Shared Storage Portal – User Guide

Web UI – Customer User Guide

Orange Business - 06/2024

Summary

1. Introduction

1.1. History

Version	Date	Modifications	Author
1.0	08/2023	Creation of this document	Orange Business
1.1	10/2023	Active directory handling	
1.2	03/2024	NSX-T configuration, BMS SVM handling and logo update	
1.3	06/2024	Minor update	

1.2. Objective of the document

This document is intended for Cloud Avenue users who need to use the Shared Storage Portal in order to manage their shared storage resources.
It aims to describe the different parts of the Cloud Avenue Shared Storage Portal :

- Information that the user can view in the portal
- Actions that the user can perform in the portal

2. Shared Storage Portal functionalities

The Shared Storage Portal allows Customer to manage NFS and SMB shares for their Cloud Avenue environment.

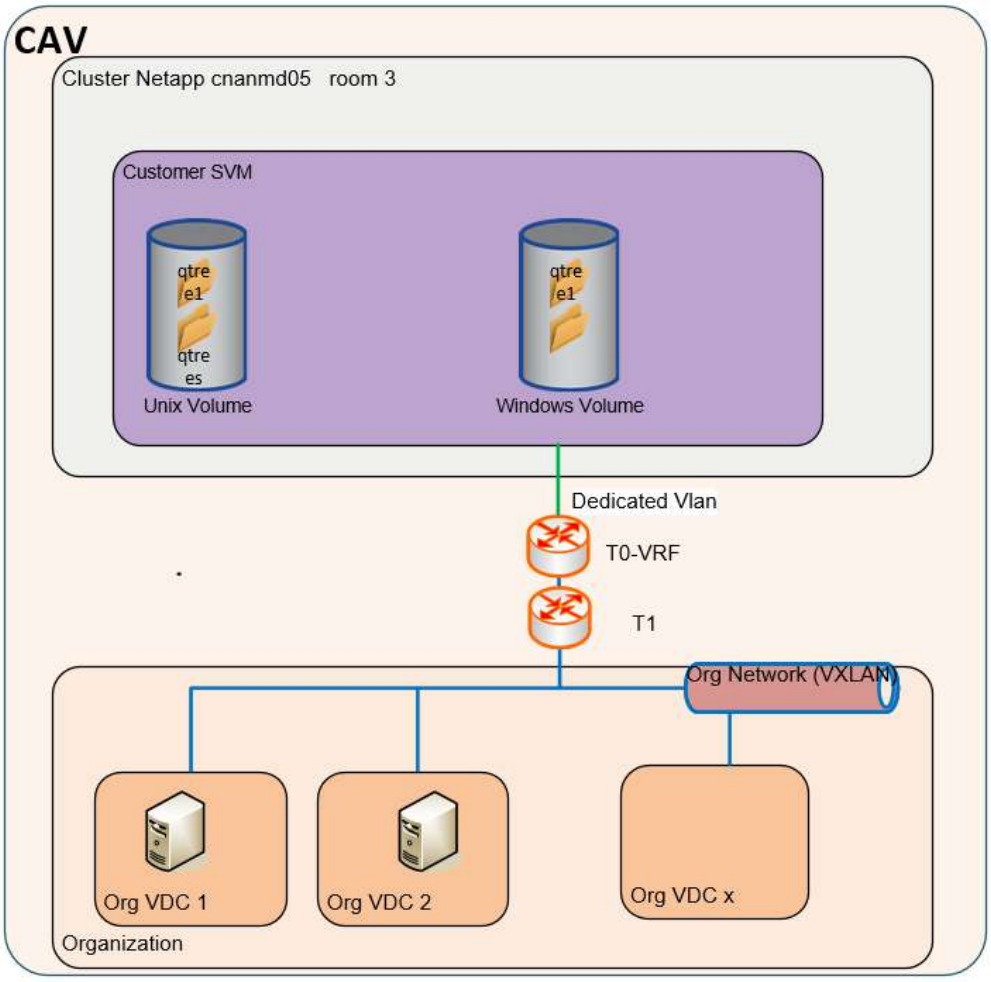


Figure 1 - Shared storage topology

You will self-provision your SVM and volumes. For capacity management reason, this self-provisioning has some limitations.

