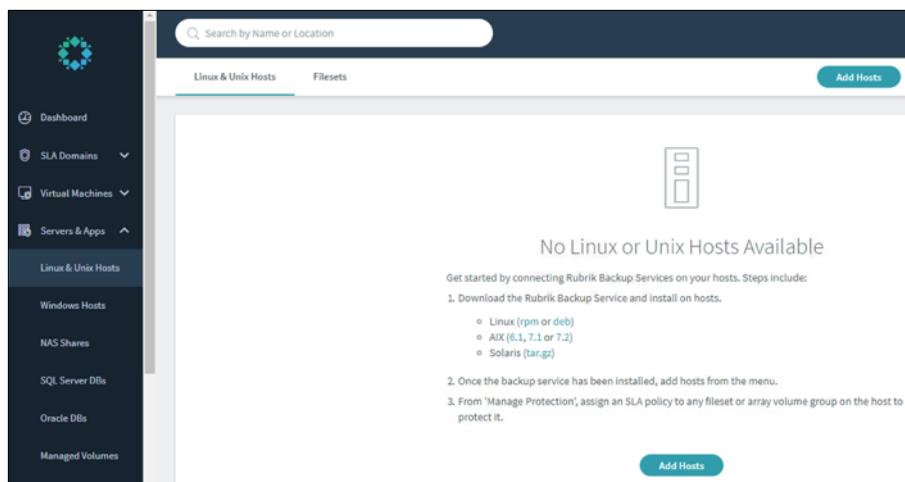
Locate Rubrik Backup Service (RBS)

To download the Rubrik Backup Service:

1. In the web UI, on the left-side menu, click **Servers & Apps > Windows Hosts**. The Windows Hosts page appears, with the Windows Hosts tab selected.
2. Click the **Add Windows Hosts**.



3. Select the hyperlink to download RBS. (It might be necessary to refresh the Rubrik UI otherwise you might get a certificate error on download)
4. The same process is used for downloading the Unix/Linux version, with the exception of navigating to **Servers & Apps > Linux & Unix Hosts**. Once there, you will need to choose the appropriate type of file for your OS (.bin, .deb, .rpm, tar.gz).



Filesets

A fileset defines a set of files and folders on a Linux host, a Windows host, or a NAS share. The Rubrik cluster interprets a fileset based on the values provided in the Include, Exclude, and Do Not Exclude fields. The Rubrik cluster applies a set of rules to the values provided in these fields and permits several types of values to be added to the fields. The Rubrik cluster uses the filesets that are assigned to a host or share to determine which data to manage and protect.

Snapshot Retention

A data object, such as a snapshot or backup will show up under Snapshot Retention when that object is unmanaged. An object is unmanaged when any of the following circumstances are true:

- Data source is no longer available to the Rubrik cluster.
- Data source was removed from an SLA Domain and not added to another SLA Domain.
- Data object was created on-demand and without a retention policy.
- Data object is a replica that is no longer associated with the replication source.
- Data object is an archival copy that was retrieved from an archival location.

In each of these cases the data object does not have a retention policy to control the life of the data. Data objects without a retention policy are called unmanaged objects.

The Snapshot Retention page may be used to initiate management tasks for unmanaged objects and consists of two levels: data source level and object level.

The data source level provides information about the virtual machines, applications, and filesets that are the source of the unmanaged object data.

The object level provides information about the individual unmanaged objects of a selected data source.

1. On the left-side menu, click **Snapshot Retention**.

The data source level of the Snapshot Retention page appears.

The screenshot shows the Rubrik Snapshot Retention interface. The left sidebar has a 'Snapshot Retention' icon. The main area has a search bar at the top. Below it, a table titled 'All Objects' lists two entries: 'Centos-vm1' and 'ubuntu14-vm1'. The columns include Name, Location, Status, Retention SLA, Scheduled Snapshots, On Demand/Downloaded Snapshots, Local Storage, and Archive Storage. Both entries are listed as 'Protected' with 'Gold' retention and 0 scheduled snapshots. The 'On Demand/Downloaded Snapshots' column shows '1' for both. The 'Local Storage' and 'Archive Storage' columns show '-'.

Name	Location	Status	Retention SLA	Scheduled Snapshots	On Demand/Downloaded Snapshots	Local Storage	Archive Storage
Centos-vm1	vc1.rubrik.lab/Rubrik1/esx1.ru...	Protected	Gold	0	1	-	-
ubuntu14-vm1	vc1.rubrik.lab/Rubrik1/esx2.ru...	Protected	Camp Rubrik	0	1	-	-

2. In the **Name** column, select the name of a data source.

The local host page or Recovery Points card page appears.

The screenshot shows the Rubrik Local host interface. On the left, the 'Overview' panel displays four key metrics: vCenter (vc1.rubrik.lab), Host (esx1.rubrik.lab), SLA Domain (Gold), and Snapshot details (Oldest Snapshot: 3/12/19 12:43 PM, Latest Snapshot: 3/13/19 9:00 AM). On the right, the 'Snapshots' panel shows a calendar for March 2019. The calendar highlights two specific dates: March 12th and March 13th, which are marked with blue dots. Navigation arrows are present at the top of the calendar, and a search bar is located above it.

Tasks (such as Instant Restore, Live Mount, etc.) may be conducted with the data available through the Snapshots panel. Please do not conduct any tasks against an Unmanaged Object at this time.

You have now completed the Exploration badge! Raise your hand so a Rubrik employee can get you the badge, answer any questions about this section, and give an overview of the next section.

Pioneering

Objective: Manage Databases

Manage Databases

In this lab, you will perform the following tasks:

- Live Mount a SQL Server Database
- Unmount a SQL Server Database

This section is where you will find new ideas and methods that take database recovery to another level. We will introduce you to the SQL Live Mount feature and with CDM 5.0, Oracle Snappables.

Getting Started

SQL Live Mount aligns with the core simplicity of the Rubrik platform. SQL Live Mount leverages Rubrik's robust Atlas file system and has algorithms around promoting active blocks into flash for performance.

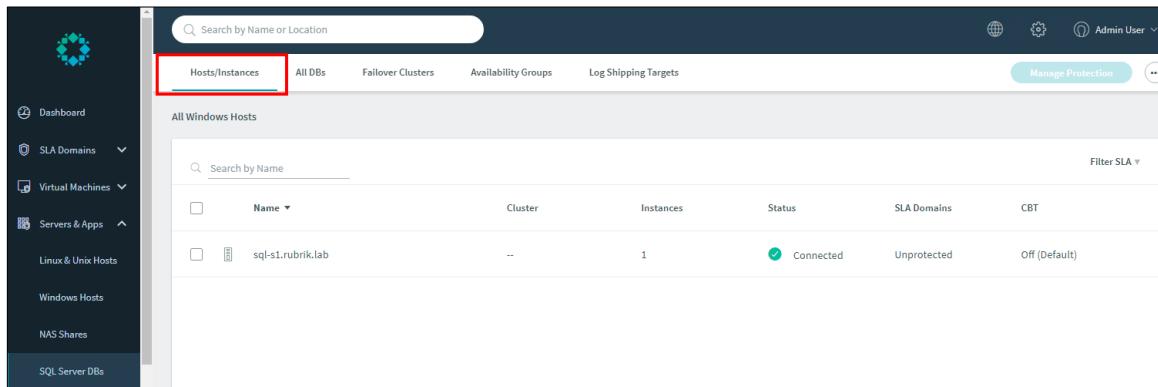
SQL Live Mount

A SQL Live Mount creates a new database from a point-in-time copy of the source database. The Rubrik cluster provides a SMB share of the new database directly from the Rubrik cluster storage layer. Using Live Mount to access a copy of a database can significantly reduce the RTO for the database.

A Live Mount database can be attached to an SQL Server instance on any Windows Server host that is running the Rubrik Backup Service. Transmissions between the Rubrik cluster and the host of the Live Mount are secured by end-to-end encryption.

Use the Live Mount feature to create a new database from a point-in-time copy of a source database.

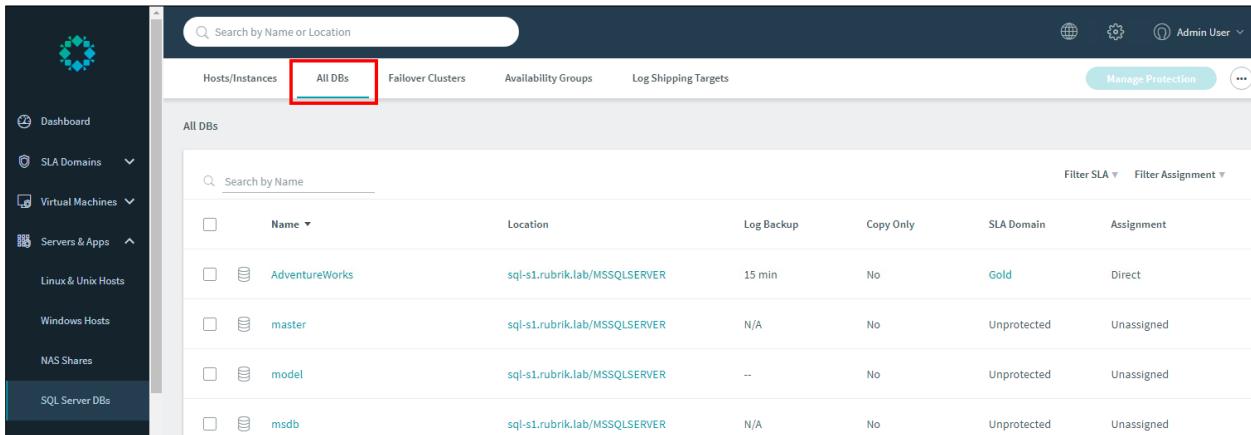
1. On the left-side menu, click **Servers & Apps > SQL Server DBs**. The Hosts/Instances window appears



The screenshot shows the Rubrik management interface. The left sidebar has a dark theme with various navigation options: Dashboard, SLA Domains, Virtual Machines, Servers & Apps (selected), Linux & Unix Hosts, Windows Hosts, NAS Shares, and SQL Server DBs. The main content area has a header with a search bar ('Search by Name or Location'), a 'Manage Protection' button, and a user dropdown ('Admin User'). Below the header is a sub-header 'All Windows Hosts'. A red box highlights the 'Hosts/Instances' tab in the top navigation bar. The main table lists one host: 'sql-s1.rubrik.lab' with 1 instance, status 'Connected', and SLA domain 'Unprotected'. There are columns for Name, Cluster, Instances, Status, SLA Domains, and CBT.

