



REFERENCE ARCHITECTURE

Quantum ActiveScale with Rubrik Cloud Data Management

Abstract

This document defines a reference architecture for a combined solution based on Quantum ActiveScale with Rubrik Cloud Data Management

Quantum[®]

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Executive Summary

Over the past years, the threat of ransomware has become one of the most worrisome threats facing today's enterprise. It has become such a threat simply because it is a very lucrative endeavor for a sophisticated criminal establishment. Targeted organizations sometimes find they have no alternative but to pay the ransom. This is the case when an organization does not properly plan for and protect themselves from an attack.

Every time an organization pays to recover its files, it is directly funding the development of the ever increasing sophistication of the attack software. As a result, ransomware continues to evolve, with more sophisticated variants and more specific targeted attacks.

Backups are the first line of defense against ransomware attacks. Both Quantum and Rubrik have developed technologies that protect your data from loss and various types of attacks. This reference architecture summarizes the results obtained during the validation of Rubrik Cloud Data Management (CDM) with Quantum ActiveScale as a fully integrated, end to end solution providing unparalleled protection for your organizations most valuable asset, your data.

Objectives

The objectives of this paper are to:

1. Articulate the importance of a robust backup and ransomware protection infrastructure
2. Present a general, scalable data protection infrastructure based on ActiveScale and CDM
3. Describe the components that make up the solution stack
4. Demonstrate that ActiveScale performs as expected when configured as an archive for CDM
5. Articulate a reference architecture that is suitable for a combined ActiveScale/CDM solution
6. Demonstrate the reference architecture is valid by performing various validation activities.

The Need for Data Protection

For most organizations today, data is at the core of their business model in some form. And real-time access to that data is mandatory to operate. For these companies, data protection is critical. Loss of access to your data, can mean loss of revenue, loss of reputation, loss of business opportunity, even loss of the business itself.

Ransomware, malicious software designed specifically to deny you access to your data, continues to proliferate and is costing companies millions of dollars. An organization should plan for when, not if, a data loss event or an attack takes place. Having an immutable backup that can't be deleted or encrypted is crucial. Being able to intelligently identify and remediate encrypted data makes recovery efforts easier and faster while reducing data loss and downtime.

A data protection plan based on ActiveScale and CDM helps organizations protect themselves from, and in a worst-case scenario, recovery rapidly from data loss as well as ransomware and other types of malware attacks.

Technology Summary

The table below lists the technology components that make up the <solution> reference architecture outlined in this document. The paragraphs that follow the table provide more detail on the function of these components in the solution.

Technology	Version
Quantum ActiveScale	6.0
Rubrik Cloud Data Manager	6.0

About ActiveScale

With data quickly becoming the most valuable asset for many enterprises and critical for business survival, Quantum's ActiveScale has emerged as a preferred platform for long term secure storage in today's backup and archiving environments. The ActiveScale product line delivers flexible scalability, from a few hundred terabytes to exabytes. ActiveScale's advanced features, such as Integrated tape-based cold storage, patent-pending 2D Erasure Coding (2D EC), Dynamic Data Placement and Dynamic Data Repair, reduce costs and simplify the deployment and management of the environment today and into the future.

