

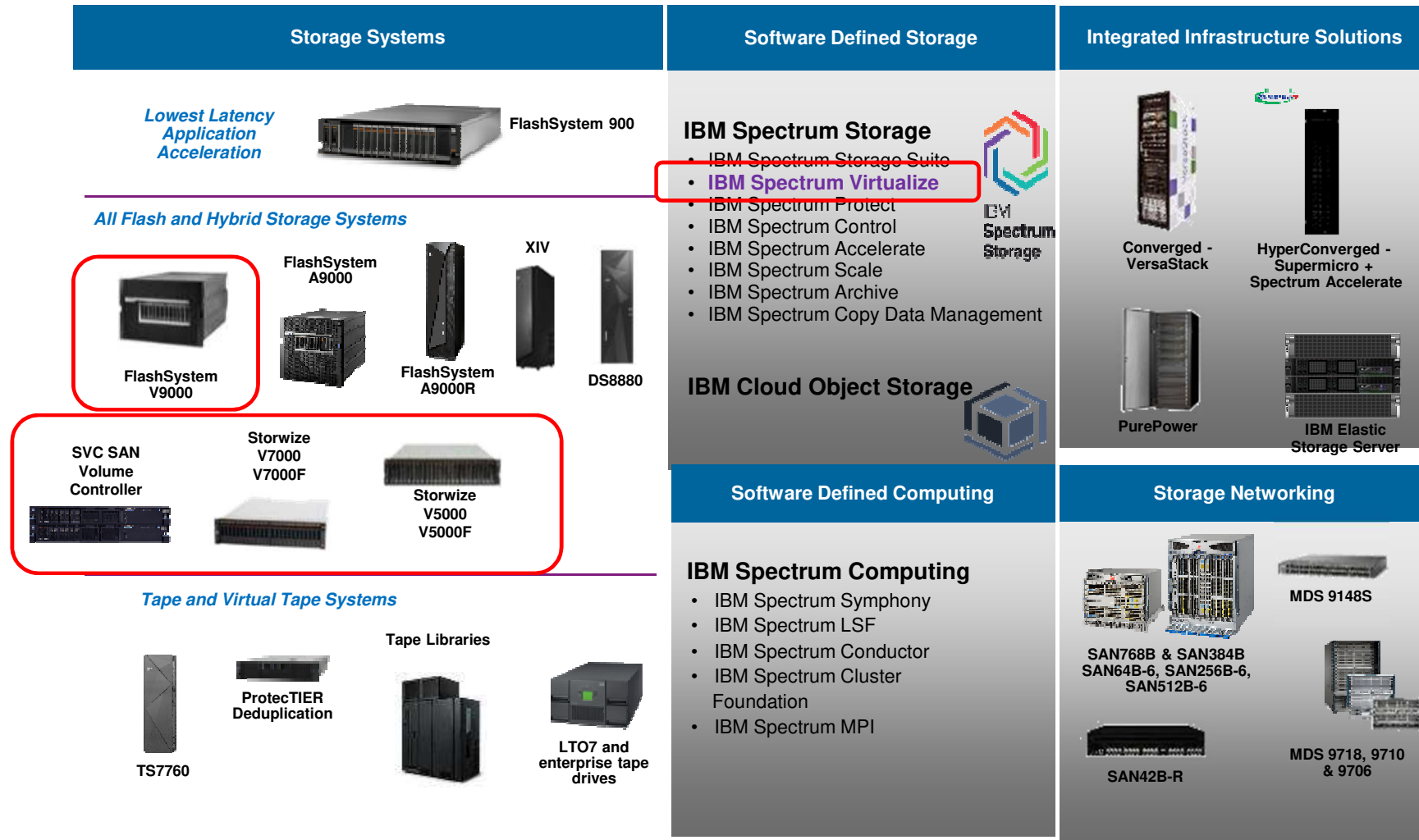
IBM Client Center Montpellier - France

# IBM Spectrum Virtualize Storwize-SVC : Transparent Cloud Tiering with Live Demonstration

**Dominique SALOMON**  
**IBM Certified - IT Specialist Storage**  
Middle East & Africa (MEA) Technical  
presales support,  
IBM Client Center, Montpellier - FRANCE



# Broadest Storage and Software Defined Portfolio in the Industry



# The IBM Storwize® Family built on Spectrum Virtualize

## Comprehensive range of virtualized software defined storage systems

- One code base on all platforms
- One set of functions (selectively licensed)
- One client experience



**Storwize V5000**  
**Storwize V5030F**

**Entry-Midrange Hybrid or All-Flash Block Storage**

### ECONOMY

More performance & scalability for traditional applications & analytics in mid-size businesses



**Storwize V7000/V7000F**

**Midrange Hybrid or All-Flash Block Storage**

### SCALABILITY

Highly scalable, high performance virtualization for analytics & mixed workloads in mid-size businesses



**Storwize V7000 Unified**

**Midrange Hybrid Unified Block & File Storage**

### CONSOLIDATION

Highly scalable, high performance consolidation of block & file data



**FlashSystem V9000**

**Enterprise Hybrid or All-Flash Block Storage**

IBM FlashCore™ Technology Optimized

### PERFORMANCE

Highest performance fully-integrated storage virtualization solution



**SAN Volume Controller**

**Enterprise Storage Virtualization of Flash & Hybrid**

### FLEXIBILITY

Flexibility to virtualize entire data centers using existing storage



**Spectrum Virtualize**

**Enterprise Software-Only Block Storage**

### VERSATILITY

Fully-Integrated Solutions

Software-Defined

**ENTRY**

**MIDRANGE**

**ENTERPRISE**

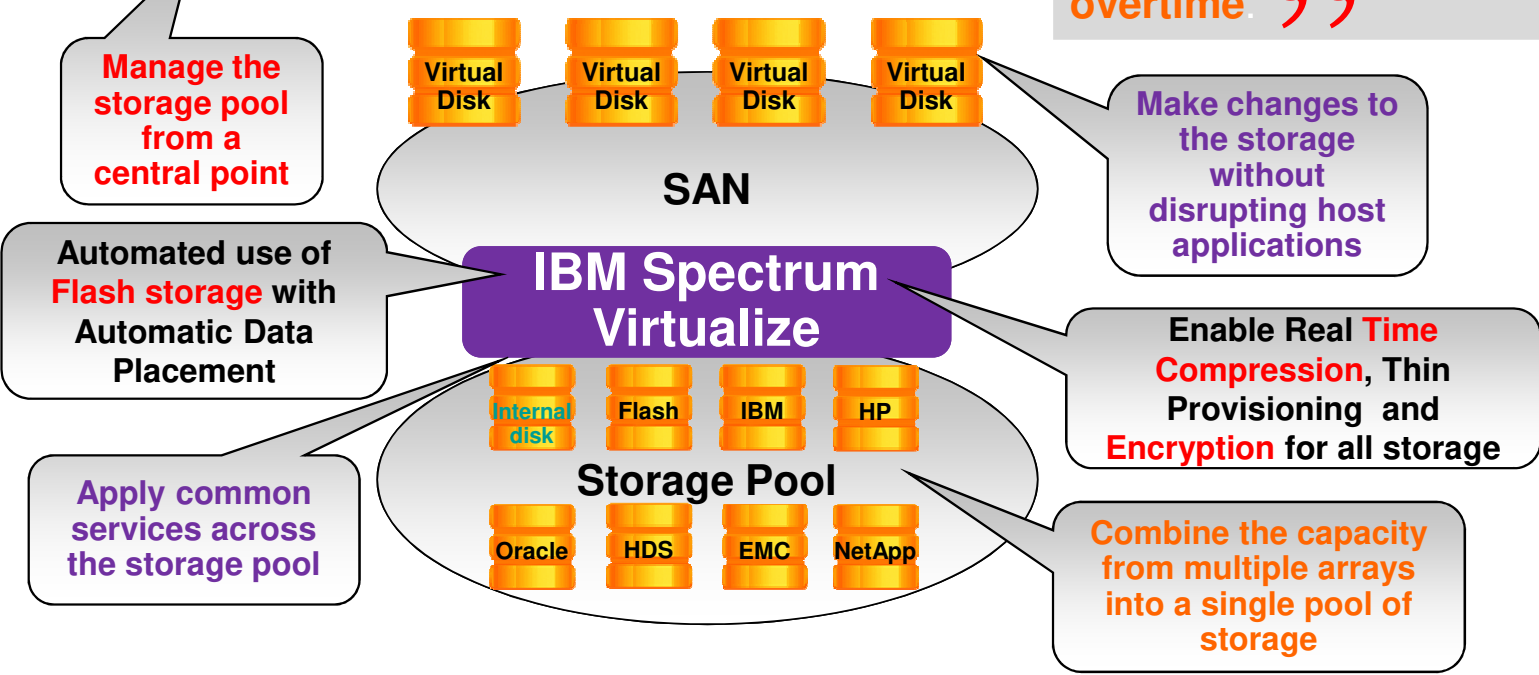
# IBM Spectrum Virtualize

is the foundation of an **Efficient SAN Storage Infrastructure**



“ .....we can now make changes during business hours. ....we estimate to have saved £1m/year in overtime. ”

*UK Bank*

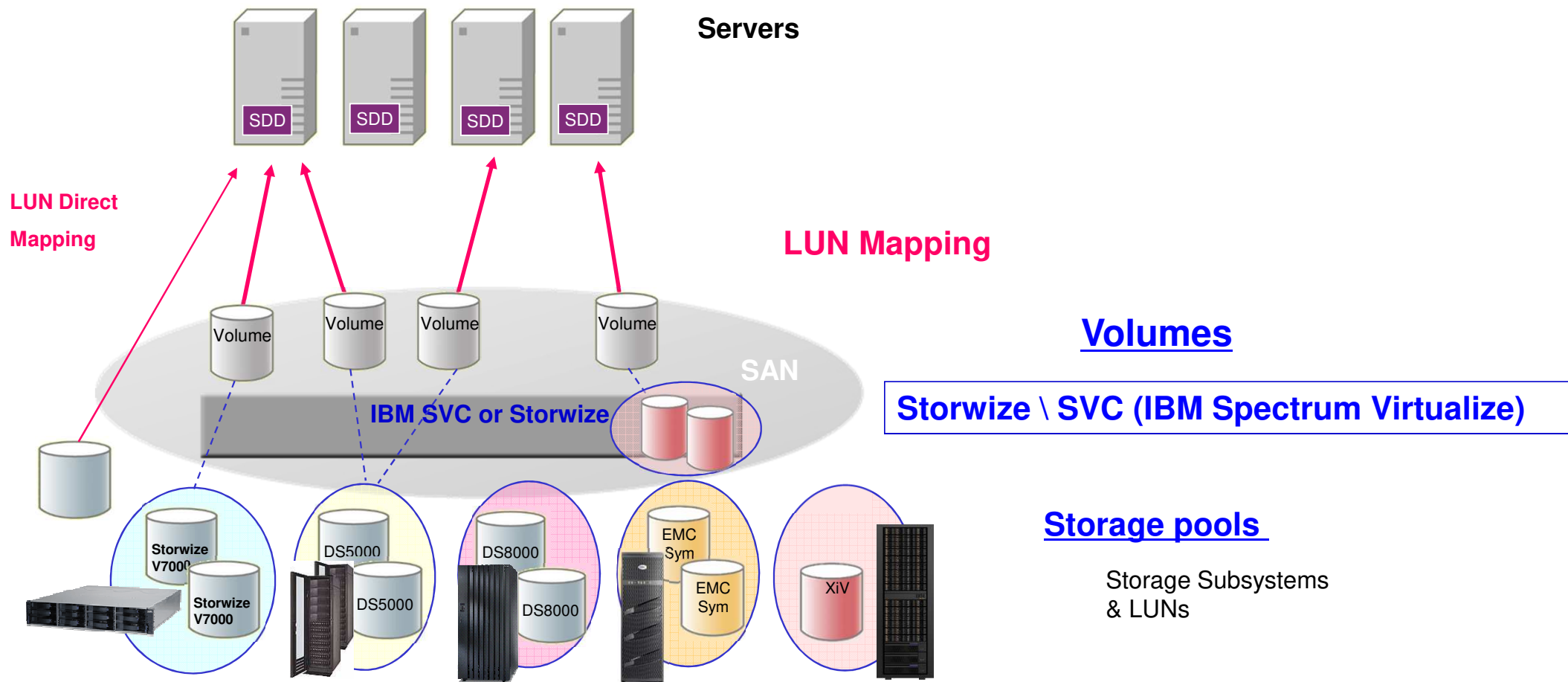


With the largest interoperability matrix

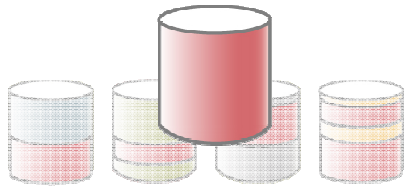




# IBM Storage Virtualization concepts



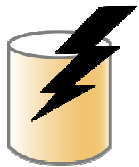
# IBM Spectrum Virtualize Improves Data Value



- ***Improves efficiency of your storage***, increasing **utilization** up to double

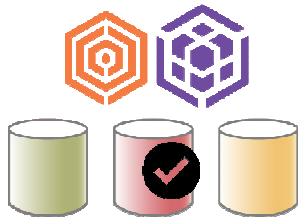


- ***Increases the amount of data you can store***, enabling up to **5x** as much data to be **stored** in the same space with **Real Time Compression**



- ***Improves storage performance*** so you can get more done with your data with **Easy Tier**

- ***Optimizes storage use*** by moving data to the most appropriate type of storage using **transparent data migration**



“We’ve gone from **35%** to **82%** utilization. Economically, we’ve gotten some killer gains from this... our storage maintenance cost reduction year-over-year is **60%**.”

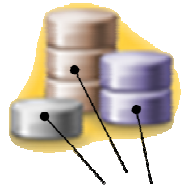
# IBM Spectrum Virtualize Improves Data Simplicity



Logical Representation



Virtualization

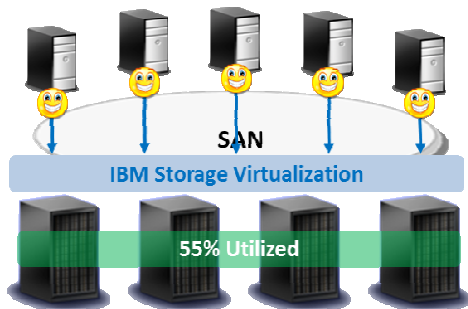
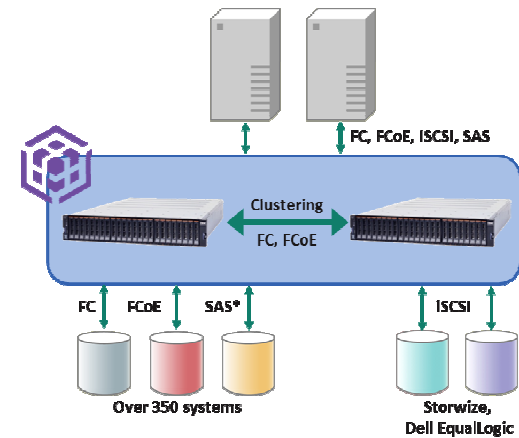


Physical Resources

- **Improves agility** with easy deployment of new storage technologies and automated provisioning of storage as it is required by applications, providing integration with virtualization layer such as VMware (vCenter, vRealize) and Open source (Openstack)
- **Consolidates all your storage**—no matter the vendor—for simplified management, consistent functionality, and greater efficiency
- **Enables flexibility in storage acquisition** by supporting common capability across all types of storage so you can mix vendors with ease
- **Enable transparent data migration** with no impact on application servers

ITG | INTERNATIONAL  
TECHNOLOGY  
GROUP

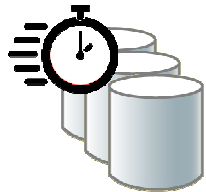
*“ITG found personnel costs for use of IBM Spectrum Virtualize and IBM Spectrum Control averaged **63 percent less** than for EMC equivalents and **55 percent less** than Hitachi.”*



# IBM Spectrum Virtualize – Improving **Data Security**



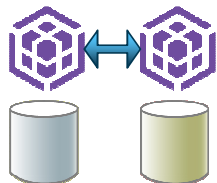
- **Improves data protection** with 5-10x faster rebuild of data following a drive failure with **Distributed RAID**



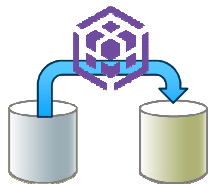
- **Improves data security** with software based **encryption**

- **Improves data protection** with **instant copies**

- **Improves data availability** with fully duplexed copies of data and automatic **switchover across data centers**



- **Eliminates storage downtime** with **non-disruptive movement** of data from one type of storage to another



*“The IBM System Storage technology has given us the ability to meet end users’ storage needs easily and efficiently, supporting 24x7 availability.”*

—Lou Passarello, Assistant Director at the Network Operations Center, University of Pittsburgh



# IBM Spectrum Virtualize Copy Services

## Volume Mirroring

- Volume Mirroring

## FlashCopy

- Point-in-Time Copy

## Metro Mirror\*

- Synchronous Mirror
  - Write IO response time doubled + distance latency
  - No data loss

2 close sites (<300 Km)

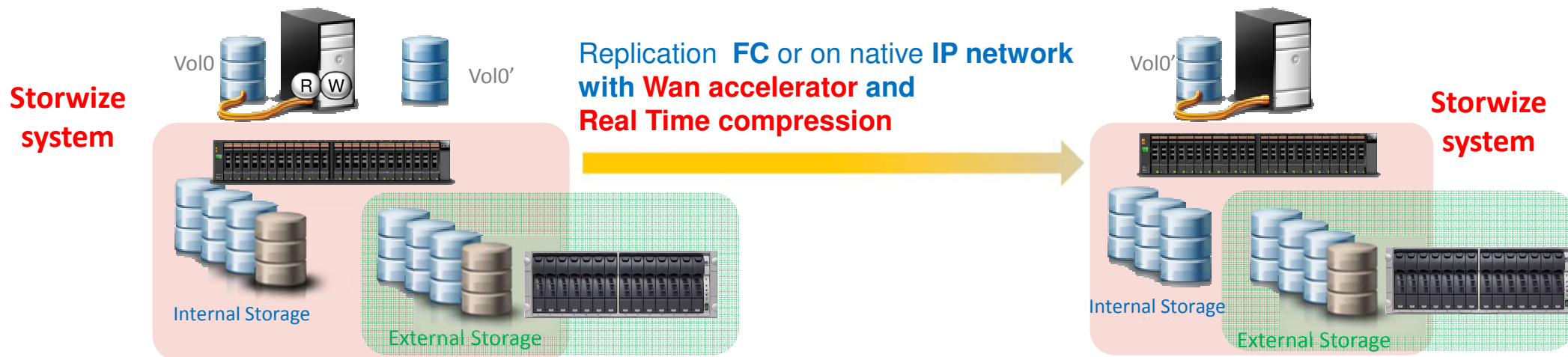
## Global Mirror\*

- Consistent Asynchronous Mirror

2 remote sites (>300 Km)

Low bandwidth Remote Mirroring  
(Global Mirror with change Volumes)

Replication of Flash Copies



Source and target can have different characteristics and be from different vendors

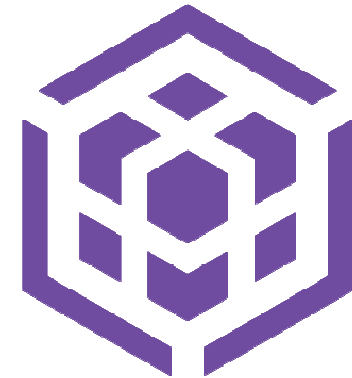
Source and target can be in the same cluster

Remote Copy between SVC & Storwize is supported

(\*) not supported with Storwize V3700

# IBM Spectrum Virtualize : Proven, Efficient, Dependable

- **IBM Spectrum Virtualize software is the heart of IBM SAN Volume Controller, IBM Storwize family, IBM FlashSystem V9000, and VersaStack**
  - Deployed on over **126,000** Storwize systems and **54,500** SVC engines
  - Managing over **297,000** enclosures of data
  - Virtualizing, managing and securing **5.6** exabytes of data
  - Exceeding 99.999% availability
  - Supporting almost 400 IBM and non-IBM storage systems



IBM  
**Spectrum**  
**Virtualize**

Enabling clients to do more with less  
3x performance with only 5% flash  
Up to 63% lower personnel costs  
Up to 100% better storage utilization

