# Virtuozzo

## Virtuozzo Hybrid Infrastructure 4.6

## Storage User Guide

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## **1** Supported storage types

Your service provider can configure Virtuozzo Hybrid Infrastructure to keep your data in three storage types:

- S3 object storage for storing an unlimited number of objects (files).
- iSCSI block storage for virtualization, databases, and other needs.
- NFS shares for storing an unlimited number of files via a distributed filesystem.

The following sections describe the ways to access data in Virtuozzo Hybrid Infrastructure in detail.

## 2 Accessing S3 buckets

To access S3 buckets, get the following information (credentials) from your system administrator:

- User panel IP address
- DNS name of the S3 endpoint
- Access key ID
- Secret access key

Virtuozzo Hybrid Infrastructure allows you to access your S3 data in several ways:

- Via the Virtuozzo Hybrid Infrastructure user panel
- Via a third-party S3 application like Cyberduck, Mountain Duck, etc.

## 2.1 Managing buckets via the Virtuozzo Hybrid Infrastructure user panel

This section describes how to manage buckets and their contents from the Virtuozzo Hybrid Infrastructure user panel.

#### 2.1.1 Logging in to the user panel

To log in to the Virtuozzo Hybrid Infrastructure user panel, do the following:

1. On any computer with access to the web interface, in a web browser visit http://<user\_panel\_IP\_ address>:8888/s3/.

#### Note

If you use a self-signed certificate, add it to the browser's exceptions.

	Log in
ENDPOINT	
s3.example.com	n
✓ Use secure tr	ansfer (SSL)
ACCESS KEY ID	
d9fde6a530879	9f59HB8U
SECRET ACCESS	KEY
•••••	
	LOG IN

2. On the login screen, enter your credentials, and then click Log in.

Once you log in to the web interface, you will see the **Buckets** screen with the list of your buckets. From here, you can manage buckets, as well as folders and files stored inside the buckets.

To log out, click the user icon in the upper right corner of any screen, and then click **Log out**.

#### 2.1.2 Adding, deleting, and listing S3 buckets

#### On the **Buckets** screen:

• To add a new bucket, click **Add bucket**, specify a name, and click **Add**.

X Add buckel	
Bucket name	
bucket1	
	Add Cancel

Use bucket names that comply with DNS naming conventions. For more information on bucket naming, refer to "S3 bucket and key naming policies" (p. 10).

- To delete a bucket, select it, and then click **Delete**.
- To list the bucket contents, click the bucket name on the list.

#### Listing S3 bucket contents in a browser

You can list bucket contents with a web browser. To do this, visit the URL that consists of the external DNS name for the S3 endpoint that you specified when creating the S3 cluster and the bucket name. For example, **s3.example.com/mybucket**.

#### Note

You can also copy the link to bucket contents by right-clicking it in CyberDuck, and then selecting **Copy URL**.

#### 2.1.3 Creating, deleting, and listing folders

On the bucket contents screen:

• To create a folder, click **New folder**, specify the folder name in the **New folder** window, and then click **Add**.

#### × New folder

Folder name	
folder1	
	Add

- To delete a folder, select it, and then click **Delete**.
- To list the folder contents, click the folder name.

#### 2.1.4 Uploading and downloading files

On the bucket or folder contents screen:

• To upload files to S3, click **Upload**, and then choose files to upload.

Buckets	s > bucket1			
Туре	Name	Size	Last modified	C New folder
È	file1.test	5.3 MB	Dec 07 18:35	Lownload file
	folder1/			L Upload file
				Get certificate
				Verify
			Uploading file 1 of 1	
			file2.test 103.8 MB	

• To download files, select them, and then click **Download**.

#### 2.1.5 Obtaining and validating file certificates

Virtuozzo Hybrid Infrastructure offers integration with the Acronis Notary service to leverage blockchain notarization and ensure the immutability of data saved in S3 buckets.

To certify files stored in your buckets, ask your system administrator to enable the Acronis Notary service for the buckets.

After that, you will be able to do the following:

- To get a notarization certificate for a file, select it, and then click **Get Certificate**.
- To check the validity of a file's certificate, click **Verify**.

