Virtuozzo

Virtuozzo Hybrid Infrastructure 6.0

Storage User Guide

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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.

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.

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.

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
EN	DPOINT
s3	8.example.com
~	Use secure transfer (SSL)
AC	CESS KEY ID
d	9fde6a530879f59HB8U
SEC	CRET ACCESS KEY
•	
$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	LOG IN
l	111 6 6 1

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

If logging in to the user panel fails, this can be caused by one of the following reasons:

- Error: "Network failure. Check your S3 endpoint or access protocol (HTTP/HTTPS)."
 - The client is trying to access a bucket over HTTP. This does not work in most browsers, as parts of the web interface are served over HTTPS and mixed HTTP/HTTPS connections are forbidden. To solve the problem, access the service over HTTPS.
 - The client cannot resolve the DNS name associated with the service. In this case, add the mapping in your DNS. Alternatively, you can solve the problem by adding static mappings to the hosts file (/etc/hosts on Linux or %windir%\System32\drivers\etc\hosts on Windows); note that this needs to be done on all clients.
 - The service is using a self-signed or invalid SSL certificate. In this case, use a valid SSL certificate recognized by a certificate authority. Alternatively, you can temporarily solve the problem by pointing the browser to the service URL (for example, https://s3.example.com) and manually accepting the certificate; note that this only works on the client where the certificate has been manually accepted.
- Error: "Bad signature. Check your key and signing method."
 - \circ $\,$ The client or server time or timezone are incorrect.
 - The user credentials are incorrect.
 - The S3 user is disabled.

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**.

Adding, deleting, and listing S3 buckets

On the **Buckets** screen:

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

× Add bucket

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**.

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 Cancel

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

Uploading and downloading files

On the bucket or folder contents screen:

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

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

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

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 53	•
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.

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	nissions Metadata Distribution (CDN)				
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 Oloudstat				
	None				
	Open the URL to setup log analytics with Qloudstat.				
Versioning	V 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 🔹				

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		Y
Nickname:	S3 Storage	
URL:	https://e5afdeeb012d44d3RRFD@s3.dns.name.com	
Server:	s3.dns.name.com Port: 443	÷
Username:	e5afdeeb012d44d3RRFD	
	Anonymous Login	
SSH Private Key:	None Y Choose.	
Client Certificate:	None	Y
Path:		
Encoding:	UTF-8	V
Notes:		
Timezone:	UTC	v
Drive Letter:	Auto	v
Mount Options:	Read Only	
	Connect Delete	

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

🔼 Login s3.dns.nan	ne.com	٢
a,	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:	••••••	
1	Anonymous Login	
SSH Private Key:	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.

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.

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.

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.

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**.

Datastores Adapters Devices			
Configure iSCSI 💻 Rescan C Refresh	n Actions	Q Sear	ch
Name Configure iSCSI for this host	~ Model ~	Status ~	Driver ~
🐖 vmhba0	Sunrise Point-H AHCI Controller	Unknown	vmw_ahci
vmhba64	iSCSI Software Adapter	Online	iscsi_vmk
			2 items 🦼

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**.

Configure iSCS1					
Static targets	🙋 Add static target 🛛 🧕 Remove static	c target	🥖 Edit settings 🧿	Search	×
	Target	~	Address (Port	~
	ign.2013-10.com.vstorage:test1		10.94.125.197	3260	
	iqn.2013-10.com.vstorage:test2		10.94.125.205	3260	E
	iqn.2013-10.com.vstorage:test3		10.94.125.207	3260	
			Sav		Cancel

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

Datastores Adapters Devices						
😫 New datastore 🖭 Increase capacity 🚊 Rescan	C Refresh	🔅 Actions		Q 8	dearch	
Name 😔	Status ~	Туре ~	Capacity ~	Queue v	Vendor	~
STORAGE IS CSI Disk (eui.6164383063623739)	📀 Normal	Disk	10 GB	128	VSTORAGE	^
					1 iten	ns

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.