## IBM's Cloud Storage Enabling Technologies with **IBM Spectrum Virtualize**

# IBM Spectrum Virtualize for Public Cloud

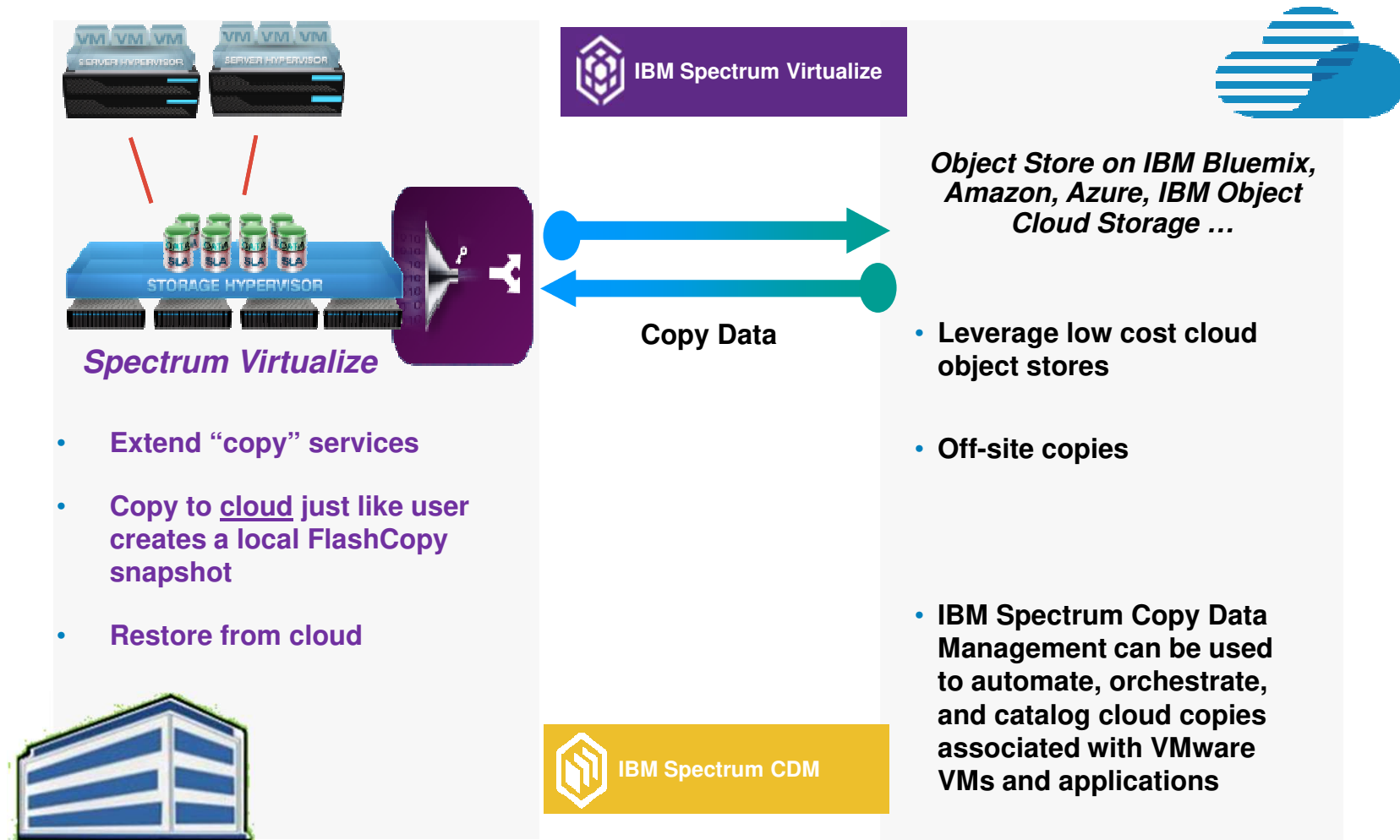
*Enabling DR, replication and migration to public cloud*

- **Uses replication to enable DR and migration between on-premises and *public cloud***
  - Supports clients with SVC, Storwize family, FlashSystem V9000, VersaStack, software only, and over 400 heterogeneous storage systems
- **Enables DR between cloud data centers**
- **Monthly licensing plus metering of incremental capacity usage**
- **Provides additional data services to underlying IBM Cloud block storage: automated tiering, FlashCopy**
- **Supports DRaaS offerings on public cloud**
  - From virtualized or bare metal servers

**New  
4Q 2017**

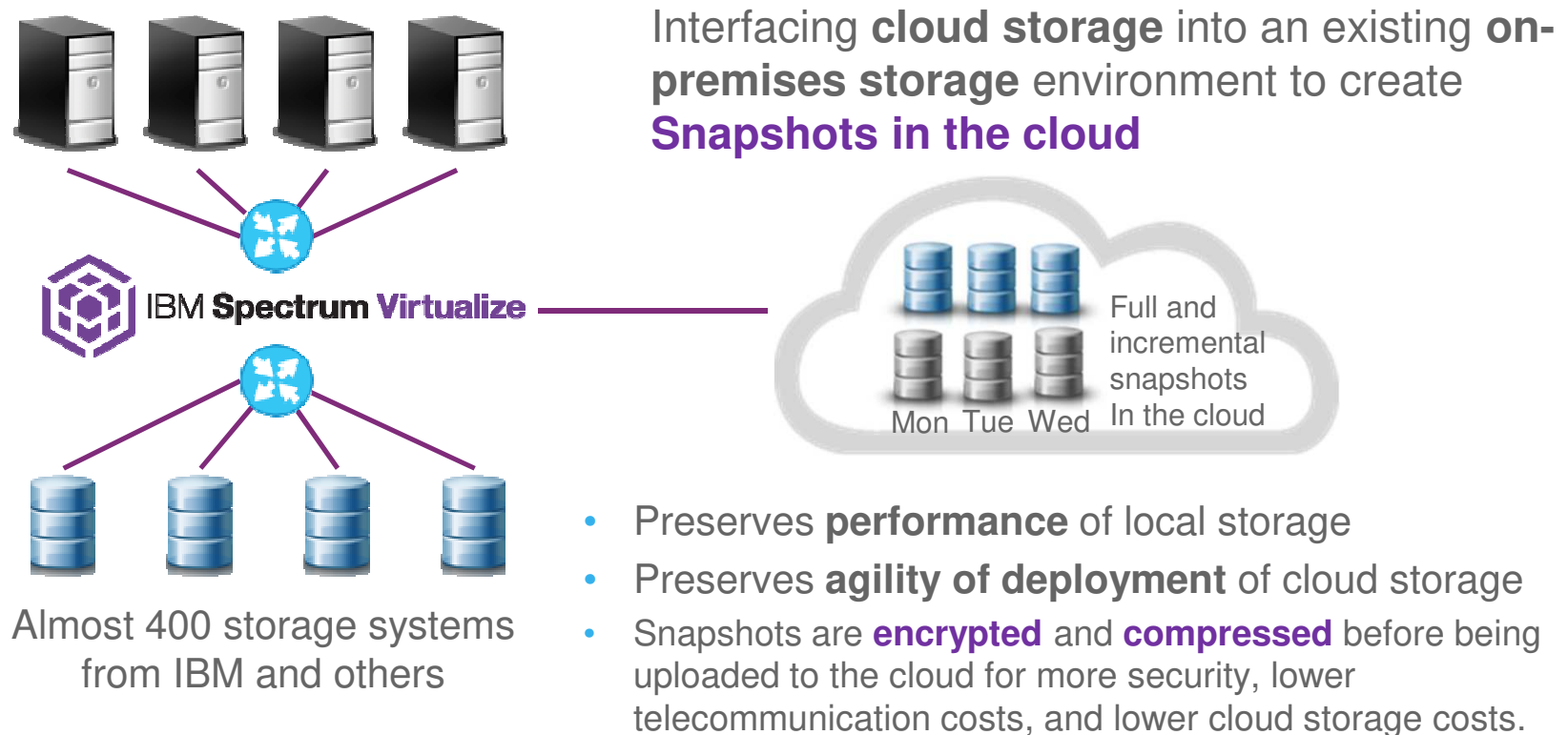


# Transparent Cloud Tiering for IBM Spectrum Virtualize

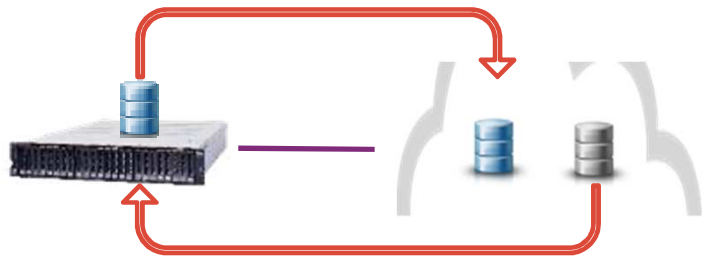




# Transparent Cloud Tiering for IBM Spectrum Virtualize



# IBM Spectrum Virtualize Cloud FlashCopy Use Cases



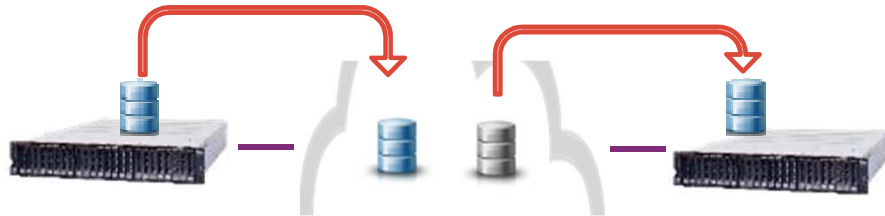
## Backup

- Store copies of volume in cloud; restore to same or other volume



## Archive

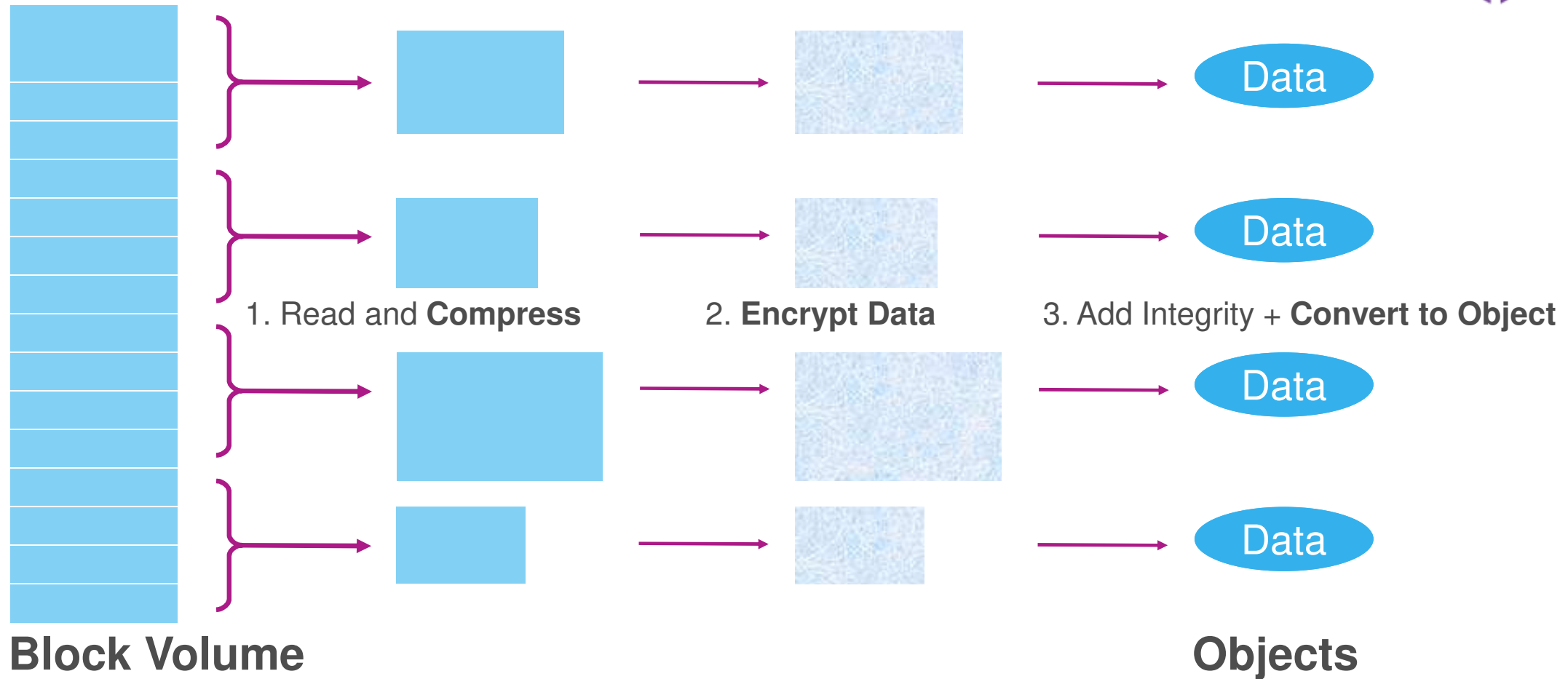
- Store copies of volume in cloud; delete original volume; restore volume if needed



## Transfer

- Store copies of volume in cloud; connect another system to same cloud account; restore volume to new system

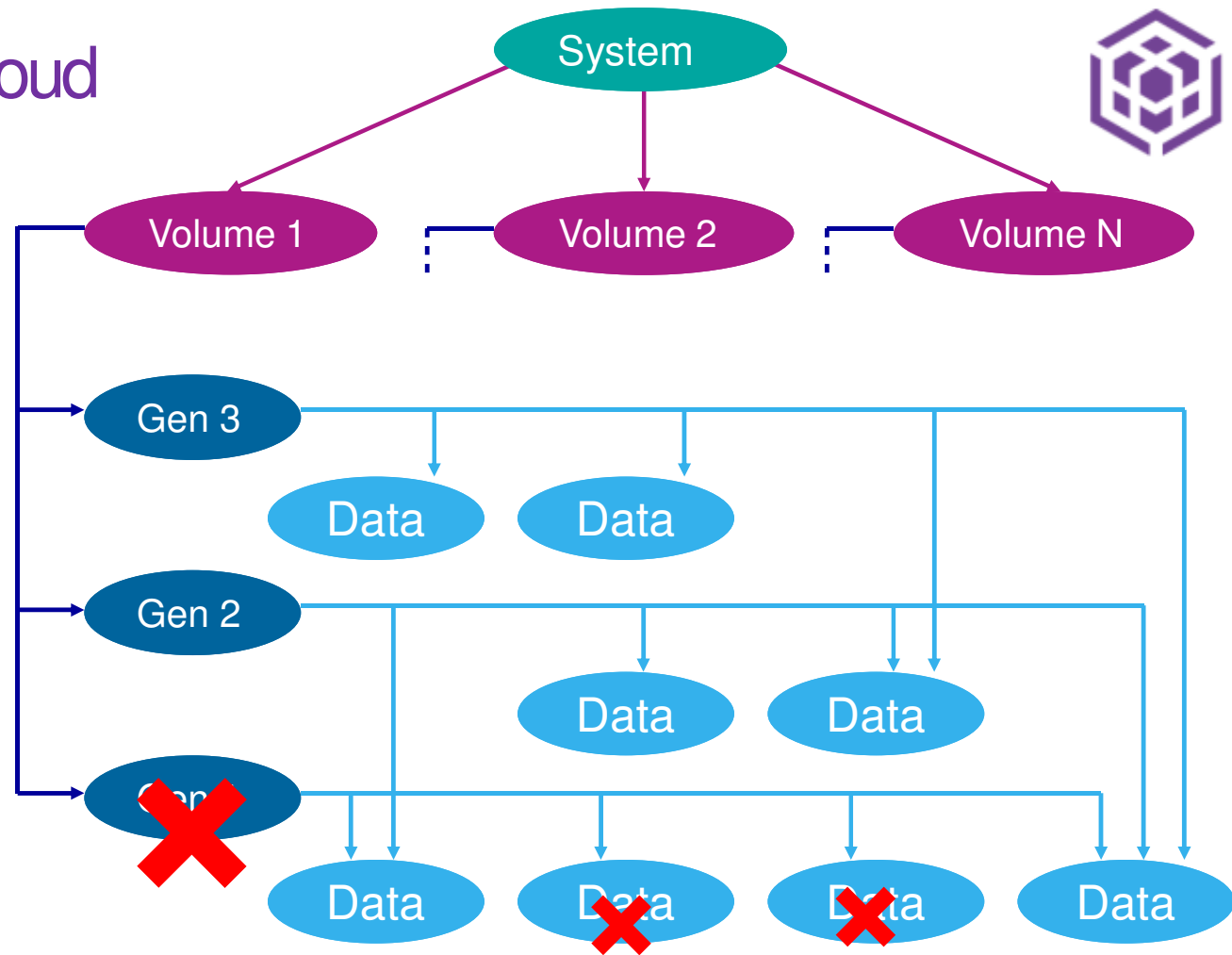
# How It Works: Converting **Block Volumes** to **Objects**



## How it Works: Data in the Cloud

When an old generation is deleted ...

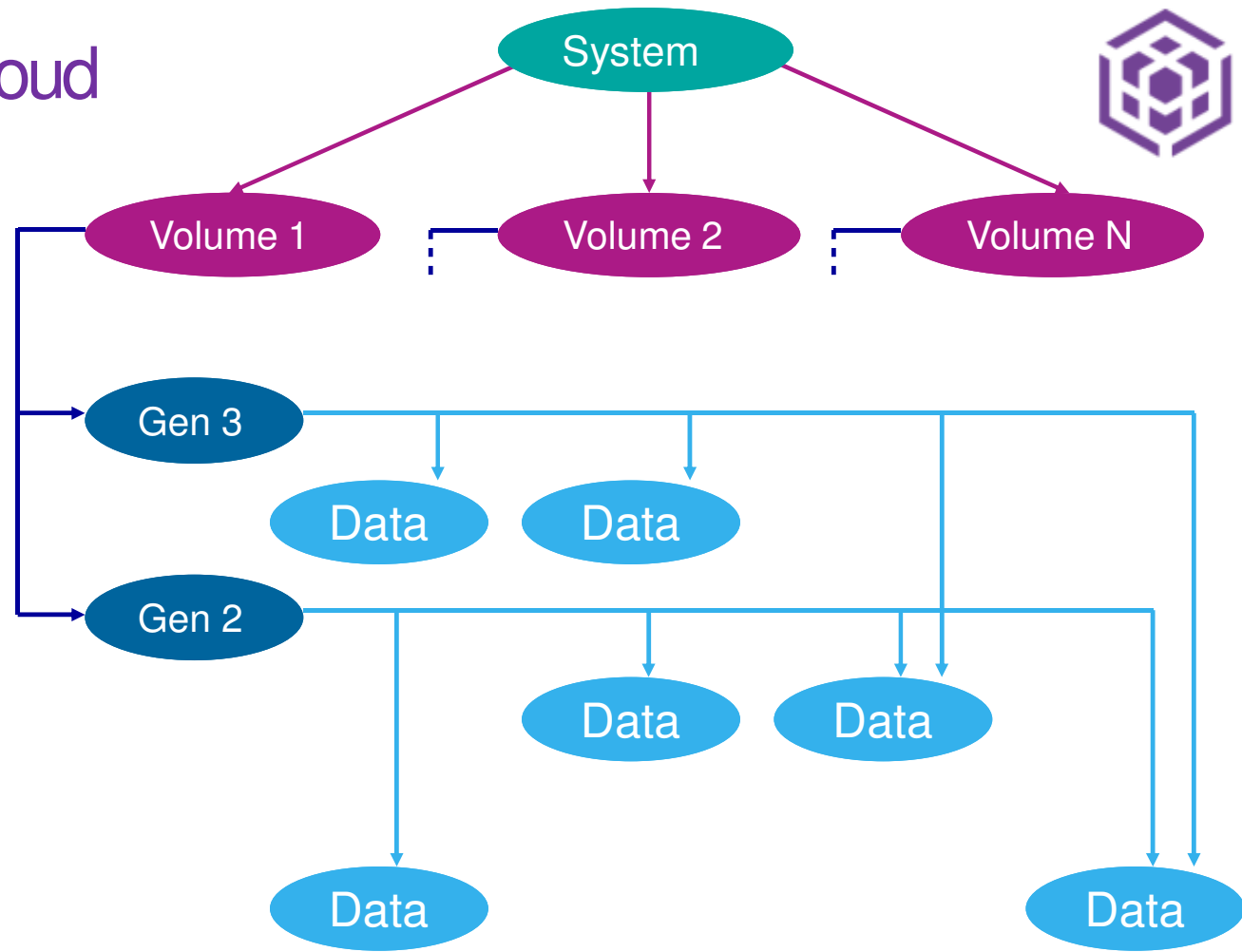
... the index and any data objects that are no longer referenced can be deleted



## How it Works: Data in the Cloud

When an old generation is deleted ...

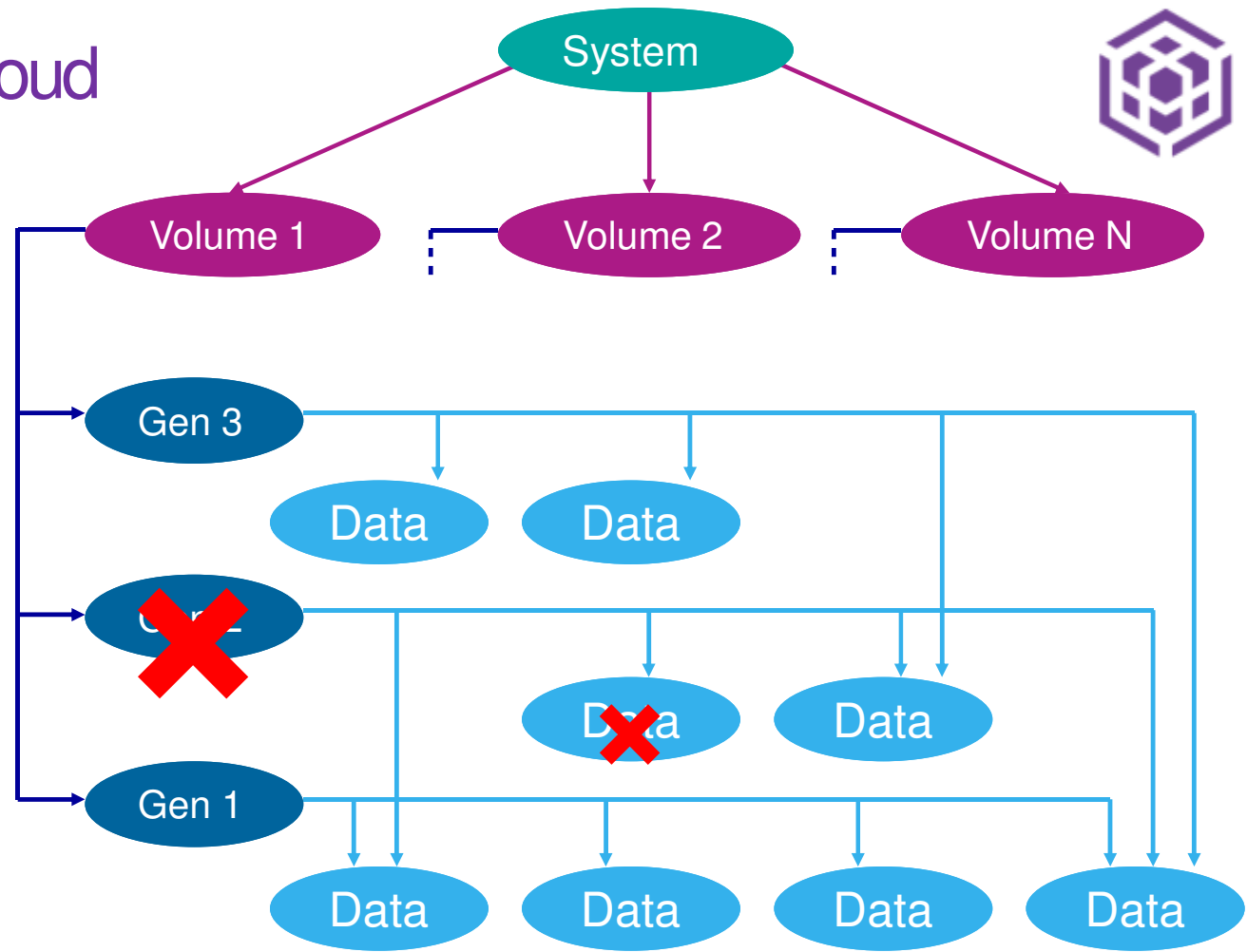
... the index and any data objects that are no longer referenced can be deleted





## How it Works: Data in the Cloud

Generations can be deleted in any order



# Transparent Cloud Tiering for IBM Spectrum Virtualize

## Live Demonstration

Full videos of this demonstration are available on **IBM Client Demonstration Center** :

<https://www.ibm.com/systems/clientcenterdemonstrations/>



IBM Spectrum Virtualize - Understanding Transparent Cloud Tiering (videos - no voice)



2017-04-13

2017-07-05



[https://www.ibm.com/systems/clientcenterdemonstrations/faces/\\_rlvid.jsp?\\_rap=!viewDemo&\\_rvip=/dcSearchDemonstrations.jsp&demoid=2445&conversationContext=1](https://www.ibm.com/systems/clientcenterdemonstrations/faces/_rlvid.jsp?_rap=!viewDemo&_rvip=/dcSearchDemonstrations.jsp&demoid=2445&conversationContext=1)

## IBM Client Demonstration Center

# IBM Spectrum Virtualize - Understanding Transparent Cloud Tiering (videos - no voice)

IBM Spectrum Virtualize - Understanding Transparent Cloud Tiering (videos - no voice)

### Objectives

With version 7.8, IBM Spectrum Virtualize brings a new feature, Transparent Cloud Tiering.