The Shared Storage Portal is only accessible to VCloud Director Tenant local users belonging to **Org Admin** role.

SSP functionalities are:

- Environment view (SVM configuration),
- Volume management (creation, modification),
- Snapshot management (scheduled and manual),
- Qtree (and NFS export or SMB share depending on the volume type) management,
- Local group and user management for SMB shares.

2.1. SVM

Cloud Avenue shared storage is based on NetApp technology which provides a SVM (Storage Virtual MAchine) hosting several volumes and an isolated network dedicated to the customer.

A SVM is a virtual instance of a NetApp filer sit on physical NetApp appliance, which have its own IP plan and routing domain.

Needed ports for protocols:

- SMB
- NFS

Protocol	TCP port
Mountd	635
Portmapper	111
NLM	4045
NSM	4046
NFS	2049
Rquota	4049

2.2. Volume

A volume is a container in which a user can create Qtrees.

Volumes can be either UNIX or Windows depending on type of sharing.

The size of volume can be from 500 GB to 10 TB.

In the **Volume** menu, you are able to create up to 6 volumes with a limit size of 10TB. For bigger size or for more than 6 volumes, contact your Orange Business support or commercial.

Class of service can be:

Class of service	IOPS/TB
Silver	600
Gold	1000
Platinum 3K	3000

It means that IOPS provided by a volume is a combination of its size and storage class (IOPS per TB).

For instance, a silver volume of 10TB will have 6000 IOPS where a 500 GB platinum volume will have 1500 IOPS. So, choose wisely correct size and class of service.

NetApp Volumes are deduplicated. It means that all common blocks within a volume are stored only once, saving space. This saved space is available back in the volume itself. The more you deduplicate, the more you store. However, deduplication efficiency depends on the file type. Office or text files will be more deduplicated than database files.

Find below common deduplication rate by file type:

Type of data	Type of application	Deduplication rate

Common office files		30 %
Database	Oracle® OLTP	0 %
	Oracle DW	15 %
	SQL Server®	20 %
Email, collaboration	Exchange 2003/2007	3 %
	Exchange 2010/2013	15 %
Engineering data		30 %
Géosismic		3 %
Archives		25 %
Backup (because of multiple instances of files)		95 %

2.3. Volume snapshots

Snapshot is a read only view of the filesystem at the instant the snapshot had been taken. So, the snapshot is an image of the past.

Even if the snapshot can be visible at Qtree level, it is only a sub view from the volume snapshot. This is why it is name as "**volume snapshot**". This means that when a snapshot is destroyed, it is at volume level. Then, all Qtrees within this volume lose "de facto" this snapshot instance at deletion.

The snapshot is part of the volume. So, all blocks of the snapshot consume blocks in the volume. However, if there are common blocks between live data and snapshots, deduplication will act.

At snapshot creation, the snapshot is empty of blocks and only contains filesystem metadata. The snapshot will be filled of blocks unreferenced in the live filesystem. In fact, there are links to inodes from live filesystem and snapshot. Block is not really moved to snapshot but only kept in volume until it is no longer used.

Each N-1 snapshot contains blocks destroyed between N-1 and N snapshots.

The last snapshot contains blocks destroyed between the snapshot time and present time.

If blocks of a file are modified at each snapshot, all versions of these blocks will be kept for file reconstruction. But if a block is modified many times between two snapshots, only last version will be in snapshot.

If an intermediary snapshot is removed, the following one (more recent) will take ownership of blocks which are necessary to reconstruct the entire file at this snapshot moment. All other blocks will be destroyed. It means that destroying a snapshot doesn't free 100 % of space used by it. This is a common mistake done by administrators. Deleting snapshots don't free space as expected. On the portal, in snapshot deletion menu, you will be informed of the space freed by deletion.