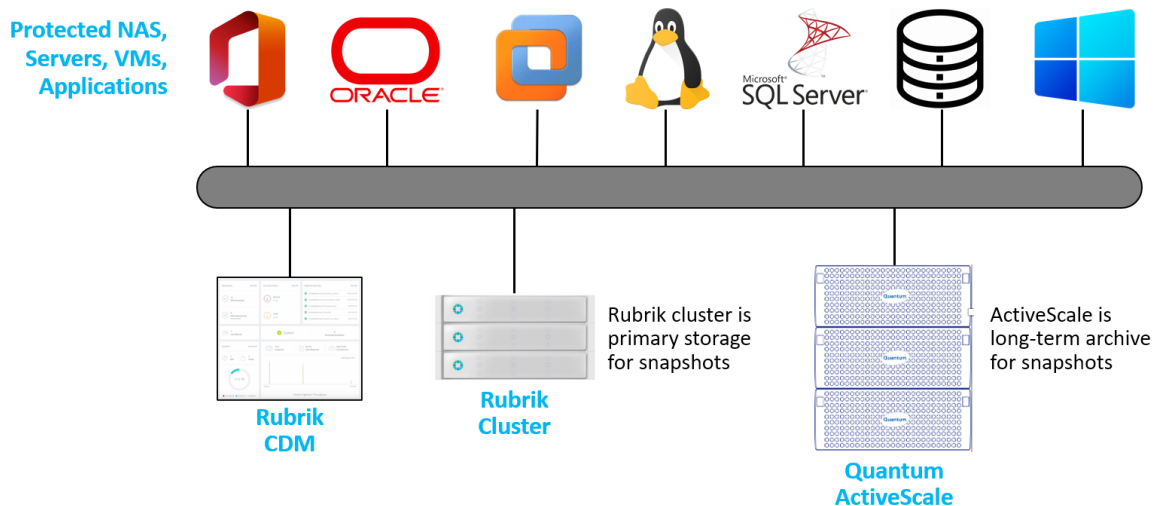
About Rubrik CDM

Rubrik CDM is a single, unified software platform to manage physical, virtual, and cloud data. With CDM, enterprises can drastically simplify their data protection processes, automate workflows, and migrate data to ActiveScale. The results are powerful: faster recoveries, easier management, no forklift upgrades, and hard dollars saved for other projects. Organizations pursuing cloud-first policies can use CDM to archive protected data to ActiveScale.

Reference Architecture

Rubrik protects a variety of servers, virtual machines and applications. Virtual machines are protected by directly taking snapshots through the hypervisor’s API. Other servers or application are protected by installing an agent in on the host system.

As snapshots are taken, they are written to the Rubrik cluster and reside on the cluster for a defined interval. Snapshots are archived to ActiveScale either immediately or after a defined number of days based on SLA domain policies.



Rubrik CDM

CDM, or Cloud Data Management is the management software for the Rubrik cluster. CDM allows an Administrator to define the policies that dictate the data protection strategy.

Rubrik Cluster

The Rubrik cluster is based on high performance appliances. The cluster is the primary storage location for snapshots. These snapshots remain on the high performance cluster for a defined period and are intended for rapid recovery.

Quantum ActiveScale

In this reference architecture, ActiveScale is an object storage-based permanent archive target. Snapshot images are copied or relocated to ActiveScale based on SLA domain policies defined in CDM.

Prerequisite

RSA Encryption Key

CDM encrypts all network traffic. It uses an RSA key for the encryption. The RSA key is required when defining ActiveScale as a storage location for CDM. The RSA key can be generated on any system that has the OpenSSL toolkit (common on Linux and MacOS). Use the following steps to generate an RSA key.

On the command line, execute the following command:

```
# sudo openssl genrsa -out rubrik_encryption_key.pem 2048
```

The above command will generate the required key and write it to a file called rubrik_encryption_key.pem. To view the key, execute the following command:

```
# cat rubrik_encryption_key.pem
```

Example:

```
bash
[17] sudo openssl genrsa -out rubrik_encryption_key.pem 2048
Generating RSA private key, 2048 bit long modulus
.....+++
.....+++
e is 65537 (0x10001)

[18] cat rubrik_encryption_key.pem
-----BEGIN RSA PRIVATE KEY-----
MIIEpQIBAAKCAQEAn9o20QsbeMl6BVpj3rVkJKSo74Iei+G+lGSvoG7AEE0ako+
6EVFGFvUQDcxo5Ez4Jc0b7b6hjwL3yk6jGyNwdJ/4Rdf/SxJpJpCLcEchsa58M9Q
oqNS77BW4bKtVl.j+TYzyJeLc3UNT9l3Xgkg4HFZ7zuNFWOH15oaQkKeFZndjqIMX
q730cAPMJXetx/sOYCzUA8IZGNRWFYc3GAz0SgyfyWuKxy+E4SVGky9B5VTyaXy
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XRPO4TefAVdBCk6qfIUWhDTdY5ogR3qAhEBrAVHntfTKa10yRXoQa8/hVGaR6Xyd
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uUxAfY56Qqbe+SJ8yt0N8ibANjQFq8wmZLgz5yF8u6EAGWEYJ8/pS3TeYqiZZLms
5NhVPqouNcEzvvuUNLx5NW0sWNQsYz2ha6iqJMyPHiApyV0wyJh4uc5v7xjPWPOH
4xLLV4BRAoGBAPYxKesl0RwLCP6CAhb+Qr1+FGN2oIyx4DqzgnwTVKCY4u+cQx
XqJylubiyiNgsXS/xx0iZztYHEIYZ9DtJe3QrSKy1JDaOVH/f5ZXGSxm5IuVnqCvV
9oFtZXMtupnZvnlLtlNyi eHy+pFjCjIb0B+54Ggnu0Dro/JC5ag2udCLAoGBAN8L
AUSxm5CoTIXbtK4rNxbu3i7sphSP5RsjsGcJSfyDA9FJ8NeqAz39uk09py0rF/D8
UrtKWp9QwUuj3FihtlS7J0ne0x3T70GIotZnCVkndzwVJunh1J/y3rCrKgn0b2R
KuyK7Zm7gFZVsUgd+eTtcv0CSyFENf04fbWe7I+JAoGBALHtpFMbml7AxxvPEouP
tTUTwi0G7aZtlrx4dwk7/4hJAxDsqH0ABVo4oRE2tmot3geZn2tQRilvH6UbuuTi
XcP+yF5x6EM5qJ5mreIKVxq3MB5GRUexMqTYkRqmMReiREUDFnnG7RoM5sU07jva
Sjy7tQw/ElmANJQRfz0MocyzaoGBAKXX7vd/AGcNXOjjNn0S2oGI11gYylzbqcUF
9k5zxrmlST9jNVuGpKaBdPBNNonKpakHbvEBaxwtS5ocxrFORFhe814b7BKT/Cho4
kJMA7Gi0svrHEII0jSBAubHr8qS4vGwctQ1EPqQ0pr3WLxtiHA6RpDdvrNbnqo7
8e0L4GXRAoGAKM37xovx54jLn2+wkFMeYZDTkhiAg6k4iDbG1Y5yG7z1ZZbYc7z
8KaRZj4+jaJ6hE f3BwAozfk3oQHA613ffjNgTTopPIDl7p+BWCvshH4EmkjWlpiq
yDFoukzG6iJw1wLmaCVNWiEsCjnpSVal5aVXv5s5md8mYau6ZyLMb0=
-----END RSA PRIVATE KEY-----

[19]
```

