

WHITE PAPER

Optimizing & Securing Veeam Backups with Hitachi Vantara Object Storage

**Veeam v11 Backup & Replication
with Hitachi Content Platform (HCP)**



May 2022

Contents

- Executive Summary 3
- Test Methodology 5
- Test Environment 5
- Hardware & Software Components..... 7
- Solution Diagram 8
- Configuring Hitachi Content Platform for Veeam 8
- Test Cases 13
- Test Results..... 14
- Performance Tuning & HCP Configuration Guidelines..... 28
- Additional Resources 28

Executive Summary

Continued exponential growth of data in the industry has led to a never ending, increased demand on storage capacity and optimization of business-critical processes like backup and recovery. Furthering the complexity of managing growth, are the ever so critical needs surrounding data security, risk mitigation, loss prevention and meeting industry compliance requirements.

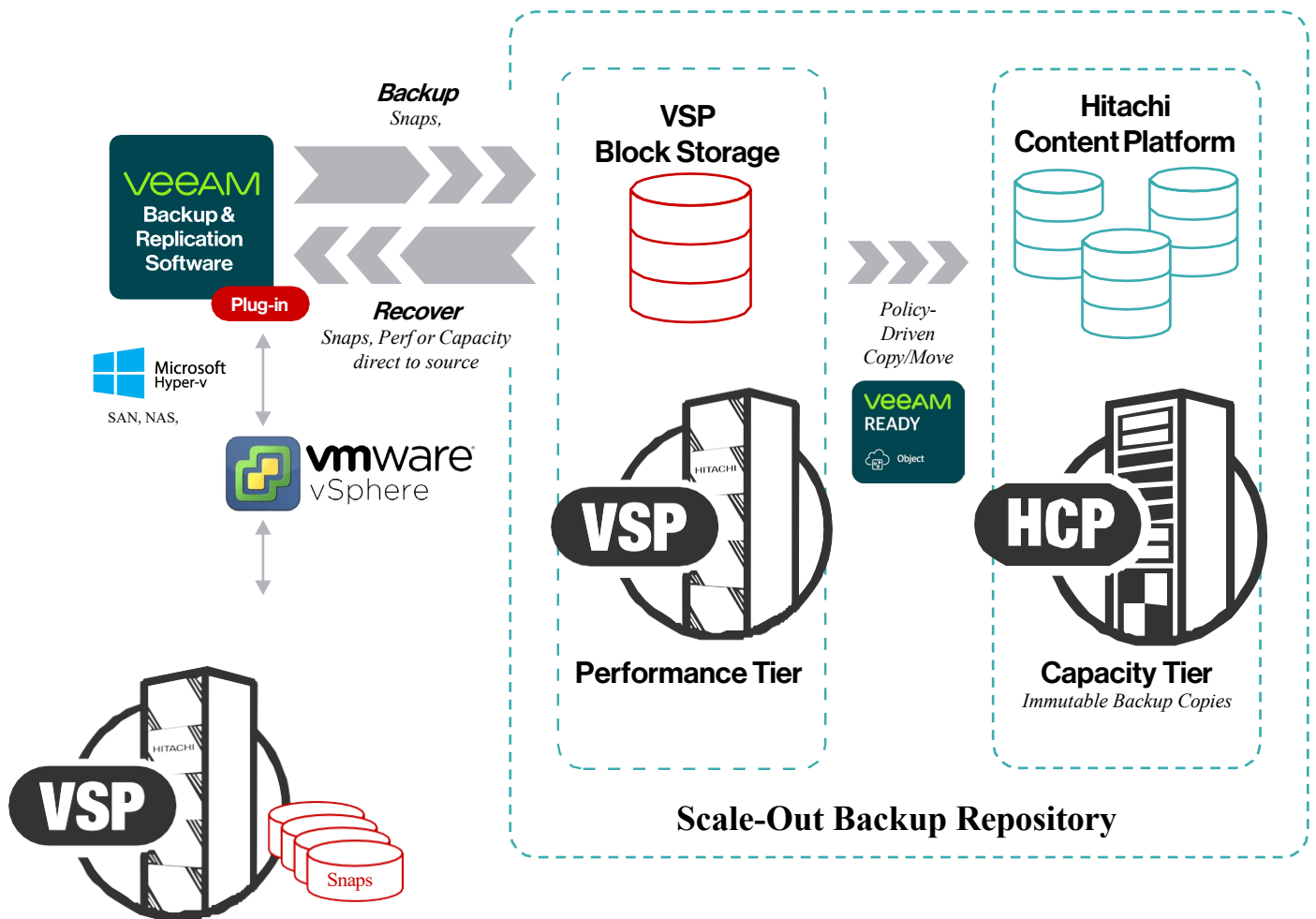
To help customers optimize their cloud data infrastructure, improve service levels for backups, replication and ensure data recovery information, Hitachi Vantara and Veeam have partnered to deliver a “Veeam Ready - Object” solution.

A Massively Scalable and Cost-Effective Solution for Object-based Storage Backup & Replication and Data Recovery.

Hitachi Content Platform (HCP) with Amazon Web Services (AWS) S3 service is an on-premises cloud Object Based Storage (OBS) solution that delivers a cost-effective, secure, and robust data platform to power a myriad of enterprise use cases.

Veeam Backup & Replication, part of Veeam Availability Suite, delivers fast, flexible, and reliable backups, recovery, and replication for virtual, physical, and cloud-based workloads. Veeam Cloud Tier, a feature of Veeam Backup & Replication Enterprise Edition, provides a Scale-Out Backup Repository for massively scalable capacity using the AWS S3 service for a compliant OBS solution with HCP.

Primary backups are tiered to HCP based on aging or capacity policies. In this manner, customers can achieve highest speed, lowest cost, and fully secured recovery data, managed in a coordinated fashion between the Veeam Backup & Replication application and the HCP platform.



VSP = Hitachi Virtual Storage Platform, HCP = Hitachi Content Platform

This Hitachi storage and Veeam Backup & Replication repository solution provides scalable, cost-effective backup and recovery, reducing risk from ransomware attacks.

The purpose of this whitepaper is to document the test configuration, results, and best practices.

The data captured in this document are specific to Veeam and Hitachi Vantara test plans, selected configurations, test methodology and processes used to measure results. Actual end user experiences may vary based on customer specific environments and corresponding solution design. Please consult with your Veeam and Hitachi Vantara technical representatives prior to implementing this solution.

Test Methodology

The goal of this testing was to validate integration, functionality, and performance of Veeam Scale-Out Backup Repository (SOBR) and Replication v11 with HCP using the AWS S3 object storage service. Testing was conducted as follows:

Basic Functional Run-Time Targets

- 1) Multi-Part Upload
- 2) File Level recovery (FLR)
- 3) SOBR Offload Resiliency
- 4) Large Offload to OBS
- 5) Large Download from OBS
- 6) Delete backup file on OBS

The test suite was developed and provided by Veeam. Configuration selection was at Hitachi's discretion. All results were submitted to and approved by Veeam. As such, HCP has received "**Veeam Ready -Object**" designation and is listed on Veeam's Ready program site <https://www.veeam.com/ready.html>

The corresponding Knowledge Base article can also be found at <https://www.veeam.com/kb3195>.

Test Environment

This section describes the configuration that was tested, following Veeam Backup & Replication and HCP reference documentation.

The full Veeam documentation set can be accessed here at <https://www.veeam.com/documentation-guides-datasheets.html>.

Veeam Community forum is here at <http://forums.veeam.com>.

Hitachi Vantara Community site can be found here <https://community.hitachivantara.com/s/>.