2.3.1. Types of snapshots

Snapshot types

Snapshot can be manual or scheduled.

Scheduled snapshots a taken according to a snapshot policy, which manages schedule and retention.

Manual snapshots are done via the portal where you can name them freely. Retention of this snapshot is infinite till you explicitly destroy it. Be warned that the older a snapshot is, the bigger it is. This may have impact on capacity and retention of scheduled snapshots.

Snapshot naming

Scheduled snapshots names depend on the policy (see chapter snapshot policy).

Manual snapshot name is free. Only manual snapshot can have comment.

2.3.2. Snapshot size consideration

Snapshot size depends on the daily change rate. Daily change rate (DRC) average is 3-4% but is tied to your activity. Archiving will have lower DCR than database.

Common averages are daily snapshot to 3 % of used data, weekly to 5-8 % and monthly to 12-15%. You will have to modify those values for dimensioning from your experiment.

2.3.3. Snapshot autodeletion

Some autodeletion mechanisms can be put in place in order to prevent from filling up volume or snap reserve of snapshots.

Autodeletion is triggered when you reach less than 15 % of free space. But free space of what? There are two triggers: **Snap reserve** (will be explained in next chapter) and **volume** :

- When trigger is set to **snap reserve**, snapshots may be destroyed to respect 15 % of free space within snap reserve.
- When trigger is **volume**, snapshots may be destroyed to respect 15 % of free space within the entire volume.

Autodeletion mechanism destroys oldest snapshot(s) to respect the 15 % of free space.

/!\ Scheduled snapshots will be destroyed in priority against manual snapshots (if any).

This means that if you leave an old manual snapshot, it may push all other scheduled snapshot to deletion. So be careful of forgotten snapshots.

2.3.4. Snapshot visibility and restoration considerations

You can make snapshots visible from client side (see chapter for snapshot configuration).

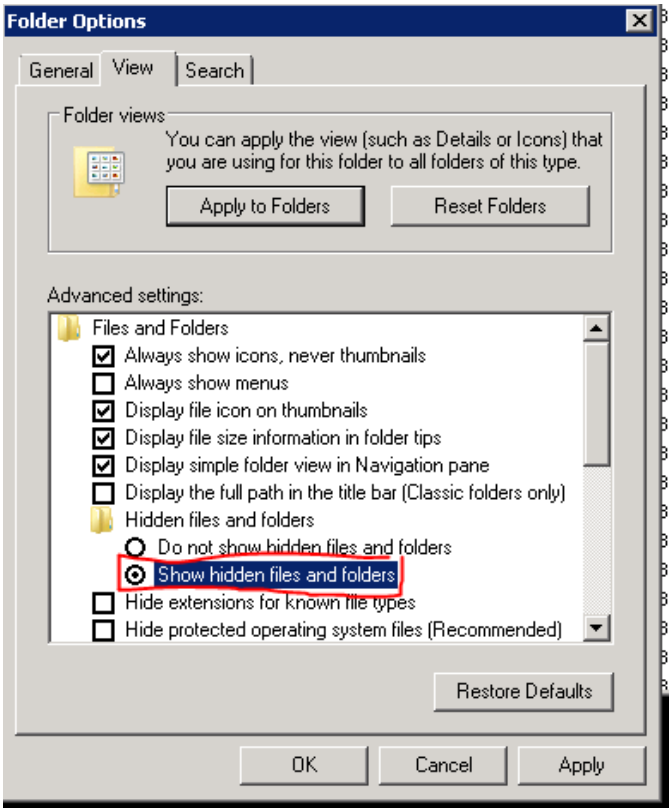
When option is enabled, you will be able to see at the root mount of the qtree the snapshot folder.