The key is the entire contents of the file, including the -----BEGIN RSA PRIVATE KEY----- and -----END RSA PRIVATE KEY----- markers.

Configuration

The following paragraphs detail the configuration required for ActiveScale and CDM in this reference architecture.

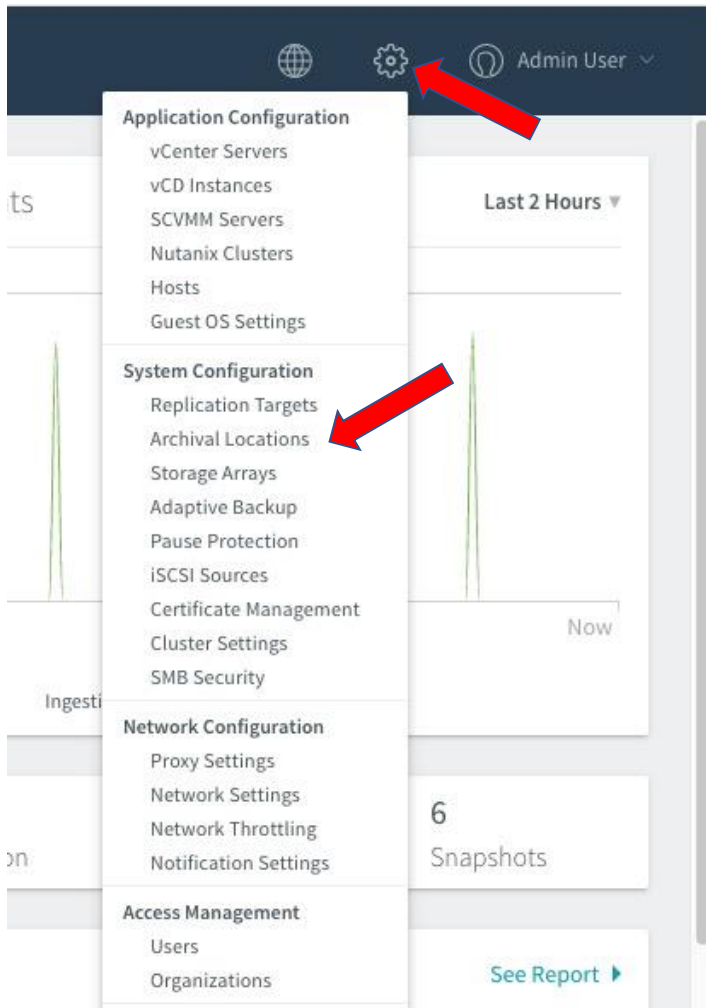
ActiveScale Configuration

There are no configuration activities required for ActiveScale. When defining ActiveScale as an archival storage location, CDM will create the required buckets.