Hardware & Software Components

■ (1) Veeam Backup and Restore Server

- Microsoft Windows Server 2019 Standard, 10.0.17763 Build 17763
- 8vCores, 64GB vMemory,
 - Disk 1: 300GB vStorage (SSD)
 - Disk 2: 2.2TB vStorage (HDD)
 - Disk 3: 2.0TB vStorage (HDD)
- Veeam Backup and Restore v11

■ (2) Microsoft SQL Server:

- 4 vCores, 8GB Vmemory, 100GB vStorage (SSD)

■ (3) Proxy Server:

- 8vCores, 8GB vMemory, 100GB vStorage (HDD)

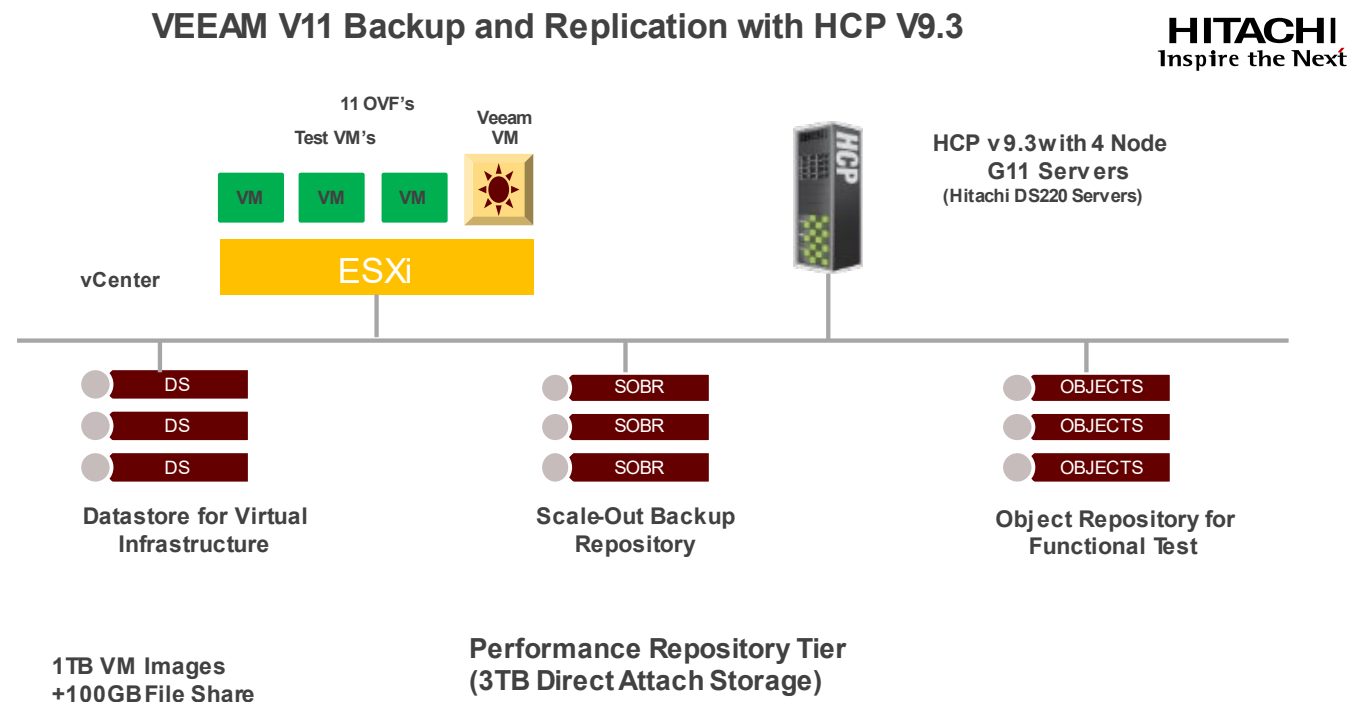
■ (4) Performance Tier Backup Repository:

- 24 vCores, 180GB vMemory, 3527GB vStorage (SSD)

■ (5) Hitachi Content Platform

- **4 - G11 Storage Nodes**
 - (G11) Hitachi DS220 Servers
 - 2x Intel(R) Xeon(R) E5-2630 v4
768 GB ECC Memory (24x 32GB dimms)
 - 12 x 1.9TB SSD Drives
- HCP Software V9.3.0.249

Solution Diagram



Configuring Hitachi Content Platform for Veeam

Hitachi Content Platform (HCP)

- Minimum Standard 4 – Node System
 - 12 internal 1.9TB drives per node with a useable storage of 61.31 TB

General Nodes							Restart	Shut Down
Node ID								
Node ID	Model	Status	Alerts	Logical Volumes	Volume Usage			
1	G11	Available			5.0% of 16.31 TB			
3	G11	Available			9.0% of 16.31 TB			
5	G11	Available			9.0% of 16.31 TB			
7	G11	Available			5.0% of 16.31 TB			


HCP Namespace Creation Configuration

When creating a namespace, ensure that Search and Versioning features are turned ON. Protocol Optimization should be “Cloud protocols”. Directory usage should be “Unbalanced” to ensure proper performance. See below.

Namespace Name		Namespace Owner <i>(Optional)</i>		<input checked="" type="radio"/> Local <input type="radio"/> Active Directory	
<div>NS-VeeamV11</div> <div>0 namespaces used 9975 namespaces available</div>		<div>NS-VeeamV11</div>			
Description <i>(Optional)</i>					
<div></div>					
Hash Algorithm		Hard Quota		Soft Quota	
SHA-256		50.00 <input type="radio"/> GB <input checked="" type="radio"/> TB		85 %	
		Allocated: 0.00 KB			
		Available: 5.00 GB			
<div>> Tags</div> <div>Optional</div>					
Configure features for this namespace					
Protocol Optimization			Versioning		
<input type="radio"/> All protocols <i>Balanced directory usage only</i>			<input type="radio"/> Off		
<input checked="" type="radio"/> Cloud protocols			<input checked="" type="radio"/> On		
Directory Usage			Version Pruning		
<input type="radio"/> Balanced			<input checked="" type="checkbox"/> Prune versions older than 90 days		
<input checked="" type="radio"/> Unbalanced <i>Requires cloud protocols only</i>					

The Object Storage Creation Summary:

Edit Object Storage Repository



Summary
You can copy the configuration information below for future reference.

Name	<div>Summary: Object storage repository was successfully modified. Name: capacity veeam Description: Created by WIN-941KLO5MVFB\Administrator at 9/23/2021 6:11 AM. Type: S3-compatible Gateway server: not selected Service point: https://veeamtest1.cluster105a-1.lab.archivas.com Region: us-east-1 Bucket: namespacestest1 Concurrent tasks limit: unlimited Storage consumption limit: unlimited Recent backups will not be immutable</div>
Account	
Bucket	
Summary	

< Previous

Next >

Finish

Cancel

Object Storage GUI:

S3 Browser 9.2.1 - Free Version (for non-commercial use only) (Administrator) - Cluster105a-1

Accounts Buckets Files Tools Upgrade to Pro! Help

+ New bucket ✖ Delete bucket ↻ Refresh

Path: / Veeam/ Archive/

namespacest1

File	Size	Type	Last Modified	Storage Class
..				
New Folder/				
large/				

Upload Download Delete New Folder Refresh

0 files (0 bytes) and 2 folders

Tasks (1) Permissions Http Headers Tags Properties Preview Versions EventLog

URL: <https://veeamtest1.cluster105a-1.lab.archivas.com/namespacest1/> Copy

Property	Value
Owner	dev (1f772233-7d0e-4a38-b0d5-d7159d5086cb)
Name	namespacest1
Creation date	9/23/2021 6:06:29 AM
Location	Default Region (us-east-1)
Total objects	4
Total files	0
Total folders	4
Total size	0 bytes
Bucket logging	disabled
Versioning	enabled (MfaDelete: disabled)
Cross-region replication	failed: The remote server returned an error: (403) Forbid...
Transfer Acceleration	Not supported
Default Storage Class	STANDARD
Server-side encryption	disabled

Activate Windows
Go to Settings to activate Windows.

Scale-Out Backup Repository (SOBR):

Repository Tools

Veeam Backup and Replication

Home

Backup Repository

Backup Infrastructure

Backup Proxies

Backup Repositories

External Repositories

Scale-out Repositories

veeam test ready SOBR

WAN Accelerators

Service Providers

SureBackup

Application Groups

Virtual Labs

Managed Servers

VMware vSphere

Microsoft Windows

Home

Inventory

Backup Infrastructure

Storage Infrastructure

Type in an object name to search for

Name	Type	Host	Path
capacity veeam	S3-compatible		amazonS3://veeamtest1.cluster105a-1.lab.archivas.com/namespacetest1/Veeam/Arc
PerfBackupRep2-HDD	Windows	172.18.105.128	E:\Backups

Activate Windows
Go to Settings to activate Windows.