Name	Cluster	Instances	Status	SLA Domains	CBT
sql-s1.rubrik.lab	--	1	Connected	Unprotected	Off (Default)

2. Click **All DBs**. The **All DBs** window appears.

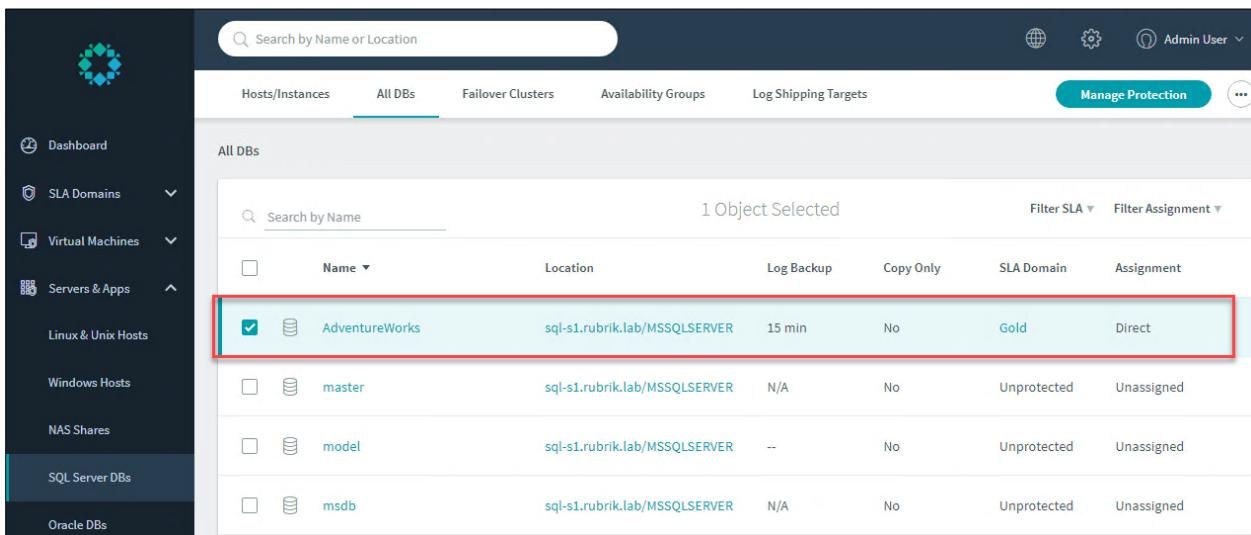


The screenshot shows the Rubrik interface with the 'All DBs' tab selected. The left sidebar is visible with categories like Dashboard, SLA Domains, Virtual Machines, Servers & Apps, and SQL Server DBs. The main area displays a table of databases:

	Name	Location	Log Backup	Copy Only	SLA Domain	Assignment
<input type="checkbox"/>	AdventureWorks	sql-s1.rubrik.lab/MSSQLSERVER	15 min	No	Gold	Direct
<input type="checkbox"/>	master	sql-s1.rubrik.lab/MSSQLSERVER	N/A	No	Unprotected	Unassigned
<input type="checkbox"/>	model	sql-s1.rubrik.lab/MSSQLSERVER	--	No	Unprotected	Unassigned
<input type="checkbox"/>	msdb	sql-s1.rubrik.lab/MSSQLSERVER	N/A	No	Unprotected	Unassigned

3. In the **Name** column, select the AdventureWorks database.

Alternatively, enter AdventureWorks in the search field or use the filters at the top left of the list.



The screenshot shows the 'All DBs' tab selected in the Rubrik interface. The left sidebar includes categories like Dashboard, SLA Domains, Virtual Machines, Servers & Apps, and SQL Server DBs. The main area shows a table of databases. The 'AdventureWorks' row is highlighted with a red box, indicating it is selected. The table columns are:

	Name	Location	Log Backup	Copy Only	SLA Domain	Assignment
<input checked="" type="checkbox"/>	AdventureWorks	sql-s1.rubrik.lab/MSSQLSERVER	15 min	No	Gold	Direct
<input type="checkbox"/>	master	sql-s1.rubrik.lab/MSSQLSERVER	N/A	No	Unprotected	Unassigned
<input type="checkbox"/>	model	sql-s1.rubrik.lab/MSSQLSERVER	--	No	Unprotected	Unassigned
<input type="checkbox"/>	msdb	sql-s1.rubrik.lab/MSSQLSERVER	N/A	No	Unprotected	Unassigned

- The Local page for the database appears, with the Recovery Points pane showing the month view.
- On the Recovery Points pane, select a day that has a green dot.
The green dot indicates that at least one successful snapshot was created on that day.

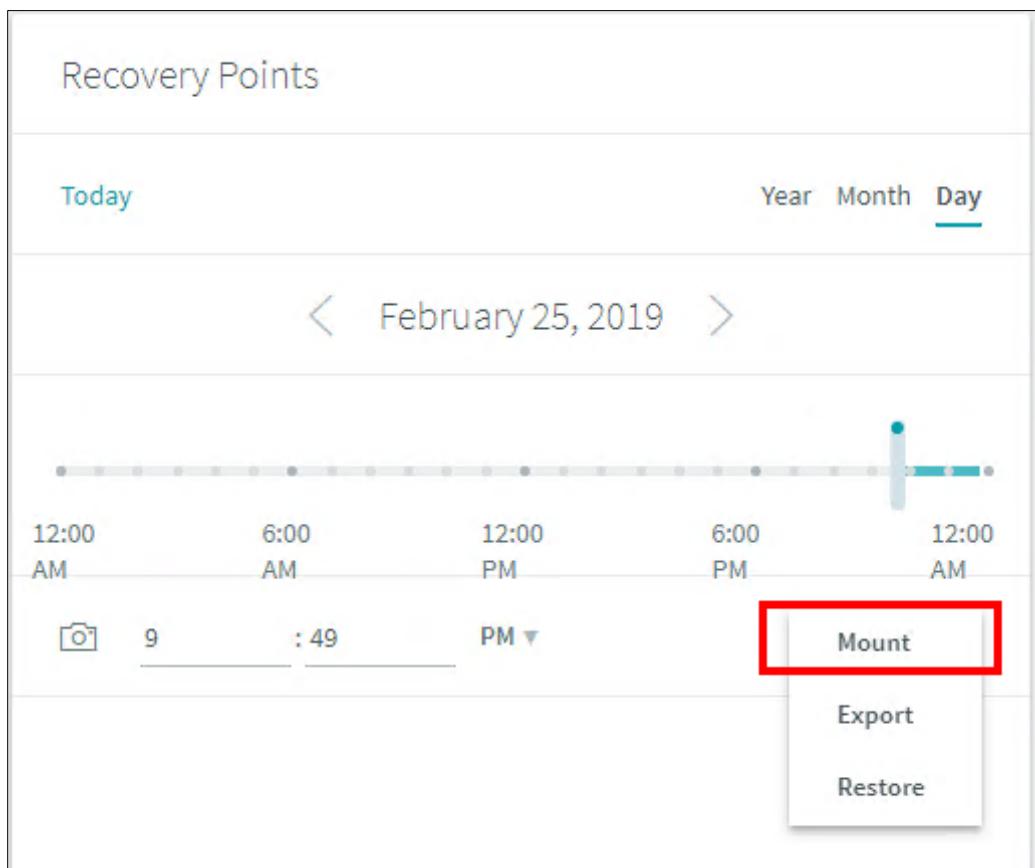
The Recovery Points card displays the Day view.

Trail Map:

While Rubrik always sends incremental backups of SQL Server databases, the green dot indicates the synthetically created Full to match the assigned policy. The points in time between fulls are offered for databases in Full Recovery mode via automatically rolling transaction logs. Restoring to a Full (aka blue dot) will be somewhat faster than choosing a point in time in between Fulls due to the time savings of not rolling transaction logs.

6. Move the Recovery point slider to select a recovery point.

To select a snapshot, move the slider to a snapshot indicator or click the snapshot indicator dot. The selected time icon changes.

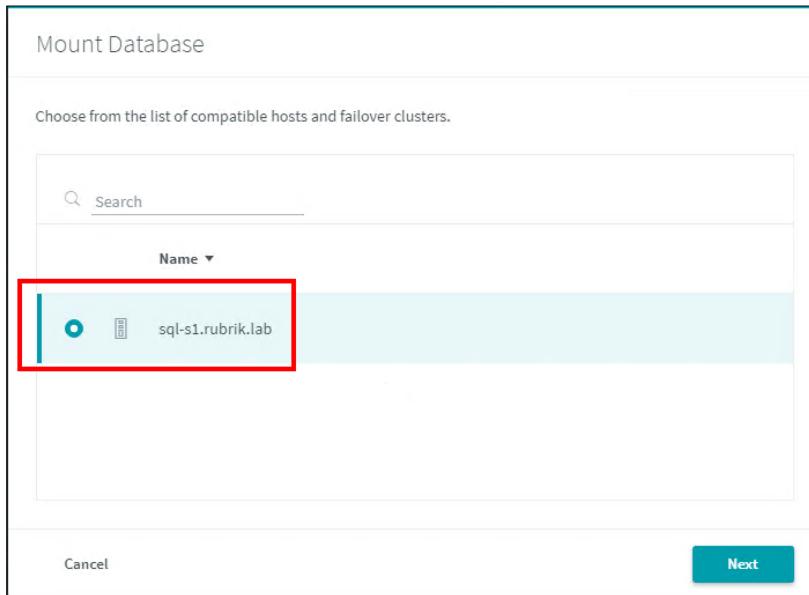


To select a recovery point other than a snapshot time, move the slider to choose that time. The time appears in the time field and the selected time icon changes.
Alternatively, type a specific time into the time field.

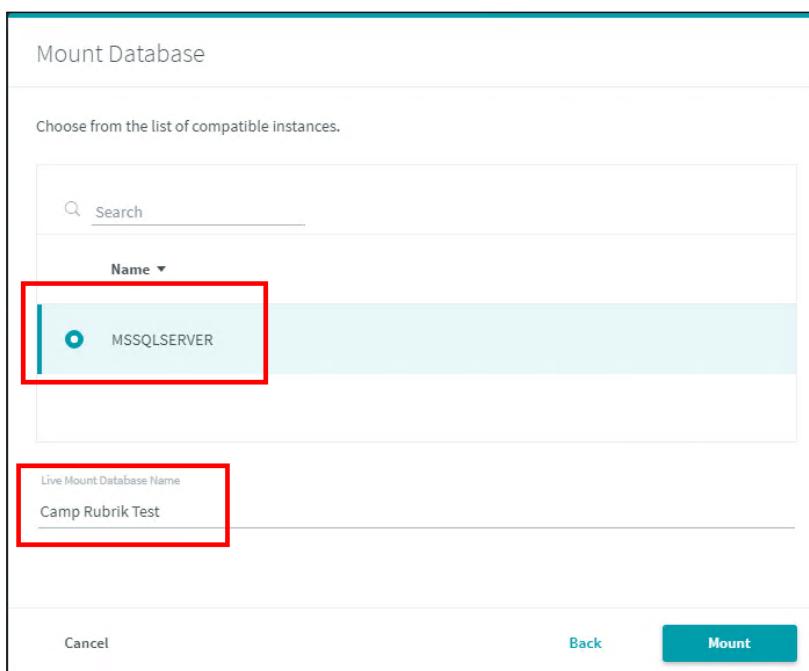
7. Open the ellipsis (...) menu and select **Mount**.