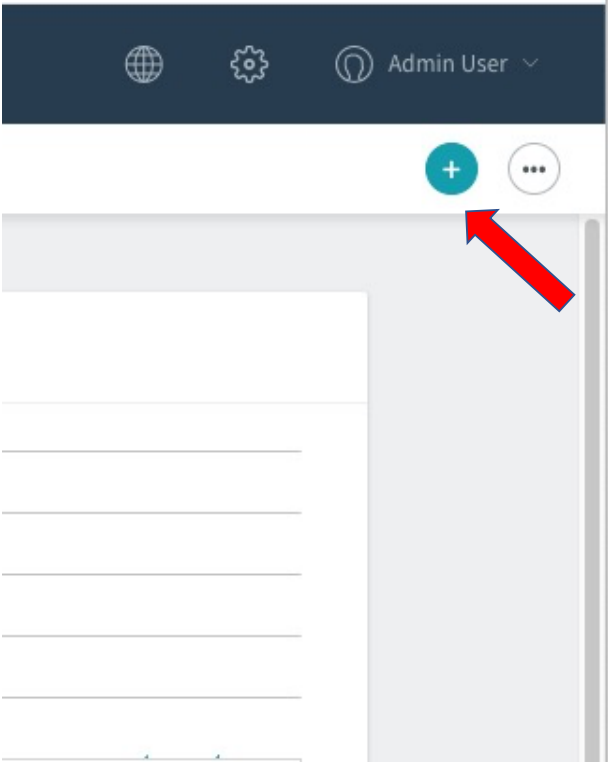
Rubrik CDM Configuration

Create an Archival Location

1. From the CDM console, under the **Configuration Menu**, select **Archival Locations**.



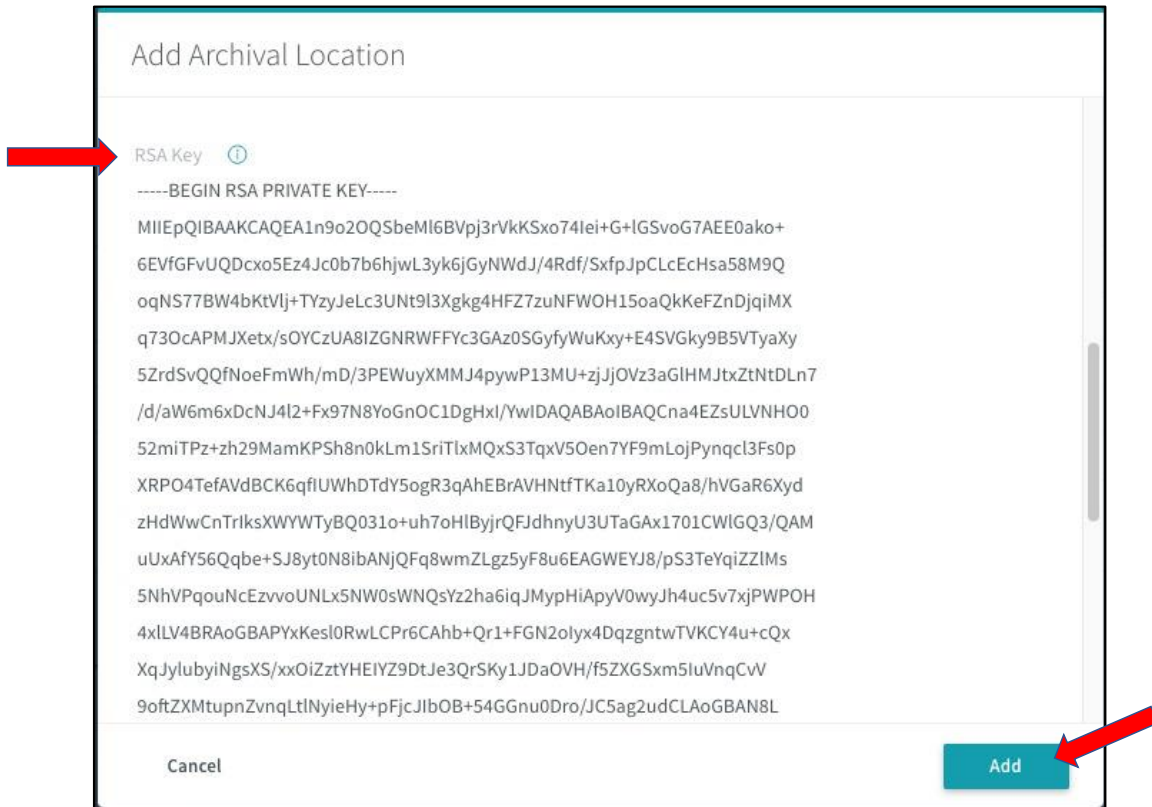
- 2. You will be directed to the **Archival Locations** screen. On the **Archival Locations** screen, select the **plus (+)** menus to add ActiveScale as an Archival Location.