With Transparent Cloud Tiering, you will be able build a hybrid cloud infrastructure in a glimpse, taking benefits of cloud storage, like lowering the costs of on-premise hardware infrastructure and maintenance.

As a first release, Transparent Cloud Tiering allows to:

- backup and restore volumes from a IBM Spectrum Virtualize system to a cloud provider
- archive volumes from a IBM Spectrum Virtualize system to a cloud provider
- import/migrate volumes from a IBM Spectrum Virtualize system to another from the Cloud



#### Backup

- Store copies of volume in cloud; restore to same or other volume



#### Archive

- Store copies of volume in cloud; delete original volume; restore volume if needed



#### Transfer

- Store copies of volume in cloud; connect another system to same cloud account; restore volume to new system

[? Help](#)

Efficiency average rating



Qty per rating:

Very efficient	1	<div></div>
Efficient	3	<div></div>
Ok	0	
Not so hot	0	
Poor	0	

[Make a request](#)

☒ [Book this demonstration](#)

About this demo

Video

**Location:** Montpellier

**Duration:** from 20 to 120 min

**1) Transparent Cloud Tiering for IBM Spectrum Virtualize Configuration :  
Cloud Provider (Softlayer) account creation  
& Transparent Cloud Tiering configuration on Spectrum Virtualize**

# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 1) Cloud Provider (Softlayer) account creation

The screenshot shows the SoftLayer Customer Portal interface. The 'Storage' menu is highlighted, and the 'Object Storage' option is selected. A red overlay message states: "Transparent Cloud Tiering requires an Object Storage account." The interface also displays the Account Summary, Scheduled Maintenance & Updates, and Tickets sections.

**Storage Menu Options:**

- Block Storage
- File Storage
- Object Storage
- CDN
- LockBox
- Backup

**Account Summary:**

Current Balance: \$0.00

Current Payment Method: Manual Modify

**Scheduled Maintenance & Updates:**

March 2017

Su	Mo	Tu	We	Th	Fr	Sa
26	27	28	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

April 2017

Su	Mo	Tu	We	Th	Fr	Sa
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	1	2	3	4	5	6

**Scheduled events**

Click a highlighted calendar date to see scheduled events starting on that day

**Bandwidth**

No bandwidth data to display

**Tickets**

Open: 4

Awaiting Response: 0



# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 1) Cloud Provider (Softlayer) account creation

SoftLayer Customer Portal

SoftLayer Technologies, Inc. [US] | https://control.softlayer.com/storage/objectstorage

HELPCONTACT5 NOTIFICATIONS4 OPEN TICKETS

GAUTHIER SIRIIBM - IBMCCMPL (311896)LOG OUT

SOFTLAYERan IBM Company

DevicesStorageNetworkSecurityServicesSupportAccount

Search

Object Storage

[Order Object Storage](#) [View Documentation](#)

You can now migrate to IBMid. Visit your [User Profile](#) page to get started.

25 Items per page | 1-3 of 3 Volumes

ACCOUNT NAME	API TYPE
<a href="#">IBMOS311896-2</a>	SWIFT
<a href="#">IBMOS311896-3</a>	SWIFT

Order Object Storage

Select Storage Type

Cloud Object Storage - S3 API

Cloud Object Storage - Standard Regional Swift API

Cloud Object Storage - S3 API

Object Storage pricing is accrued on a pay-as-you-go basis, charges are based on storage bucket type and resiliency. Prices may differ depending on the datacenters used.

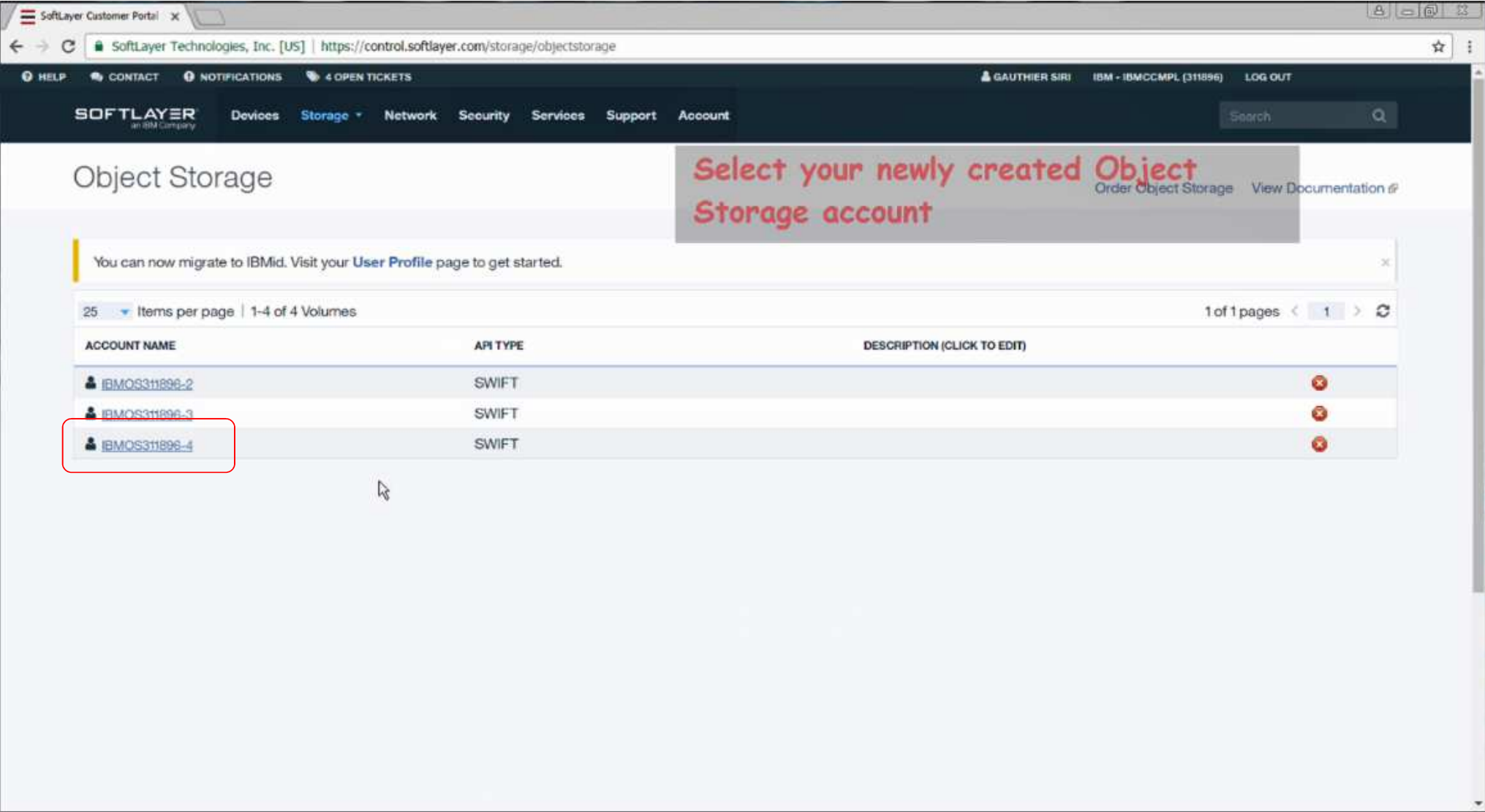
	Standard Active data	Vault Less active data	Cold Vault Long-term data
Capacity Usage	\$0.0220 / GB per month	\$0.0150 / GB per month	\$0.0080 / GB per month
Bandwidth Usage	\$0.0650 / GB	\$0.0650 / GB	\$0.0650 / GB
Class A Operations	\$0.0044 / 1000 Requests	\$0.0090 / 1000 Requests	\$0.0180 / 1000 Requests
Class B Operations	\$0.0036 / 10000 Requests	\$0.0090 / 10000 Requests	\$0.0180 / 10000 Requests
Data Retrieval	N/A	\$0.0070 / GB	\$0.0360 / GB

Cancel

Continue

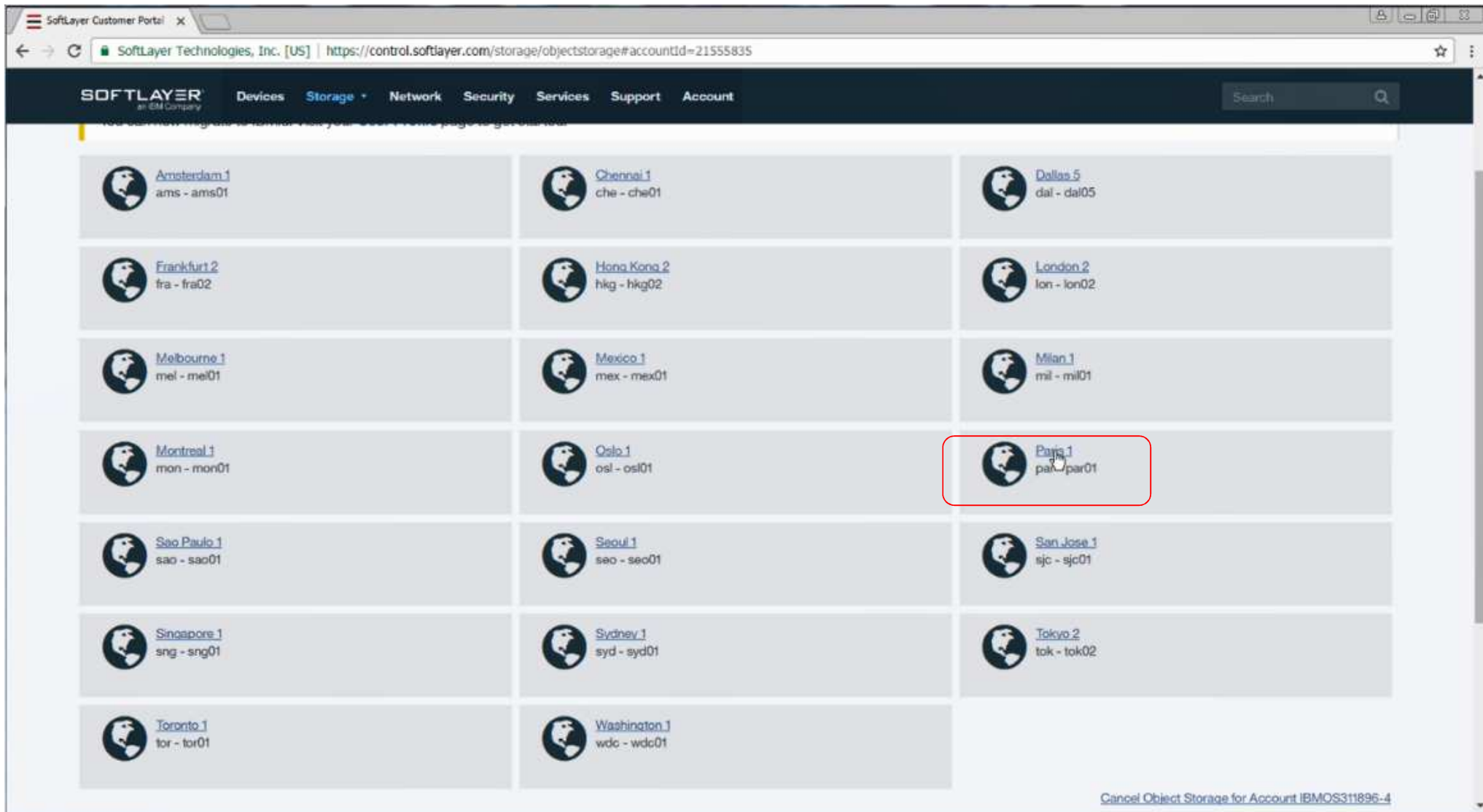
# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 1) Cloud Provider (Softlayer) account creation



# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 1) Cloud Provider (Softlayer) account creation



## 1) Cloud Provider (Softlayer) account creation

**All the necessary information to configure the Transparent Cloud Tiering will be found in View Credentials**

Object Storage

You can now migrate to IBMid. Visit your [User Profile](#) page to get started.

Account ▾

◀ Paris 1

IBMOS311896-4 ▾

[View Credentials](#)  
[Manage User](#)  
[Cancel Account](#)

Cluster / par01

Type to filter [Clear](#)

25 ▾ Items per page!

☐ NAME

**Credentials**

**Authentication Endpoint**  
 Public: <https://par01.objectstorage.softlayer.net/auth/v1.0/>  
 Private: <https://par01.objectstorage.service.networklayer.com/auth/v1.0/>

**Username**  
 IBMOS311896-4:siri.gauthier

**API Key (Password)**  
 19d10a3a322b0c31724ed29041227d222251e19d21bacc203220241003

[OK](#)

**Account Usage**

Containers

**Public Network Usage**

Incoming

**Private Network Usage**

Incoming

Outgoing

**CDN Usage**

HTTP

Adobe Flash

[Add Container](#)

[Search](#) [Clear](#)

**Details**

Click a row to view item details.

[No Containers Found](#)

# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 1) Cloud Provider (Softlayer) account creation

**All the necessary information to configure the Transparent Cloud Tiering will be found in View Credentials**

The screenshot displays the SoftLayer Customer Portal interface. A modal window titled "Credentials" is open, showing the following information:

- Authentication Endpoint:**
  - Public: `https://par01.objectstorage.softlayer.net/auth/v1.0/`
  - Private: `https://par01.objectstorage.softlayer.net/auth/v1.0/`
- Username:** `IBMOS311896-4.siri.gauthier`
- API Key (Password):** `19d10car9522e41724ad95412275d2523951e10d5f8acc2952200449663`

Red arrows and text annotations highlight the following fields:

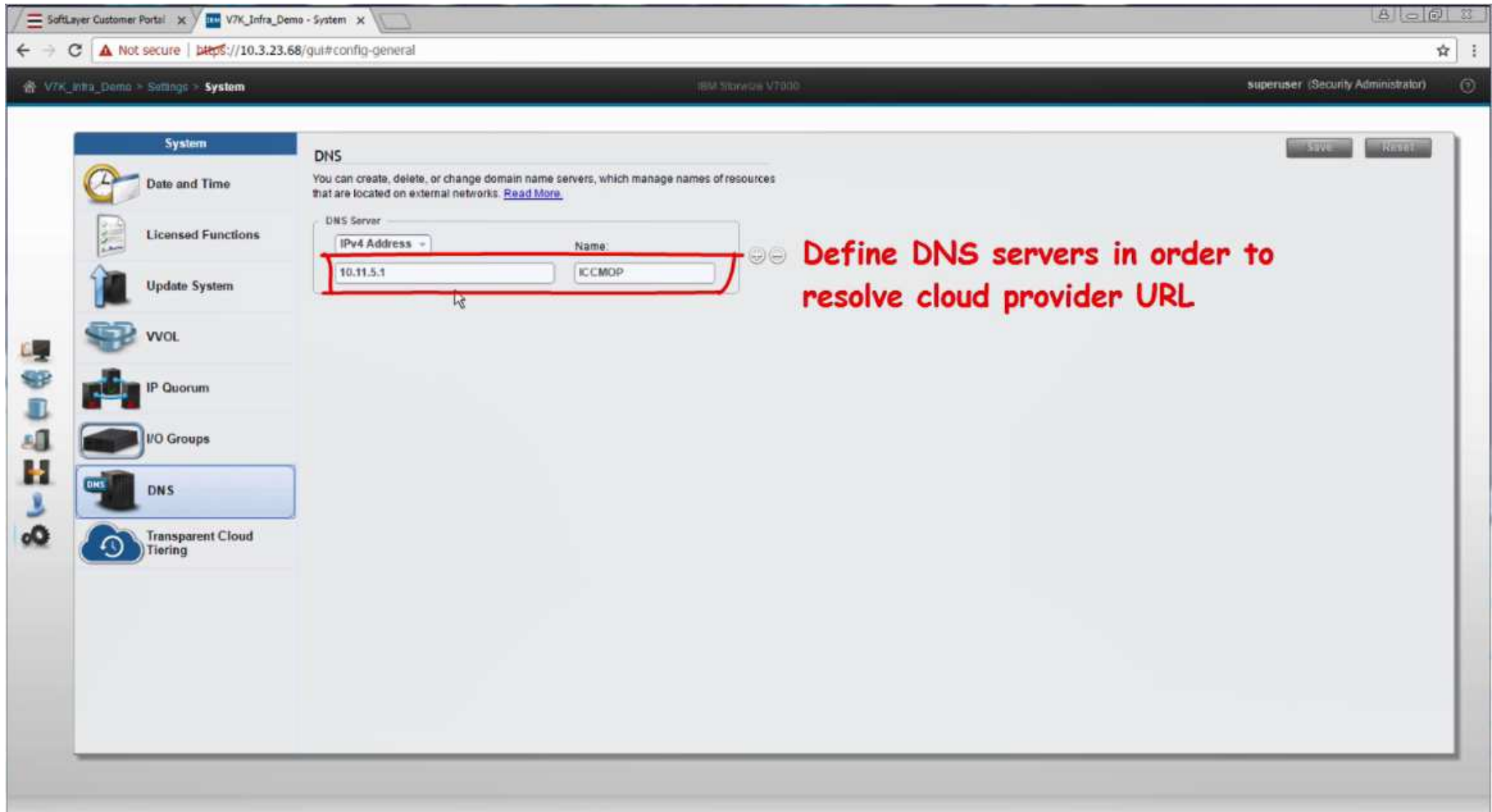
- Tenant:** Points to the "par01" part of the URL in the Authentication Endpoint.
- Object Storage URL:** Points to the "Public" Authentication Endpoint.
- User name:** Points to the "Username" field.
- API Key:** Points to the "API Key (Password)" field.

The background of the portal shows the "Object Storage" section with a "View Credentials" button and a "Details" section.



# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 2) Transparent Cloud Tiering configuration on Spectrum Virtualize



The screenshot displays the 'System' configuration page in the IBM Spectrum Virtualize management console. The left sidebar contains a navigation menu with options: Date and Time, Licensed Functions, Update System, VVOL, IP Quorum, I/O Groups, DNS (selected), and Transparent Cloud Tiering. The main content area is titled 'DNS' and includes a description: 'You can create, delete, or change domain name servers, which manage names of resources that are located on external networks. [Read More](#)'. Below this, there is a table for DNS servers. The first entry is highlighted with a red rectangle, showing an IPv4 Address of '10.11.5.1' and a Name of 'ICCMOP'. To the right of the table, there is a red text annotation: 'Define DNS servers in order to resolve cloud provider URL'. The top of the browser window shows the URL 'https://10.3.23.68/qui#config-general' and the user 'superuser (Security Administrator)'.