The Mount Database dialog box appears.

8. In **Name**, select a Windows Server host, and click **Next**. You will automatically see all SQL Servers with the Rubrik connector installed. Alternatively, enter the name of a host in the search field.



9. In **Name**, select a SQL Server instance.
Alternatively, enter the name of an instance in the search field.
10. In **Live Mount Database Name**, type a name.



11. Click **Mount**.

The Rubrik cluster shares the Live Mount over the SMB/CIFS protocol and sets the protection state of the new database to **Do Not Protect** to ensure the Rubrik cluster does not backup data stored on itself. The Rubrik cluster then mounts the share to the specified Windows Server host and attaches the Live Mount database to the specified SQL Server instance. To view the SQL Live Mount:

12. On the left-side menu of the web UI, click **Live Mounts > SQL Server DBs**.

The SQL Server DB Live Mounts page appears.

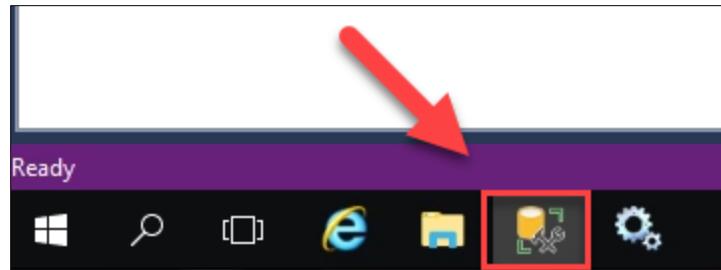
Wait until the Status changes to Available. This may take approximately one minute.

A screenshot of the Rubrik web interface showing the 'SQL Server DB Live Mounts' page. The left sidebar has a dark background with white icons and text. The main area has a light gray header 'SQL Server DB Live Mounts'. Below it is a search bar with placeholder 'Search by Source Name'. A table follows with columns: Name, Host, Status, Recovery Point, Source SQL Server DB, and Mounted. A single row is listed: 'Camp Rubrik Test' under 'Name', 'sql-s1.rubrik.lab' under 'Host', 'Available' under 'Status' (which is highlighted with a red box), '2/25/2019 9:49:14 PM' under 'Recovery Point', 'AdventureWorks' under 'Source SQL Server DB', and 'Admin User 2/26/19 1...' under 'Mounted'. There is also a three-dot ellipsis button next to the 'Mounted' column.

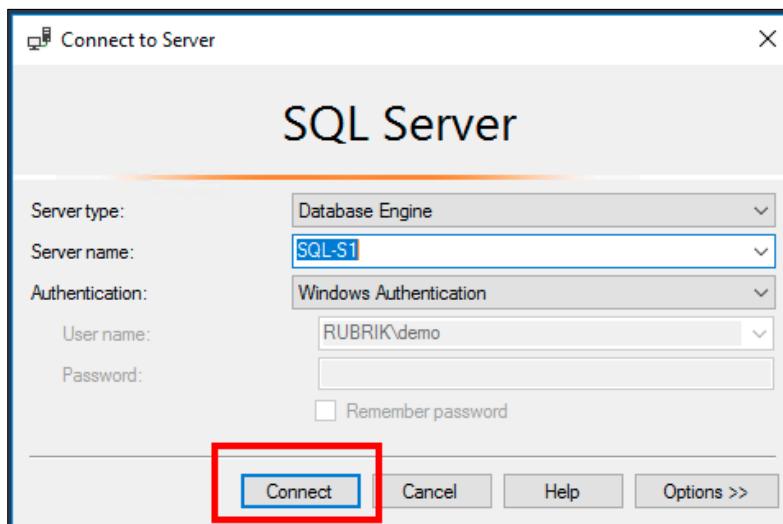
13. On the desktop of Jump1, you will find an SQLServer RDP icon. Double-click on it to open it.



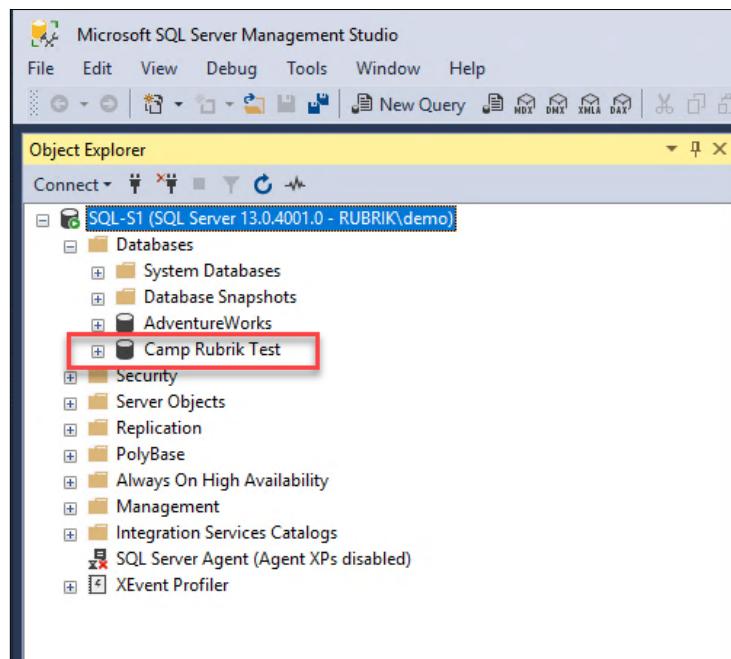
14. Open Microsoft SQL Server Management Studio by clicking the icon on the Start



15. Click **Connect** at the login prompt.



16. In the left-hand column, expand the **Instance name > Databases**.
The Live Mounted Database should be listed.



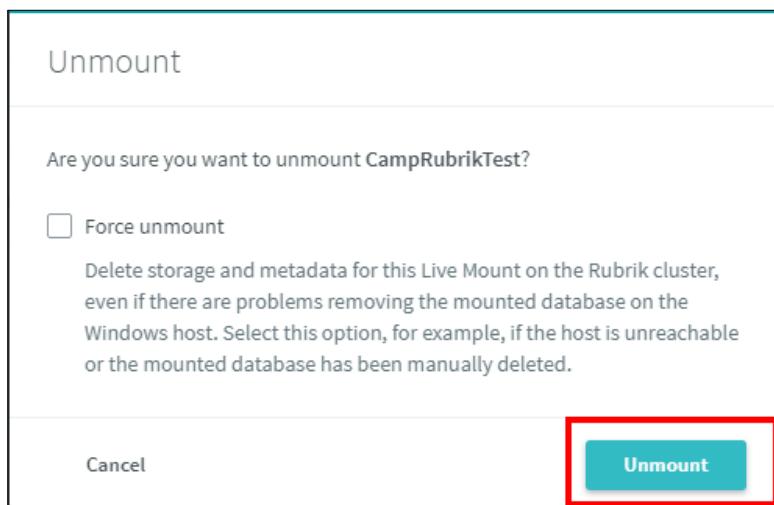
20. Minimize the SQL Server RDP window and switch back to the Rubrik UI tab.
 21. On the left-side menu of the web UI, click **Live Mounts > SQL Server DBs**.
The SQL Server DB Live Mounts page appears.
- NOTE: Could we crop and over the red box to the far right hand side over the ellipsis?**

Name	Host	Status	Recovery Point	Source SQL Server DB	Mounted
Camp Rubrik Test	sql-s1.rubrik.lab	Available	2/25/2019 9:49:14 PM	AdventureWorks	Admin User 2/26/19 1...

22. Open the ellipsis (...) menu next to the entry for your Live Mount database.

Unmount

23. Click **Unmount**.
A confirmation message appears.



24. Click **Unmount** once more. The Rubrik cluster detaches the database from the SQL Server instance and unmounts the share from the Windows Server host.

Oracle

The Rubrik CDM 5.0 release introduces a new set of features and improvements to make backing up an Oracle environment simple and fast. Oracle now has the same protection that SQL enjoys. The ability to Live Mount and orchestration of point-in-time recoveries all point to Rubrik's commitment to making backup and recovery easy for DBAs. Oracle backups are preserved in an immutable format and managed via the same Rubrik policy that applies to all other datasets.

Our Oracle backup method aligns with the simplicity and ease of Rubrik's platform. Starting with 5.0, Rubrik allows for the same easy workflow that SQL DB Admins are already enjoying. Using Elastic Application Services, or Managed Volumes 2.0, Rubrik extends DB support to NoSQL platforms as well.

Nephology

Objective: Unleash the Power of Hybrid Cloud

In this lab, you will perform the following tasks:

- Navigate CloudOut archival functionality
- Explore CloudOn and Cloud Conversion options

This section will provide you the opportunity to explore Rubrik's cloud functionality for AWS, Microsoft Azure, and Google Cloud Platform. Some of the screens may be shown as a reference rather than actually performing the steps in the lab.

Getting Started

The word **nephology** means the study or contemplation of clouds. The Rubrik Founding Engineers definitely put in thousands of hours studying and contemplating how to design a Cloud Data Management product to exploit the power of cloud computing. With the power of Cloud Cluster, CloudOut, and CloudOn your data is no longer bound to one geographical area.

CloudOut

CloudOut is Rubrik's ability to cost effectively archive data to the cloud for long-term retention. An SLA Domain can include an archival policy that instructs Rubrik to copy protected data to an archival location. The archival policy specifies the archival location to use, how soon after a backup the data is copied, and how long the data is retained.