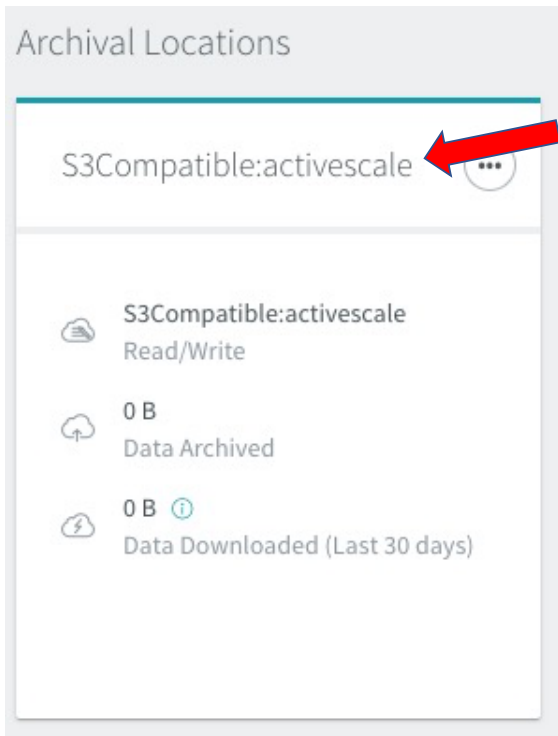
3. In the **Add Archival Location**, enter appropriate values:
 - a. Storage Type: Object Store
 - b. Object Storage Vendor: S3 Compatible
 - c. Access Key: Your ActiveScale access key
 - d. Secret Key: Your ActiveScale secret key
 - e. Host Name: The name or IP address of the ActiveScale system
 - f. Bucket Prefix: CDM will create a bucket in ActiveScale using this value as a prefix. In this example, with a prefix of activescale, CDM will create a bucket named activescale-rubrik. This field can contain lowercase letters and numbers only.

The screenshot shows a web form titled "Add Archival Location". The form contains several input fields, each with a red arrow pointing to it from the left. The fields and their values are: "Object Store" (dropdown menu), "Object Store Vendor" (dropdown menu with value "S3 Compatible (StorageGRID, Cloudian, IBM COS, or other compatible object storage)"), "Access Key" (text input with value "AK04WYTMCAA2CFV0C5Q5"), "Secret Key" (password input field with dots), "Host Name" (text input with value "10.20.220.191"), "Bucket Prefix" (text input with value "activescale"), and "Number of Buckets" (text input with value "1"). At the bottom of the form, there are "Cancel" and "Add" buttons.

4. Scroll to the bottom of the Add Archival Location form.
 - a. Paste the RSA key generated in the Prerequisites section of this document
 - b. Click Add to create the archival location