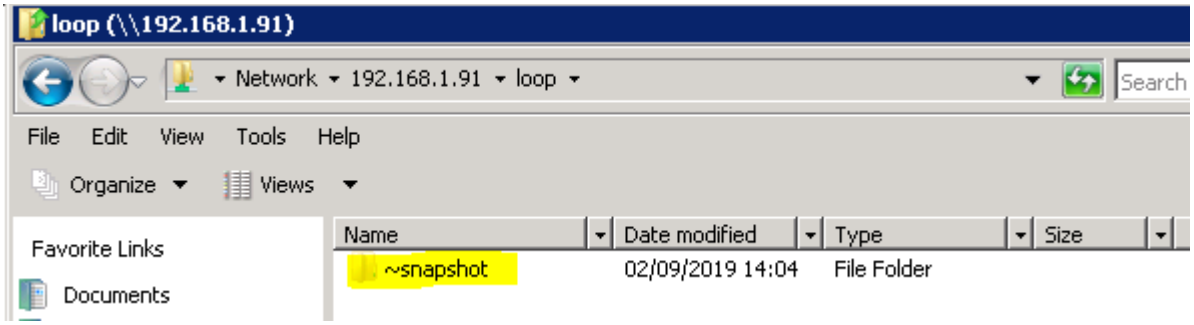
On Windows its name is **~snapshot**. On Linux, its name is **.snapshot**. Both are hidden folders.

On Linux, simple **ls –a** shows it, for example :

```
[root@sharedNFSNU backup]# ls -la
total 162680
drwxr-xr-x   3 root root      4096 Aug 31 23:57 .
drwxr-xr-x. 11 root root      4096 Mar 29 12:02 ..
-rw-r--r--   1 root root      5287 Aug 29 23:57 [2019-08-29]-dbs.sql
-rw-r--r--   1 root root      5287 Aug 30 23:57 [2019-08-30]-dbs.sql
-rw-r--r--   1 root root      5287 Aug 31 23:57 [2019-08-31]-dbs.sql
drwxrwxrwx  12 root root      4096 Sep  2 14:05 .snapshot
drwxr-xr-x   3 root root      4096 Sep 14  2018 var
```

On Windows, you need to enable "**show hidden files and folders**" to see it.





Inside .snapshot folder, you will be able to see snapshots.

```
 [root@sharedNFSNU .snapshot]# ls -la
total 48
drwxrwxrwx 12 root root 4096 Sep  2 14:05 .
drwxr-xr-x  3 root root 4096 Aug 31 23:57 ..
drwxr-xr-x  3 root root 4096 Aug 31 23:57 daily.2019-09-01_0010
drwxr-xr-x  3 root root 4096 Aug 31 23:57 daily.2019-09-02_0010
drwxr-xr-x  3 root root 4096 Aug 31 23:57 hourly.2019-09-02_0905
drwxr-xr-x  3 root root 4096 Aug 31 23:57 hourly.2019-09-02_1005
drwxr-xr-x  3 root root 4096 Aug 31 23:57 hourly.2019-09-02_1105
drwxr-xr-x  3 root root 4096 Aug 31 23:57 hourly.2019-09-02_1205
drwxr-xr-x  3 root root 4096 Aug 31 23:57 hourly.2019-09-02_1305
drwxr-xr-x  3 root root 4096 Aug 31 23:57 hourly.2019-09-02_1405
drwxr-xr-x  3 root root 4096 Aug 24 23:57 weekly.2019-08-25_0015
drwxr-xr-x  3 root root 4096 Aug 31 23:57 weekly.2019-09-01_0015
```

In this case you can see that the timestamp time is not corresponding to creation date. It only means that client time is not correctly synchronized with NetApp server.