System

DNS

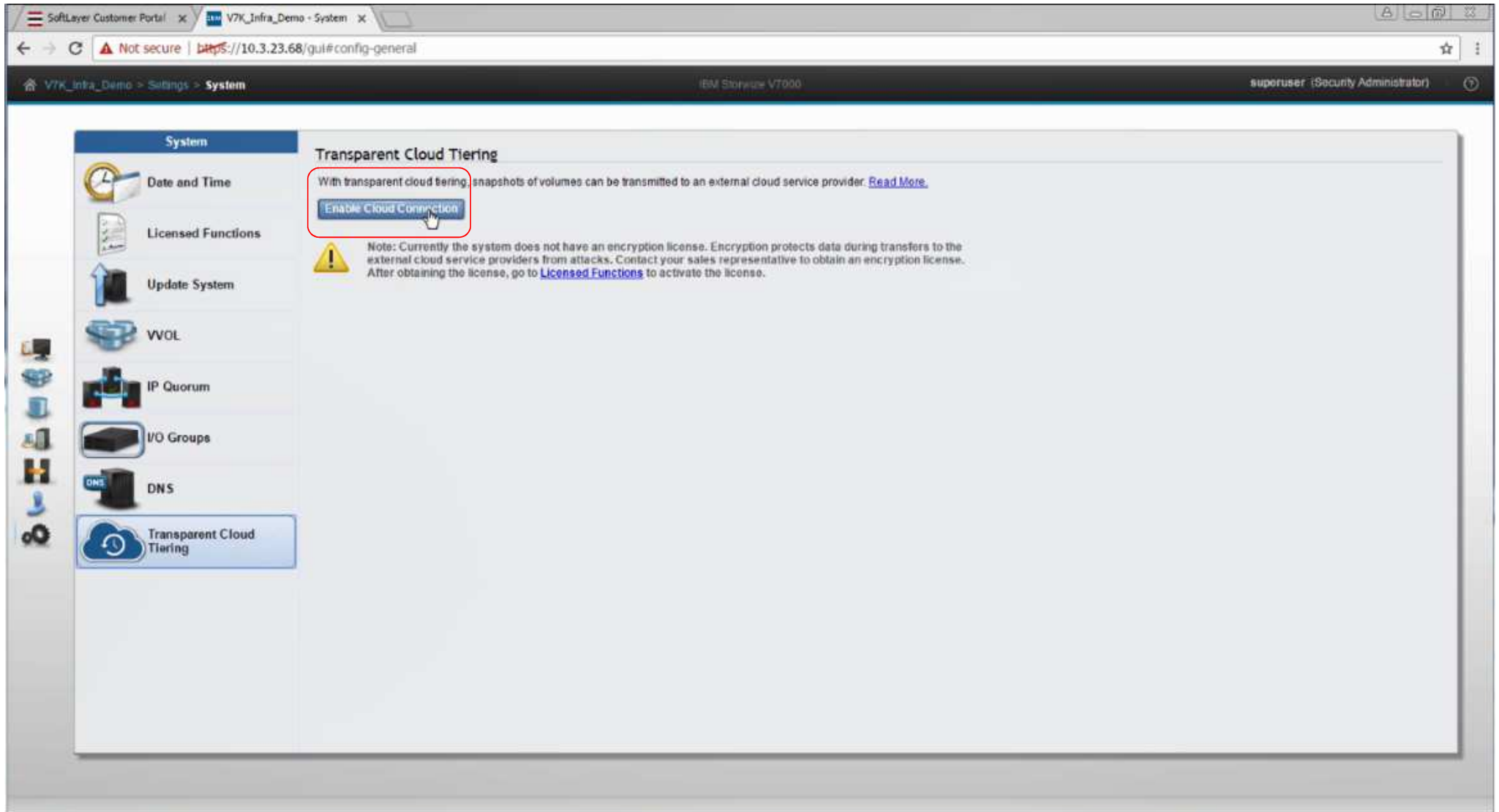
You can create, delete, or change domain name servers, which manage names of resources that are located on external networks. [Read More](#)

IPv4 Address	Name
10.11.5.1	ICCMOP

Define DNS servers in order to resolve cloud provider URL

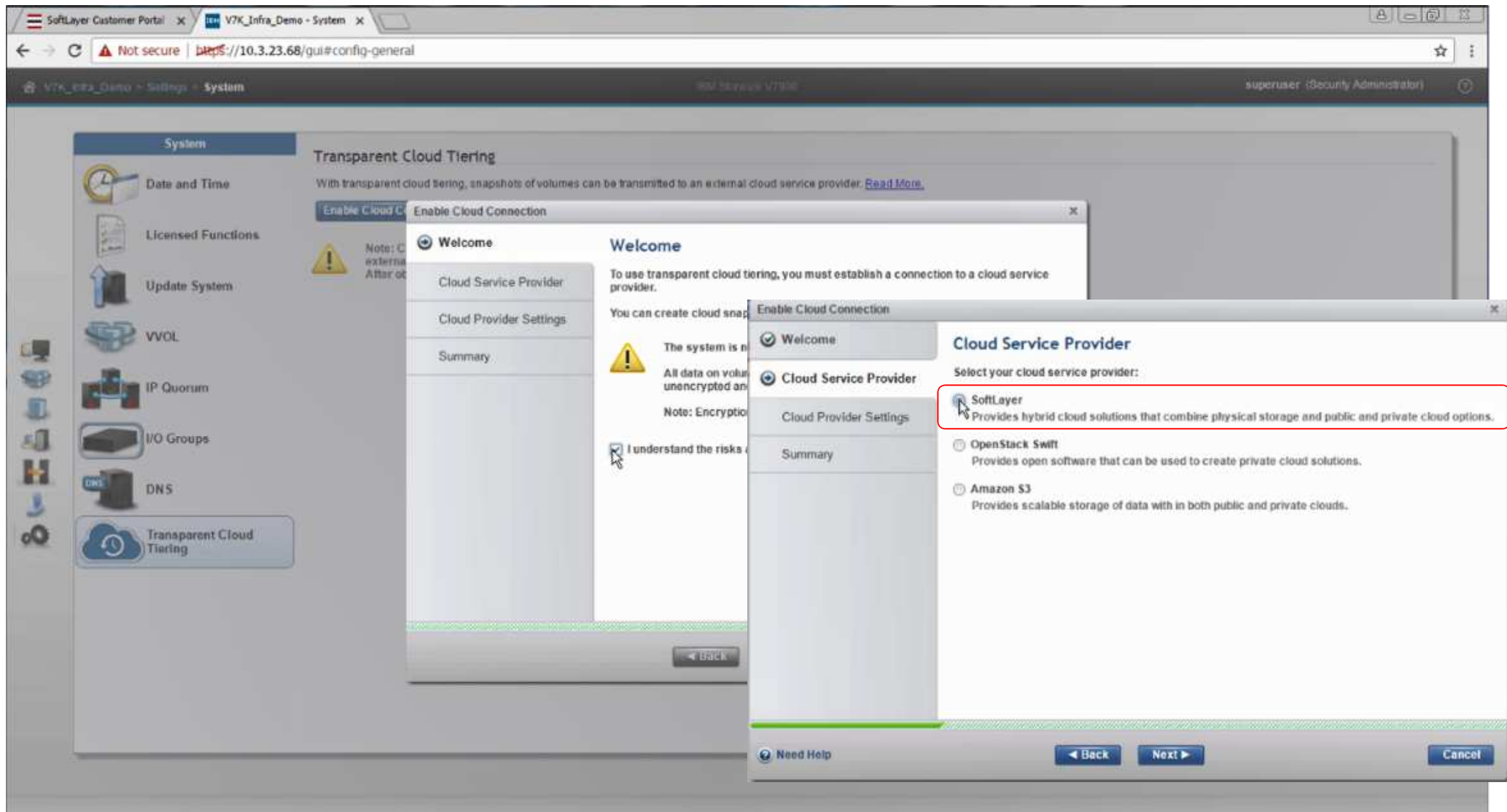
# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 2) Transparent Cloud Tiering configuration on Spectrum Virtualize



# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 2) Transparent Cloud Tiering configuration on Spectrum Virtualize



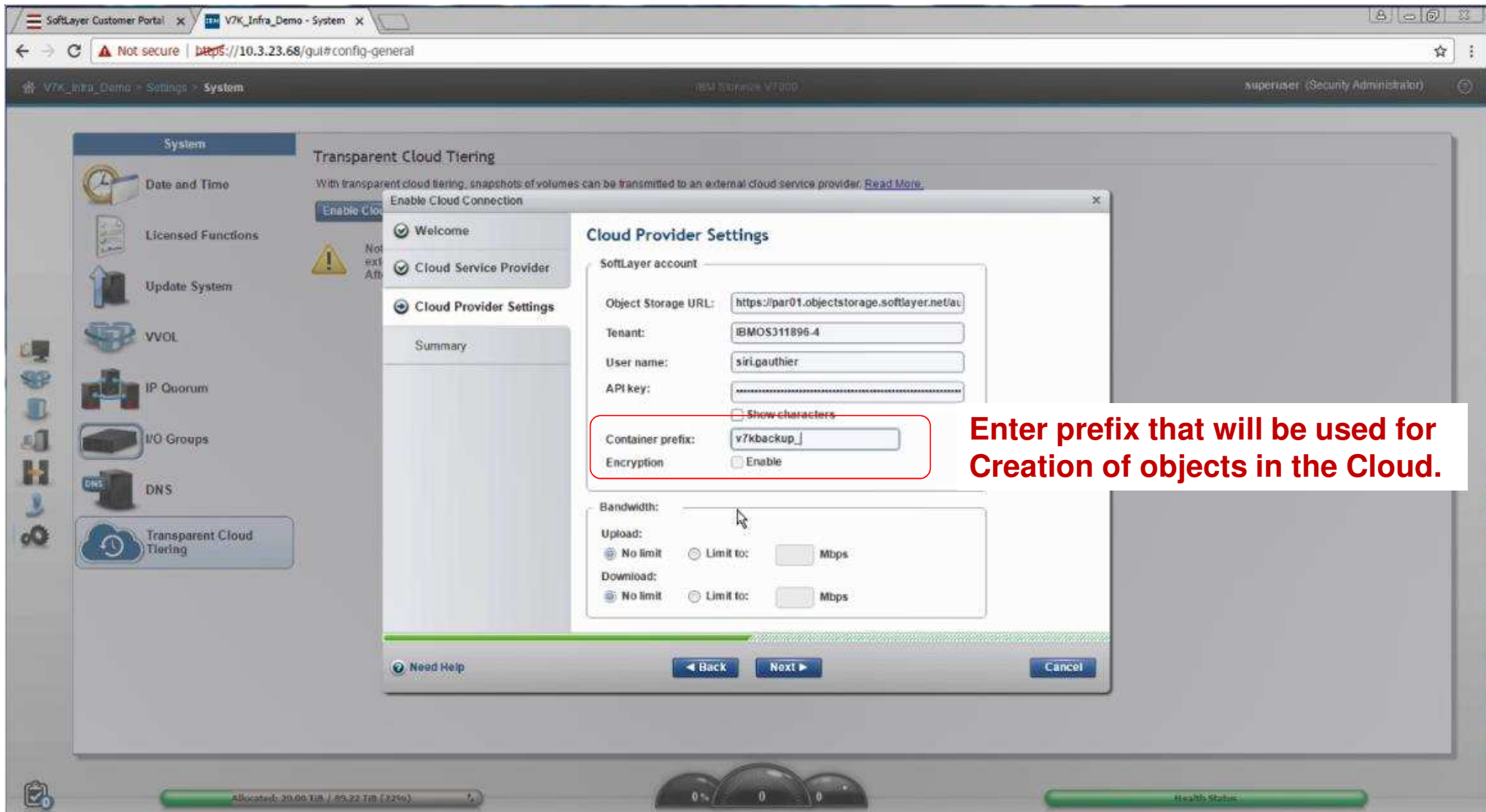
## 2) Transparent Cloud Tiering configuration on Spectrum Virtualize

Enter parameter of the Object Storage account created in the Cloud provider (Softlayer)

The screenshot shows the 'Cloud Provider Settings' page in the SoftLayer Customer Portal. The 'SoftLayer account' section is highlighted with a red box, and a red arrow points to the 'Object Storage URL' field. The 'Object Storage URL' field contains the value 'https://par01.objectstorage.softlayer.net/auth/v1.0/'. Other fields include 'Tenant' (IBMOS311896-4), 'User name' (siri.gauthier), and 'API key' (a long alphanumeric string). The 'Show characters' checkbox is checked. The 'Container prefix' field is empty, and the 'Encryption' checkbox is unchecked. The 'Bandwidth' section shows 'Upload' and 'Download' limits, both set to 'No limit'. The 'Transparent Cloud Tying' section is visible on the left sidebar.

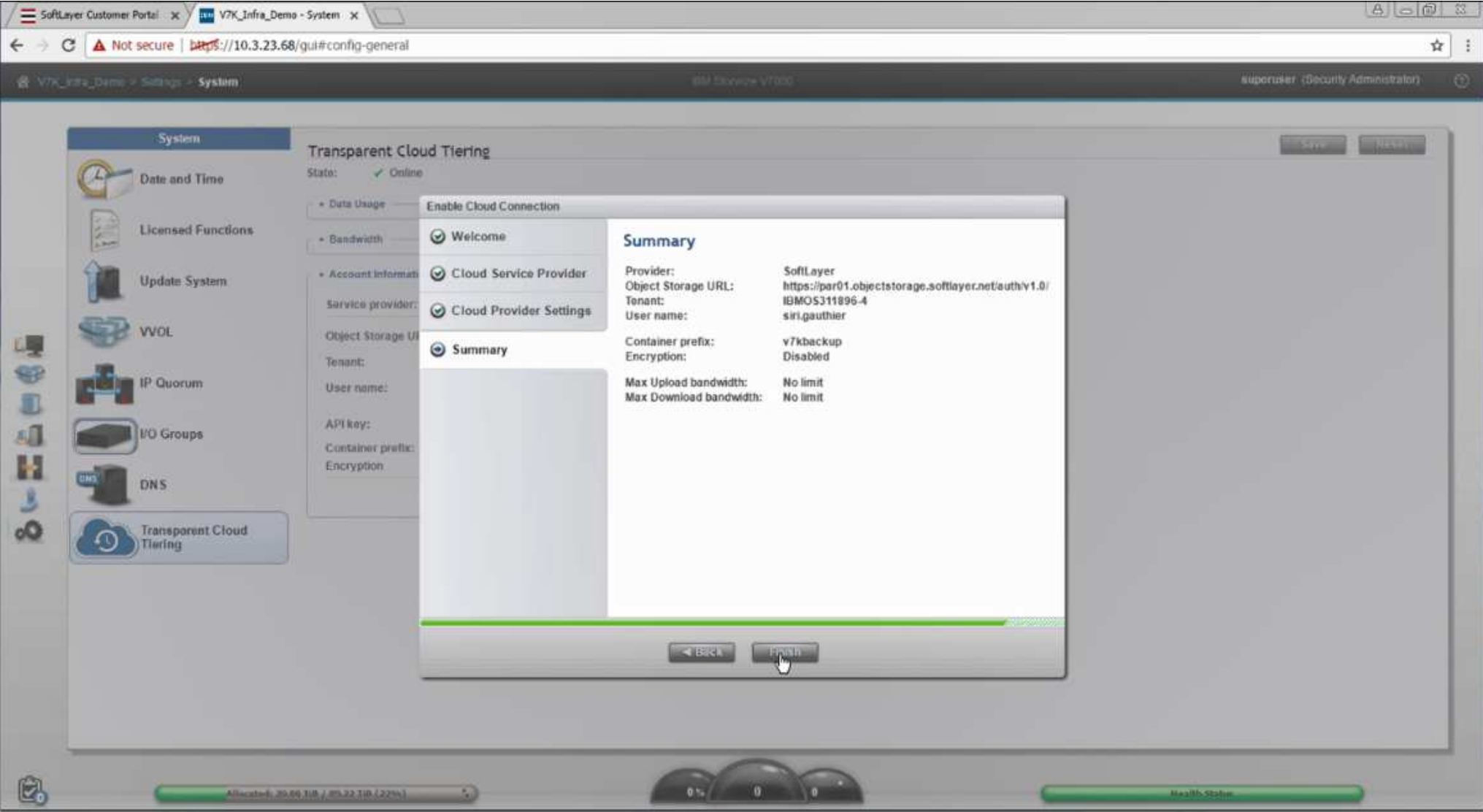
# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 2) Transparent Cloud Tiering configuration on Spectrum Virtualize



# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 2) Transparent Cloud Tiering configuration on Spectrum Virtualize





# Transparent Cloud Tiering for IBM Spectrum Virtualize : Configuration

## 2) Transparent Cloud Tiering configuration on Spectrum Virtualize

Software Customer Portal x V7K\_Infra\_Demo - System x

Not secure | <https://10.3.23.68/gui#config-general>

V7K\_Infra\_Demo > Settings > System IBM Storage V7000 superuser (Security Administrator)

### System

- Date and Time
- Licensed Functions
- Update System
- VVOL
- IP Quorum
- I/O Groups
- DNS
- Transparent Cloud Tiering

### Transparent Cloud Tiering

State: ✓ Online

**Data Usage**

Date:	3/22/17
Data Uploaded:	0 bytes
Data Downloaded:	0 bytes
Storage Consumed:	0 bytes

[Reset History](#) [Download Cloud Usage History](#)

**Bandwidth**

Upload: ☒ No limit ☐ Limit to:  Mbps

Download: ☒ No limit ☐ Limit to:  Mbps

**Account Information**

Service provider:	SoftLayer
Object Storage URL:	<input type="text" value="https://par01.objectstorage.softlayer.net/auth/v1.0/"/>
Tenant:	IBMO5311896-4
User name:	<input type="text" value="siri.gauthier"/>
API key:	<input type="text" value="Configured"/> <a href="#">Edit</a>
Container prefix:	v7kbackup
Encryption:	Disabled

[Remove Account](#)

[Save](#) [Reset](#)

Health Status

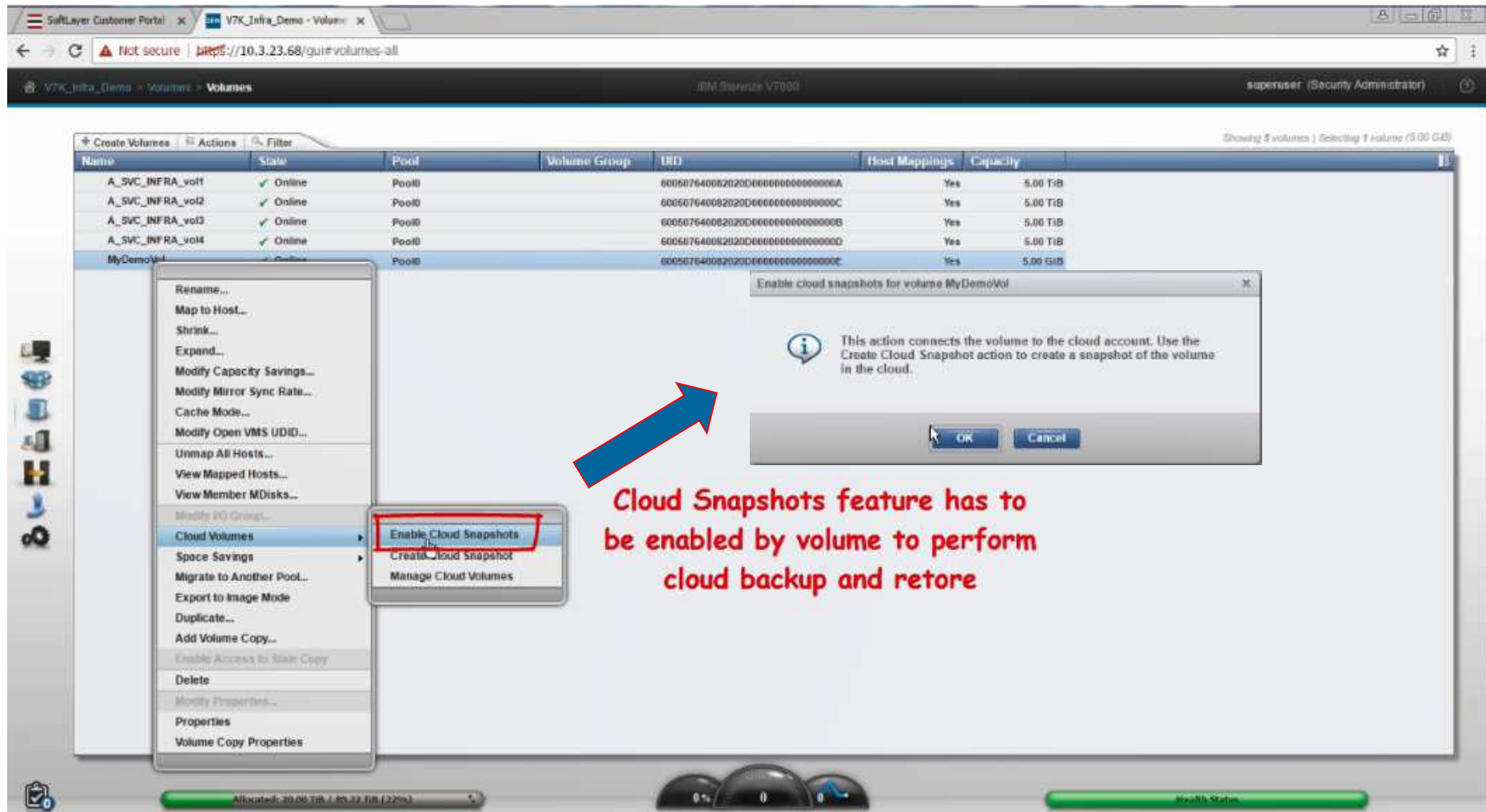
**IBM Spectrum Virtualize Transparent Cloud Tiering  
is now ready to use**



## **Backup in the Cloud with IBM Spectrum Virtualize**

# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 3) Backup in the Cloud



# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 3) Backup in the Cloud

Software Customer Portal x V7K\_Infra\_Demo - Volume x

Not secure <https://10.3.23.68/gui#volumes-all>

V7K\_Infra\_Demo > Volumes > Volumes IBM Storwize V7000 superuser (Security Administrator)

Showing 5 volumes | Selecting 1 volume (5.00 GiB)

Name	State	Pool	Volume Group	UUID	Host Mappings	Capacity
A_SVC_INFRA_vol1	Online	Pool0		600587640082020D0000000000000000A	Yes	5.00 TiB
A_SVC_INFRA_vol2	Online	Pool0		600587640082020D0000000000000000C	Yes	5.00 TiB
A_SVC_INFRA_vol3	Online	Pool0		600587640082020D0000000000000000B	Yes	5.00 TiB
A_SVC_INFRA_vol4	Online	Pool0		600587640082020D0000000000000000D	Yes	5.00 TiB
MyDemoVol	Online	Pool0		600587640082020D0000000000000000E	Yes	5.00 GiB