Rubrik currently supports the following archival location types:

- Amazon S3
- Amazon Glacier
- Google Cloud Platform
- Azure
- Object Store
- NFS

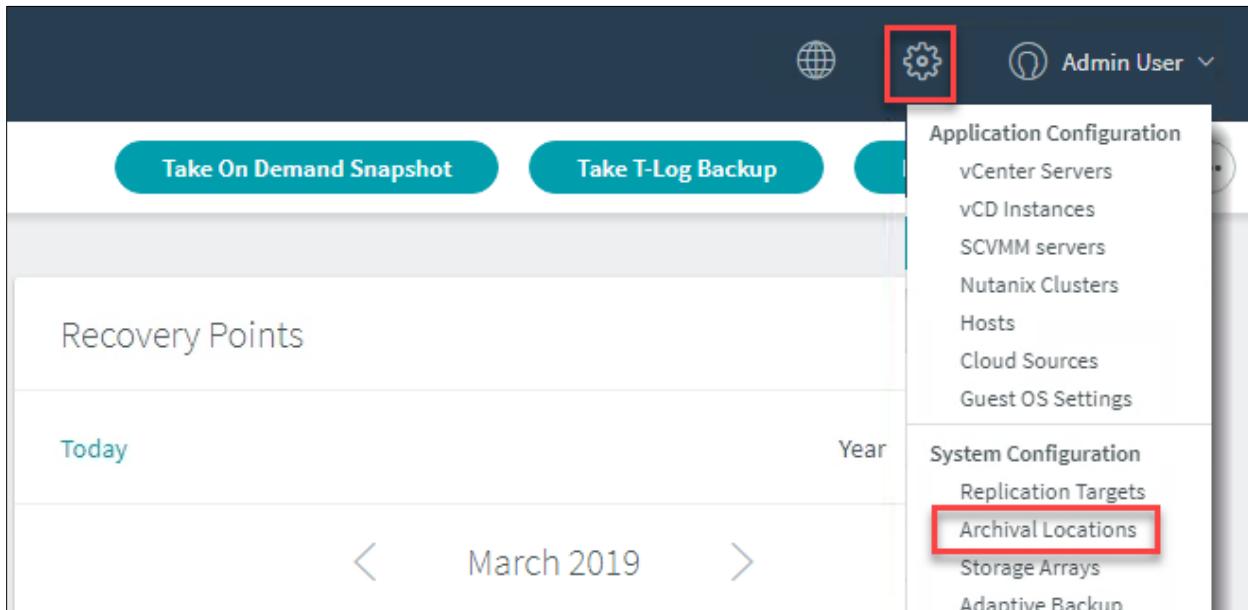
Multiple archival locations and types can be added into Rubrik. The archival policy of an SLA Domain can only specify one archival location but each SLA Domain can specify a different archival location.

Adding an Amazon S3 Archive

Using Amazon S3 as an example, let's walk through adding an archive location:

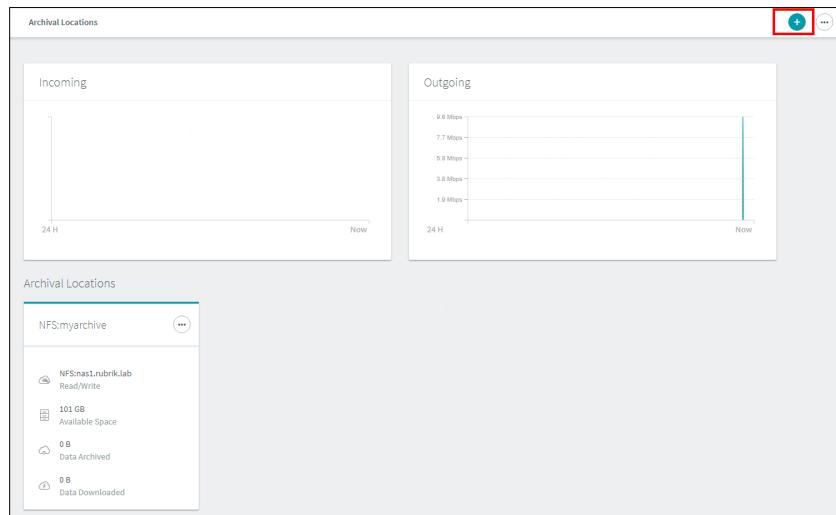
1. Click on the gear icon located on the top right bar of the web UI.

The Settings menu appears.



2. From the **Settings** menu, select **Archival Locations**.

The Archival Locations page appears.



3. Click the blue + icon.

The Add Archival Location dialog box appears.

4. In **Archival Type**, select **Amazon S3**.

The Amazon S3 archival location fields appear.

The screenshot shows a dialog box titled 'Add Archival Location'. It has a dropdown menu for 'Archival Type' set to 'Amazon S3'. Below it are dropdown menus for 'Region', 'Storage Class', and 'AWS Access Key'. There are also input fields for 'AWS Secret Key', 'AWS Bucket Name', and 'Archival Location Name'. At the bottom, there is a section for 'Encryption Type' with radio buttons for 'KMS Master Key ID' (which is selected) and 'RSA Key'. A 'Cancel' button is on the left and a teal 'Add' button is on the right.

View the different inputs required for Amazon S3 as an archive.

Feel free to browse other archive types to view required settings.

5. Press **Cancel** when finished.
6. On left pane of the web UI, select **SLA Domains > Local Domains**. The Local SLA Domains page appears.
7. Select the Camp Rubrik SLA Domain that you previously created. The SLA Domain page will load.
8. Click the ellipses (...) at the top right corner of the SLA Domain page. Select **Edit**.
9. Click **Configure Remote Settings** at the bottom of the dialog (depending on the resolution of your screen it may be necessary to scroll down).
10. In Archival, click the toggle (if not already done). Notice the **Enable Instant Archive** option. Do not select it at this time although you can click the circled "i" to read what it does.

Create SLA Domain

Remote Storage Configuration

Retention On Brik

Archival

Archival Location

Enable Instant Archive

Archival starts after 10 days and is retained on the archival location for 90 days.

Replication

Replication starts immediately, and is retained for X Days.

The Instant Archive feature can be enabled to instruct a Rubrik cluster to immediately queue a task to copy a new snapshot to a specified archival location.

11. Press **Cancel**.

CloudOn

Cloud instantiation allow users to migrate existing on-premises workloads to the cloud for test/development or even disaster recovery purposes. Rubrik's CloudOn feature converts workload data (VM image) sent to the cloud into a compute instance. There is no need to run Rubrik in the cloud to migrate workloads to the cloud for test/dev, increasing overall cloud savings.

Better yet, imagine not needing a separate cluster for test/development workloads or an identical physical infrastructure for disaster recovery. Using Rubrik CloudOn, workloads can be migrated at a VM level from on-premises to AWS or Azure.

Rubrik offers three options that can be applied to on-premises workloads that customers choose to instantiate in AWS or Azure:

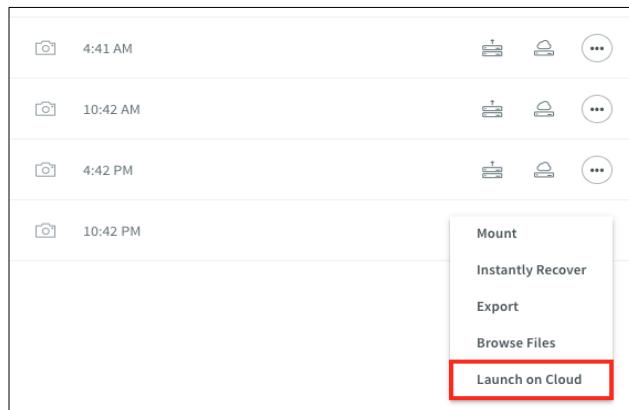
- **On-Demand** - The default configuration in which Amazon Machine Images (AMIs) or Azure Virtual Hard Drives (VHDs) are created only at the time of a “power on in the cloud” request.
- **Auto Convert Latest Snapshot - Keep One** - Rubrik will automatically construct an AMI or VHD reflecting the latest snapshot to be archived into S3 or Azure. When a new

snapshot is sent to the archive, a new AMI or VHD is constructed with the new archive data. Once completed, the older AMI or VHD is removed.

- **Auto Convert Latest Snapshot - Keep All** - Rubrik will automatically construct an AMI or VHD reflecting the latest snapshot to be archived into S3 or Azure. When a new snapshot is sent to the archive, a new AMI or VHD is constructed with the new archive data. The older AMI or VHD is retained if desired (configurable via policy) creating a series of AMIs or VHDs representing each snapshot.

Launch on Cloud

On the local page for a selected virtual machine, a snapshot is selected and then **Launch on Cloud** is chosen (You will not do this in the lab, shown is an example screenshot).



The Launch on Cloud dialog appears, as shown in the following screenshot.

Toggling the Cloud Provider between AWS and Azure will result in being prompted for the vendor appropriate elements for instantiation. The following screenshot demonstrates the required inputs for both AWS and Azure.

Launch on Cloud

Cloud Provider
 AWS AZURE

Location Name

Instance Type
m4.xlarge (Recommended)

Subnet(VPC)

Security Group

Cancel Submit

Launch on Cloud

Cloud Provider
 AWS AZURE

Location Name

Virtual Machine Size
A2m v2 (Recommended)

VNet

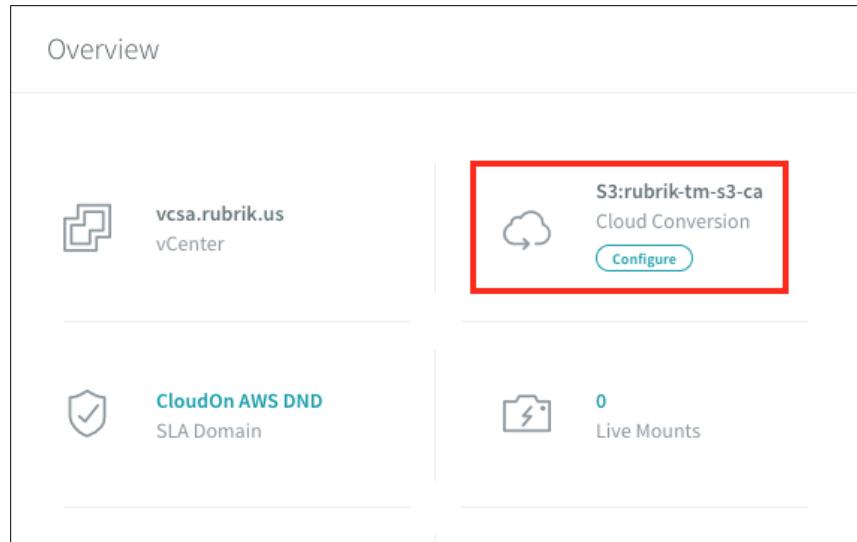
Network Security Group

Cancel Submit

The conversion time varies depending on the size of the VM being converted into a cloud instance.