## 2.2 Accessing S3 storage with CyberDuck

To access Virtuozzo Hybrid Infrastructure with CyberDuck, do the following:

- 1. In CyberDuck, click **Open Connection**.
- 2. Specify your credentials:
  - The DNS name of the S3 endpoint.
  - The Access Key ID and the Password, the secret access key of an object storage user.

Open Connection	8
🚨 Amazon S3	•
Server:	s3.dns.name.com Port: 443
URL:	https://a23859c7af2951f1H8YF@s3.dns.name.com
Access Key ID:	a23859c7af2951f1H8YF
Password:	•••••
	Anonymous Login
SSH Private Key:	None   Choose
	Save Password
	Connect Cancel
More Option	15

By default, the connection is established over HTTPS. To use CyberDuck over HTTP, you must install a special S3 profile.

3. Once the connection is established, click **File > New Folder** to create a bucket.

🔒 Create new	folder
	Enter the name for the new folder bucket1
	Create Cancel

4. Specify a name for the new bucket, and then click **Create**. Use bucket names that comply with DNS naming conventions. For more information on bucket naming, refer to "S3 bucket and key naming policies" (p. 10).

The new bucket will appear in CyberDuck. You can manage it and its contents.

#### 2.2.1 Managing S3 bucket versions

Versioning is a way of keeping multiple variants of an object in the same bucket. You can use versioning to preserve, retrieve, and restore every version of every object stored in your S3 bucket. With versioning, you can easily recover from both unintended user actions and application failures. For more information about bucket versioning, refer to the Amazon documentation.

Bucket versioning is turned off by default. In CyberDuck, you can enable it in bucket properties. For example:

Info - folder1	
General Perr	Le L
Location	US East (Northern Virginia)
Storage Class	Regular Amazon S3 Storage
Encryption	Unknown
Transfer	Transfer Acceleration
Logging	Bucket Access Logging
	Write access logs to selected container.
	None
Analytics	Read Access for Qloudstat
	None
	Open the URL to setup log analytics with Qloudstat.
Versioning	Bucket Versioning
	You can view all revisions of a file in the browser by choosing View $\rightarrow$ Show Hidden Files.
	Multi-Factor Authentication (MFA) Delete
Lifecycle	Transition to Glacier
	after 1 Days 🔹
	Delete files
	after 1 Days 🔹

## 2.3 Mounting S3 storage with Mountain Duck

Mountain Duck enables you to mount and access Virtuozzo Hybrid Infrastructure S3 storage as a regular disk drive. Do the following:

- 1. If your service provider has provided you with an SSL certificate, install it.
- 2. In Mountain Duck, click **New Bookmark**.

	New Bookmark
	Sort By
	No Bookmarks
٩	History •
	About
	Help
	Quit

- 3. In the properties window, select **Amazon S3** profile from the first drop-down list and specify the following parameters:
  - Disk drive name in the Nickname field
  - Endpoint DNS name in the Server field

• Access key ID in the **Username** field

Click Connect.

S3 Storage				x
🚇 Amazon S3				~
Nickname:	S3 Storage			
URL:	https://e5afdeeb012d44d3RRFD@s3.dns.nan	ne.com	1	
Server:	s3.dns.name.com	Port:	443	3 🗘
Username:	e5afdeeb012d44d3RRFD			
	Anonymous Login			
SSH Private Key:	None	~	Choos	e
Client Certificate:	None			~
Path:				
Encoding:	UTF-8			$\sim$
Notes:				
Timezone:	UTC			~
Drive Letter:	Auto			~
Mount Options:	Read Only			
	Conr	nect	Dele	te

4. In the login window, specify Secret Access Key and click Login.

🔼 Login s3.dns.nan	ne.com
	Login s3.dns.name.com Login s3.dns.name.com with username and password. No login credentials could be found in the Keychain.
Access Key ID:	e5afdeeb012d44d3RRFD
Secret Access Key:	•••••
SSH Private Key:	Anonymous Login     None     Choose
Save Password	d Login Cancel

Mountain Duck will mount the S3 storage as a disk drive. On the disk, you can manage buckets and store files in them.