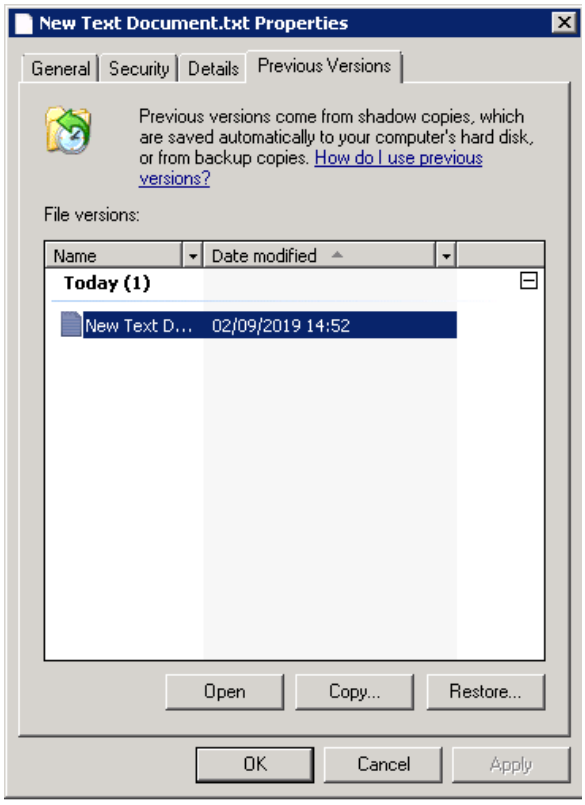
So, on Linux, restore a file is a simple **cp** (not **mv** : snapshot are read only) of the file to live filesystem folder (original place or other)

```
[root@sharedNFSNU]# cp /mnt/backup/.snapshot/hourly.2019-09-02_1105/tt.tar /mnt/backup

cp: overwrite /mnt/backup/tt.tar? y

[root@sharedNFSNU]#
```

On Windows, you can copy paste from Explorer, copy from dos or PowerShell. You can use also “show previous version” functionality:



2.4. Snap reserve.

A volume may have a snap reserve. It is a percent of the volume size. This snap reserve is dedicated to host snapshots. The bigger the snap reserve is, the less live data space is available.

On portal you will be able to disable snap reserve (this does not mean you cannot have snapshots) or a snap reserve between 5 and 20 %. Size depends on the retention you need and the daily change rate of your data.

Live data will never be granted to write in snap reserve.

Volume

Use cases implemented in the portal:

1 – Snap reserve without overflow in live data space (trigger: snap reserve)

Snapshot will only be hosted in this snap reserve.

Oldest snapshots will be destroyed to respect 15 % free space of the snap reserve.

2 – Snap reserve with overflow. (Snapshots consuming in live data space are called spilling snapshots)

Oldest snapshots will be destroyed to respect 15 % free space of the volume space. Grant to snap reserve if you fill with data the data space to 100%, snapshots remaining in snap reserve will remain in.

3 – No snap reserve with trigger on volume.

It is the same behavior as case 2 but in this one, all snapshots can be destroyed in case of volume filled over 15 % free space.

4 - No snap reserve with trigger snap reserve

No snapshot is possible (scheduled or manual)

2.5. Snapshot policies

Snapshot policies are used to plan snapshots and manage retention.

A snapshot policy will permit to do multi daily, daily, weekly, monthly snapshots or a combination of them within a policy.

A snapshot policy can be assigned to one or many volumes.

Scheduled are named with the type of snapshot as prefix (hourly, daily, weekly, monthly) plus the timestamp.

The available snapshot policies are:

	Retention			
Policy	Hourly	Daily	Weekly	Monthly
cust_pol_daily-7		7		
cust_pol_hourly6-5-daily-7	5	7		
cust_pol_cust_daily-7-weekly-4		7	4	

cust_pol_daily-7-weekly-4-monthly-3		7	4	3

On Cloud Avenue :

- Hourly snapshots are taken at 3:03,9:03,15:03,21:03
- Daily snapshots are taken at 0:00
- Weekly snapshots are taken each Sunday at 0:10
- Monthly snapshots are taken the first day of the month at 0:15

2.6. Qtree

A Qtree is a directory created at the root of the volume in which a user can allocate a quota and add NFS export policy for UNIX Qtrees or share ACL for Windows.

Qtree size show non deduplicated size of files. Summing all Qtree used space will not be the same value of Volume used space.