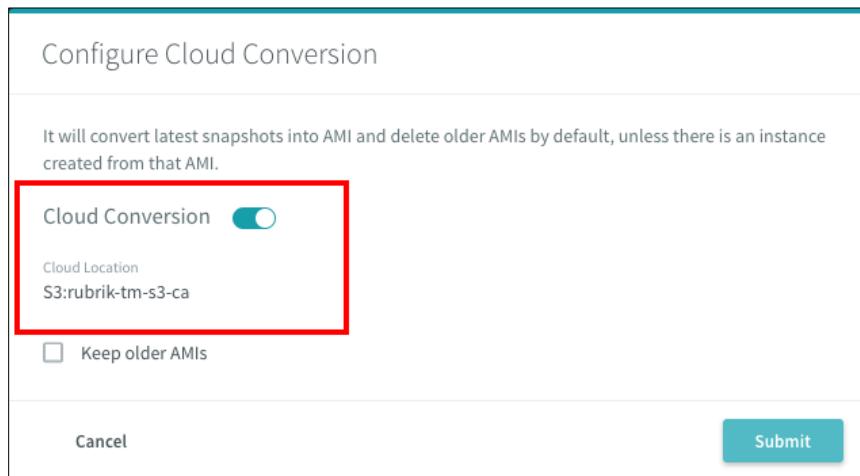
Cloud Conversion

Once connectivity has been established to AWS and/or Azure, the **Overview** pane will display the **Cloud Conversion** field in which you may click **Configure**.



A **Configure Cloud Conversion** dialog will appear, in which you may toggle the choice between:

- Auto Convert Latest Snapshot - Keep One
- Auto Convert Latest Snapshot - Keep All



This configuration results in the latest snapshot being converted into a cloud image, for example, if using AWS then it will be an AMI. This AMI can be used to spin up as many instances of the workload as desired.

Use Cases

- Whether instantiating workloads on-demand or automatically with the latest snapshot, spinning up copies of workloads in the cloud results in faster development cycles as developers are unblocked from the constraints of physical infrastructure. Picture the cost

savings garnered when avoiding a dedicated on-premises infrastructure for test/development. Developers can spin up instances when required and shut down when not in use.

- Using the auto-convert options can allow administrators to stage workloads in the cloud for disaster recovery - “computeless DR” by consuming cloud compute resources only when needed Continuously converting on-premises VMs to cloud instances per SLA policy enables smaller RPOs / RTOs when it comes time to recover.

Cloud Cluster

The Rubrik Cloud Cluster feature enables you to run the Rubrik Cloud Data Management software inside your virtual private cloud and provides data protection for workloads and infrastructure running there.

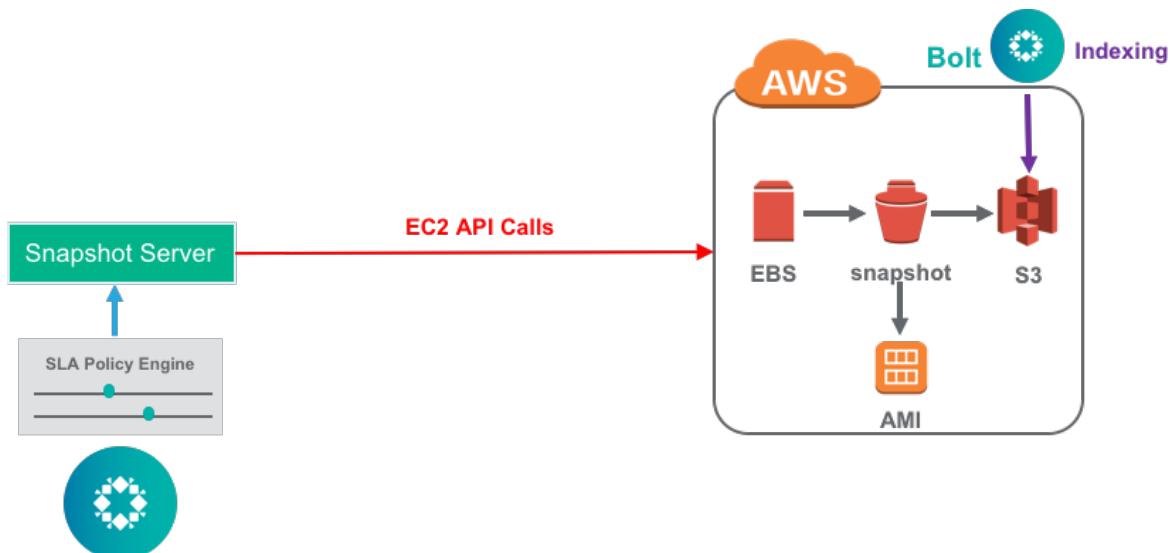
The Rubrik cloud cluster products are:

- Rubrik for AWS
- Rubrik for Azure

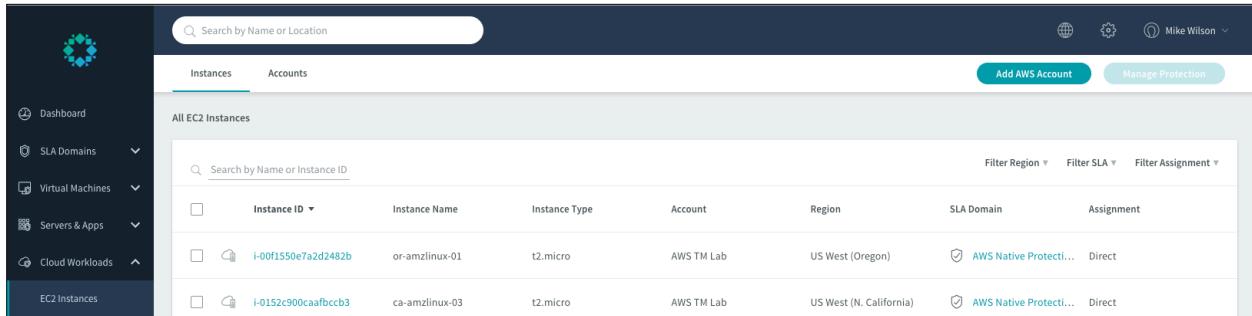
Rubrik Cloud Cluster uses the same Rubrik software that is used by a physical Rubrik cluster and includes all of the same features.

AWS Native Protection (EC2 Instances)

Rubrik CDM integrates its internal snapshot service with the relevant Amazon EC2 APIs. Specifically, Rubrik leverages the create-image API to snapshot EBS volumes and to create Amazon Machine Images (AMI) from those snapshots. An AMI is a saved template of an EC2 instance that can be created from a snapshot. Users can launch multiple instances using the same AMI. The figure below shows the workflow integration below Rubrik and Amazon EC2.



Rubrik does not need to ingest any data, allowing management to be done from either a Cloud Cluster instance or from an on-premises Rubrik instance. Discovery of EC2 instances are conducted from a Rubrik cluster using the EC2 API, which populates the new “Cloud Workloads” section. Users can specify which AWS accounts and Regions to manage.



The screenshot shows the Rubrik Cloud Workloads interface. On the left, there's a sidebar with icons for Dashboard, SLA Domains, Virtual Machines, Servers & Apps, and Cloud Workloads (which is currently selected). The main area has tabs for Instances and Accounts, with Instances selected. A search bar at the top says "Search by Name or Location". Below it, a table lists "All EC2 Instances". The table has columns for Instance ID, Instance Name, Instance Type, Account, Region, SLA Domain, and Assignment. Two rows are visible:

Instance ID	Instance Name	Instance Type	Account	Region	SLA Domain	Assignment
i-00f1550e7a2d2482b	or-amzlinux-01	t2.micro	AWS TM Lab	US West (Oregon)	AWS Native Protecti...	Direct
i-0152c900caafbccb3	ca-amzlinux-03	t2.micro	AWS TM Lab	US West (N. California)	AWS Native Protecti...	Direct

At the bottom right of the table are filter buttons for Region, SLA, and Assignment.

Example Screenshot

Discovered EC2 instances can be associated with an SLA Domain where the retention period and backup window can be specified. Note that replication and archival policies are not applicable and therefore not available for configuration.

You have now completed the Nephology badge! Raise your hand so a Rubrik employee can get you the badge, answer any questions about this section, and give an overview of the next section.

Signs, Signals & Codes

Objective: Work with Envision Reporting, Activities, and Notifications

In this lab, you will perform the following tasks:

- Explore System Overview
- Create a Custom Report
- Filter the Activity Log and Notifications

Use Rubrik to stay informed and laser-focused on the horizon ahead when protecting your critical data.

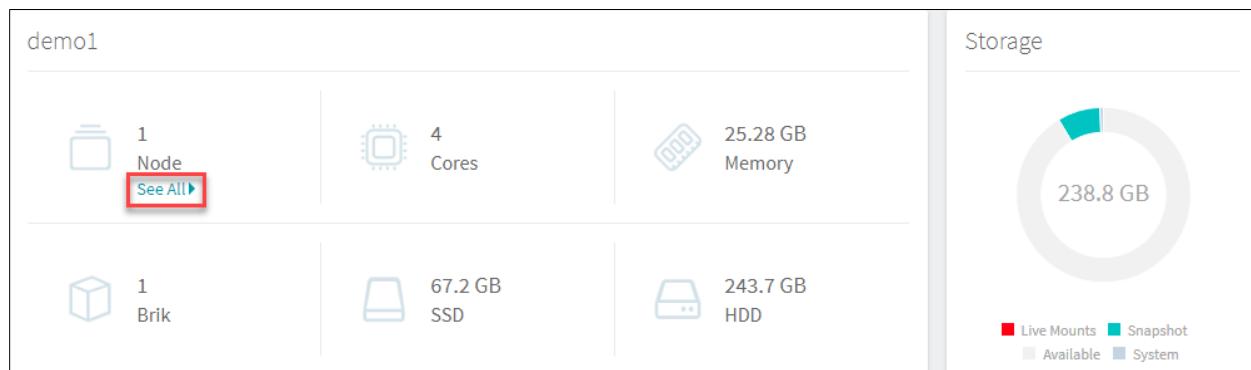
Getting Started

Envision is Rubrik's feature for custom reporting that is useful for day-to-day operations and management. System, Activities, and Notifications provide insight around specific tasks and management activities performed by the Rubrik cluster.

System

The System page is where you can see various hardware and storage metrics at a glance. This is useful to see system utilization levels, hardware health or failure, and more.