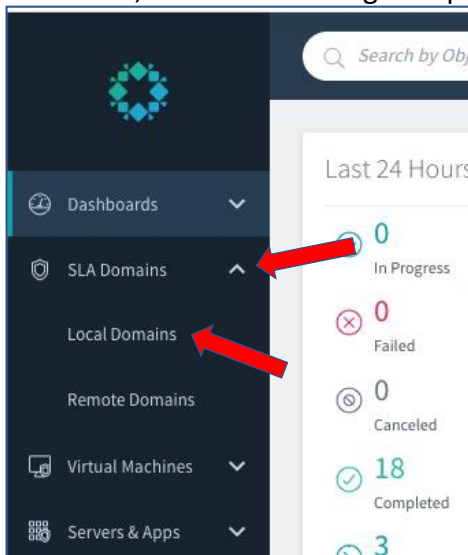


5. The newly created archive location is now created and displays on the **Archival Locations** screen.

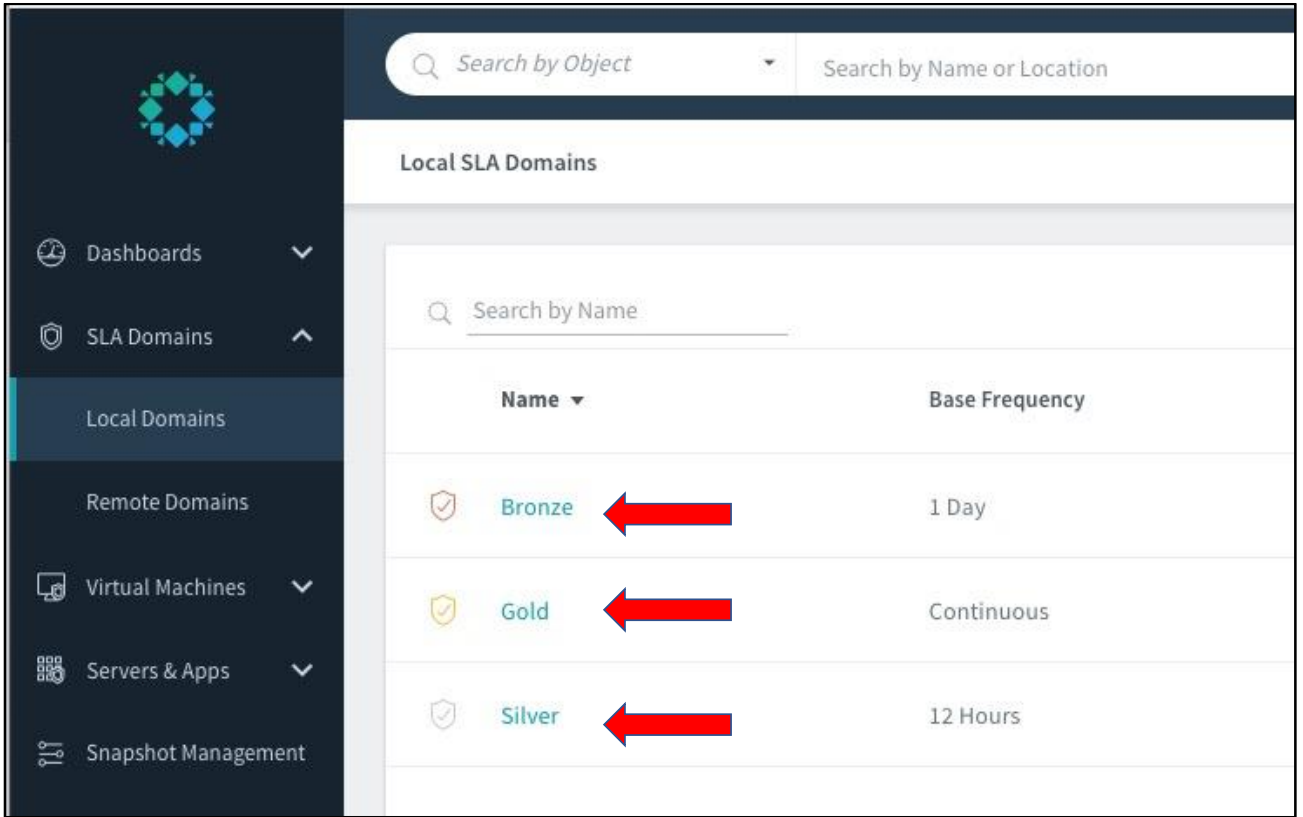


[Link the Archival Location to an SLA Domain](#)

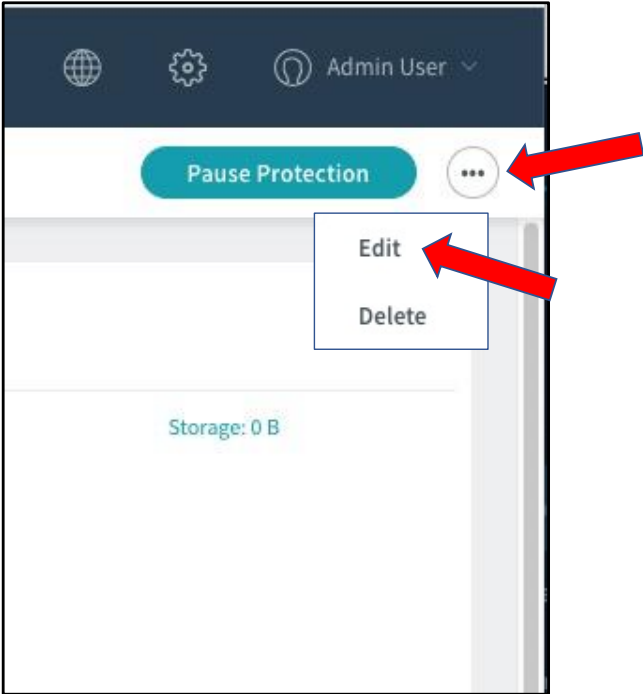
1. In the CDM, under the left navigation pane, expand **SLA Domains** and then select **Local Domains**.



2. You will be directed to the Local SLA Domains screen. Select the domain you wish to archive to the newly created archival location.



3. Under the management menu, select Edit.



4. An Edit SLA Domain wizard will start. There are no changes on step 1 of the wizard. Click **Next** to proceed with step 2.