#### 2.3.1 Creating S3 buckets on Mounted S3 Storage

Windows and macOS, operating systems supported by Mountain Duck, treat buckets as folders in case the S3 storage is mounted as a disk drive. In both operating systems, the default folder name contains spaces. This violates bucket naming conventions (refer to "S3 bucket and key naming policies" (p. 10)), therefore you cannot create a new bucket directly on the mounted S3 storage. To

create a bucket on a mounted S3 storage, create a folder with a name complying with DNS naming conventions elsewhere and copy it to the root of the mounted S3 storage.

## 2.4 S3 bucket and key naming policies

It is recommended to use bucket names that comply with DNS naming conventions:

- Can be from 3 to 63 characters long
- Must start and end with a lowercase letter or number
- Can contain lowercase letters, numbers, periods (.), hyphens (-), and underscores (\_)
- Can be a series of valid name parts (described previously) separated by periods

An object key can be a string of any UTF-8 encoded characters, up to 1024 bytes long.

## **3 Accessing iSCSI targets**

This section describes ways to attach iSCSI targets to operating systems and third-party virtualization solutions that support the explicit ALUA mode.

## 3.1 Accessing iSCSI targets from VMware ESXi

Before using Virtuozzo Hybrid Infrastructure volumes with VMware ESXi, you need to configure it to properly work with ALUA Active/Passive storage arrays. It is recommended to switch to the VMW\_PSP\_ RR path selection policy (PSP) to avoid any issues. For example, on VMware ESXi 6.5:

• To set the default PSP for all devices, run:

```
# esxcli storage nmp satp rule add --satp VMW_SATP_ALUA --vendor VSTORAGE \
    --model VSTOR-DISK --psp VMW_PSP_RR -c tpgs_on
```

• To set the PSP for a specific device, run:

```
# esxcli storage core claimrule load
```

Now you can proceed to create datastores from Virtuozzo Hybrid Infrastructure volumes exported via iSCSI. Log in to the VMware ESXi web panel and do the following:

1. In the Navigator, go to the **Storage** > **Adapters** tab and click **Configure iSCSI**.

s host 🗸 🗸 Me	odel ~	Status ~	Driver
Su	unrise Point-H AHCI Controller	Unknown	vmw_ahci
iS	CSI Software Adapter	Online	iscsi_vmk
	S	Sunrise Point-H AHCI Controller iSCSI Software Adapter	Sunrise Point-H AHCI Controller Unknown

2. In the **Configure iSCSI** window, click **Add static target** in the **Static targets** section, fill out target IQNs, IP addresses, and ports. Click **Save configuration**.

Static targets	🧟 Add static target 🛛 👰 Remove sta	tic target 🥜 Edit settings	Q Search	×
	Target	∽ Address	😔 Port	~
	iqn.2013-10.com.vstorage:test1	10.94.125.197	3260	
	iqn.2013-10.com.vstorage:test2	10.94.125.205	3260	
	ign.2013-10.com.vstorage:test3	10.94.125.207	3260	

3. Proceed to the **Devices** tab and click **Refresh**. The newly added disk will appear in the list of devices.

New datastore	📱 Increase capacity	🗏 Rescan	C Refresh	🔅 Actio	ons		<b>Q</b> 8	learch	
Vame			Status	~ Туре	~	Capacity ~	Queue v	Vendor	~
VSTORAGE IS CSI	Disk (eui.616438306)	3623739)	🐼 Normal	Disk		10 GB	128	VSTORAGE	

4. Select the disk and click **New datastore**. In the wizard that appears, enter a name for the datastore and select partitioning options. Click **Finish** to actually partition the disk.

```
Warning!
```

Partitioning the disk will erase all data from it.

The ready-to-use disk will appear in the list of datastores. You can now view its contents it with the datastore browser and provision it to VMs.