Datastores Adapters Devices							
😫 New datastore 🛛 Increase capacity	🔐 Regist	era VM 🛛)atastore brow	ser 🤁 Re	fresh 🔅 A	ctions Q Search	
Name 😔	Drive Ty 🗸	Capacity ~	Provisi 🗸	Free 🗸	Туре ~	Thin pr 🗸	Access ~
atastore01	Non-SSD	9.75 GB	1.41 GB	8.34 GB	VMFS6	Supported	Single
							1 items

Note

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

Accessing iSCSI targets from Linux

Important

To mount an iSCSI device to a storage node from another Virtuozzo Hybrid Infrastructure cluster, use the vinfra node iscsi target add/delete commands, as described in the Administrator Guide.

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

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

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
```

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.

🍓 Services					-		×
File Action View	v Help						
le e	Q 🛃 🔢 🖬 🕨 🔳 🕪						
🔍 Services (Local)	Services (Local)	_					
	Microsoft iSCSI Initiator Service	Name	Description	Status	Startup Type	Log O	n As ^
		Link-Layer Topology Discovery Map	Creates a N		Manual	Local S	Servi
	Stop the service	Local Session Manager	Core Windo	Running	Automatic	Local S	Syste
	Restart the service	Microsoft (R) Diagnostics Hub Stand	Diagnostics		Manual	Local S	Syste
		Alternation Account Sign-in Assistant	Enables use		Manual (Trig	Local S	Syste
	Description:	Microsoft App-V Client	Manages A		Disabled	Local S	Syste
	Manages Internet SCSI (iSCSI)	Microsoft iSCSI Initiator Service	Manages In	Running	Automatic	Local	Syste
	remote iSCSI target devices. If this	Microsoft Passport	Provides pr		Manual (Trig	Local S	Syste
	service is stopped, this computer will	Microsoft Passport Container	Manages Io		Manual (Trig	Local S	Servi
	not be able to login or access iSCSI	Microsoft Software Shadow Copy Pr	Manages so		Manual	Local S	Syste
	services that explicitly depend on it	🖏 Microsoft Storage Spaces SMP	Host service		Manual	Netwo	ork S.
	will fail to start.	🥋 NC Host Agent	Network Co		Disabled	Local S	Syste
		🧠 Net.Tcp Port Sharing Service	Provides abi		Disabled	Local S	Servi
		🏟 Netlogon	Maintains a		Manual	Local S	Syste
		Network Connection Broker	Brokers con	Running	Manual (Trig	Local S	Syste
		Network Connections	Manages o	Running	Manual	Local S	Syste
		🖏 Network Connectivity Assistant	Provides Dir		Manual (Trig	Local S	Syste
		🔍 Network List Service	Identifies th	Running	Manual	Local S	Servi
		Network Location Awareness	Collects an	Running	Automatic	Netwo	ork S.
		Network Setup Service	The Networ	Running	Manual (Trig	Local S	Syste
		🥋 Network Store Interface Service	This service	Running	Automatic	Local S	Servi
		🖏 Offline Files	The Offline		Disabled	Local S	Syste
		Optimize drives	Helps the c		Manual	Local S	Syste
		Performance Counter DLL Host <	Enables rem		Manual	Local S	Servi Y
	Extended Standard						

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

iSCSI Initiator Properties

Targets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
Targe The s Addr	t portals system will loc ess	ok for Targets on fo Port	llowing portals: Adapter	I	Refresh P address	
To ad To re then	ld a target po move a targe click Remove	ortal, click Discover et portal, select the	Portal. address above and	Disco	over Portal Remove	

Х

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 po want to add.	ort number of the portal you
To change the default settings of the disc the Advanced button.	overy of the target portal, dick
IP address or DNS name:	Port: (Default is 3260.)
10.94.22.166	3260
Advanced	OK Cancel

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

iSCSI Init	iator Proper	ties				×
Targets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
-Quick C To disc DNS na	Connect cover and log ame of the ta	on to a target usin arget and then click	g a basic connection, ty Quick Connect.	ype the IP	address or	
Target	t:			Qu	uick Connect	
Discov	ered targets			_		
					Refresh	
Name	•			Status	20	