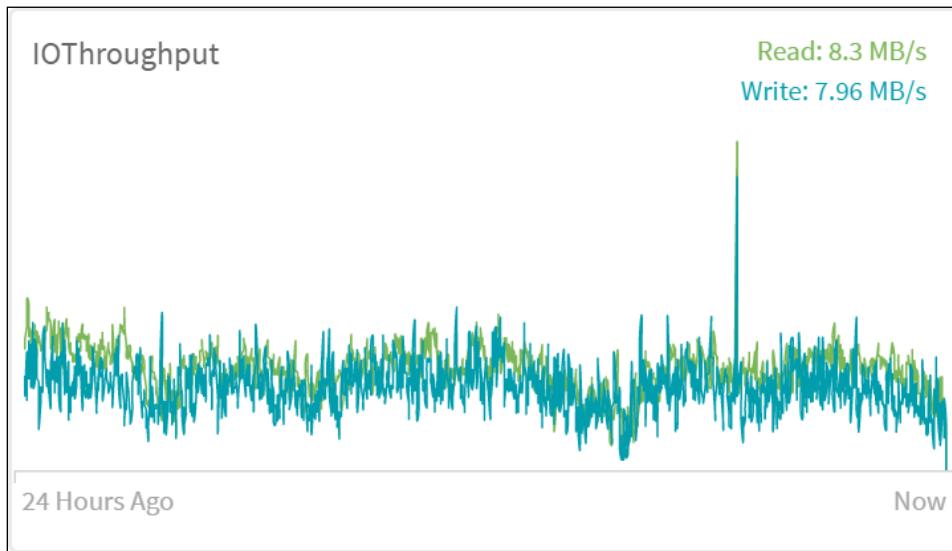
1. In the Rubrik UI, in the left-hand pane, click **System**.
Note the resource configurations for the entire cluster: # of nodes, cores, memory, and more.



2. Click “See all” underneath the node count to see individual node information. Then click on an individual node to see detailed information for that node.

Nodes			
Name ▾	Status	IP Address	Brik ID
VRVW564D26A19	OK	10.0.2.10	RUBRIK

3. Go back to the **System** screen.
4. Note the other metrics available - I/O Throughput, IOPs, and Storage.
To determine whether your I/O Throughput is trending optimally based on your network you can view it easily here and make a decision to investigate further.



Envision

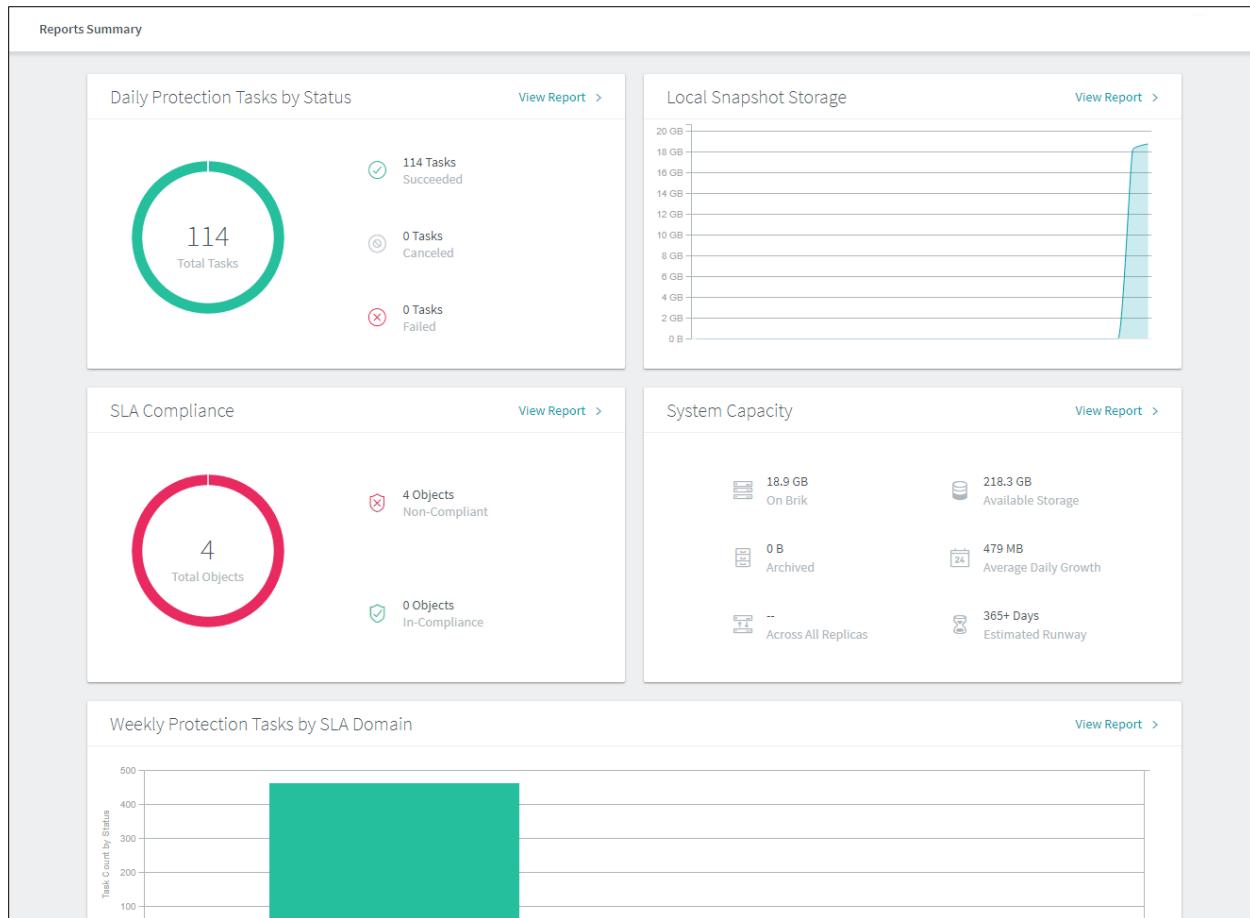
Rubrik Envision provides customizable data protection reports with valuable information from the Rubrik cluster. Envision gives insight into historical information based on Protection Tasks, SLA Compliance, and System Capacity.

You can explore Envision in two formats:

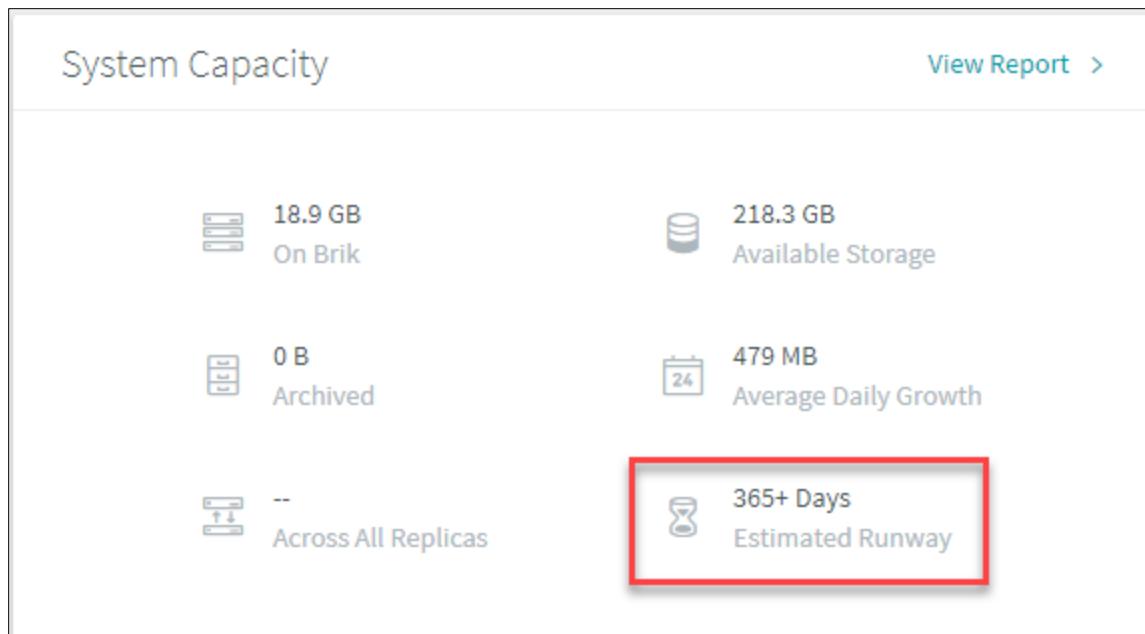
- Reports Summary
- Reports Gallery

In the **Reports Summary** you can view or create individual reports in the Daily Protection Tasks by Status, SLA Compliance, Local Snapshot Storage, System Capacity, or Weekly Protection Tasks by SLA Domain sections. Let's explore that section:

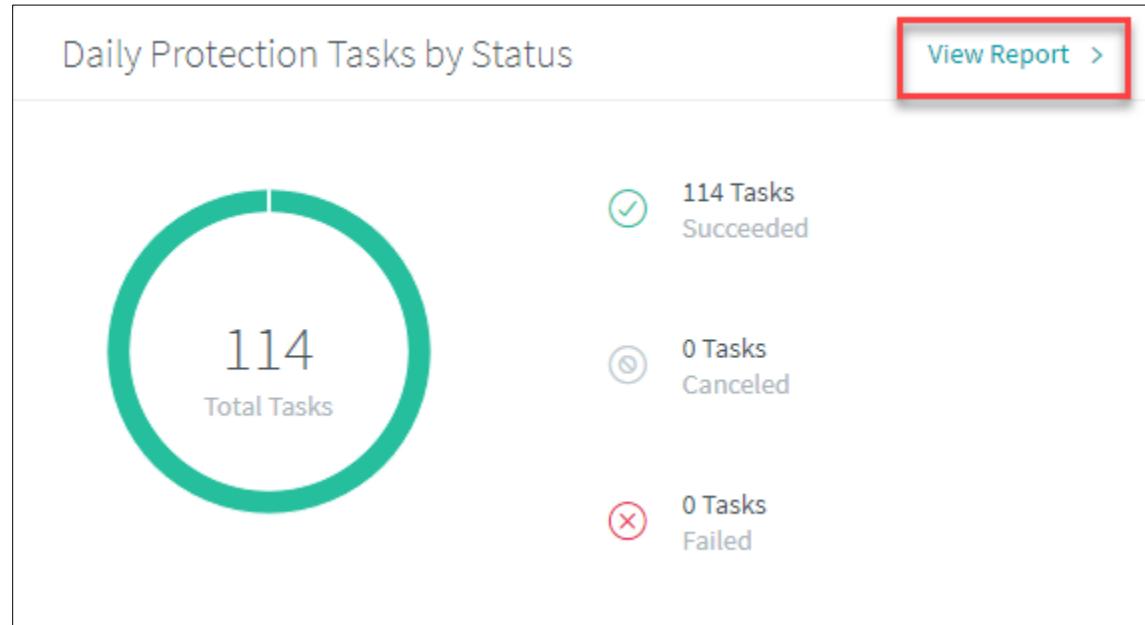
1. In the Rubrik UI, in the left-hand pane, select **Reports > Summary**.
The Protection Tasks Details page appears.



2. Scroll down to **System Capacity** and you will notice: On Brik, Available Storage, Archived, Average Daily Growth, Across All Replicas, and Estimated Runway.
One of the most critical details here is the **Estimated Runway** that reports the estimated number of days remaining before additional data storage space is required on the Rubrik cluster. This is a critical metric to have available on any system that leverages data reduction combining incremental forever, deduplication, and compression.