😫 New datastore 📧 Increase capacity 📔 🍄 Register a VM 🛛 🔂 Datastore browser 📔 🧲 Refresh 🛛 🔅 Actions								
							Q Search	
Name	$\overline{\mathbf{v}}$	Drive Ty 🗸	Capacity 🗸	Provisi 🗸	Free 🗸	Туре ~	Thin pr 🗸	Access
datastore01		Non-SSD	9.75 GB	1.41 GB	8.34 GB	VMFS6	Supported	Single

#### Note

If your ESXi host loses connectivity to VMFS3 or VMFS5 datastores, follow the instructions in KB article #2113956.

## 3.2 Accessing iSCSI targets from Linux

To connect a Linux-based iSCSI initiator to iSCSI targets of Virtuozzo Hybrid Infrastructure working in the ALUA mode, do the following:

- 1. Make sure the required packages are installed.
  - On RPM-based systems (CentOS and other), run:

# yum install iscsi-initiator-utils device-mapper-multipath

• On DEB-based systems (Debian and Ubuntu), run:

```
# apt-get install open-iscsi multipath-tools
```

2. Create and edit the configuration file /etc/multipath.conf as follows:

```
...
devices {
```

```
device {
    vendor "VSTORAGE"
      product "VSTOR-DISK"
    features "2 pg_init_retries 50"
    hardware_handler "1 alua"
    path_grouping_policy group_by_node_name
    path_selector "round-robin 0"
      no_path_retry queue
    user_friendly_names no
    flush_on_last_del yes
    failback followover
    path_checker tur
      detect_prio no
    prio alua
 }
}
. . .
```

3. Load the kernel module and launch the multipathing service.

```
# modprobe dm-multipath
# systemctl start multipathd; systemctl enable multipathd
```

- 4. If necessary, enable CHAP parameters node.session.auth.\* and discovery.sendtargets.auth.\*in/etc/iscsi/iscsid.conf.
- 5. Launch the iSCSI services:

```
# systemctl start iscsi iscsid
# systemctl enable iscsi iscsid
```

6. Discover all targets by their IP addresses. For example:

```
# iscsiadm -m discovery -t st -p 10.94.91.49 10.94.91.49 3260,1 \
iqn.2014-06.com.vstorage:target1
# iscsiadm -m discovery -t st -p 10.94.91.54 10.94.91.54:3260,1 \
iqn.2014-06.com.vstorage:target2
# iscsiadm -m discovery -t st -p 10.94.91.55 10.94.91.55:3260,1 \
iqn.2014-06.com.vstorage:target3
```

7. Log in to the discovered targets. For example:

```
# iscsiadm -m node -T iqn.2014-06.com.vstorage:target1 -1
# iscsiadm -m node -T iqn.2014-06.com.vstorage:target2 -1
# iscsiadm -m node -T iqn.2014-06.com.vstorage:target3 -1
```

8. Find out the multipath device ID. For example:

Now you can create partitions on the iSCSI device

When you no longer need the external iSCSI device, you can remove it from the initiator node. Do the following:

- 1. Make sure the iSCSI device is not in use.
- 2. Disable multipathing to the device. For example:

3. Log out of the iSCSI targets. For example:

```
# iscsiadm -m node -T iqn.2014-06.com.vstorage:target1 -p 10.94.91.49:3260 -u
# iscsiadm -m node -T iqn.2014-06.com.vstorage:target2 -p 10.94.91.54:3260 -u
# iscsiadm -m node -T iqn.2014-06.com.vstorage:target3 -p 10.94.91.55:3260 -u
```

4. Delete the iSCSI targets. For example:

```
# iscsiadm -m node -o delete -T iqn.2014-06.com.vstorage:target1 \
-p 10.94.91.49:3260
# iscsiadm -m node -o delete -T iqn.2014-06.com.vstorage:target2 \
-p 10.94.91.54:3260
# iscsiadm -m node -o delete -T iqn.2014-06.com.vstorage:target3 \
-p 10.94.91.55:3260
```

#### 3.3 Accessing iSCSI targets from Microsoft Hyper-V

Before connecting an iSCSI initiator of Microsoft Hyper-V to iSCSI targets working in the ALUA mode, you need to install and configure Multipath I/O (MPIO). This feature can be used starting from Windows Server 2008 R2. To connect the initiator, for example, on Microsoft Hyper-V Server 2016, do the following:

1. Run Windows PowerShell with administrator privileges and install MPIO.

> Enable-WindowsOptionalFeature -Online -FeatureName MultiPathIO

Your server will automatically reboot to finalize the installation.