Volumes

- Volumes
- Volumes by Pool
- Volumes by Host
- Cloud Volumes

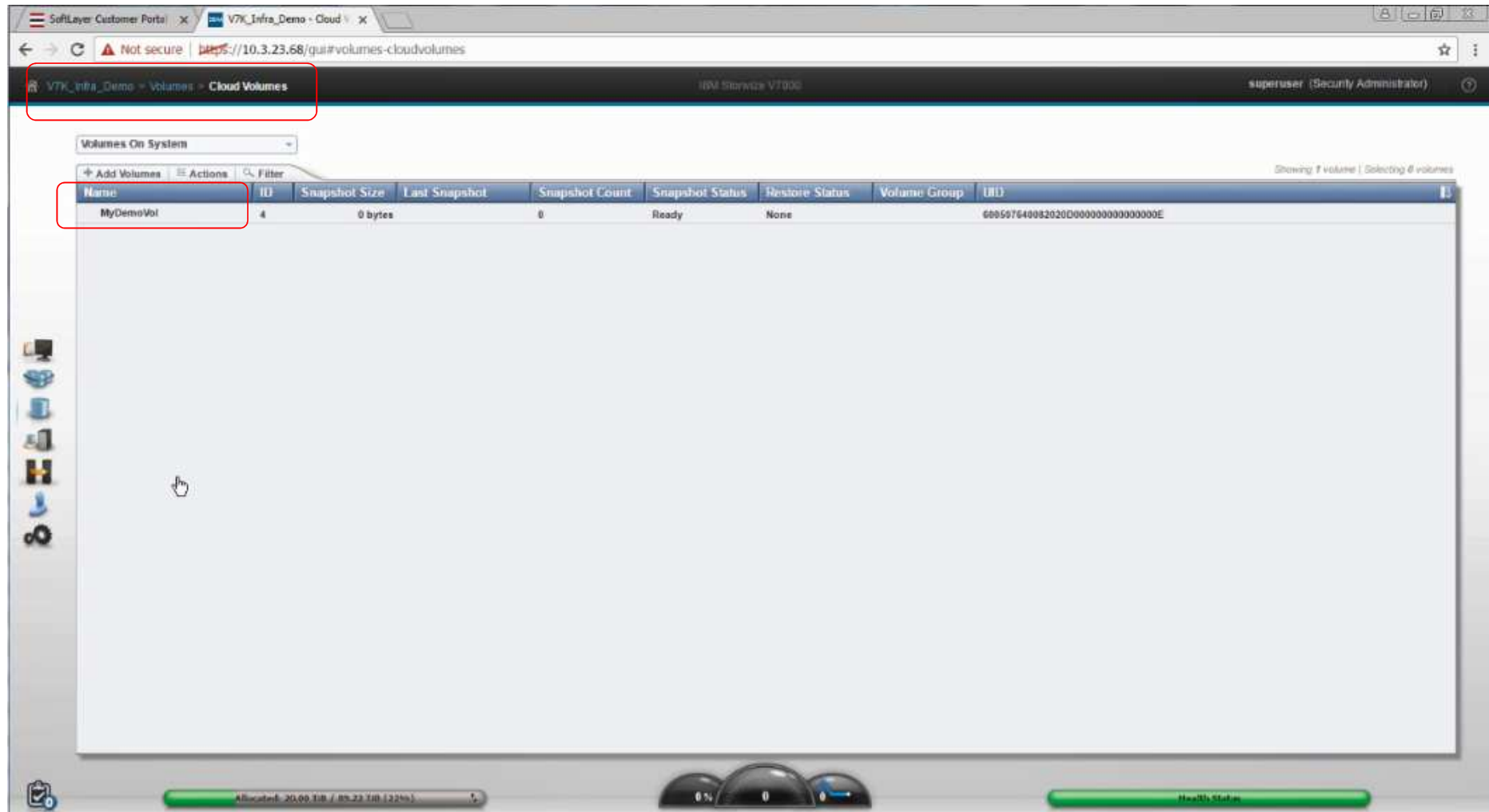
New page dedicated to Cloud Volumes

0% 0 Health Status

<https://10.3.23.68/gui#volumes-cloudvolumes>

# Transparent Cloud Tiering for IBM Spectrum Virtualize :

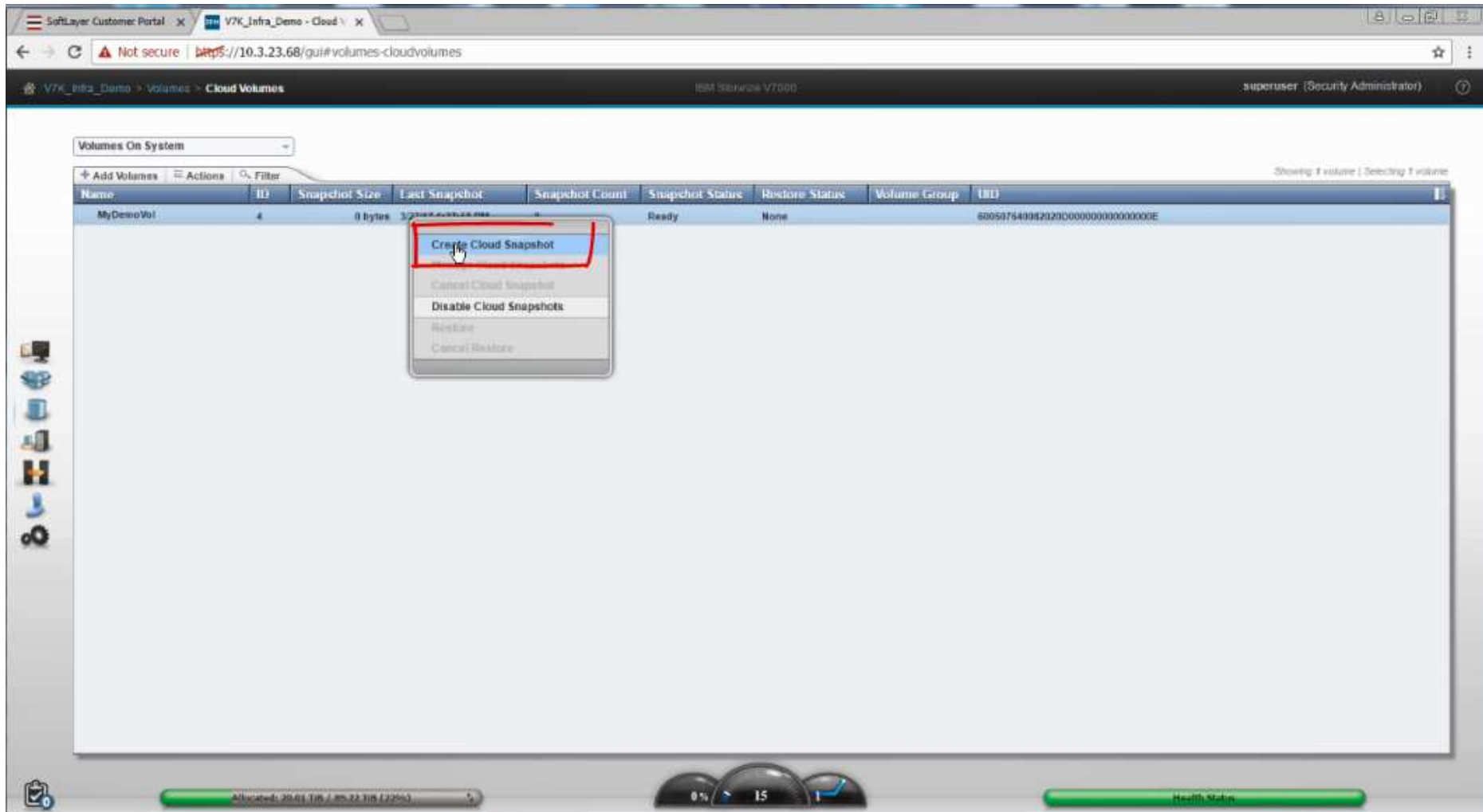
## 3) Backup in the Cloud



## Transparent Cloud Tiering for IBM Spectrum Virtualize :

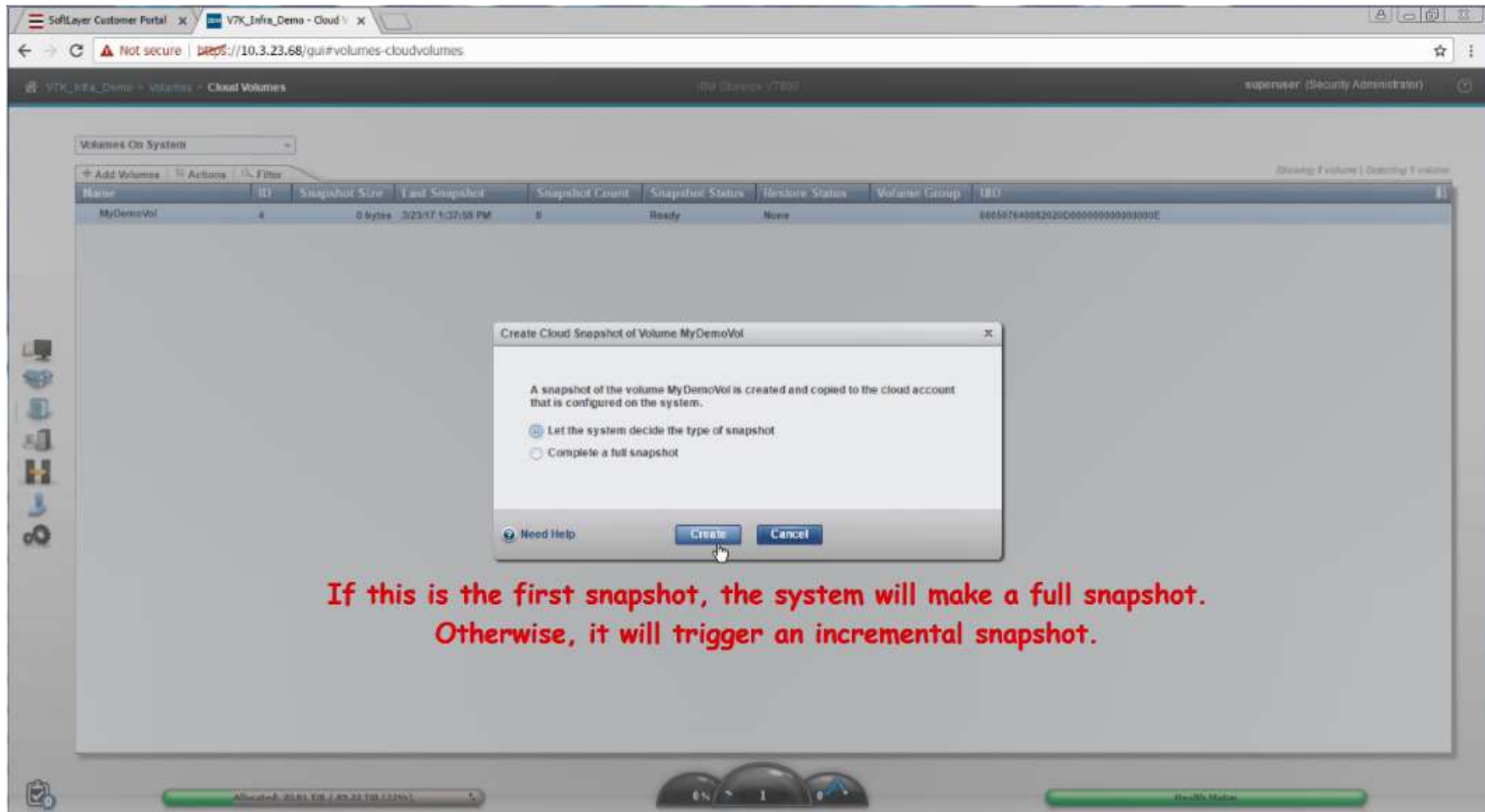
### 3) Backup in the Cloud

Create a Cloud Snapshot of the Volume.



## Transparent Cloud Tiering for IBM Spectrum Virtualize :

### 3) Backup in the Cloud



# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 3) Backup in the Cloud

The screenshot shows the IBM Spectrum Virtualize console interface. At the top, the browser address bar shows a URL starting with 'https://10.3.23.68'. The console header indicates 'V7K\_Infra\_Demo - Cloud Volumes' and 'superuser (Security Administrator)'. Below the header, there's a section titled 'Volumes On System' with a dropdown menu. A table lists the volumes, with one volume 'MyDemoVol' highlighted. A red box highlights the 'Snapshot Status' and 'Restore Status' columns for this volume, showing 'Ready' and 'Available' respectively. Red text overlay says 'When the snapshot is completed, the status is updated.'

Name	ID	Snapshot Size	Last Snapshot	Snapshot Count	Snapshot Status	Restore Status	Volume Group	UUID
MyDemoVol	4	254.66 MB	3/23/17 1:42:18 PM	1	Ready	Available		6065676400020200000000000000000E

When the snapshot is completed, the status is updated.

Running Tasks

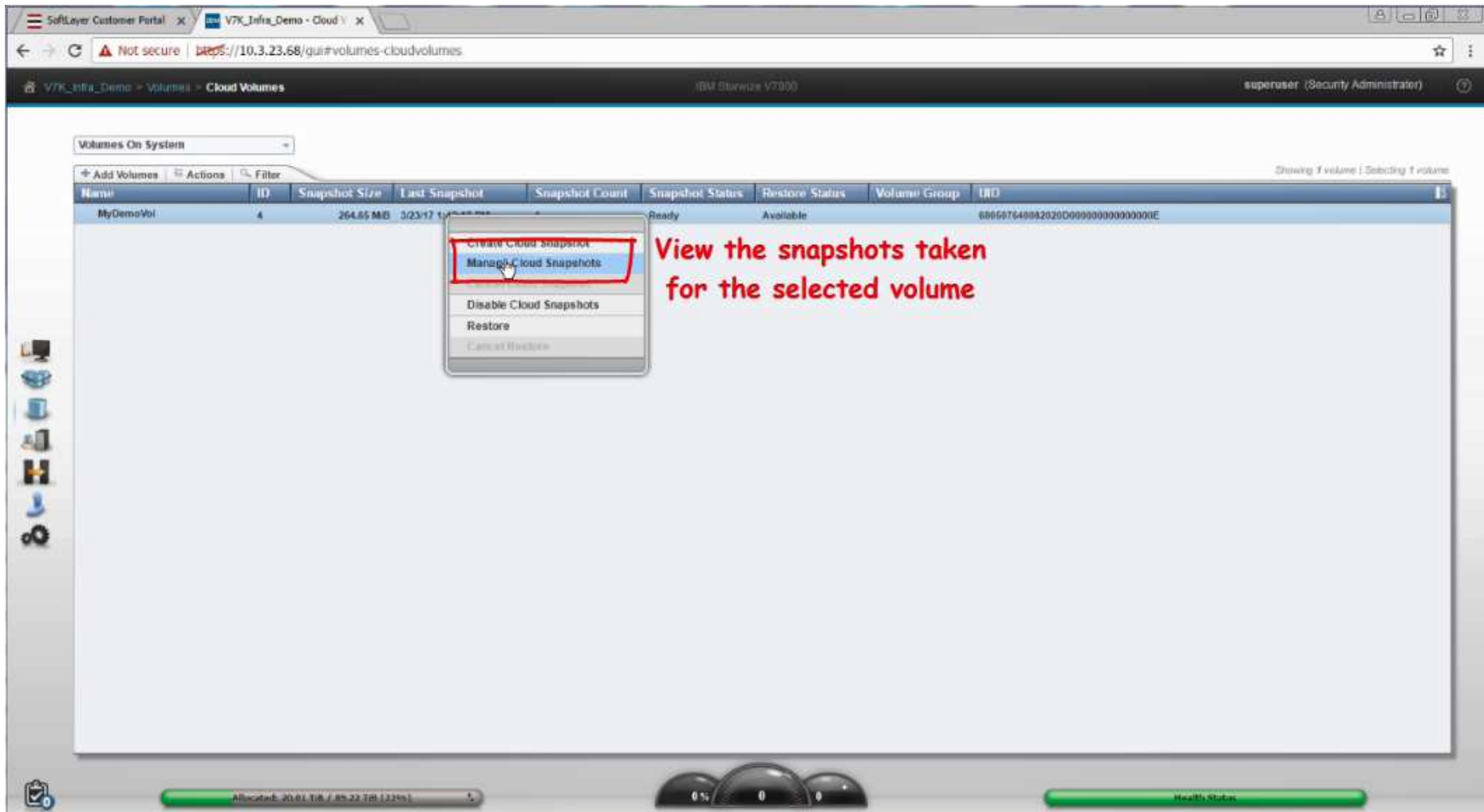
Recently Completed Tasks (0)

Allocated: 30.63 TiB / 39.33 TiB (77%)

Health Status

# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 3) Backup in the Cloud





# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 3) Backup in the Cloud

Software Customer Portal x VTK\_Infra\_Demo - Cloud V x

Not secure | <https://10.3.23.68/qui#volumes-cloudvolumes>

VTK\_Infra\_Demo > Volumes > Cloud Volumes IBM Service V7300 superuser (Security Administrator)

Volumes On System

+ Add Volumes | Actions | Filter Showing 1 volume | Detailing 1 volume

Name	ID	Snapshot Size	Last Snapshot	Snapshot Count	Snapshot Status	Restore Status	Volume Group	UUID
MyDemoVol	4	254.85 MB	3/23/17 1:42:18 PM	1	Ready	Available		000507640052020D0000000000000000E

Manage cloud snapshots for volume MyDemoVol

Indicates the date and time when the volume was backed up to the cloud.

Snapshot Date	Volume Size	Volume Group	Type	State
3/23/17 1:42:18 PM	5.00 GiB		Full	Complete

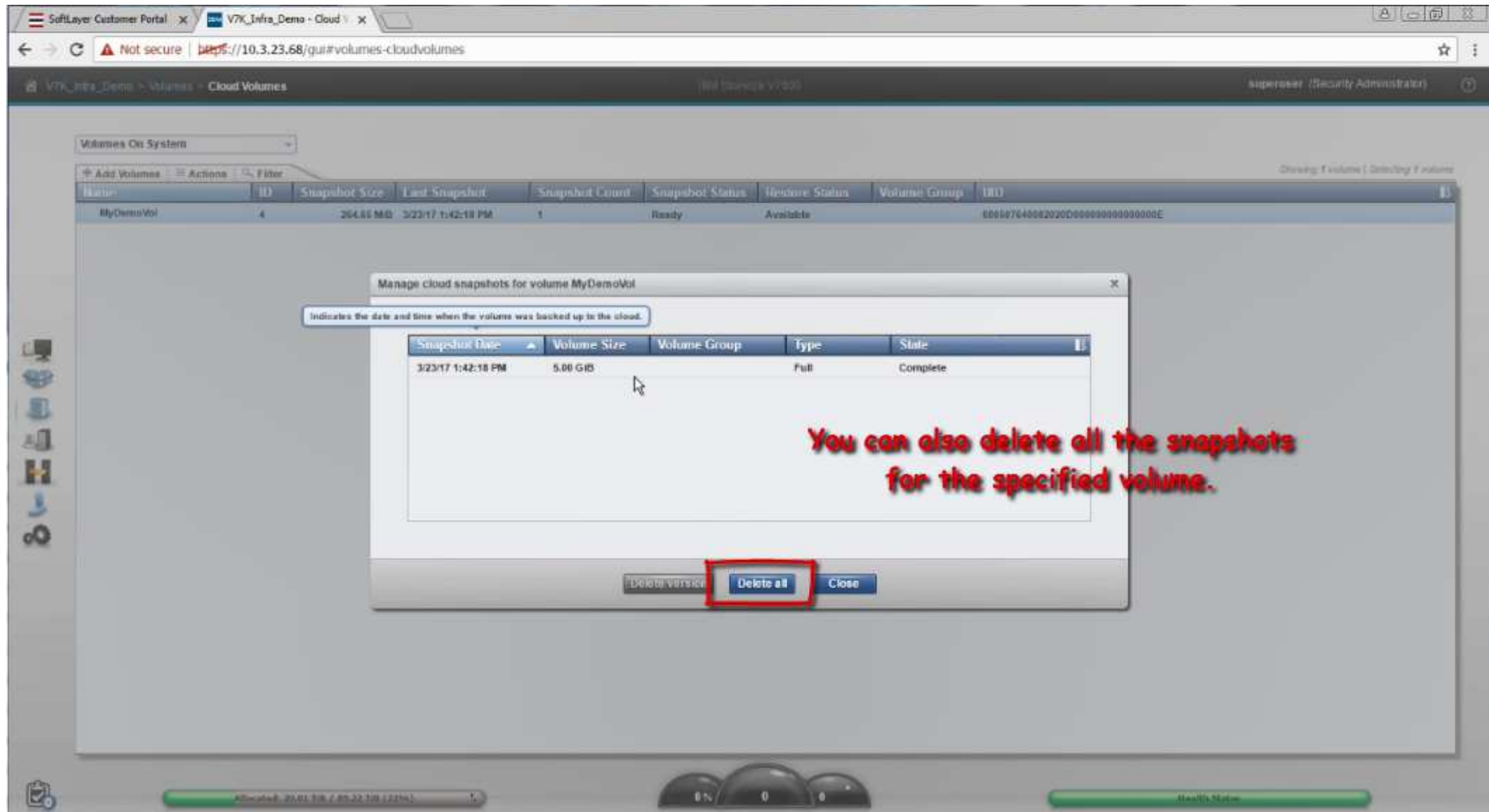
From this panel, you can delete one specific snapshot, the system will consolidate data between different snapshots generation

Delete version Delete all Close

Allocated: 254.85 MB / 80.00 MB (322%) 0% 0 0 Health: Monitor

# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 3) Backup in the Cloud



# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 3) Backup in the Cloud

The screenshot shows the 'Transparent Cloud Tiering' configuration page in the IBM Spectrum Virtualize management console. The page is titled 'Transparent Cloud Tiering' and shows a state of 'Online'. A red box highlights the 'Data Usage' section, which contains the following information:

Data Usage	
Date:	3/23/17
Data Uploaded:	246.00 MiB
Data Downloaded:	0 bytes
Storage Consumed:	0 bytes

Below the data usage section, there are links for 'Recent History' and 'Download Cloud Usage History'. To the right of the red box, a red text annotation reads: 'Amount of data consumed on the Cloud provider'.

The 'Bandwidth' section shows options for 'Upload' and 'Download', each with a 'No limit' radio button selected and a 'Limit to' field set to 'Mbps'.