ign.2	014-06.com.	vstorage:target1		Inactive		
ign.2	014-06.com.v	vstorage:target2		Inactive		
To con dick Co	inect using a onnect.	dvanced options, se	elect a target and then		Connect	1
To con then d	npletely disco lick Disconneo	nnect a target, sek ct.	ect the target and		Disconnect	1
For tar select	rget propertie the target ar	es, including configu nd click Properties.	uration of sessions,	1	Properties	1
For co the tar	nfiguration o rget and ther	f devices associate 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 Ta This will make the system automatically atte connection every time this computer restart	argets. mpt to restore the ts.	
☑ Enable multi-path		
Advanced	₹K	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.

De	vice Details					Х
М	PIO					
	Load balance	e policy:				
	Fail Over Or	nly			\sim	
	Description					
	The fail ov other patt round-rob available p This device h	ver policy en hs as standb in approach path is found has the follo	nploys one a by. The star upon failure d. wing paths:	active path a ndby paths e of the acti	and designates all will be tried on a ve path until an	
	Path Id	Status	Туре	Weight	Session ID	1
	0x7704	Conne	Active	n/a	ffffe502d2a50010-400	0
	0x7704 0x7704	Conne Conne	Standby Standby	n/a n/a	ffffe502d2a50010-400 ffffe502d2a50010-400	0
	<				>	
				De	tails Edit	
			0	к	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 M	lanagemen	nt							^
File Act	ion View	/ Help							
⊨ • [r ? ,	m 🗩 🗹 🛙	8						
Volume		Layout	Туре	File Syster	m Status	Capacity	Free Spa	% Free	
- (C:)		Simple	Basic	NTFS	Healthy (B	199.51 GB	188.89 GB	95 %	
SSS_X64	FREV_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	S	System Reserv	ed		(C:)				
Disk 0 Basic 200.00 GB Online	5	System Reserv 600 MB NTFS Healthy (Systen	ed n, Active, Prir	(19 mary Part H	(C:) 99.51 GB NTFS Healthy (Boot, Page F	ile, Crash Dum	p, Primary Parti	tion)	
Disk 0 Basic 200.00 GB Online Olise Olise Uaknown	5	System Reserv 00 MB NTFS Healthy (Systen	ed 1, Active, Prir	mary Part H	(C:) 99.51 GB NTFS Healthy (Boot, Page F	iile, Crash Dum	p, Primary Parti	tion)	
Disk 0 Basic 200.00 GB Online Online Olisk 1 Unknown 10.00 Offline	Online	System Reserv 00 MB NTFS Healthy (Systen	ed 1, Active, Prir	mary Part H	(C:) 99.51 GB NTFS Healthy (Boot, Page F	ïle, Crash Dum	p, Primary Parti	tion)	
Disk 0 Basic 200.00 GB Online Olisk 1 Unknown 10.00 Offline	S 5 F Online Properti	System Reserv 00 MB NTFS Healthy (Systen	ed n, Active, Prir	mary Part	(C:) 99.51 GB NTFS Healthy (Boot, Page F	iile, Crash Dum	p, Primary Parti	tion)	
Disk 0 Basic 200.00 GB Online Online Online Online Online	S S H Online Properti Help	System Reserv 00 MB NTFS Healthy (System	ed n, Active, Prir	mary Part	(C:) 99.51 GB NTFS Healthy (Boot, Page F	ïle, Crash Dum	p, Primary Parti	tion)	

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

VSTORAG	E VSTOR-	DISK Mu	lti-Path	Disk Dev	vice Prop	erties		×
General	Policies	Volumes	MPIO	Driver	Details	Events		
Select t	he MPIOp	olicy:	Fail Ove	er Only				\sim
Descr The fa paths active active	ailover poli are active optimized optimized	cy employs /unoptimiz d paths will d path until	one act ed, stand be tried an availa	ive/optimi dby, or un round-robi able path	ized path available. in upon fa is found.	and all of The nor ailure of th	ther 1- 1e	
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3. Partition and format the disk as usual.

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📅 Disk Management

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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.

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.

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:

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

Virtuozzo Hybrid Infrastructure supports NFS versions 4.0 and 4.1.

- $^{\circ}$ <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.
- $^\circ$ /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>/.