- 2. In the Windows PowerShell console, configure MPIO as follows:
  - a. Enable support for iSCSI disks:

> Enable-MSDSMAutomaticClaim -BusType iSCSI

b. Set the failover policy to Fail Over Only. The policy uses a single active path for sending all I/O, and all other paths are standby. If the active path fails, one of the standby paths is used. When the path recovers, it becomes active again.

> Set-MSDSMGlobalDefaultLoadBalancePolicy -Policy FOO

c. Enable path verification. By default, the initiator will verify each path every 30 seconds.

> Set-MPIOSetting -NewPathVerificationState Enabled

- d. Reboot the server.
- 3. Connect your targets to the iSCSI initiator as follows:
  - a. In the Control Panel > System and Security > Administrative Tools > Services window, make sure that Microsoft iSCSI Initiator Service is running and its startup type is set to Automatic.

Action View Help						
🔶 🖬 🖾 🖾	2 🖬 🕨 🖬 🕪					
ervices (Local) 🔍 Se	rvices (Local)					
Microso	oft iSCSI Initiator Service	Name	Description	Status	Startup Type	Log On As
Chara alter		🎑 Link-Layer Topology Discovery Map	Creates a N		Manual	Local Servi
	e service the service	🔍 Local Session Manager	Core Windo	Running	Automatic	Local Syste
11020013		Microsoft (R) Diagnostics Hub Stand	Diagnostics		Manual	Local Syste
		🏟 Microsoft Account Sign-in Assistant	Enables use		Manual (Trig	Local Syste
Descript		Microsoft App-V Client	Manages A		Disabled	Local Syste
	es Internet SCSI (iSCSI) s from this computer to	Contract Con	Manages In	Running	Automatic	Local Syste
	iSCSI target devices. If this	Contemporary Microsoft Passport	Provides pr		Manual (Trig	Local Syste
	not be able to login or access iSCSI	Microsoft Passport Container	Manages Io		Manual (Trig	Local Servi
		Microsoft Software Shadow Copy Pr	Manages so		Manual	Local Syste
		🖏 Microsoft Storage Spaces SMP	Host service		Manual	Network S.
will fail		NC Host Agent	Network Co		Disabled	Local Syste
		Wet.Tcp Port Sharing Service	Provides abi		Disabled	Local Servi
		🔍 Netlogon	Maintains a		Manual	Local Syste
		Network Connection Broker	Brokers con	Running	Manual (Trig	Local Syste
		Network Connections	Manages o	Running	Manual	Local Syste
		Network Connectivity Assistant	Provides Dir		Manual (Trig	Local Syste
		Network List Service	Identifies th	Running	Manual	Local Servi
		Network Location Awareness	Collects an	Running	Automatic	Network S.
		Network Setup Service	The Networ	Running	Manual (Trig	Local Syste
		Network Store Interface Service	This service	Running	Automatic	Local Servi
		Contraction Contra	The Offline	-	Disabled	Local Syste
		Optimize drives	Helps the c		Manual	Local Syste
		Performance Counter DLL Host	Enables rem		Manual	Local Servi
Extend	ed / Standard /					

- b. Launch iSCSI Initiator.
- c. In the **iSCSI Initiator Properties** window, open the **Discovery** tab and click **Discover Portal**.

×

iscsi I	Initiator Proper	ties				$\times$		
Targe	ets Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration			
	Target portals The system will look for Targets on following portals: Refresh							
A	Address Port Adapter IP address							
Тс			Portal. address above and		Remove			

d. In the Discover Target Portal window, enter the target IP address and click OK. Repeat this step for each target from the target group.

Discover Target Portal	×					
Enter the IP address or DNS name and port number of the portal you want to add.						
To change the default settings of the discovery of the target portal, click the Advanced button.						
IP address or DNS name:	Port: (Default is 3260.)					
10.94.22.166	3260					
Advanced	Cancel					

e. On the **Targets** tab, click **Refresh** to discover the added targets.