The 'Account Information' section shows the following details:

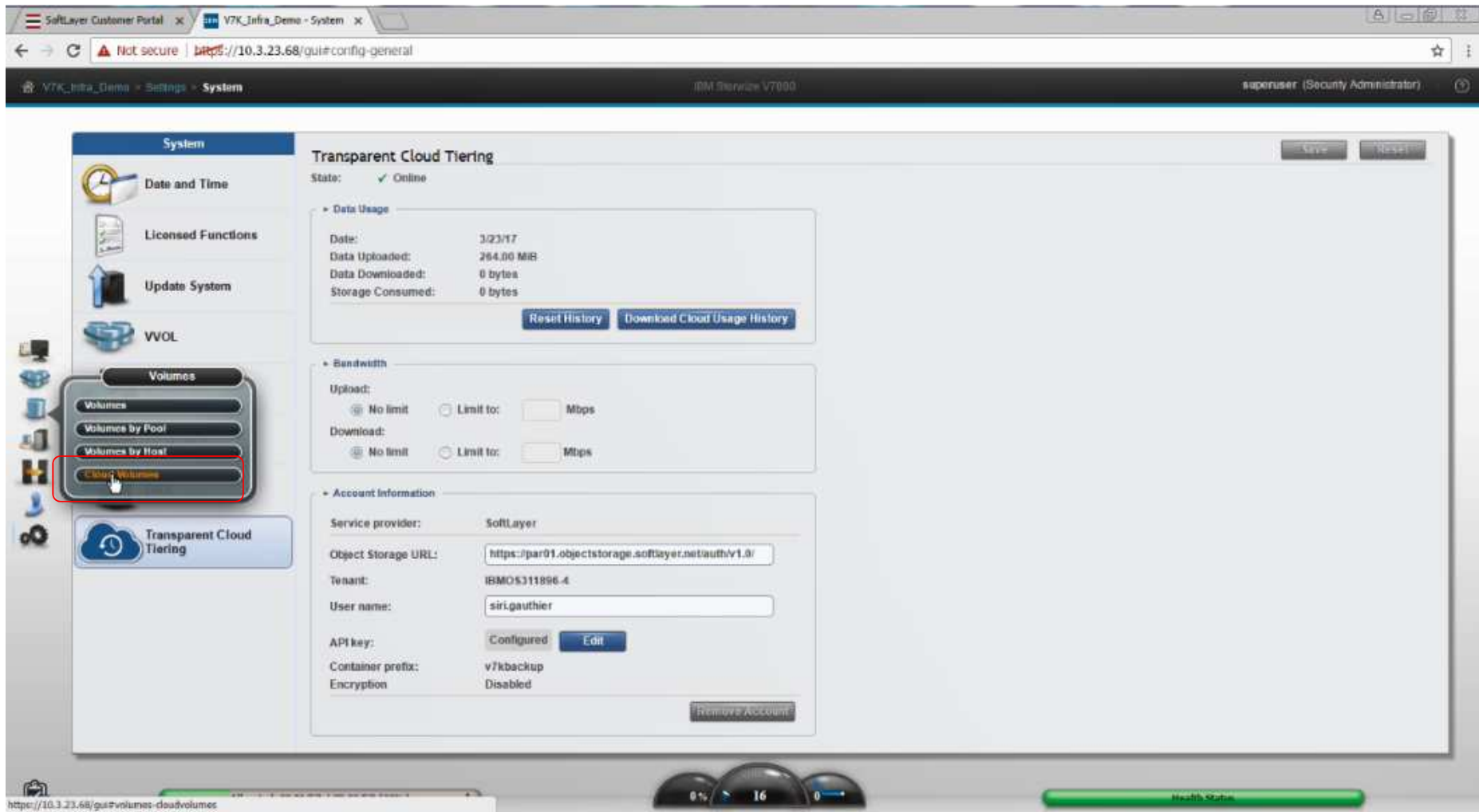
Account Information	
Service provider:	SoftLayer
Object Storage URL:	<input type="text" value="https://par01.objectstorage.softlayer.net/auth/v1.0/"/>
Tenant:	IBMOS311896.4
User name:	<input type="text" value="sirigauthier"/>
API key:	Configured <input type="button" value="Edit"/>
Container prefix:	v7kbackup
Encryption:	Disabled

At the bottom of the page, there is a 'Remove Account' button. The bottom status bar shows 'Allocated: 20.01 TiB / 25.22 TiB (22%)' and a 'Health Status' indicator.

## **Restore from the Cloud with IBM Spectrum Virtualize**

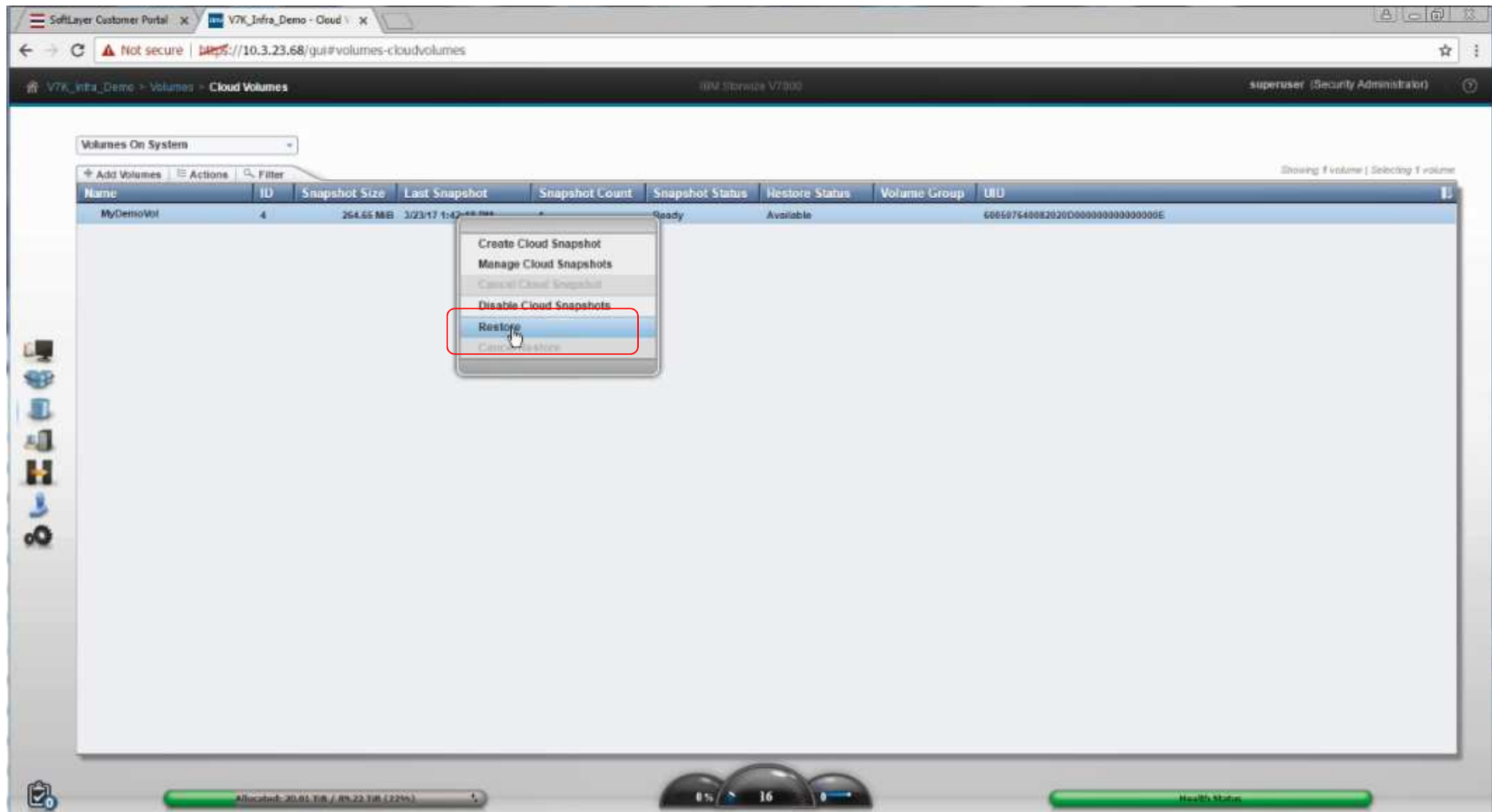
# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 4) Restore from the Cloud



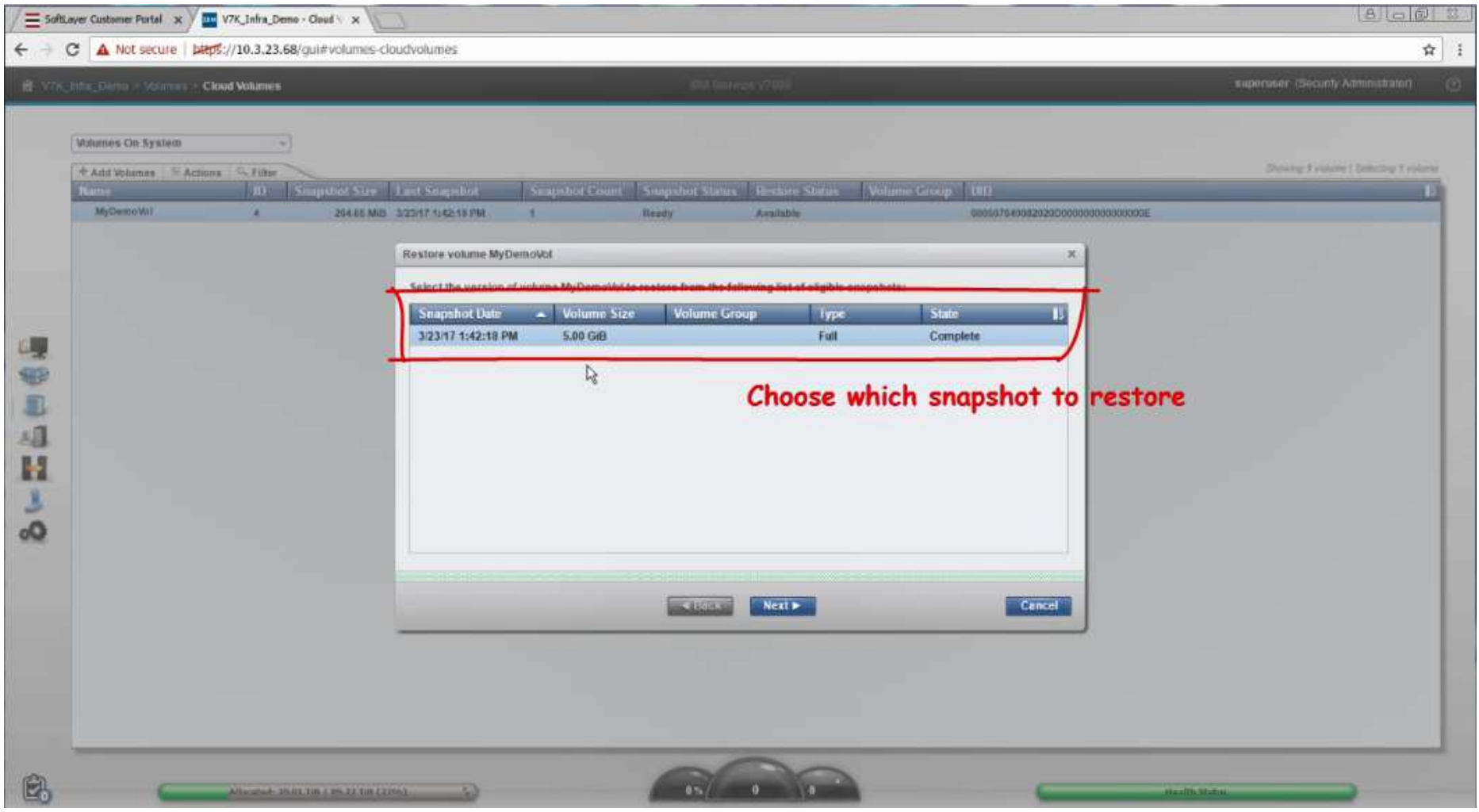
# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 4) Restore from the Cloud



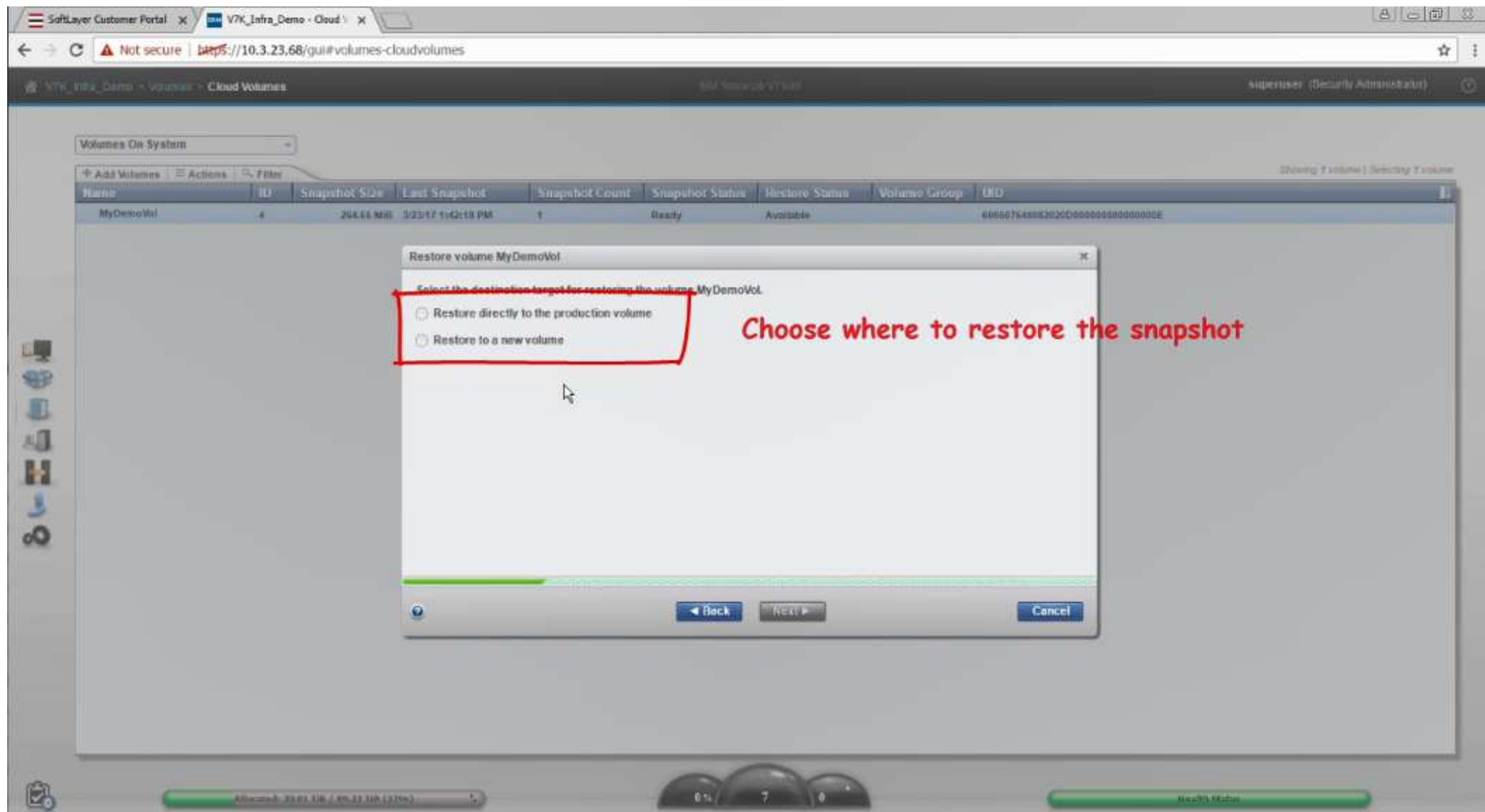
# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 4) Restore from the Cloud



# Transparent Cloud Tiering for IBM Spectrum Virtualize :

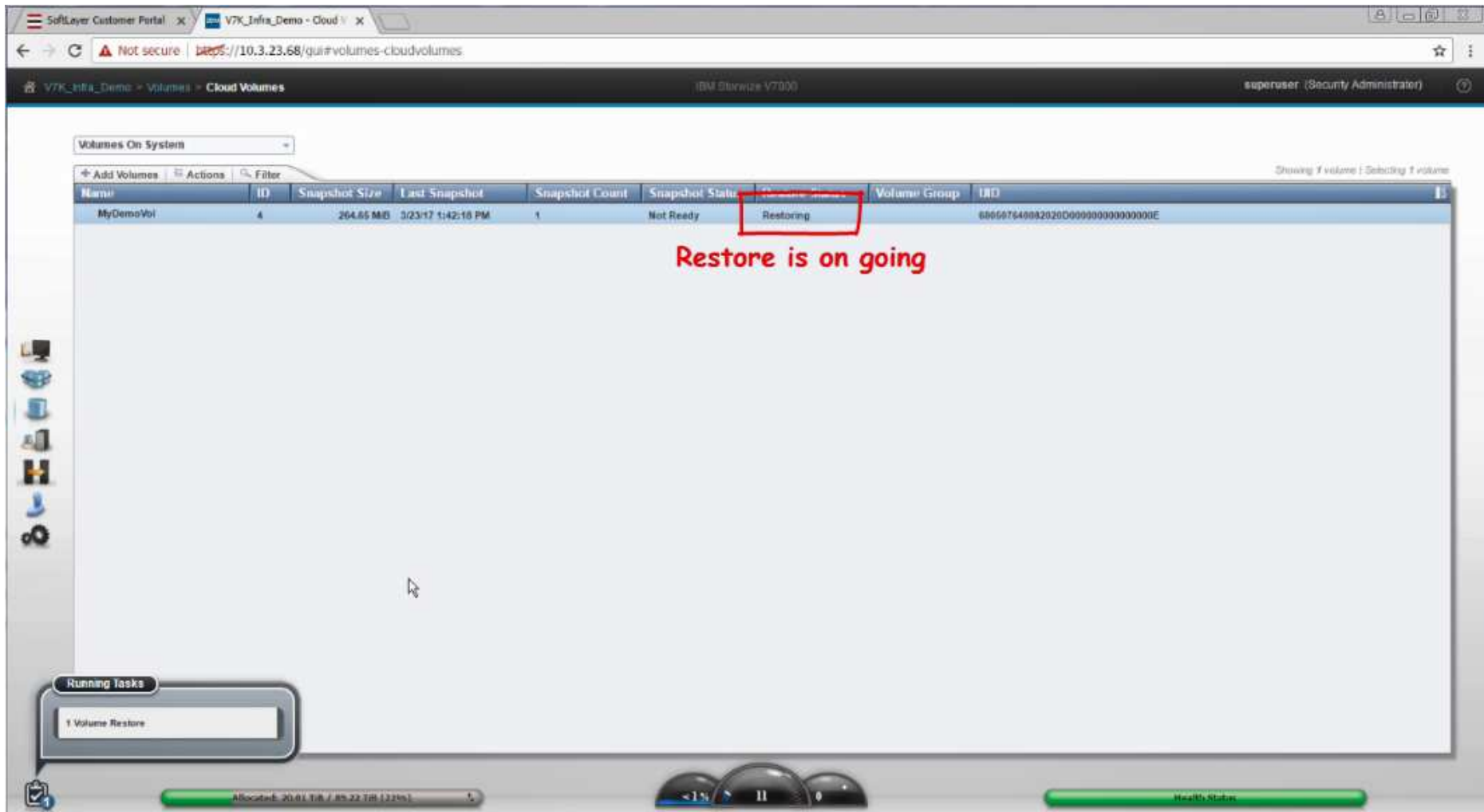
## 4) Restore from the Cloud





# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 4) Restore from the Cloud



# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 4) Restore from the Cloud

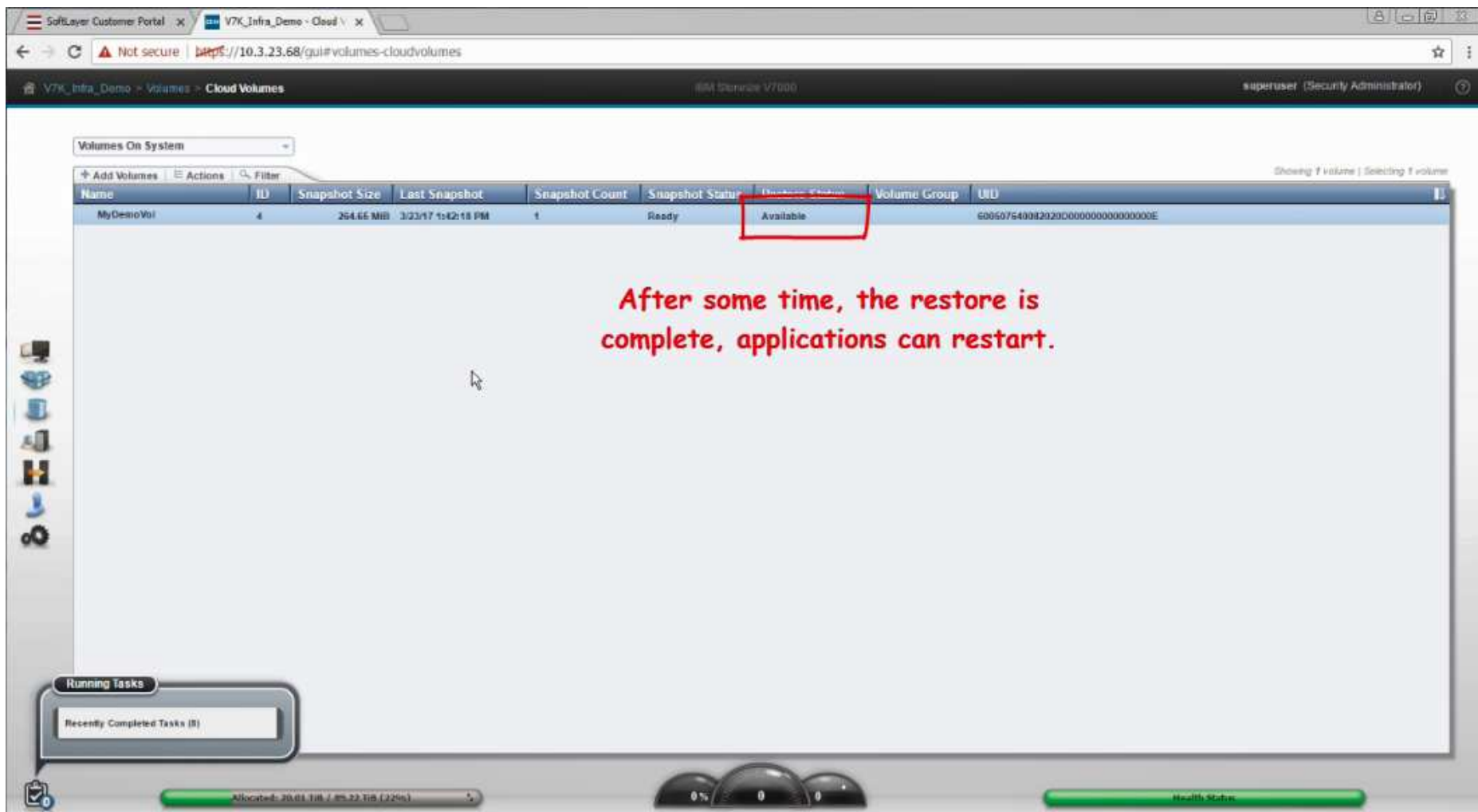
The screenshot shows the 'V7K\_Infra\_Demo - Volumes' interface. A table lists five volumes, with 'MyDemoVol' highlighted in red and marked as 'Offline'. A red text overlay explains that during the restore process, the volume is offline and completion is required.