Test Cases

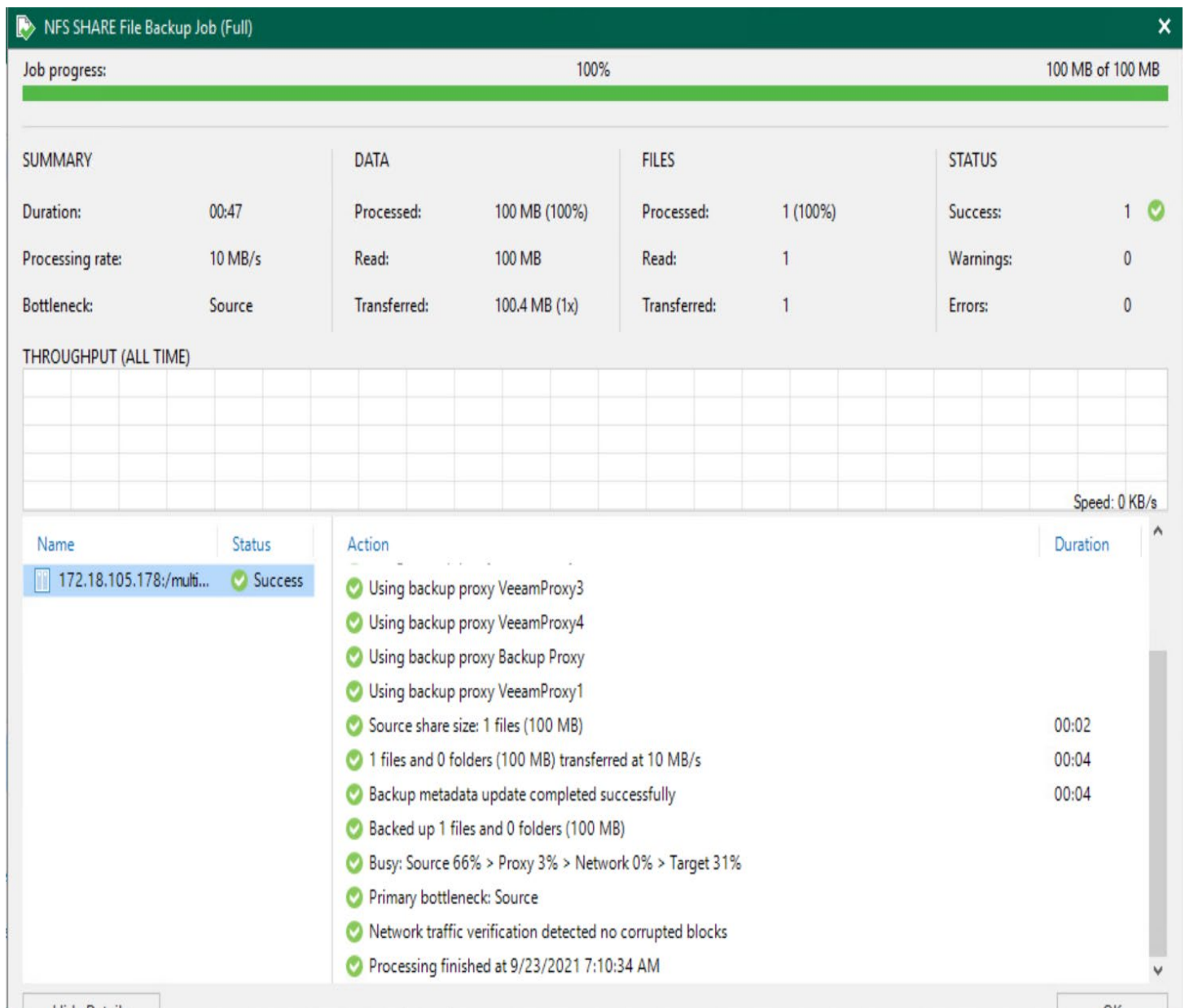
Test cases defined in the test plans for **Veeam Ready - Object** qualification as follows:

Tests:	Pass/Fail
1) Multipart Upload Test – This is testing the default upload of a backup file from Veeam to HCP.	Pass
2) File Level Recovery Test – This test restores a file stored on HCP back to Veeam and finishing by having Veeam restore that file to the local system.	Pass
3) SOBR Offload Resiliency – This test two different recovery scenarios. The first scenario tests what happens if there is a network disruption for five minutes and then it is restored. The second test will have the backup fail due to a network outage the causes the backup to fail. After that, a manual offload will be started to confirm the remainder of the file is offloaded.	Pass
4) Large Offload to OBS - Perform a large offload of a backup chain to the S3-compatible Object Storage – Take 10 large, 100GB, VMs and use Veeam to offload to HCP. There is a performance piece to this test as well, the 1TB offload needs to be completed within four-and-a-half hours.	Pass
5) Large Download from OBS - Perform a large download from the S3-compatible storage. Restore 10 large, 100GB, VMs from HCP to Veeam. There is a performance piece to this test as well, the 1TB offload needs to be completed within four-and-a-half hours.	Pass
6) Delete a backup file on OBS (S3 Compatible Storage) – Confirm that deleting a file in Veeam will also be deleted on HCP. There is a performance piece to this test as well, the delete needs to be completed within four-and-a-half hours.	Pass

Test Result Details:

1) Multi-Part Upload

Run a backup on a single file and then offload that backup to the Object Store.



1a) Multi-Part Backup Statistics Showing Archive

NFS SHARE File Backup Job

Job progress: 100% 100 MB of 100 MB

SUMMARY		DATA		FILES		STATUS	
Duration:	01:36	Processed:	100 MB (100%)	Processed:	1 (100%)	Success:	1
Processing rate:	10 MB/s	Read:	100 MB	Read:	1	Warnings:	0
Bottleneck:	Source	Transferred:	100.4 MB (1x)	Transferred:	1	Errors:	0

THROUGHPUT (ALL TIME)

Name	Status	Action	Duration
172.18.105.178:/multi...	Success	1 files and 0 folders (100 MB) transferred at 10 MB/s	00:04
		Backup metadata update completed successfully	00:05
		Required backup infrastructure resources have been assigned	
		Restore point 9/23/2021 7:10:07 AM has been archived: 1 files and 0 folders (100 MB) transferred at...	00:06
		Creating base backup infrastructure	00:01
		Transforming metadata after processing retention policy completed successfully	00:10
		Transforming backup data completed successfully	00:14
		Backed up 1 files and 0 folders (100 MB)	
		Archived 1 file versions (100 MB)	
		Busy: Source 66% > Proxy 2% > Network 0% > Target 38%	
		Primary bottleneck: Source	
		Network traffic verification detected no corrupted blocks	
		Processing finished at 9/23/2021 7:14:05 AM	

Hide Details OK

1b) S3 Browser GUI Showing /Veeam/Store/Content

S3 Browser 9.2.1 - Free Version (for non-commercial use only) (Administrator) - Cluster105a-1

Accounts Buckets Files Tools Upgrade to Pro! Help

+ New bucket ✖ Delete bucket ↻ Refresh

Path: / Veeam/

File	Size	Type	Last Modified
..			
Archive/			
Store/			

Upload Download Delete New Folder Refresh 1 folder selected

Tasks Permissions Http Headers Tags Properties Preview Versions EventLog

URL: <https://veeamtest1.cluster105a-1.lab.archivas.com/namespacetest1/Veeam/Store/> Copy

Property	Value
Folder name	Veeam/Store/
Total objects	45
Total files	37
Total folders	8
Total size	102.39 MB (107364400 bytes)

S3 Browser 9.2.1 - Free Version (for non-commercial use only) (Administrator) - Cluster105a-1

Accounts Buckets Files Tools Upgrade to Pro! Help

+ New bucket ✖ Delete bucket ↻ Refresh

Path: / Vee: Sto lar: a4afbdb6e05248c0a37 Arch e5495fba08af406486e1b: da e84ca2ef7b0c4c658b

File	Size	Type	Last Modified
0000.vblob	38.15 MB	Veeam unstructu...	9/23/2021 7:13:28 AM