1 Set Frequency and Retention — 2 Set Archiving and Replication (Optional) — 3 Review Impact

SLA Domain Name
Bronze

Continuous Data Protection

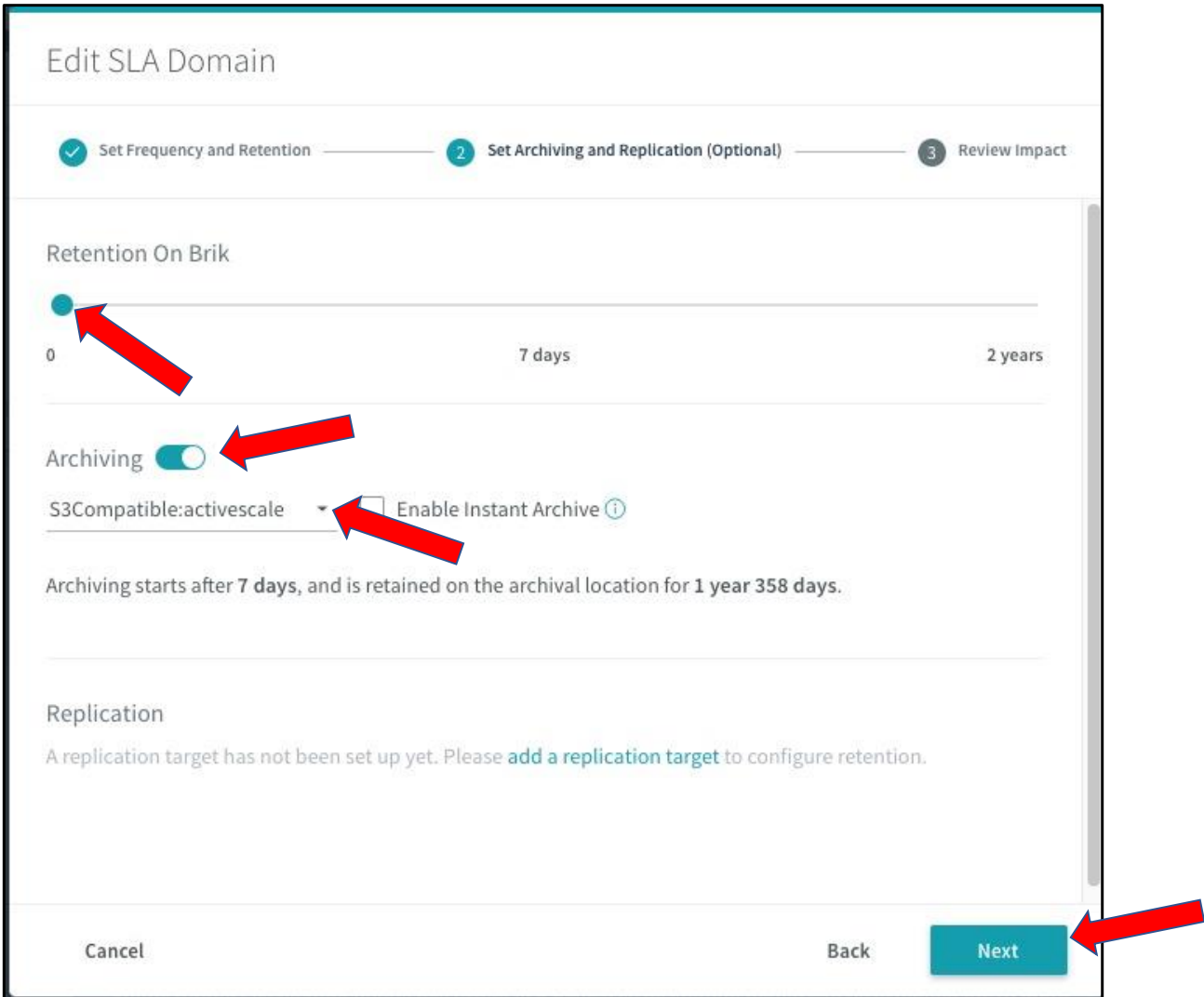
Service Level Agreement
Choose how often we take snapshots and the length of time we keep them.