3. Scroll back up to **Daily Protection Tasks by Status** and click **View Report**.



4. The **Protection Tasks Details** page appears. Scroll down to where you can **Search by Object Name** and supply dynamic filters.

5. Type “win” to search for all objects that have been protected with the word “win” in it.

Search by Object Name									
Task Status	Task Type	Object Name	Object Type	Location	SLA Domain	Start Time	End Time	Duration	Data Transferred
Succeeded	Backup	Win2016-vm1	vSphere VM	vc1.rubrik.lab	Gold	3/8/19 4:11 PM	3/8/19 4:13 PM	1 min 56 secs	22.3 MB
Succeeded	Backup	Win2016-vm1	vSphere VM	vc1.rubrik.lab	Gold	3/8/19 8:12 PM	3/8/19 8:13 PM	1 min 54 secs	13.5 MB

6. Now select **Filter SLA Domain** and select the Gold SLA Domain to view.

Search by Object Name									
Task Status	Task Type	Object Name	Object Type	Location	SLA Domain	Start Time	End Time	Duration	Unprotected
Succeeded	Backup	Win2016-vm1	vSphere VM	vc1.rubrik.lab	Gold	3/8/19 4:11 PM	3/8/19 4:13 PM	1 min 56 secs	Gold
Succeeded	Backup	Win2016-vm1	vSphere VM	vc1.rubrik.lab	Gold	3/8/19 8:12 PM	3/8/19 8:13 PM	1 min 54 secs	Silver

7. Now click **Gallery** on the left-side menu under Reports and the Reports Gallery appears.

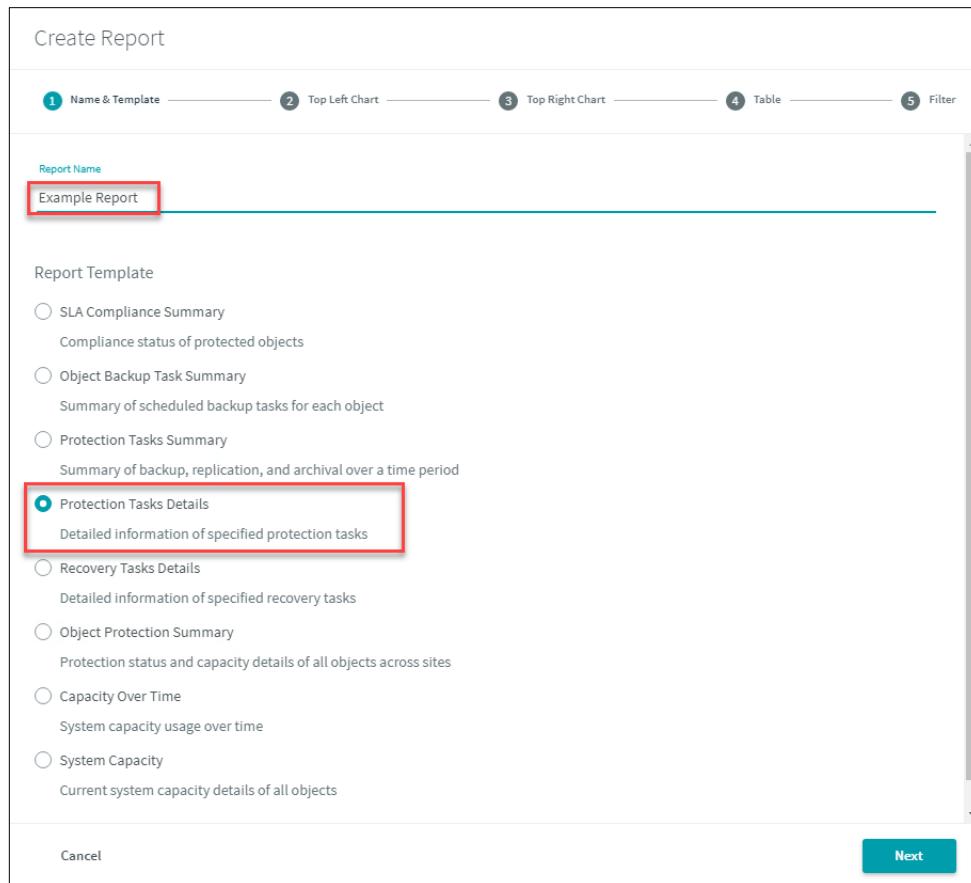
8. Click the **Create Report** button in the right-side top corner.

The screenshot shows the Rubrik interface with the 'Reports' menu item selected in the left sidebar. The main area displays a 'Report Gallery' with a table of reports. A red box highlights the 'Create Report' button in the top right corner of the gallery area. The table columns include Name, Template, Type, and Status.

Name	Template	Type	Status
SLA Compliance Summary	--	Default	Refreshed at 8:45 am on 3/14/19
Object Backup Task Summary	--	Default	Refreshed at 8:45 am on 3/14/19
Protection Tasks Summary	--	Default	Refreshed at 8:44 am on 3/14/19
Protection Tasks Details	--	Default	Refreshed at 8:44 am on 3/14/19
Recovery Tasks Details	--	Default	Refreshed at 8:44 am on 3/14/19
Object Protection Summary	--	Default	Refreshed at 8:45 am on 3/14/19

9. The Create Report dialog appears where you can create your own Custom Report.

Name the report **Example Report** and select **Protection Tasks Details** as the Report Template.



10. There are several different combinations of reports that you can create to provide you with useful information such as:

- Data Reduction Summary - Last 30 Days
- Average Job Durations - Last 7 Days
- System Capacity by Object Type - Last 30 Days
- Daily Backup Administrator Report (You will create this one)
- Daily DBA Report

11. Select the following items to create a Daily Backup Administrator Report. You will need to click Next to get to each new report.

Report Type	Created from "Protection Tasks Details"
Top Left Chart	Daily Protection Tasks by Status
Attributes	Task Type
Measures	Task Count by Status
Chart Type	Stacked Horizontal
Top Right Chart	Daily Failed Tasks by Object Name
Attributes	Object Name
Measures	Failed Tasks
Chart Type	Vertical
Table	Protection Tasks Details
Search by Attribute	SLA Domain, Task Status, Task Type, Location, Object Name, Object Type
Search by Measure	Start Time, End Time, Duration, Data Transferred, Data Stored, Dedup Ratio, Logical Dedup Ratio
Filter	
Date	Past 24 hours
Task Status, Task Type, SLA Domain, Object Type, Object Name, Location, Cluster Location	none

12. Observe the report once it has been generated (It could take a few minutes to generate).

Activities & Notifications

The Activity Log and Notifications is where you can view and monitor the current state of time-sensitive tasks. This is useful to determine success, warning, and failures of any backup or archival related tasks within the Rubrik cluster.

1. In the top right hand bar of the Rubrik UI is the Activity Log world icon.
2. Click the world icon to see all task related activity in progress and completed on the cluster.

Activity Log

Completed VDI-based transaction log backup (total 86.5 KB) in 2 seconds.
Data transfer rate was 33.8 KBps
Just Now

admin started a job to refresh report 'Example Report'
Just Now

admin started a job to refresh report 'Example Report'

See All ►

3. Click **See All** and it will take you to a page with only activity details.

4. Select **Filter by type** and choose **Backup** to view only backup related tasks.

The screenshot shows the 'Activity Log' section of the Rubrik CDM interface. At the top, there is a search bar labeled 'Search by Name'. Below it is a table with columns: 'Status', 'Name', 'Message', and 'Date'. The table contains five rows of log entries. To the right of the table is a vertical filter menu. A red box highlights the 'Backup' option in this menu. Other options listed include 'Archive', 'Configuration', 'Diagnostic', 'Instantiate', 'Recovery', 'Replication', and 'vCenter Communication'.

Status	Name	Message	Date
✓	AdventureWorks	Completed backup of the transaction log for SQL Server database 'AdventureWorks' from 'sql-s1.rubr...3/9/19 2:09 PM	
✓	admin	admin started a job to refresh report 'Example Report'	3/9/19 2:09 PM
✓	admin	admin started a job to refresh report 'Example Report'	3/9/19 2:06 PM
✓	AdventureWorks	Completed backup of the transaction log for SQL Server database 'AdventureWorks' from 'sql-s1.rubr...3/9/19 1:54 PM	
✓	AdventureWorks	Completed backup of the transaction log for SQL Server database 'AdventureWorks' from 'sql-s1.rubr...3/9/19 1:39 PM	

5. Scroll through and determine any recent warnings or failures that may require your attention.
6. Take note of the status, name, message, and date / time stamps of any tasks that require further investigation.
7. Rubrik CDM version 5.0 combines alarms with the notifications giving admins a single place to see all the notifications they need to know at once. Feel free to explore other options on these screens and trying various searches or filters.

You have now completed the Signs, Signals & Codes badge! Raise your hand so a Rubrik employee can get you the badge, answer any questions about this section, and give an overview of the next section.

API Weaving

Objective: Explore Rubrik APIs

In this lab, you will perform the following tasks:

- Access Rubrik API documentation
- Make an API using the API playground

Use API's to make your job easier, automating boring repetitive tasks. This will make you look like a superhero!

Getting Started

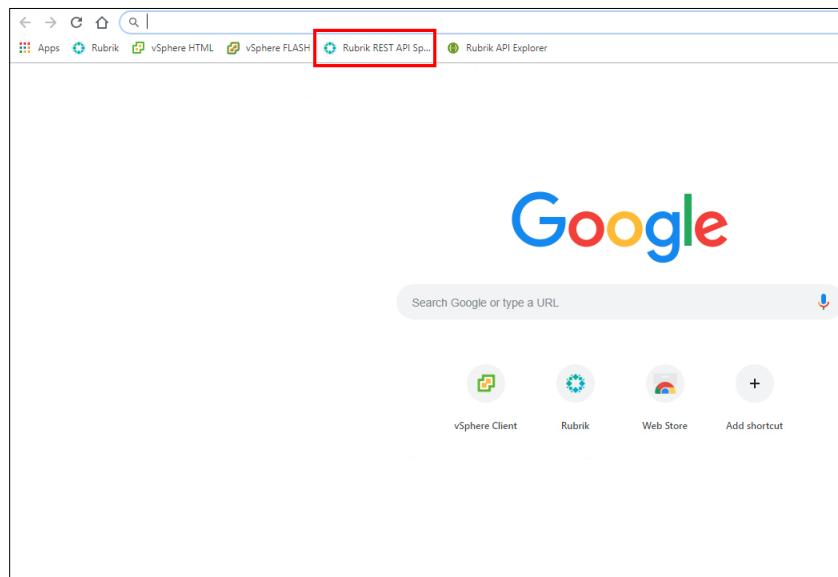
The Rubrik API provides a RESTful interface for working with Rubrik clusters and Rubrik Edge virtual appliances. The Rubrik RESTful API can be used to query, configure, and control nearly all of the operations of the Rubrik software.