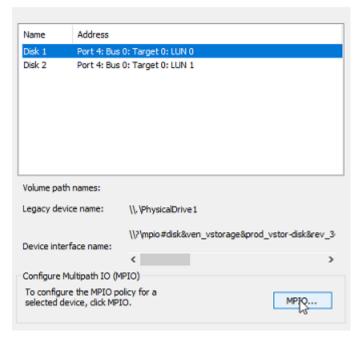
iSCSI Init	iator Proper	ties				×
Targets		Favorite Targets	Volumes and Devices	RADIUS	Configuration	
To disc		on to a target usin arget and then click	g a basic connection, ty Quick Connect.	ype the IP	address or	
Target	:			Qu	lick Connect	
Discov	ered targets					
					Refresh	
Name				Status	13	
ign.2	014-06.com.	vstorage:target1		Inactive		
ign.2	014-06.com.	vstorage:target2		Inactive		
	nect using a onnect.	dvanced options, se	elect a target and then		Connect	1
	npletely disco lick Disconne	nnect a target, sek ct.	ect the target and		Disconnect	
		es, including configu nd click Properties.	uration of sessions,		Properties	
		f devices associated n click Devices.	d with a target, select		Devices	]

f. Click **Connect** for each target to connect it to the initiator. In the **Connect To Target** window, select the **Enable multi-path** checkbox and click **OK**.

Connect To Target		×
Target name:		
iqn.2014-06.com.vstorage:target1	]	
Add this connection to the list of Favorite Tar This will make the system automatically atten connection every time this computer restarts		
✓ Enable multi-path		
Advanced	٩٤ - I	Cancel

g. On the Targets tab, click Devices.., select the connected LUN, and click MPIO...

Devices



 $\times$ 

h. Make sure the connected LUN has several paths.

Devic	e Details					>
MPIC	C					
Loa	d balance	policy:				
Fa	il Over Or	ıly				$\sim$
D	escription					
i i	other pati round-rob available p	ns as standt	y. The star upon failure d.	ndby paths v	nd designates vill be tried on ve path until a	a
P	ath Id	Status	Туре	Weight	Session ID	
0	x7704	Conne	Active	n/a	ffffe502d2a	50010-4000
			Standby	n/a		50010-4000
<		Conne	Standby	n/a Det	ffffe502d2a	> Edit
			0	ĸ	Cancel	Apply

You can now initialize the newly added disk for use in Microsoft Hyper-V. Do the following:

1. Open **Disk Management**, right-click the added disk, and choose **Properties** from the dropdown menu. 🗁 Disk Management

File Action View	Help							
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
= (C:)	Simple	Basic	NTFS	Healthy (B	199.51 GB	188.89 GB	95 %	
SSS_X64FREV_EN	Simple	Basic	UDF	Healthy (P	5.59 GB	0 MB	0 %	
System Reserved	Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	

Disk 0 Basic 200.00 GB Online	System Reserved 500 MB NTFS Healthy (System, Active, Primary Part	(C:) 199.51 GB NTFS Healthy (Boot, Page File, Crash Dump, Primary Partition)	
*O Disk 1 Unknown 10.00 ( Offling	Online		
Offina	Properties		
Unalloca	Help ted Primary partition		Y

2. Check the settings on the **MPIO** tab. The first connected target becomes **Active/Optimized** and the preferred path.

VSTORAGE VSTOR-DISK Multi-Path Disk Device Properties ×								
General	Policies	Volumes	MPIO	Driver	Details	Events		
Select t	he MPIO p	oolicy:	Fail Ove	er Only				$\sim$
Descr	iption							
The failover policy employs one active/optimized path and all other paths are active/unoptimized, standby, or unavailable. The non-active/optimized paths will be tried round-robin upon failure of the active/optimized path until an available path is found.								
DSM N	DSM Name: Microsoft DSM Details							
This device has the following paths:							_	
Path I	d	Path Sta	ite	TPG	TPG St	ate	Wei.	^
77040	0000	Active/0	Optimi	1	Active/	Optimi		
77040	001	Standby		2	Standby	/		
77040	002	Standby		3	Standby	/		<b>~</b>
<							>	
	the path s d click Edi	ettings for t t.	he MPIO	policy, se	elect a		Edit	
To appl click Ap		settings ar	id selecte	ed MPIO	policy,		Apply	
				[	OK		Cano	el