Name	State	Pool	Volume Group	UUID	Host Mappings	Capacity
A_SVC_INFRA_vol1	Online	Pool0		600507640082020C000000000000000A	Yes	5.00 TiB
A_SVC_INFRA_vol2	Online	Pool0		600507640082020C000000000000000C	Yes	5.00 TiB
A_SVC_INFRA_vol3	Online	Pool0		600507640082020C000000000000000B	Yes	5.00 TiB
A_SVC_INFRA_vol4	Online	Pool0		600507640082020C000000000000000D	Yes	5.00 TiB
MyDemoVol	Offline	Pool0		600507640082020C000000000000000E	Yes	5.00 GiB

During the restore, the volume is offline.  
We have to wait for the completion.

# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 4) Restore from the Cloud

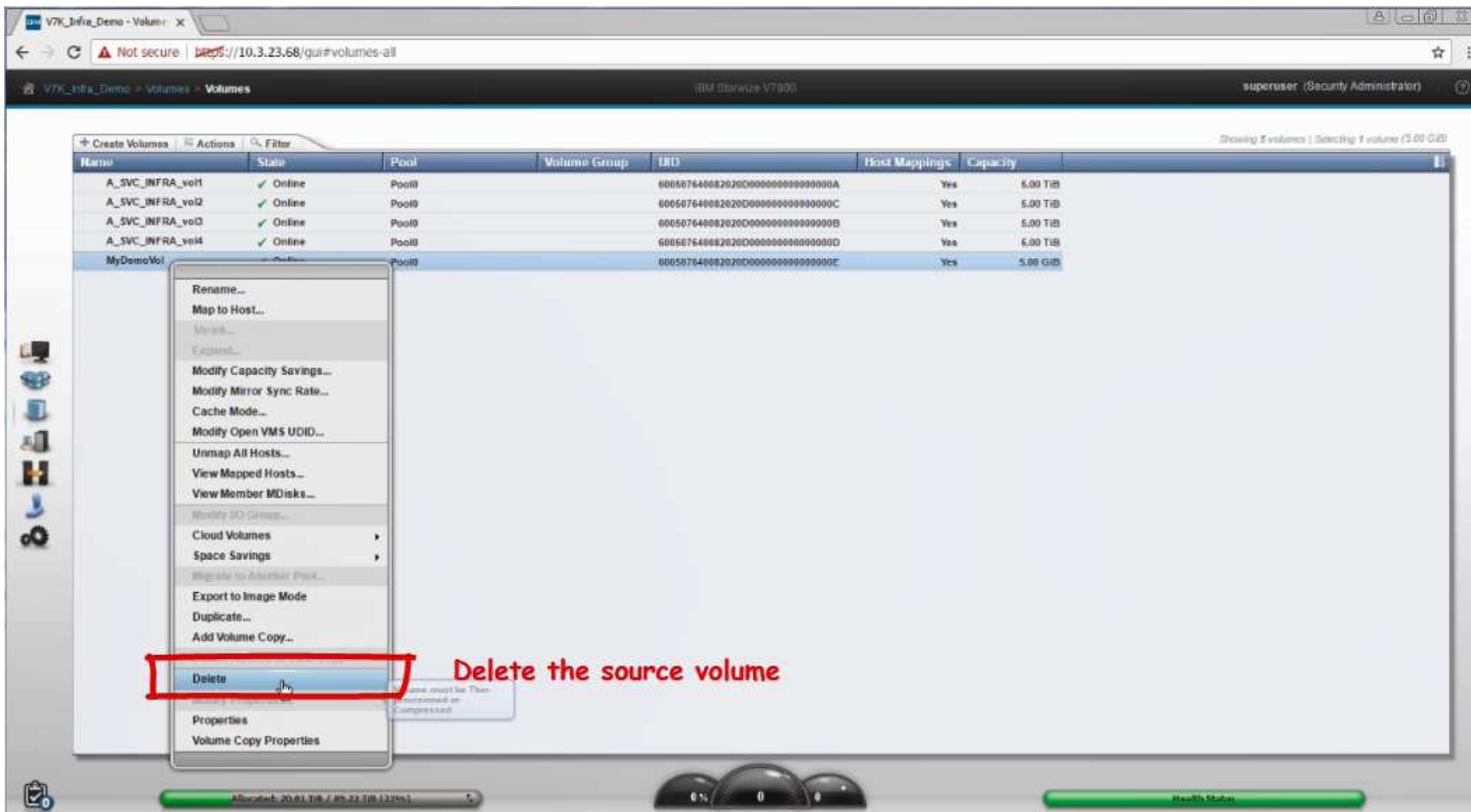


**Restore a Deleted Volume from the Cloud  
with IBM Spectrum Virtualize**

# Transparent Cloud Tiering for IBM Spectrum Virtualize :

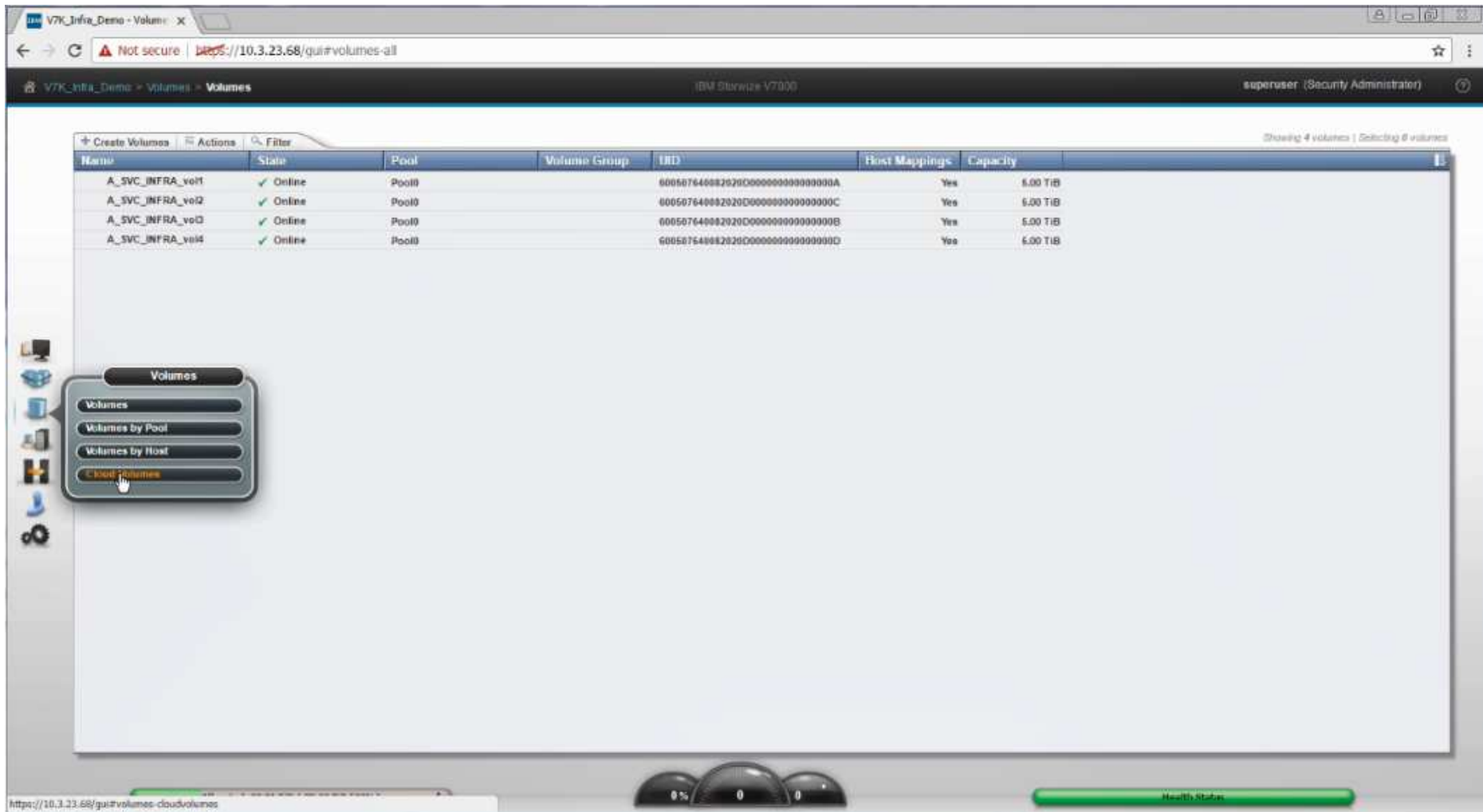
## 5) Restore a deleted Volume from a Snapshot in the Cloud

We are going now to **Restore a Deleted Volume** from a **Snapshot** that was created in the Cloud.



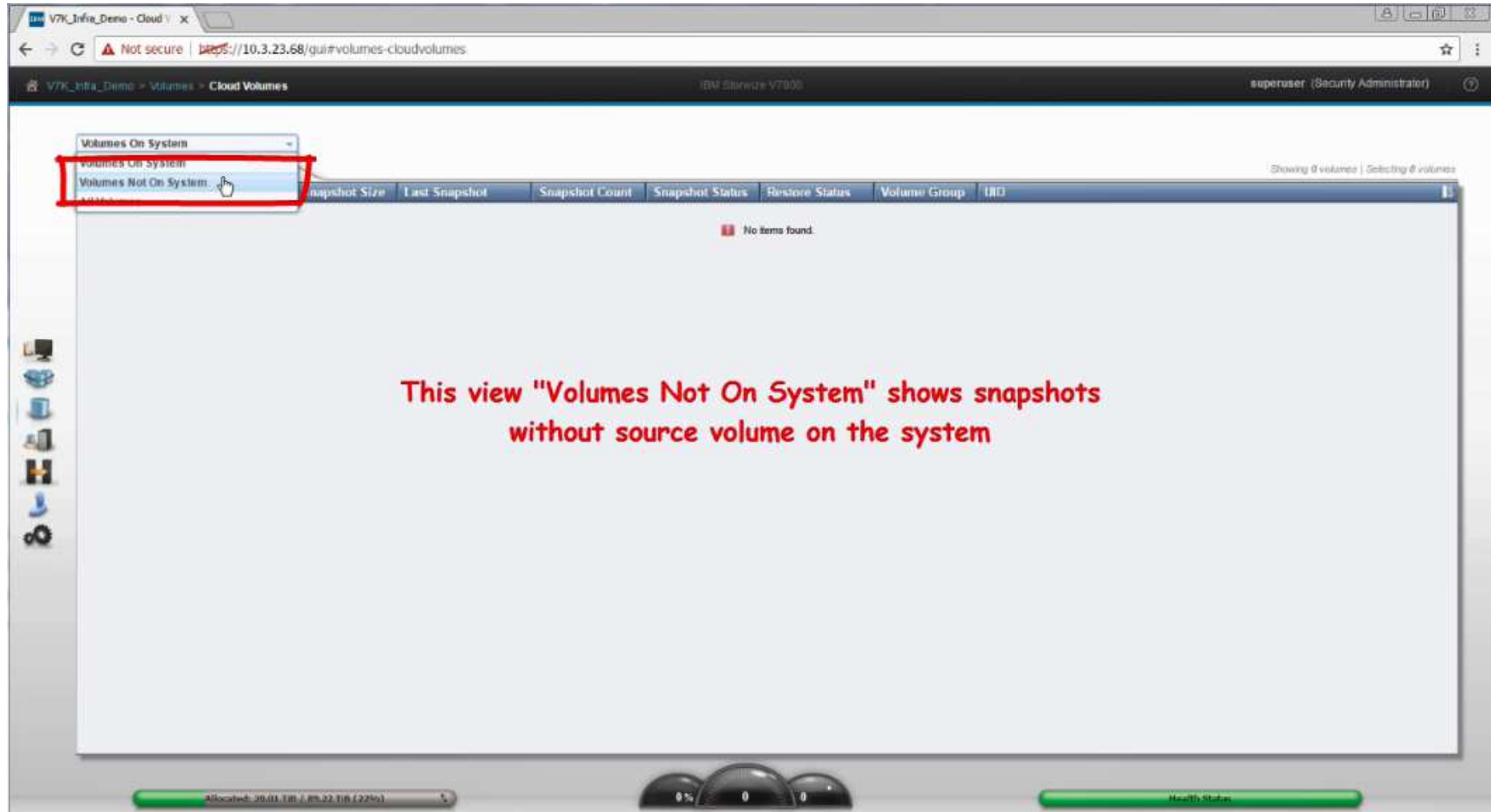
# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 5) Restore a deleted Volume from a Snapshot in the Cloud



## Transparent Cloud Tiering for IBM Spectrum Virtualize :

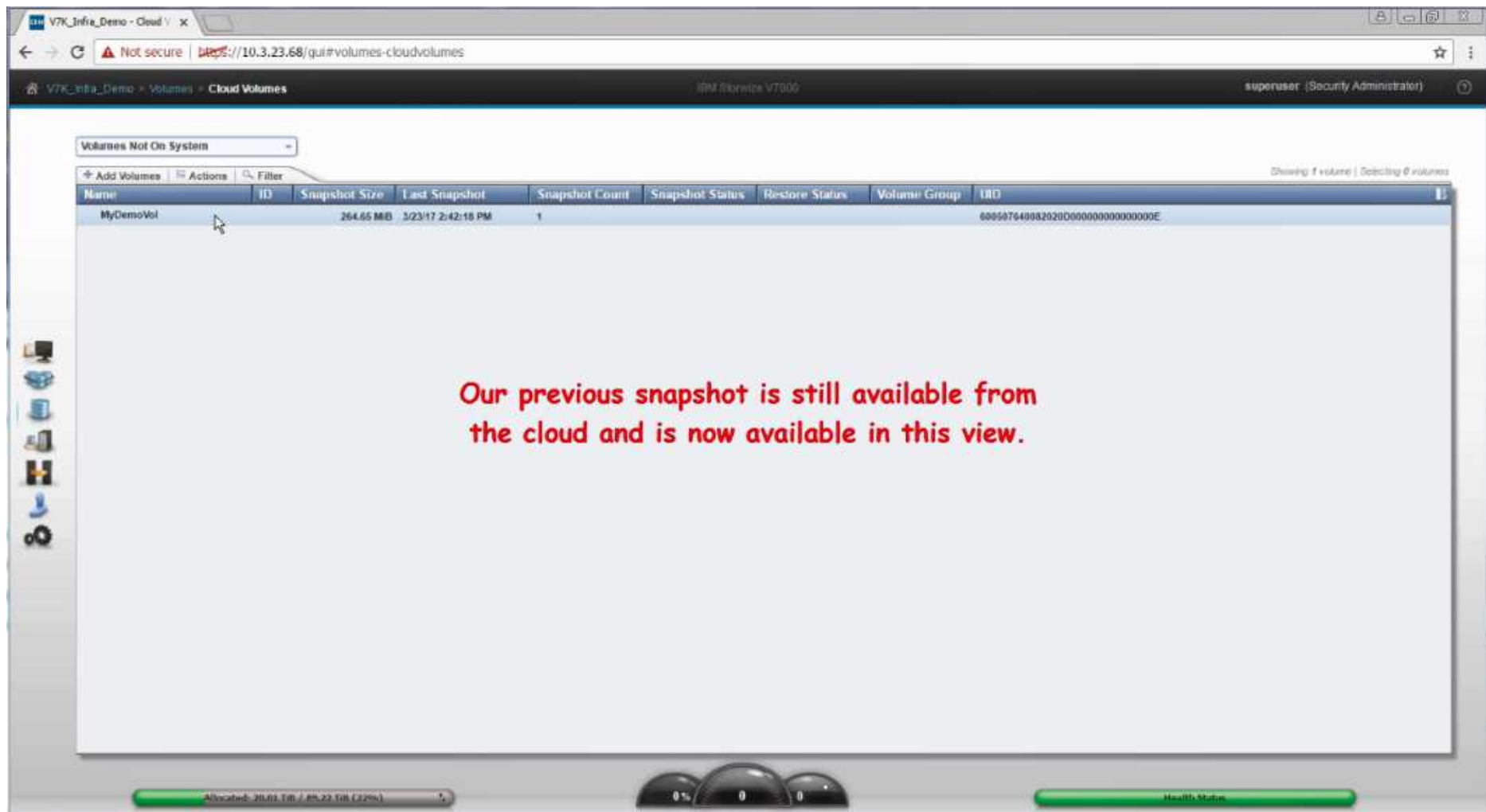
### 5) Restore a deleted Volume from a Snapshot in the Cloud





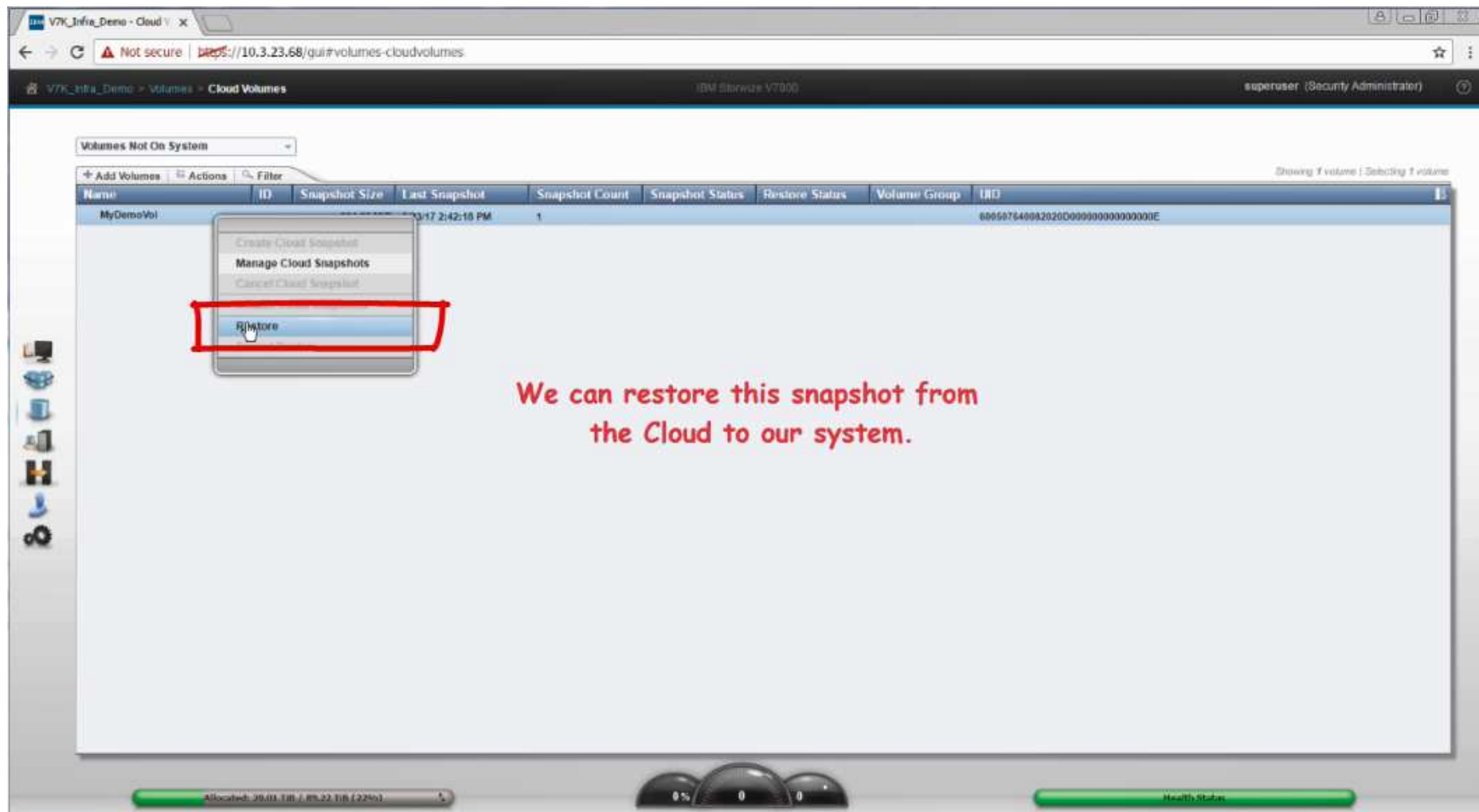
# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 5) Restore a deleted Volume from a Snapshot in the Cloud



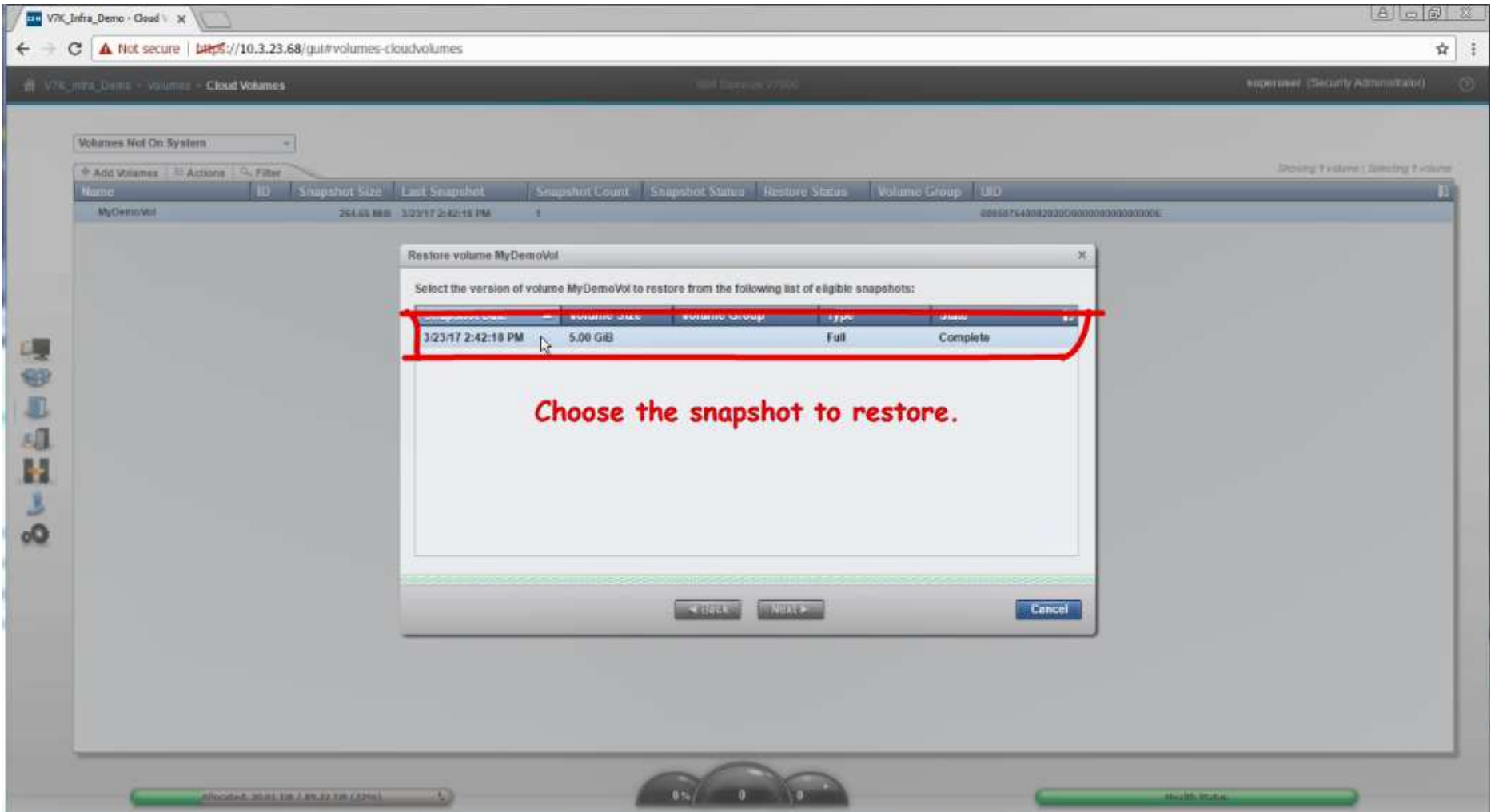
# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 5) Restore a deleted Volume from a Snapshot in the Cloud