Volume size is infrastructure view. Qtree size is Client view.

2.7. NFS exports

On the Shared Storage Portal, only NFS V3 is supported.

Counter to Linux/UNIX exportfs file mechanism, which was a single line for each export with ro/rw/sys options, NetApp chose to modify management by having a rule (like firewall rule) for each type of access and/or customer.

Traditional NFS exportfs

```
/vol/OP_C4O_DA5_OFF_FRA_01/DEMO_SAS      -sec=sys,rw=192.168.1.0/25,root192.168.1.0/25
```

Netapp Export-policy rules:

Rule Index	Client	ReadOnly	Read-Write	Superuser
1	192.168.1.1,192.168.2.1	☑	☑	☑
2	192.168.1.0	☑	☑	☐
3	192.168.2.0	☑	☐	☐

2.7.1. Ports for NFS

```
[root@nfsclient ~]# rpcinfo -p 10.61.92.34
program vers proto port service
100000 2 udp 111 portmapper
100000 2 tcp 111 portmapper
100000 3 udp 111 portmapper
100000 3 tcp 111 portmapper
100000 4 udp 111 portmapper
100000 4 tcp 111 portmapper
100003 3 udp 2049 nfs
```

```
100003 3 tcp 2049 nfs
100003 4 tcp 2049 nfs
400010 1 tcp 2049
100005 1 udp 635 mountd
100005 2 udp 635 mountd
100005 3 udp 635 mountd
100005 1 tcp 635 mountd
100005 2 tcp 635 mountd
100005 3 tcp 635 mountd
100021 4 udp 4045 nlockmgr
100021 4 tcp 4045 nlockmgr
100024 1 udp 4046 status
100024 1 tcp 4046 status
100011 1 udp 4049 rquotad
```

2.8. SMB Shares

You can manage Windows shares on your SVM. Your SVM is configured as a standalone Workgroup server. You will be able, as on a windows server, to create local users and group on the SVM. Those groups and users will be granted.

SMB shares on Ontap use SMB V2/V3 protocols. As SMB V1 is deprecated, it is disabled.

Authentication protocol is ntlmv2. NTLM V1 and LM are disabled.

Depending on the choice you do you can:

Activate SMB in Workgroup mode:

- Access is handled at share level
- You are able to create local users and groups

Activate SMB in Active Directory mode:

- Access is handled at NTFS level with domain users.
- Share rights are: Authenticated users Full Control (not modifiable)
- No local users and groups management

SMB version:

In order to know which SMB Version your machine handles on SVM shares, use get-smbconnection Powershell cmdlet.

At first, check what your machine is configured to use:

```
dir \\localhost\c$
Get-SmbConnection -ServerName localhost
ServerName  ShareName  UserName            Credential          Dialect  NumOpens
----------  ---------  --------            ----------          -------  --------
localhost   c$         DomainName\UserN... DomainName.Testi... 3.02     0
```

Mount a resource on the SVM and do the same command

```
ServerName       ShareName    UserName            Credential        Dialect    NumOpens
----------       ---------    --------            ----------        -------    --------
192.168.1.61     ragnar       SRV2012\Adminis... 192.168.1.61\mcd  3.00       1
```

Supported SMB versions and functionalities.

	Is supported in ONTAP 9 for these SMB versions:			
This functionality:	2	2.1	3	3.1.1
Legacy SMB 1.0 functionality	X	X	X	X
Durable handles	X	X	X	X
Compounded operations	X	X	X	X
Asynchronous operations	X	X	X	X
Increased read and write buffer sizes	X	X	X	X
Increased scalability	X	X	X	X
Lease oplocks		X	X	X
Persistent handles			X	X
Witness			X	X
Scale out (required by CA shares)			X	X
Transparent failover			X	X
Pre-authentication integrity				X
Cluster client failover v.2 (CCFv2)				X

Unsupported Windows features

Before you use SMB in your network, you need to be aware of certain Windows features that ONTAP does not support.