Advanced Frequencies

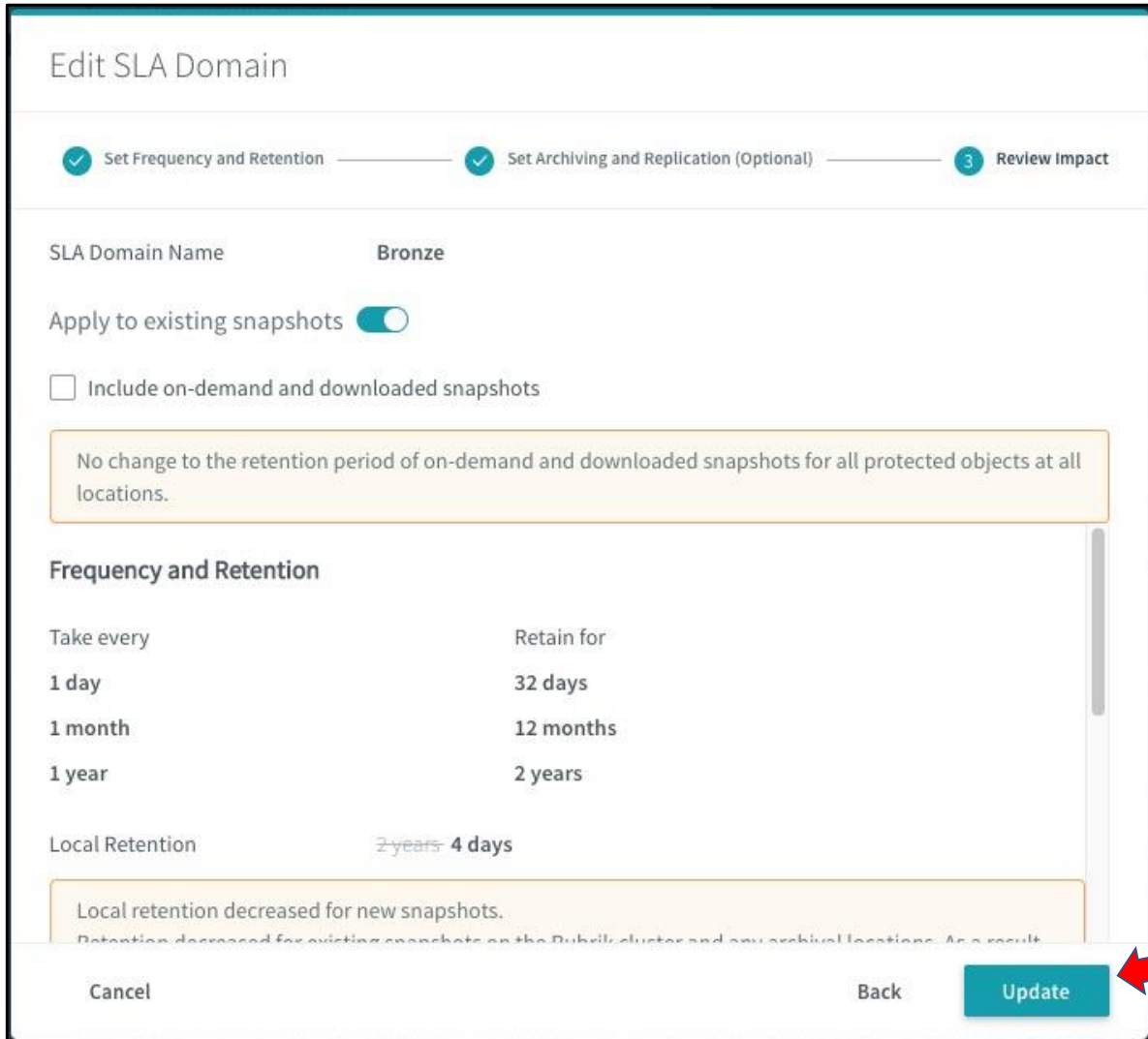
Take Snapshots:	Keep Snapshots:
Every (Hours)	For (Days)
Every (Days) 1	For (Days) 32

Cancel Next

5. On step 2 of the wizard, perform the following steps:
 - a. Enable Archiving
 - b. Use the Retention on Brik slider to select when to archive snapshots
 - c. Using the pull down menu, select the newly created archival location
 - d. Click Next to continue



6. There are no required changes on step 3 of the wizard. Click Update to complete the wizard.



7. CDM will now archive snapshots to ActiveScale using the schedule defined by the SLA Domain.

Validation Activities

CDM uses a subset of the features provided by ActiveScale. The purpose of the integration testing is to ensure the S3 calls CDM uses for to communicate with and ActiveScale system are fully supported. The following functionality was tested and confirmed successful to validate a ActiveScale/CDM integration.

- Define ActiveScale as an archival location for CDM
- Define a SLA domain that archives snapshots to that archival location
- Define various servers and workstation to be protected under the SLA domain
- Confirm snapshot are being taken as defined by the SLA policy
- Confirm snapshots are being archived to ActiveScale as defined by the SLA policy
- Delete various data sets from the systems being protected
- Perform a full recovery of data from ASActiveScale
- Encrypt various data sets on the systems being protected
- Perform a full recovery of data from ActiveScale

Summary

CDM can be used as a backup and recovery application suited for a variety of use cases. It is however particularly well suited as a robust ransomware protection strategy as well. CDM's ability to automatically detect what data needs to be restored greatly simplifies the recovery process and removes the possibility of user error.

The validation testing performed between Quantum and Rubrik confirmed there were no anomalous API level behaviors observed on either the ActiveScale or CDM sides. A data protection infrastructure based on Quantum ActiveScale and Rubrik CDM is a viable and stable solution that can be deployed in virtually any environment.

References

The documents below were referenced to configure the software and systems for validation of this reference architecture.

Document Title	Download URL
ActiveScale S3 API Reference Guide	Link to Document
ActiveScale OS Admin Guide	Link to Document
Rubrik CDM Version 6.0 User Guide	Available on the Rubrik support portal www.rubrik.com/support

Version History

Version	Notes	Date
1.0	Initial Release	August 2018
2.0	Updated for ActiveScale 6.0 and CDM 6.0	October 2021