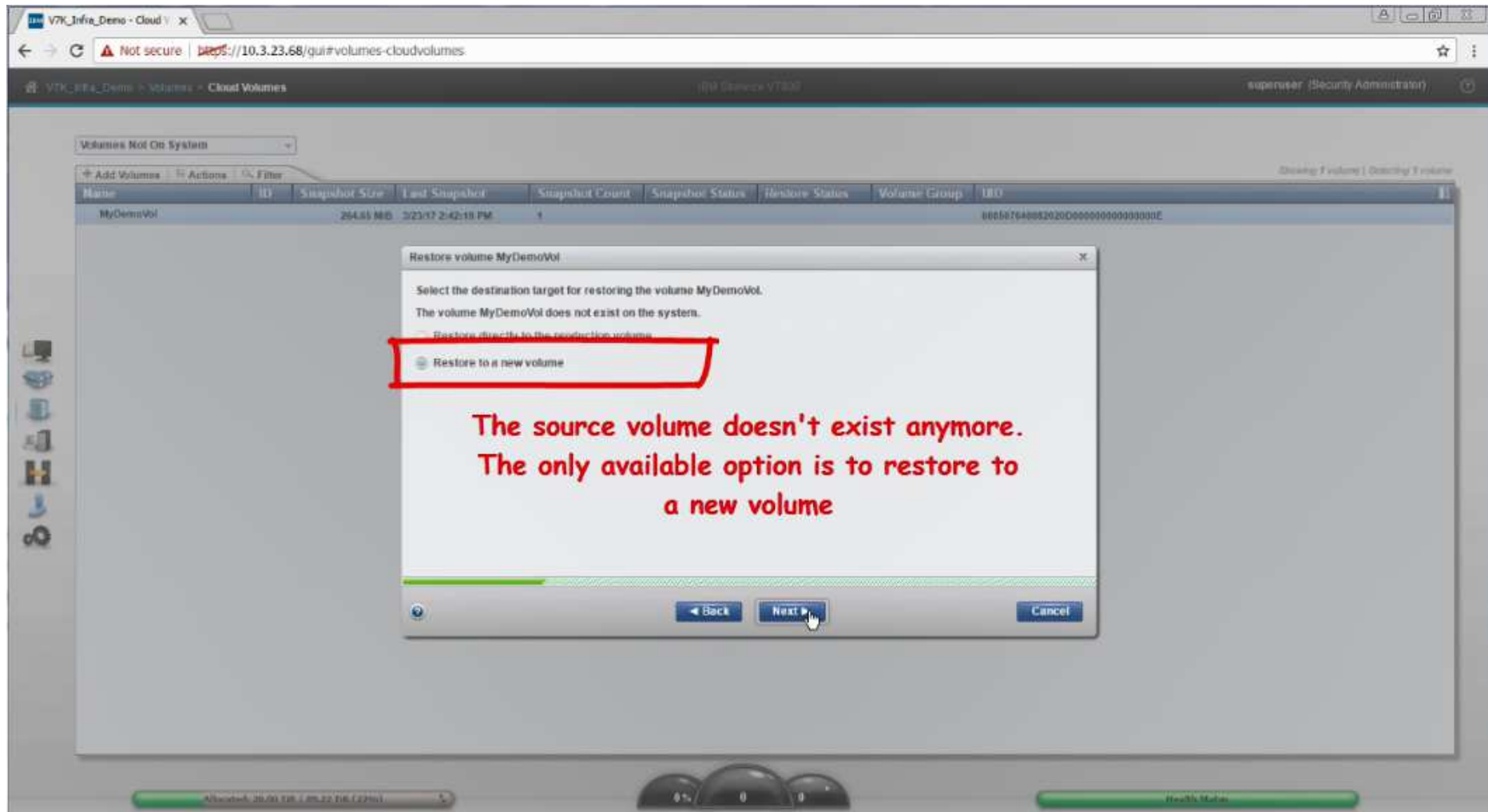
Transparent Cloud Tiering for IBM Spectrum Virtualize :

**5) Restore a deleted Volume from a Snapshot in the Cloud**



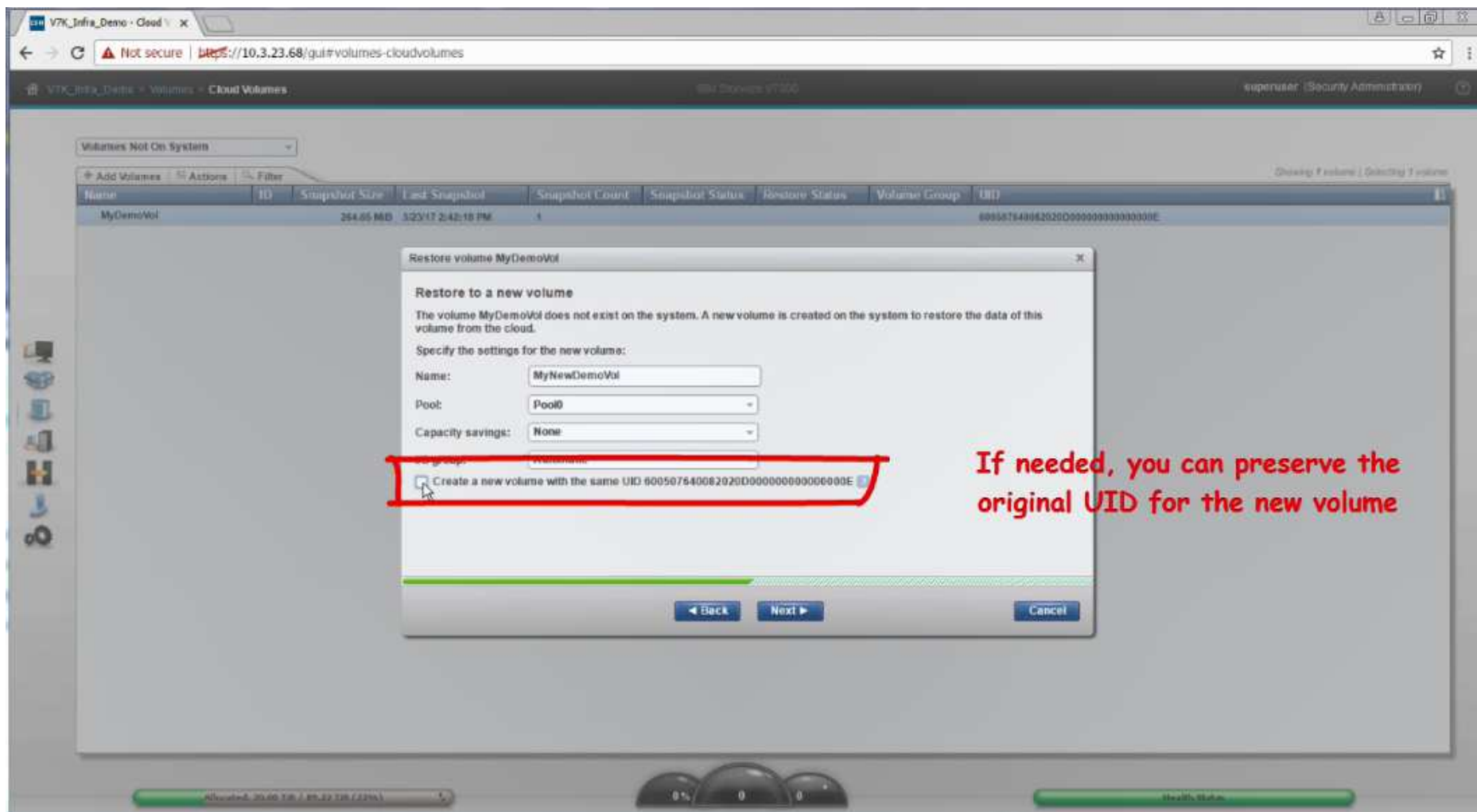
## Transparent Cloud Tiering for IBM Spectrum Virtualize :

### 5) Restore a deleted Volume from a Snapshot in the Cloud



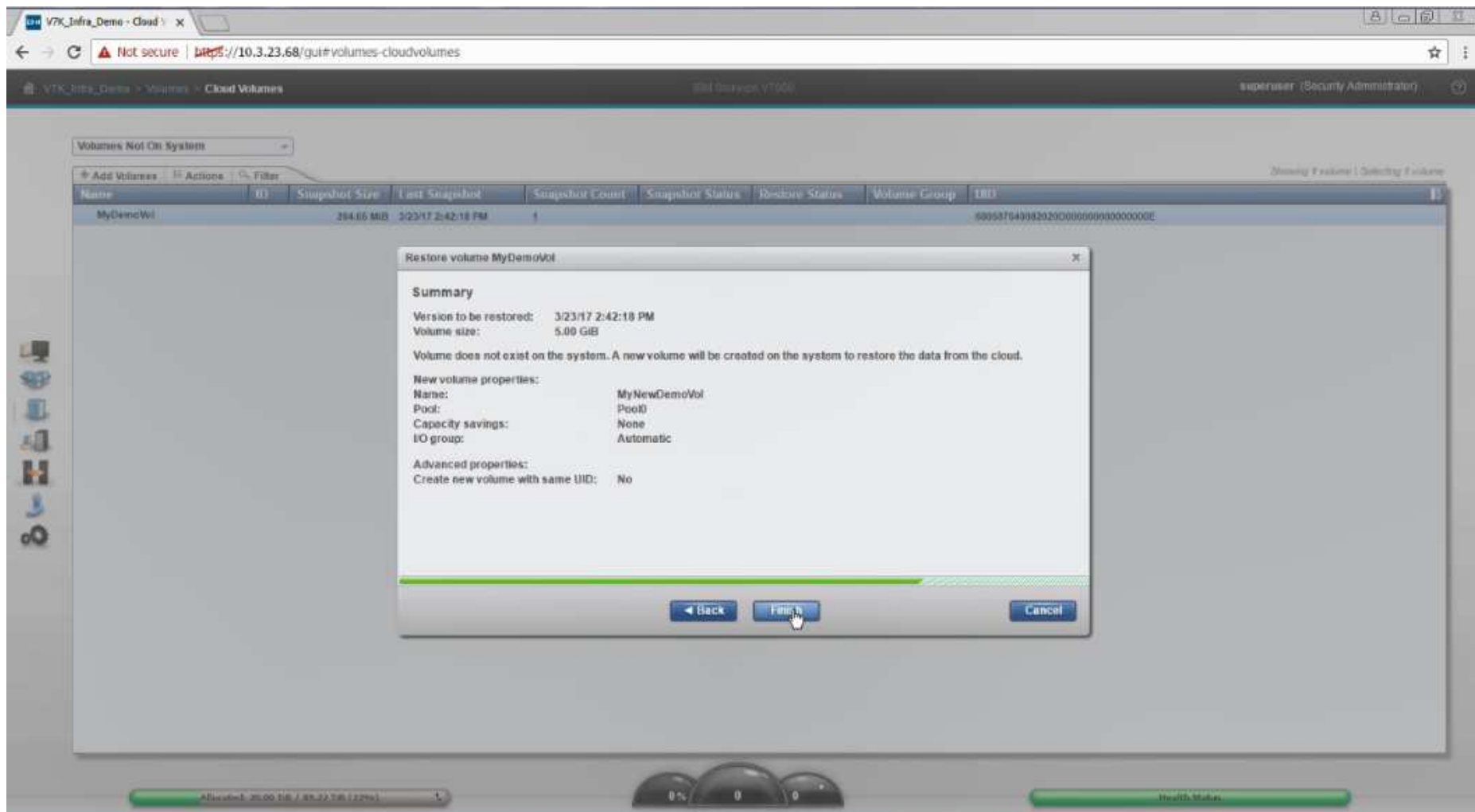
# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 5) Restore a deleted Volume from a Snapshot in the Cloud



# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 5) Restore a deleted Volume from a Snapshot in the Cloud



# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 5) Restore a deleted Volume from a Snapshot in the Cloud

The screenshot shows the IBM Spectrum Virtualize V7000 console interface. At the top, the browser address bar shows <https://10.3.23.68/gui#volumes-all>. The page title is "V7K\_Infra\_Demo - Volumes". The user is logged in as "superuser (Security Administrator)".

The main content area displays a table of volumes. The table has columns: Name, State, Pool, Volume Group, ID, Host Mappings, and Capacity. The following table represents the data shown in the screenshot:

Name	State	Pool	Volume Group	ID	Host Mappings	Capacity
A_SVC_INFRA_vol1	Online	Pool0		600567640032020D0000000000000000A	Yes	5.00 TiB
A_SVC_INFRA_vol2	Online	Pool0		600567640032020D0000000000000000C	Yes	5.00 TiB
A_SVC_INFRA_vol3	Online	Pool0		600567640032020D0000000000000000B	Yes	5.00 TiB
A_SVC_INFRA_vol4	Online	Pool0		600567640032020D0000000000000000D	Yes	5.00 TiB
MyNewDemoVol	Offline (formatting)	Pool0		600567640032020D0000000000000000E	No	5.00 GiB

A red box highlights the row for "MyNewDemoVol". Below the table, there is a large area with red text that reads:

But during the restore, the target volume is offline.  
The status changes to online as soon as the restore is complete.

At the bottom of the console, there are two green progress bars. The left one is labeled "Allocated: 20.00 TiB / 85.22 TiB (23%)" and the right one is labeled "Health Status".



# Transparent Cloud Tiering for IBM Spectrum Virtualize :

## 5) Restore a deleted Volume from a Snapshot in the Cloud

The screenshot displays the IBM Spectrum Virtualize web interface. At the top, the browser address bar shows 'https://10.3.23.68/gui#volumes-all'. The page title is 'V7K\_Infra\_Demo - Volumes'. The user is logged in as 'superuser (Security Administrator)'. The main content area shows a table of volumes with the following columns: Name, State, Pool, Volume Group, URD, Host Mappings, and Capacity. Five volumes are listed, all in an 'Online' state and belonging to 'Pool0'. The volume 'MyNewDemoVol' is highlighted with a mouse cursor. Below the table, a red text overlay states: 'The volume can now be mapped to the server'. The bottom status bar shows 'Allocated: 30.00 TiB / 8% 22 TiB (22%)', a temperature gauge at '125', and a 'Health Status' indicator.

Name	State	Pool	Volume Group	URD	Host Mappings	Capacity
A_SVC_INFRA_vol1	Online	Pool0		600507640082020D0000000000000000A	Yes	5.00 TiB
A_SVC_INFRA_vol2	Online	Pool0		600507640082020D0000000000000000C	Yes	5.00 TiB
A_SVC_INFRA_vol3	Online	Pool0		600507640082020D0000000000000000B	Yes	5.00 TiB
A_SVC_INFRA_vol4	Online	Pool0		600507640082020D0000000000000000D	Yes	5.00 TiB
MyNewDemoVol	Online	Pool0		600507640082020D000000000000000018	No	5.00 GiB

The volume can now be mapped to the server

Allocated: 30.00 TiB / 8% 22 TiB (22%)    125    Health Status

## Transparent Cloud Tiering for IBM Spectrum Virtualize : **Online Help**

### **Cloud volumes**

A cloud volume is any volume that is enabled for transparent cloud tiering. After transparent cloud tiering is enabled on a volume, point-in-time copies, or snapshots, can be created and copied to cloud storage that is provided by a cloud service provider. These snapshots can be restored to the system for disaster recovery purposes. Before you create cloud volumes, a valid connection to a supported cloud service provider must be configured.

With transparent cloud tiering, the system supports connections to cloud service providers and the creation of cloud snapshots of any volume or volume group on the system. Cloud snapshots are point-in-time copies of volumes that are created and transferred to cloud storage that is managed by a cloud service provider. A cloud account defines the connection between the system and a supported cloud service provider and must be configured before data can be transferred to or restored from the cloud storage. After a cloud account is configured with the cloud service provider, you determine which volumes you want to create cloud snapshots of and enable transparent cloud tiering on those volumes.

In the management GUI, volumes that do not have restrictions are enabled for cloud snapshots when a snapshot is created for that volume.

- A volume cannot be enabled for cloud snapshots if the volume is used in any of the following capacities:
- The volume is part of a remote-copy relationship.
- The volume is a VMware vSphere Virtual Volume.
- The volume is associated with a FlashCopy® mapping.
- A volume has a copy in a different storage pool.
- A volume is being migrated between different storage pools.
- A volume cannot be enabled for cloud snapshots if the cloud storage is set to import mode.
- A volume cannot be enabled for cloud snapshots if the maximum number of cloud volumes already exists. The maximum number of cloud volumes on the system is 1024.

Note: If the system exceeds this limit, you can disable cloud snapshots on an existing cloud volume and delete its associated snapshots from the cloud storage to accommodate snapshots on new cloud volumes.

## Transparent Cloud Tiering for IBM Spectrum Virtualize : **Online Help**

After the volume is enabled for the function, cloud snapshots of those volumes can be created and stored on cloud storage. Multiple snapshots can be created at different times and each version is timestamped and stored in the cloud storage. Each snapshot version on the cloud storage represents the data at a specific point in time, so different versions can be restored if necessary. The system supports both snapshots of local system data and also data on different systems. Some of these cloud snapshots can have corresponding cloud volumes on the local system, but other snapshots might not. You can restore data from these different snapshots of the cloud volume if necessary.

The system supports two types of cloud snapshots:

### **Full snapshot :**

When the cloud snapshot is created for the first time for a volume, all data is copied to the cloud storage. Any subsequent cloud snapshots of the volume include only the changed data from the initial snapshot. Each snapshot version of the volume is timestamped and stored on the cloud storage. Therefore, full plus incremental snapshots ensure that all data is copied to the cloud storage and is available if a restore operation is necessary. If the volume contains a large amount of data, full snapshots can be time-consuming.

### **Incremental snapshots :**

The version contains changed data from the last time the cloud snapshot was created for a selected volume. Incremental-only snapshots are quicker to complete than a full snapshot.

Individual volumes can be added to a single volume group for creating snapshots for all the volumes in that group. If volumes have similar content or are used by a specific host or application, they can be added to volume group to simplify snapshot operations. Separate snapshots are started for each volume in the group and the group must be created before the snapshots are created. Volume groups can be configured by using the `mkvolumegroup` command. The management GUI lists all cloud volumes and specifies the name of the volume group in which the volumes belong.

## Transparent Cloud Tiering for IBM Spectrum Virtualize : **Online Help**

In addition to creating snapshots of volume data to transfer to cloud storage, transparent cloud tiering also supports **restoring** volume data from cloud storage back to the system. Like with snapshots, versions of each copy operation are timestamped and stored on the cloud, which allows for specific point-in-time recovery operations to the original system or to another system. Older versions can be deleted and removed from the system and the cloud storage simultaneously to manage space. Snapshots can be restored only for individual volumes. You can restore multiple volumes simultaneously, but each restore operation needs to be started separately for each volume.

Certain recovery scenarios can require the restoration of an older version of the cloud snapshot. However, all newer versions on the cloud storage are deleted, including any in-progress snapshot operations. The management GUI verifies the version of cloud snapshot and issues a warning if the selected snapshot is not the most recent version. To proceed with the restore operation, you must confirm the deletion of these other versions.

You restore volume data with any snapshot version that was copied to the cloud, including restoring from a snapshot version that is still in progress. The snapshot version and volume that the snapshot version is being restored to must be the same size. A version cannot be deleted while it is being used for a restore. You can restore a snapshot version with following methods:

### **Restore to the production volume :**

If the snapshot version is restored to the production volume, which is the original volume from which the snapshots were created. The snapshot version replaces the current data that exists on production volume with the data that is stored on the cloud storage. The production volume goes offline during the restore operations. Data is not fully restored to the production volume until the changes are committed.

## Transparent Cloud Tiering for IBM Spectrum Virtualize : **Online Help**

### **Restore to a new volume :**

When the snapshot version is restored to a new volume, you can use the restored data independently of the original volume from which the snapshot was created. If the new volume exists on the system, then the restore operation uses the unique identifier (UID) of the original volume. If the new volume does not exist on the system, you need to choose whether to use the UID from the original volume or create a new UID. If you plan on using the new volume on the same system, use the UID that is associated with the snapshot version that is being restored. You want a unique UID if you are restoring a version of a volume that exists on another system to the current system.

धन्यवाद

Hindi

谢谢

Simplified  
Chinese

תודה רבה

Hebrew

Спасибо

Russian

شكراً

Arabic

Thank You

English

Gracias

Spanish

Obrigado

Brazilian Portuguese

Grazie

Italian

감사합니다

Korean

Danke

German

Merci

French

நன்றி

Tamil

謝謝

Traditional Chinese

ขอบพระคุณ

Thai