ONTAP does not support the following Windows features:

- Encrypted File System (EFS)
- Logging of NT File System (NTFS) events in the change journal
- Microsoft File Replication Service (FRS)
- Microsoft Windows Indexing Service
- Remote storage through Hierarchical Storage Management (HSM)
- Quota management from Windows clients
- Windows quota semantics
- The LMHOSTS file
- NTFS native compression

2.8.1. Ports for SMB

ONTAP System	Direction	Domain Controller
ANY	->	SMB over IP (TCP:445) DNS (TCP and UDP: 53) LDAP (TCP: 389) LDAPS (TCP: 636) (**optional:** only if LDAPS enabled) Kerberos (TCP and UDP: 88) Kpasswd (TCP and UDP: 464)

ONTAP System	Direction	Domain Controller
SMB over IP (TCP:445) (**optional:** needed to access the shares)	<-	ANY

3. Shared Storage Portal menu description

3.1. Login Page

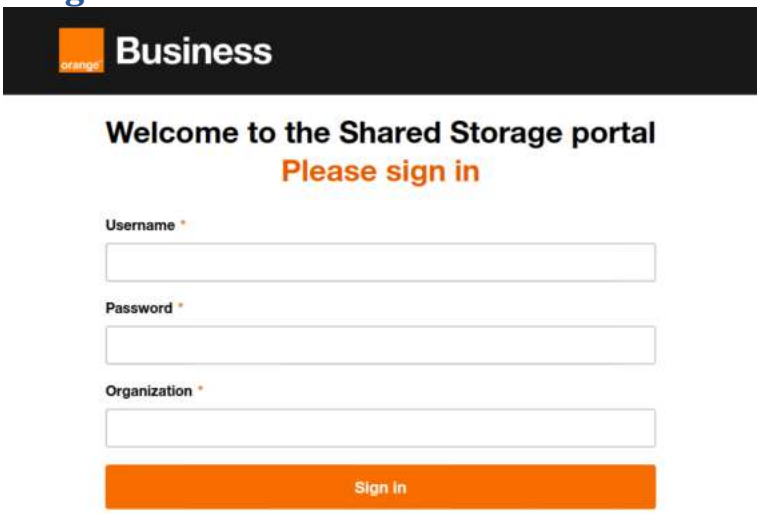


Figure 2 - Login page

Description:

This is the login screen users will sign in to in order to access the application. The “username” and “organization” fields are both case insensitive. In case of valid credentials, the user will be redirected to the Shared storage portal homepage. Otherwise, an error will be displayed on the screen.

3.2. Home Page

3.2.1. Home page with no SVM already created.

At first login, if SVM had not been produced by OPS team, you will be able to create your SVM.

Welcome page inform you that no SVM is available and you have a button to provision your SVM:

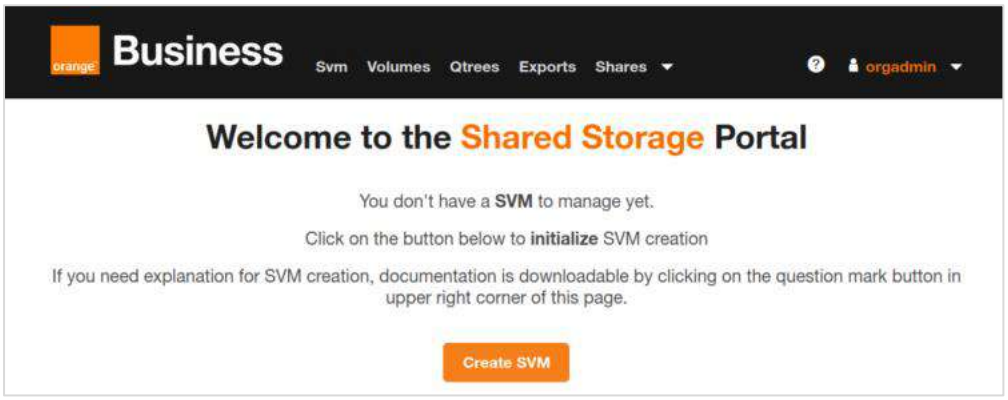


Figure 3 - Home page when no SVM is produced yet

3.2.2. Create SVM menu.

When you click on Create SVM button, some information need to be filled in (greyed values cannot be modified).