Rubrik's native RESTful APIs allow users to automate the delivery of data management services (apply SLA policies, automate recovery testing plans, etc.) with granular control.

API Documentation and Playground

To view Rubrik's built-in API documentation:

1. Open a new tab in your web browser and navigate to Rubrik REST API Specifications bookmark (bookmarked in the Chrome web browser).



2. Browse through the documentation to learn more about Rubrik APIs and how they may be used.

Rubrik REST API (v1)

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Introduction

Welcome to the Rubrik™ REST API documentation. The Rubrik REST API provides a RESTful interface for working with Rubrik clusters and Rubrik Edge virtual appliances. The Rubrik REST API can be used to query, configure, and control nearly all of the operations of the Rubrik software.

Through authenticated and encrypted interaction with the Rubrik REST API server, perform any of the operations that are available through the Rubrik web UI and many bulk-type operations that might otherwise be difficult or impossible to perform.

This documentation provides reference information and examples of typical workflows for the Rubrik REST API. For more detailed information about working with Rubrik clusters and Rubrik Edge virtual appliances refer to the *Rubrik User Guide*.

A quick way to become familiar with the Rubrik REST API, is to use the Rubrik REST API Explorer. [OpenAPI](#) describes this tool.

Refer to the [changelog](#) to see information about changes within this version of the Rubrik REST API.

Changelog

Revisions are listed with the most recent revision first.

3. Scroll down to **SLA Domains > Retrieving SLA Domains**. Read through this section.

Retrieving SLA Domains

Before assigning snappables to SLA Domains, get a list of the SLA Domains that exist on a Rubrik cluster. For a new Rubrik cluster, the list shows only the default SLA Domains. When custom SLA Domains are added to the Rubrik cluster, the list is modified to include those SLA Domains.

Example: Retrieving SLA Domains from a Rubrik cluster

Send a GET request to [/sla_domain](#).

```
curl -X GET "https://$cluster_address/api/v1/sla_domain"
```

The Rubrik REST API server returns a `ListResponse` object of all SLA Domains. At a minimum, the `ListResponse` object includes the default SLA Domains: Gold, Silver, and Bronze.

```
{
  "data": [
    {
      "id": "$gold_sla_id",
      "name": "Gold"
    },
    {
      "id": "$silver_sla_id",
      "name": "Silver"
    },
    {
      "id": "$bronze_sla_id",
      "name": "Bronze"
    }
  ]
}
```

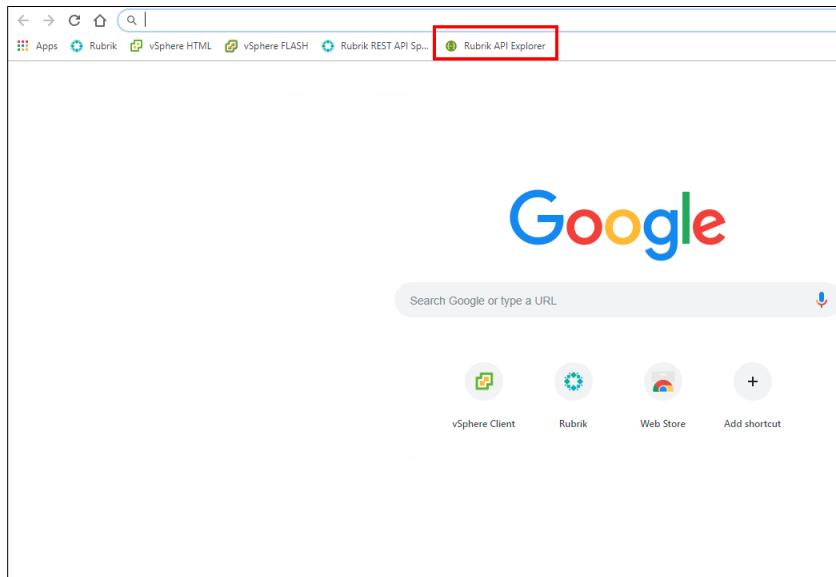
The documentation provides code snippets and parameters to make it easy for you to learn and use our APIs.

Everything is documented using ReDoc, if you go to a specific URL endpoint, Rubrik will provide out the documentation for the APIs. Rubrik's API is also now documented completely on Rubrik Build website located at <https://build.rubrik.com/>. Besides the complete API documentation online, you can also find cool ways and examples to automate workflows.

API Playground

To use Rubrik's API playground:

1. Open a new tab in your web browser and navigate to the Rubrik API Explorer bookmark.



2. In the top right-hand corner, click **Authorize**.

The screenshot shows the Rubrik REST API Explorer interface. At the top, there is a dark header bar with the 'Rubrik REST API Explorer' logo and an 'Authorize' button, which is highlighted with a red box. The main area displays a list of API endpoints categorized by resource type. Each endpoint row includes 'Show/Hide', 'List Operations', and 'Expand Operations' buttons. The listed endpoints are:

- /cluster : Cluster configuration and health
- /fileset : File system filesets
- /fileset_template : File system fileset templates
- /host : Linux hosts and Windows hosts
- /mssql : SQL Server instances and databases
- /session : User session management
- /sla_domain : SLA Domains
- /vmware/host : VMware hypervisor hosts
- /vmware/vcenter : VMware vCenter
- /vmware/vm : VMware virtual machines
- /windows_cluster : Windows clusters

3. Log in using the username **admin** and **Welcome10!Rubrik** password.
4. Navigate to **/sla_domain:SLA Domains** and click **Show/Hide**. Click **Get list of SLA Domains**.

/sla_domain : SLA Domains

		Show/Hide	List Operations	Expand Operations
GET	/sla_domain		Get list of SLA Domains	
POST	/sla_domain		Create SLA Domain	
DELETE	/sla_domain/{id}		Remove SLA Domain	
GET	/sla_domain/{id}		Get SLA Domain details	
PATCH	/sla_domain/{id}		Patch SLA Domain	
PUT	/sla_domain/{id}		Update SLA Domain	

5. Under **Parameters**, enter the **Value Gold** for **name**.
6. Click Try it out!

Parameters

Parameter	Value	Description	Parameter Type	Data Type
primary_cluster_id		Limits the information retrieved to those SLA Domains that are associated with the Rubrik cluster ID that is specified by primary_cluster_id . Use local for the Rubrik cluster that is hosting the current REST API session.	query	string
name	gold	Limit the list information to those SLA Domains which match the specified SLA Domain 'name' value.	query	string
sort_by	<input type="button" value="▼"/>	Attribute to use to sort the SLA Domains summary information. Optionally use sort_order to specify whether to sort in ascending or descending order	query	string
sort_order	<input type="button" value="▼"/>	Sort order, either ascending or descending. If not specified, SLA Domain summary results will be sorted in ascending order	query	string
Try it out!				

- Notice the **Response Body**. should be at least one response for Gold. This details the configuration of the Gold SLA Domain. If you scroll down you can even determine how many and what type of machines are protected by the Gold SLA.

Response Body

```

    "maxLocalRetentionLimit": 63072000,
    "archivalSpecs": [],
    "replicationSpecs": [],
    "numDbs": 1,
    "numOracleDbs": 0,
    "numFilesets": 0,
    "numHypervVms": 0,
    "numNutanixVms": 0,
    "numManagedVolumes": 0,
    "numStorageArrayVolumeGroups": 0,
    "numWindowsVolumeGroups": 0,
    "numLinuxHosts": 0,
    "numShares": 0,
    "numWindowsHosts": 0,
    "numVms": 3,
    "numEc2Instances": 0,
    "numVcdApps": 0,
    "numProtectedObjects": 4,
    "isDefault": true,
    "uiColor": "#f8c044"
}

```

Example Use Cases (supplemental information)

The use cases with Rubrik's RESTful APIs are unlimited. This section is intended to provide a few examples of what you could do.

Configuration Management - Easily plug into config management tools (i.e. Puppet, Chef, Salt, Ansible) to simplify deployments across hundreds of servers or VMs. Tag objects with metadata via the API. Rubrik auto-assigns associated data protection policies when new objects are created.

Orchestration Management - Leverage service catalogues to deliver Rubrik-as-a-Service with custom pre-built integrations. Simplify orchestration of daily data management tasks (backup, recovery, and archival) with self-service and get customized analytics built-into your tool of choice.

- **ServiceNow** - Deploy the Rubrik appliance from the ServiceNow Store to deliver critical data management functions (automated data protection, self-service le recovery, test/dev, analytics) through items presented in ServiceNow's Service Catalog.
- **VMware vRealize Orchestrator & Automation (vRO, vRA)** - Perform self-service data management tasks through vRO/vRA. Modify SLA protection policies, create backups on-demand, and instantly recover VMs within the vRealize portal.

Application and Server Validation - Instantly provision copies to test restore of data, applications, and entire servers against an orchestration engine with minimal API calls (i.e. build a live mount in one line of code).

Automated Recovery Testing - Conduct end-to-end recovery testing in less than three minutes with a simple script. Create a live mount, run tests to validate, and shut down in only a few lines of code. Use any language of your choice or Rubrik's pre-built PowerShell module to get started quickly.

Be sure to check out Rubrik's BUILD page for more! (<https://build.rubrik.com/>)

The screenshot shows the Rubrik BUILD website. At the top, there's a navigation bar with links for 'SDKs', 'TOOLING INTEGRATIONS', 'USE CASES', and 'API DOCUMENTATION'. The main heading is 'Build the Future of Cloud Data Management'. Below this, there are three sections: 'Software Development Kits' (with icons for Go, PowerShell, and Python), 'Tooling Integrations' (with icons for Ansible, VMware vRealize, and Terraform), and 'Use Cases' (with icons for Backup Validation with PowerShell, Monitor Rubrik with Splunk, and Provision and Protect with vRealize). Each section has a 'VIEW ALL' button at the bottom. Below these sections is a 'Upcoming Events' section. It lists three events: 'PowerShell + DevOps Global Summit' (29th April 2019, Bellevue, WA, USA), 'PowerShell Conference Europe' (4th June 2019, Hannover, Germany), and 'DevRelCon - SF' (6th June 2019, San Francisco, CA). Each event entry includes a small logo, the date and location, and a 'LEARN MORE' button.

You have now completed the API Weaving badge and the entire Camp Rubrik Field Guide - congratulations! Raise your hand so a Rubrik employee can give you your badge, answer any questions about this section, or answer any other questions about Rubrik.