Upload Download Delete New Folder Refresh 1 file (38.15 MB) selected

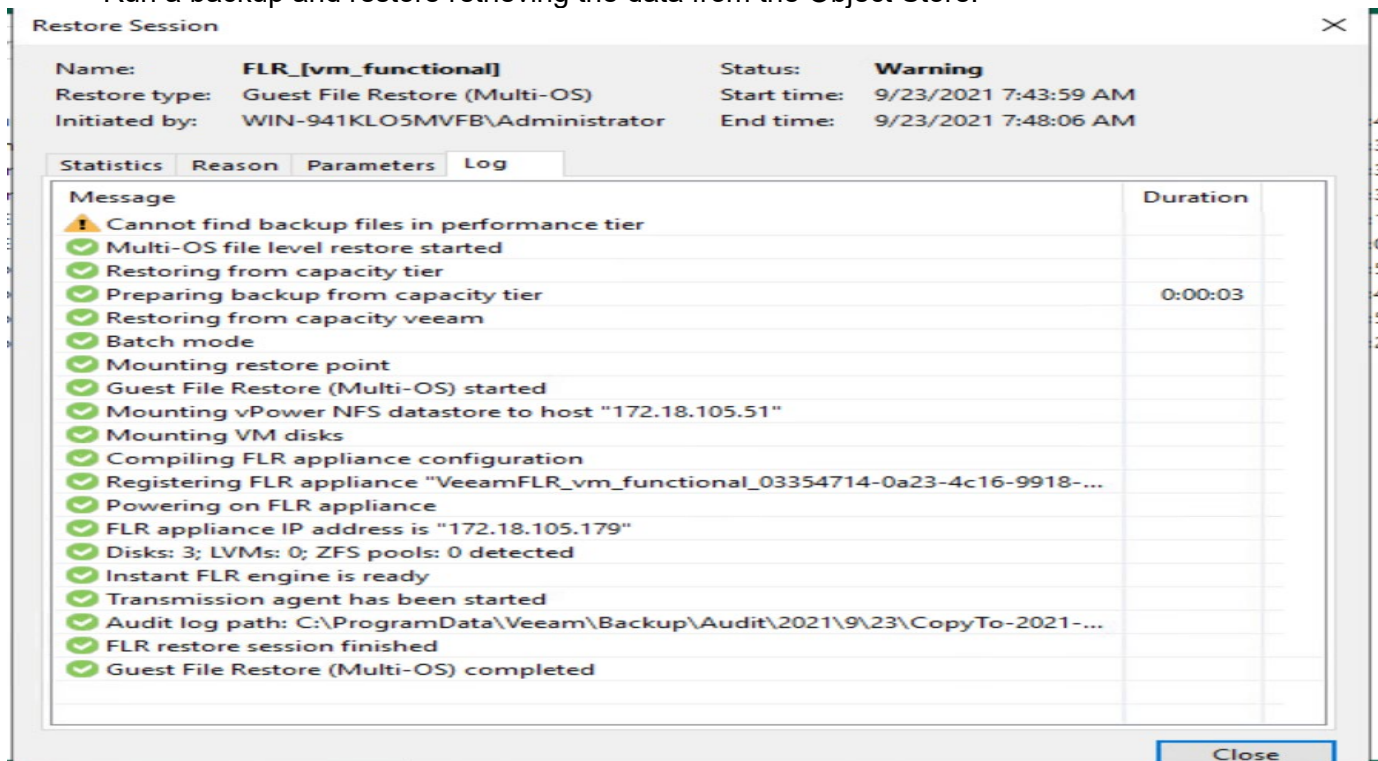
Tasks Permissions Http Headers Tags Properties Preview Versions EventLog

URL: <https://veeamtest1.cluster105a-1.lab.archivas.com/namespacetest1/Veeam/Store/large/a4afbdb6e05248c0a371d1697fccb55a/Archive/e5495fba08af406486e1b:da/e84ca2ef7b0c4c658b/0000.vblob> Copy

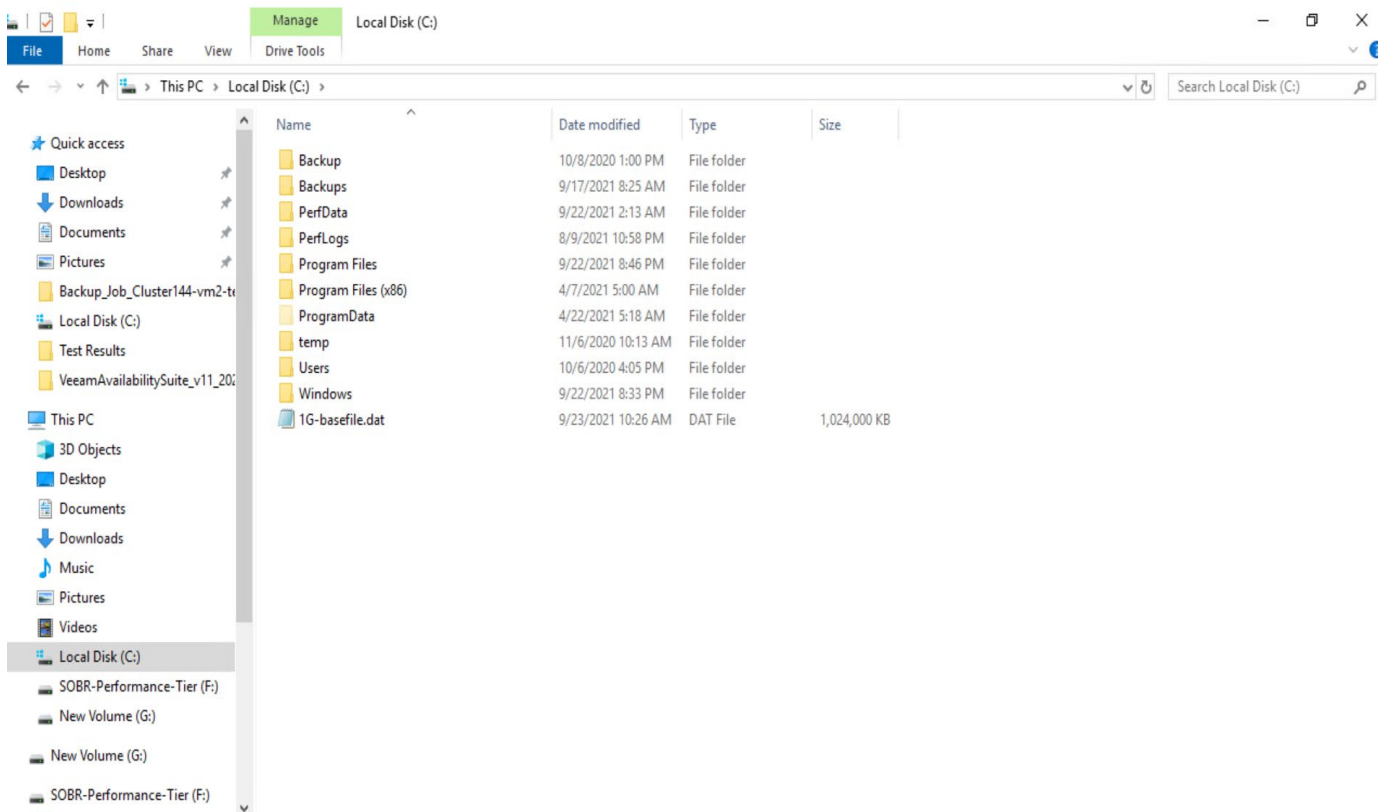
Property	Value
ETag	"34e8d5ddd05941a7f9b91edff6b7ca"
Key	Veeam/Store/large/a4afbdb6e05248c0a371d1697fccb...
Server-side modified	9/23/2021 7:13:28 AM
Owner	dev (1f772233-7d0e-4a38-b0d5-d7159d5086cb)
Size	38.15 MB (4006096 bytes)
Storage class	STANDARD
Server-side encrypted	no
Client-side encrypted	no
Client-side compressed	no
Client-side modified	unknown

2) File Level Recovery (FLR)

Run a backup and restore retrieving the data from the Object Store.