#### 3. Partition and format the disk as usual.

📅 Disk Manager	ment						-	×
File Action \	View Help							
de 🔿 🛛 🖬 🖡	? 🖬 🗩 🖓	5						
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	199.51 GB	188.89 GB	95 %	
New Volume (	(E:) Simple	Basic	NTFS	Healthy (P	10.00 GB	9.96 GB	100 %	
SSS_X64FREV_E	EN Simple	Basic	UDF	Healthy (P	5.59 GB	0 MB	0 %	
🛲 System Reserve	ed Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	
Disk 0								i
- Disk 0 Basic 200.00 GB Online	System Reser 500 MB NTFS Healthy (Syste			.) .51 GB NTFS lithy (Boot, Page F	ile, Crash Dum	p, Primary Parti	tion)	
Basic 200.00 GB	500 MB NTFS	m, Active, Pri (E:)	199	51 GB NTFS	ile, Crash Dum	p, Primary Parti	tion)	
Basic 200.00 GB Online Disk 1 Basic 10.00 GB	500 MB NTFS Healthy (Syste New Volume 10.00 GB NTFS Healthy (Prima	m, Active, Pri (E:) ary Partition)	199	51 GB NTFS	ile, Crash Dum	p, Primary Parti	tion)	

## **4** Accessing NFS shares

This section describes ways to mount Virtuozzo Hybrid Infrastructure NFS shares on Linux and macOS.

#### Note

Virtuozzo Hybrid Infrastructure currently does not support the Windows built-in NFS client.

#### 4.1 Mounting NFS exports on Linux

You can mount an NFS export created in Virtuozzo Hybrid Infrastructure like any other directory exported via NFS. You will need the share IP address (or hostname) and the volume identifier.

In console, run the following commands:

```
# mkdir /mnt/nfs
# mount -t nfs -o vers=4.0 <share_IP>:/<share_name>/ /mnt/nfs
```

where:

• -o vers=4.0 is the NFS version to use.

Virtuozzo Hybrid Infrastructure supports NFS versions 4.0 and 4.1.

- <share\_IP> is the share IP address. You can also use the share hostname.
- /<share\_name>/ is the root export path, like share1. For user exports, specify their full path, for example: /<share\_name>/export1.
- /mnt/nfs is an existing local directory to mount the export to.

## 4.2 Mounting NFS exports on macOS

You can mount an NFS export created in Virtuozzo Hybrid Infrastructure like any other directory exported via NFS. You will need the share IP address (or hostname) and the volume identifier.

You can use the command-line prompt or Finder:

• In console, run the following commands:

```
# mkdir /mnt/nfs
# mount -t nfs -o vers=4.0 <share_IP>:/<share_name>/ /mnt/nfs
```

where:

 $\circ~$  -o vers=4.0 is the NFS version to use.

Virtuozzo Hybrid Infrastructure supports NFS versions 4.0 and 4.1.

- <share\_IP> is the share IP address. You can also use the share hostname.
- /<share\_name>/ is the root export path, like share1. For user exports, specify their full path, for example: /<share\_name>/export1.
- /mnt/nfs is an existing local directory to mount the export to.

- In Finder, do the following:
  - 1. Set the NFS version to 4.0. To do this, add the nfs.client.mount.options = vers=4.0 line to the /etc/nfs.conf file.
  - 2. In the Finder > Go > Connect to server window, specify nfs://192.168.0.51:/<share\_ name>/

where:

- 192.168.0.51 is the share IP address. You can also use the share hostname.
- /<share\_name>/ is the root export path. For user exports, specify their full path, for example: /<share\_name>/export1.

3. Click **Connect**.

The Finder will mount the export to /Volumes/<share\_name>/.