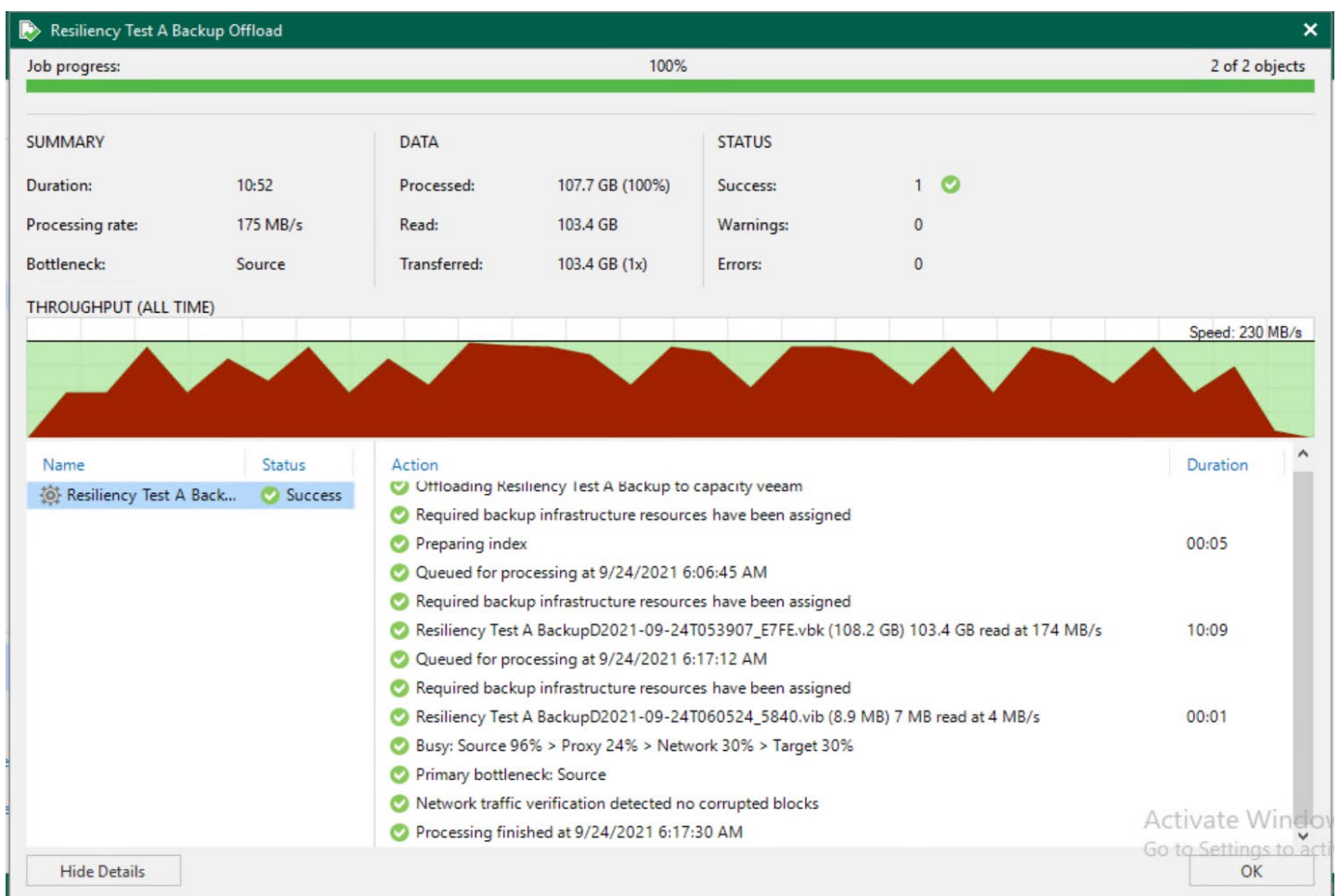
2a) File Explorer Showing File Copied to Veeam VM



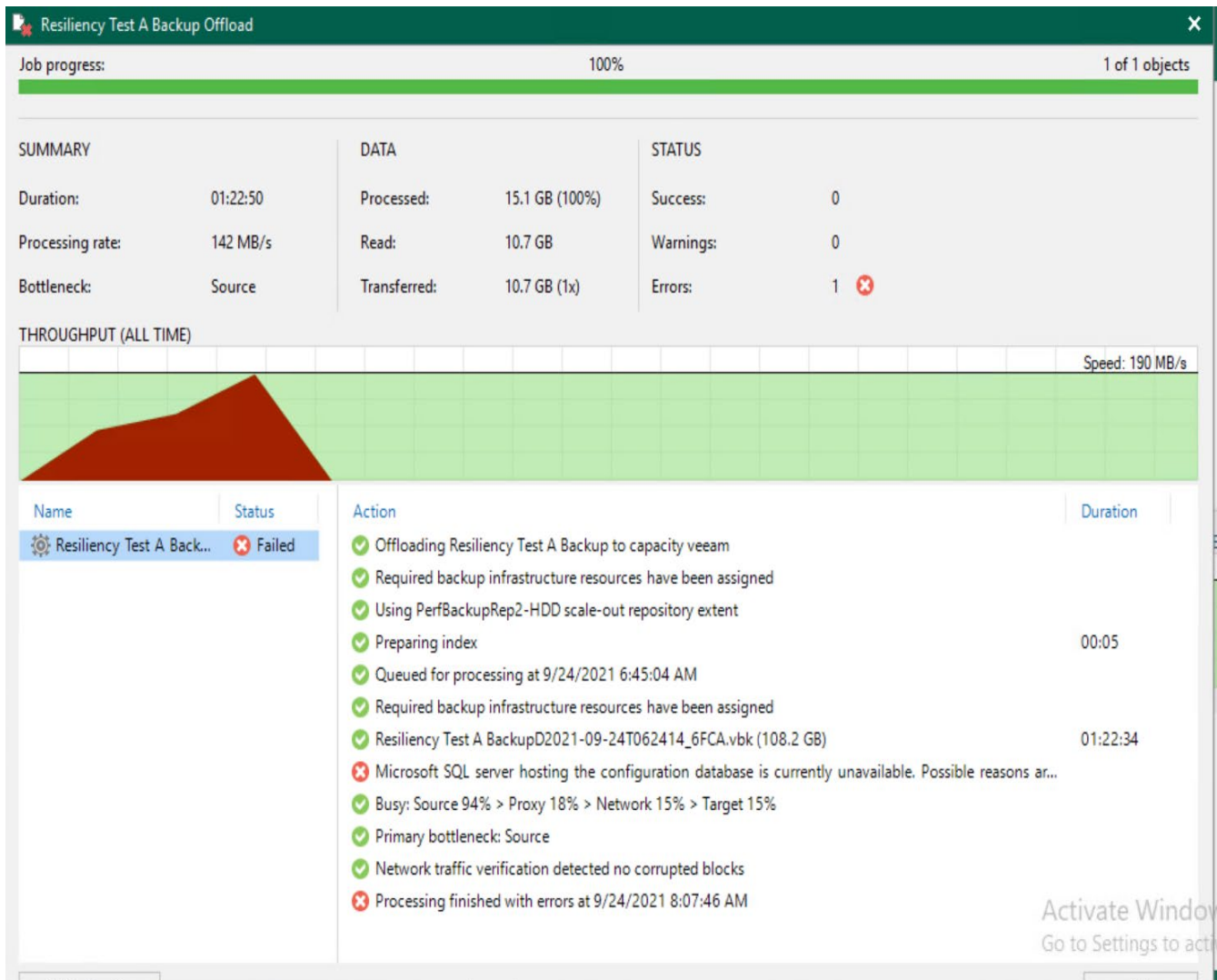
3) SOBR Offload Resiliency A

Run two backups:

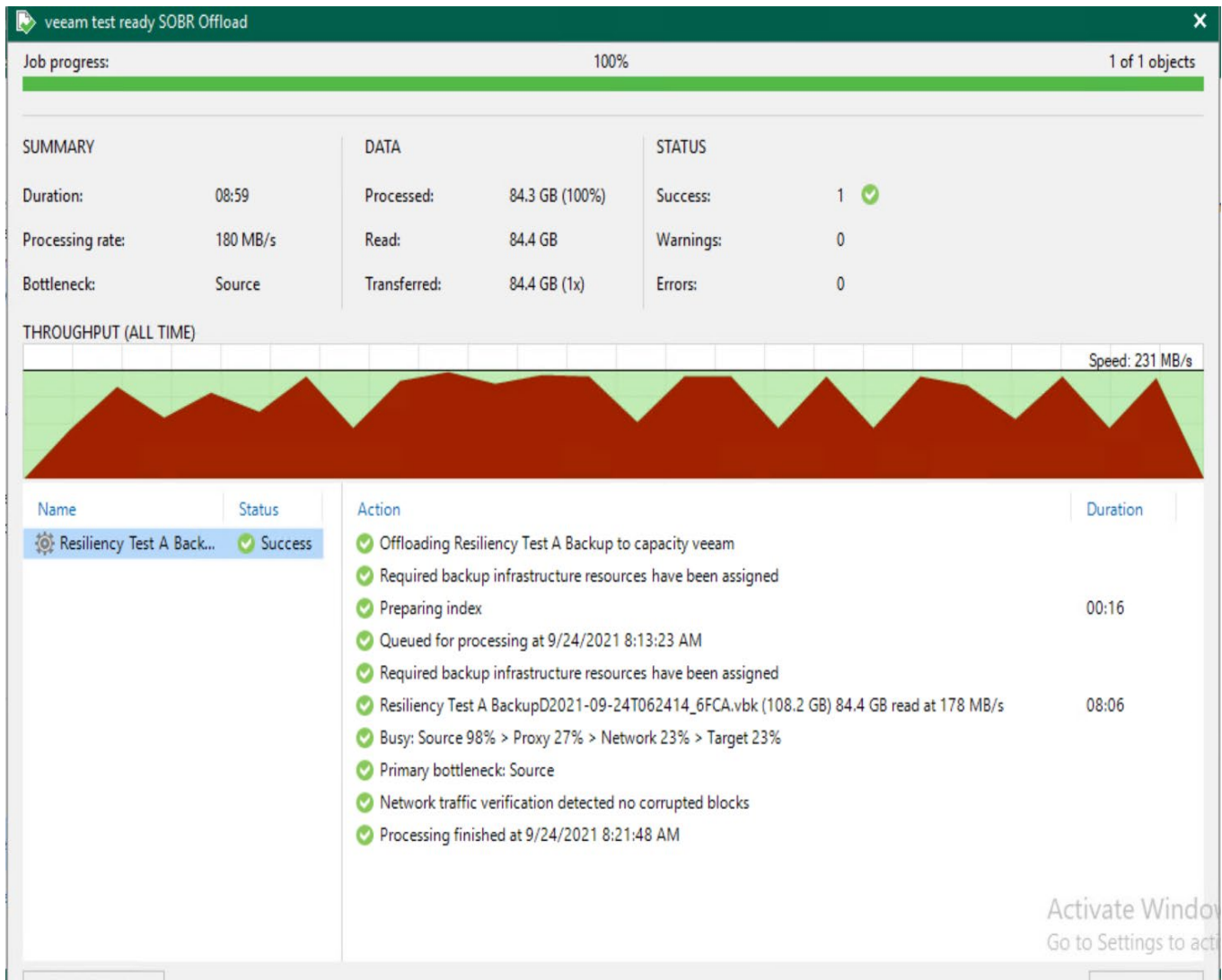
- A. First, during an offload have the network connection between the Veeam server and the Object store to fail for five minutes. Afterwards, restore the connection and let the offload complete.
- B. Second, during the offload have the network connection fail for over thirty minutes causing the offload to time out.
- C. After the timeout, restore the network connection and manually run an offload to complete the originally failed offload.



3a) SOBR Offload Resiliency B



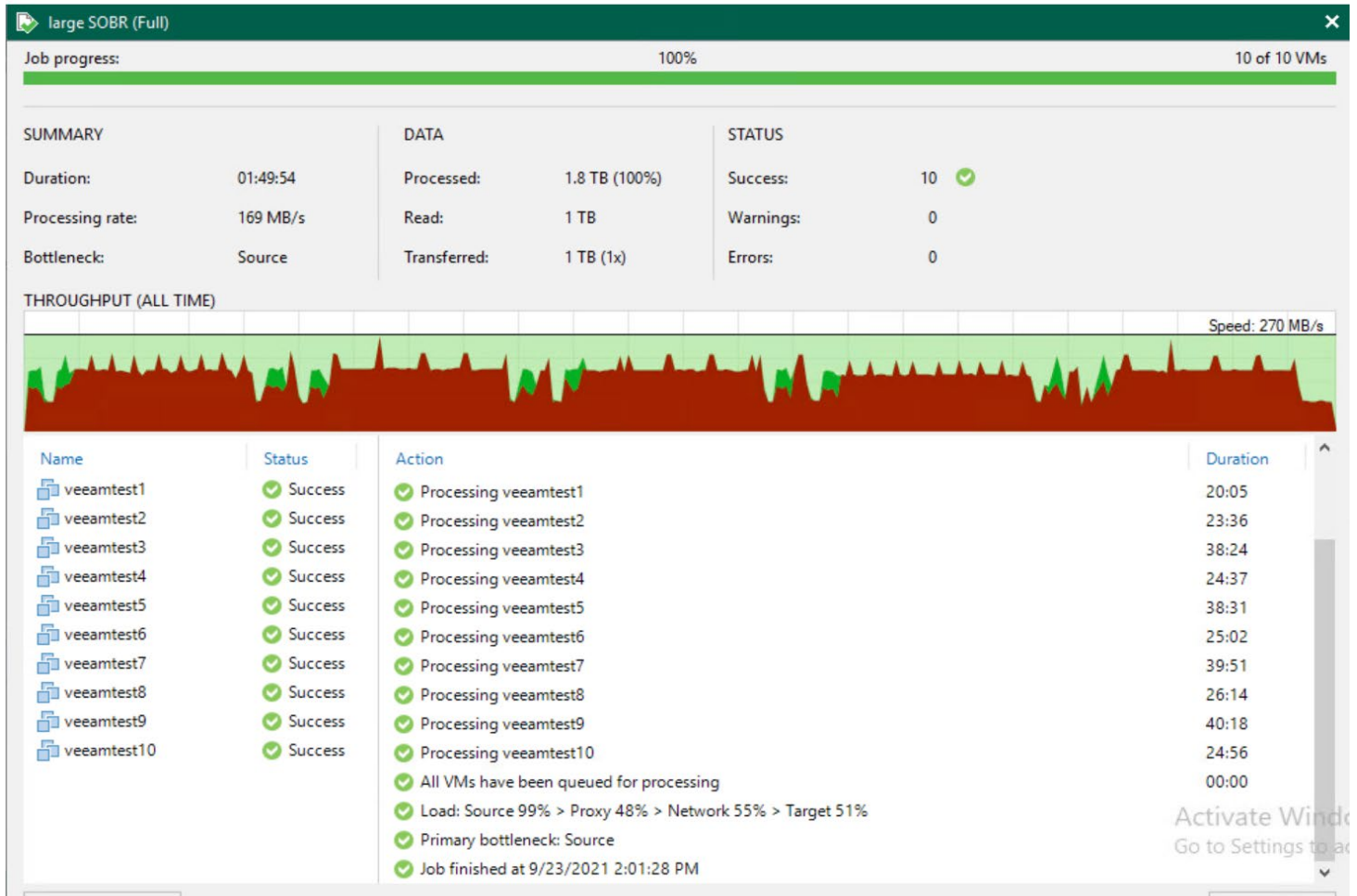
3b) SOBR Manual Offload Resiliency C



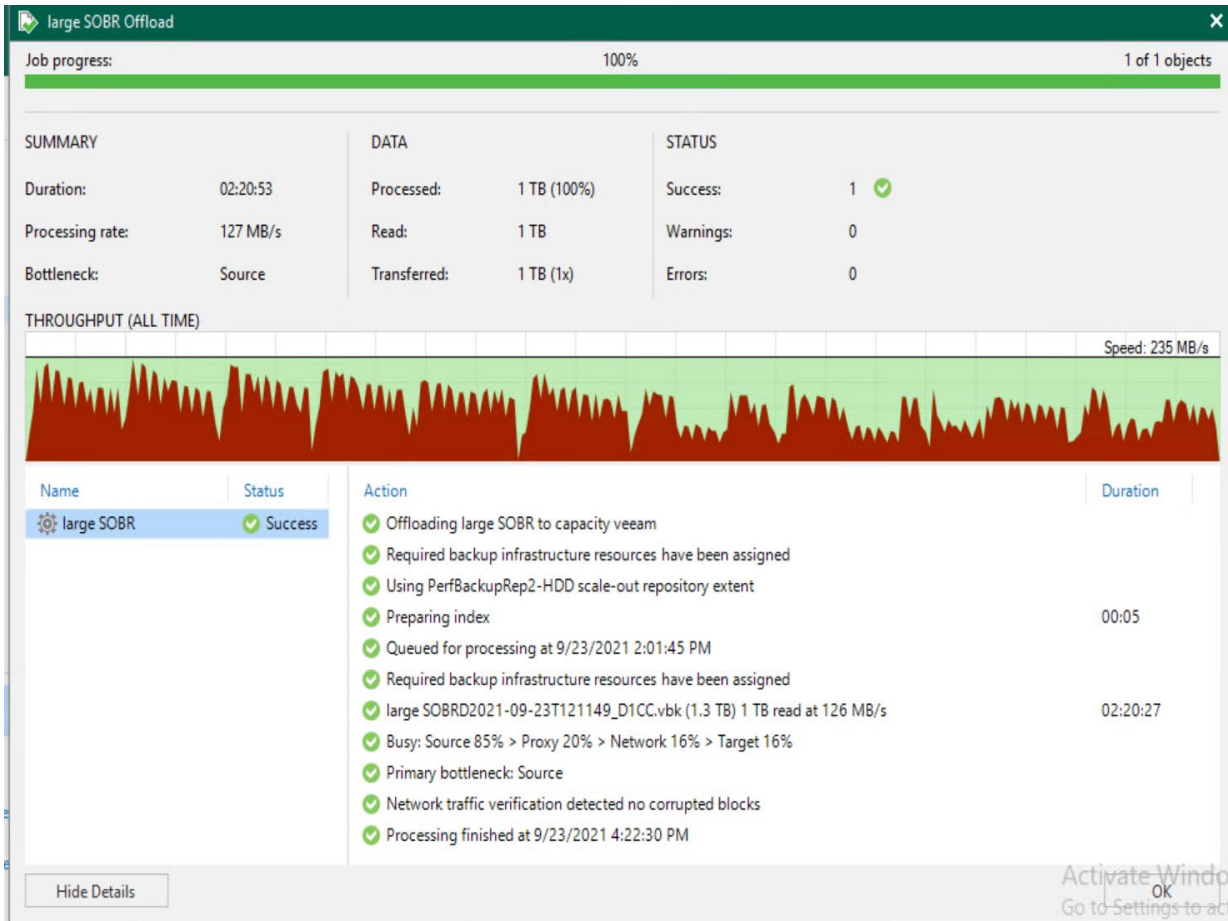
4) Large Offload to OBS

Perform a Large Offload of a Backup Chain to the S3-Compatible Object Storage

Perform a backup consisting of ten VMs totaling a terabyte in size. Measure the offload time to ensure it completes in under four-and-a-half hours.



4a) SOBR Offload Statistics



4b) SOBR Offload Job Report

SOBR Tiering: large SOBR Offload

Thursday, September 23, 2021 2:01:37 PM

Success	1	Start time	2:01:37 PM	Total size	1.3 TB	Scale-out Backup Repository: veeam test ready SOBR Used archive extents: capacity veeam	
Warning	0	End time	4:22:30 PM	Data read	1 TB		
Error	0	Duration	2:20:53	Transferred	1 TB		

Details

Name	Status	Start time	End time	Size	Read	Transferred	Duration
large SOBR	Success	2:01:37 PM	4:22:30 PM	1.3 TB	1 TB	1 TB	2:20:52

4c) Veeam Object Storage GUI with Archive Content

S3 Browser 9.2.1 - Free Version (for non-commercial use only) (Administrator) - Cluster105a-1

Accounts Buckets Files Tools Upgrade to Pro! Help

+ New bucket - Delete bucket Refresh

Path: / Veeam Archive large 2d8727ea-4175-44c2-8e12-a08534 00000000-0000-0000-0000-000000

namespacetest1

File	Size	Type	Last Modified	Storage Class
..				
blocks/				
checkpoints/				
objs/				
storages/				

Upload Download Delete New Folder Refresh

0 files (0 bytes) and 4 folders

Tasks Permissions Http Headers Tags Properties Preview Versions EventLog

URL: https://veeamtest1.cluster105a-1.lab.archivas.com/namespacetest1/ Copy

Property	Value
Owner	dev (1f772233-7d0e-4a38-b0d5-d7159d5086cb)
Name	namespacetest1
Creation date	9/23/2021 6:06:29 AM
Location	Default Region (us-east-1)
Total objects	4377567
Total files	4377426
Total folders	141
Total size	1.01 TB (1109536872028 bytes)
Bucket logging	disabled
Versioning	enabled (MfaDelete: disabled)
Cross-region replication	failed: The remote server returned an error: (403) Forbid...
Transfer Acceleration	Not supported
Default Storage Class	STANDARD

Activate Windows
Go to Settings to activate Windows.

5) Large Download to OBS

Perform a Download from S3-Compatible Storage

System

Name: Configuration Database Resynchr...

Status: Success

Action type: Configuration Resynchronize

Start time: 9/23/2021 9:54:31 PM

Initiated by: WIN-941KLO5MVFB\Administrator

End time: 9/23/2021 9:56:24 PM

Log

Message	Duration
✓ Starting backup repositories synchronization	
✓ Enumerating repositories	
✓ Found 1 repository	
✓ Processing performance tier extents of veeam test ready SOBR	0:00:04
✓ PerfBackupRep2-HDD: added 1 unencrypted, updated 1, skipped 1	0:00:02
✓ Processing capacity tier extent of veeam test ready SOBR	0:01:36
✓ capacity veeam: updated 1, skipped 2	0:01:33
✓ Downloading storage large SOBRD2021-09-23T121149_D1CC.vbk from object stor...	0:00:05
✓ Backup repositories synchronization completed successfully	

Close

5a) SOBR Download Job

SOBR Download

Job progress:

100%

1 of 1 objects

SUMMARY	DATA	STATUS
Duration: 50:50	Processed: 1019.6 GB (100%)	Success: 1
Processing rate: 347 MB/s	Read: 1008.4 GB	Warnings: 0
Bottleneck: Target	Transferred: 1008.6 GB (1x)	Errors: 0

THROUGHPUT (ALL TIME)

Speed: 406 MB/s

Name	Status	Action	Duration
large SOBR	Success	<ul style="list-style-type: none"> ✓ Downloading large SOBR from capacity veeam ✓ Preparing to download backup files from object storage ✓ 1008.4 GB will be downloaded from object storage, 0 B will be copied from performance tier ✓ Queued for processing at 9/23/2021 9:59:02 PM ✓ Required backup infrastructure resources have been assigned ✓ Using PerfBackupRep2-HDD scale-out repository extent ✓ large SOBRD2021-09-23T121149_D1CC.vbk (1.3 TB) 1008.4 GB read at 347 MB/s ✓ Busy: Source 80% > Proxy 38% > Network 47% > Target 97% ✓ Primary bottleneck: Target ✓ Network traffic verification detected no corrupted blocks ✓ Processing finished at 9/23/2021 10:48:50 PM 	<div>00:47</div> <div>49:36</div>

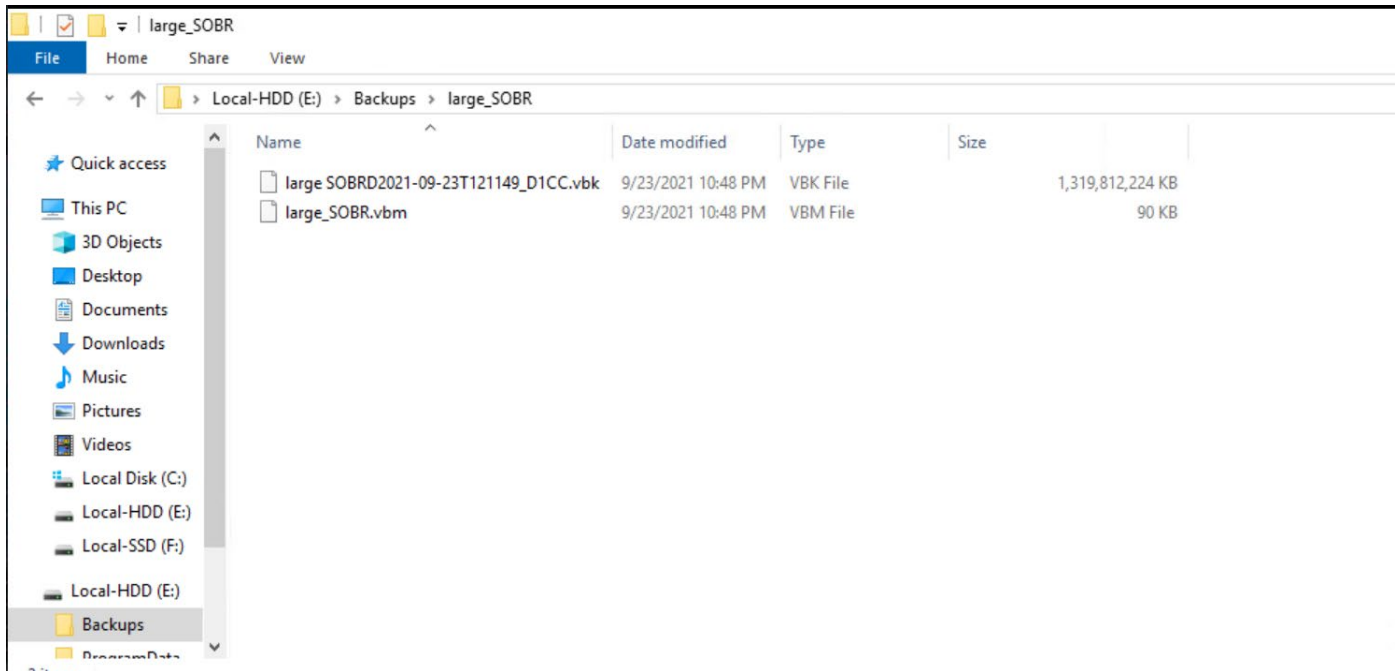
Hide Details

Activate Windows

Go to Settings to activate Windows

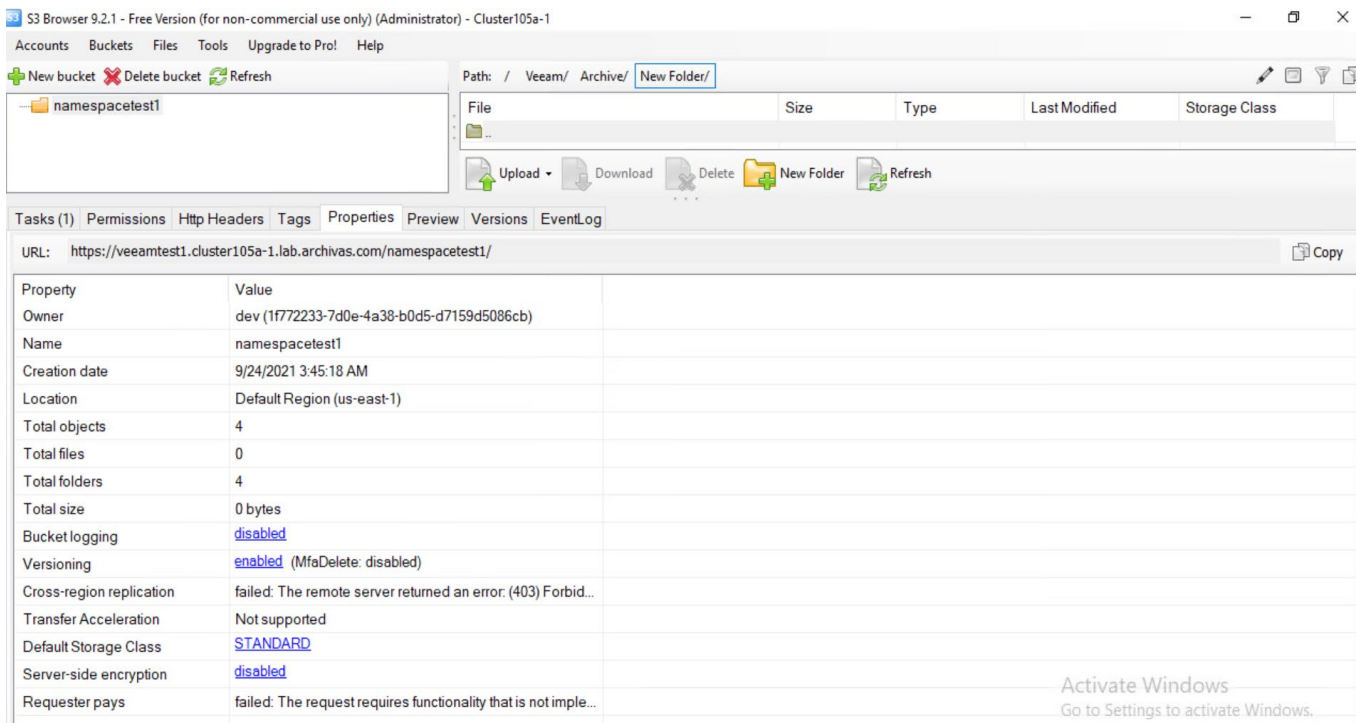
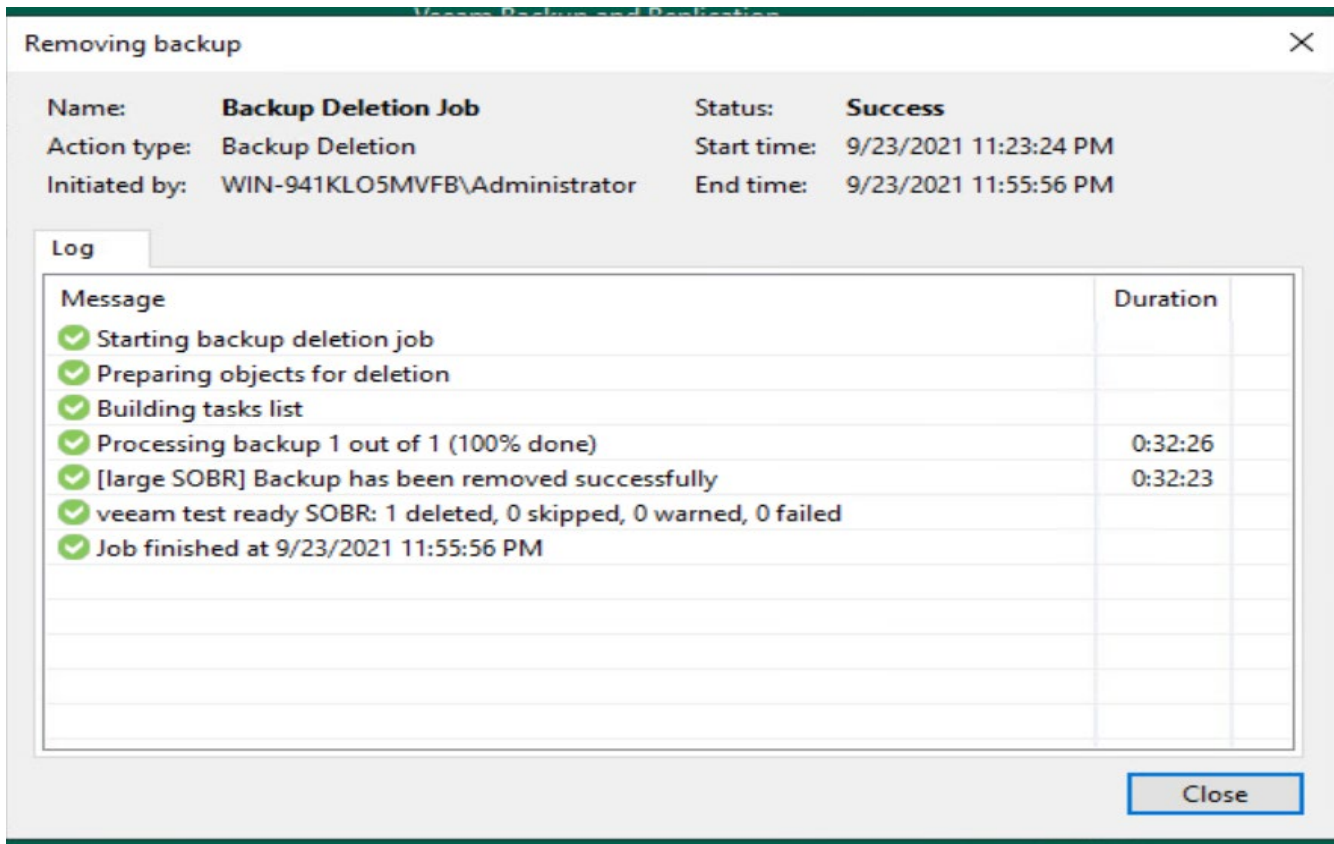
OK

5b) File Explorer Performance Tier



6) Delete Backup file on OBS

Removing a backup session.



Performance Tuning & HCP Configuration Guidelines

Simultaneous Connections

- Veeam has the option to set several threads for uploads. Setting one thread per S3 gateway running produced the best results. In our example we had ten S3 gateways and ten threads for Veeam.

The following are key question to be answered, leading up to a proper system design:

1. Identify if Object Immutability is required. If so, the bucket will need to be created with the object immutability flag set on HCP as you cannot change the option once the bucket is created.
2. Retention Requirements. Whether delete or freezing an archive of specific data sets will be necessary. Veeam Backup & Replication in conjunction with HCP should be designed to meet company compliance and data retention policies while optimizing access searchable datasets.

Additional Resources

Check out the resources below to learn how Hitachi Vantara and Veeam work together to enable organizations to optimize their Veeam environments for reduced storage costs and greater efficiency.

[Learn how](#) Hitachi Content Platform makes your data securely available anywhere, anytime.

[Read about](#) the power of the Hitachi Content Platform portfolio.

[Learn how](#) to use Veeam to safely backup and have your data available.