Figure 4 - SVM creation page

- Svm name is software defined for production on the Netapp cluster.
- Depending on declared cluster types (Primary/Backup), Primary or BMS SVM types can be created.

Figure 5 - SVM type selection list

- NFS V3 protocol will be enabled by default.
- You must set IP compliant to RFC 1918 (You should use first half of the subnet to define SVM IP, the other half is reserved for gateways and BMS). In case of need of IP for Bare Metal servers on this subnet, don't use /28 - .240 mask.
- Gateway VIP and node IPs are calculated automatically (last 3 addresses of the subnet). Gateway VIP will be automatically filled in Gateway field.

Until IP respects RFC 1918, Create button will remain greyed out and disabled.

Figure 6 - Netmask selection list.

After clicking on Next button, you will be prompted to select an available topology. In case there is an available T0 and T1 pairs the following screen appears. It shows the list of the available tiers in green with enabled radio button.

If there are no available pairs; or if the pairs don't pass the requirements to have an SVM the following screen appears along with a dropdown menu for listing the available VDCs. The portal creates the SVM automatically according to user's choices.

After clicking on Next button, the SVM will be produced.

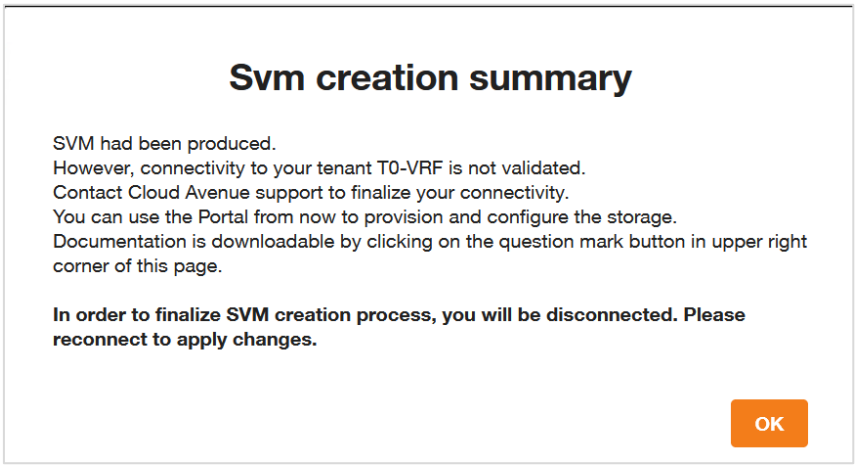


Figure 7 - SVM successful creation message

Then the system proceeds to automatically log out the user.

Error message:

In some case (no more storage or network resource unavailable) you may encounter this message:

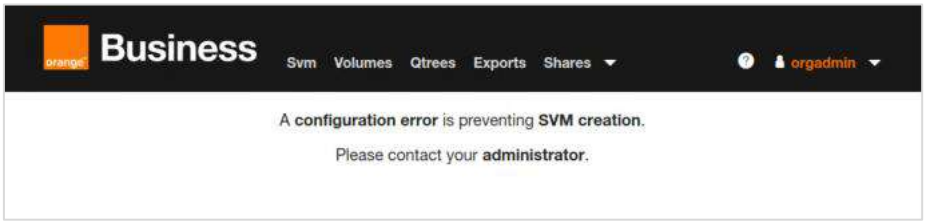


Figure 8 - SVM creation error message

Contact your Orange Business support to check if it is a temporary issue or capacity issue that needs some additional resources.

3.2.3. Usual home page

Nominal case:

When a SVM is produced or already exists, the following welcome page is displayed

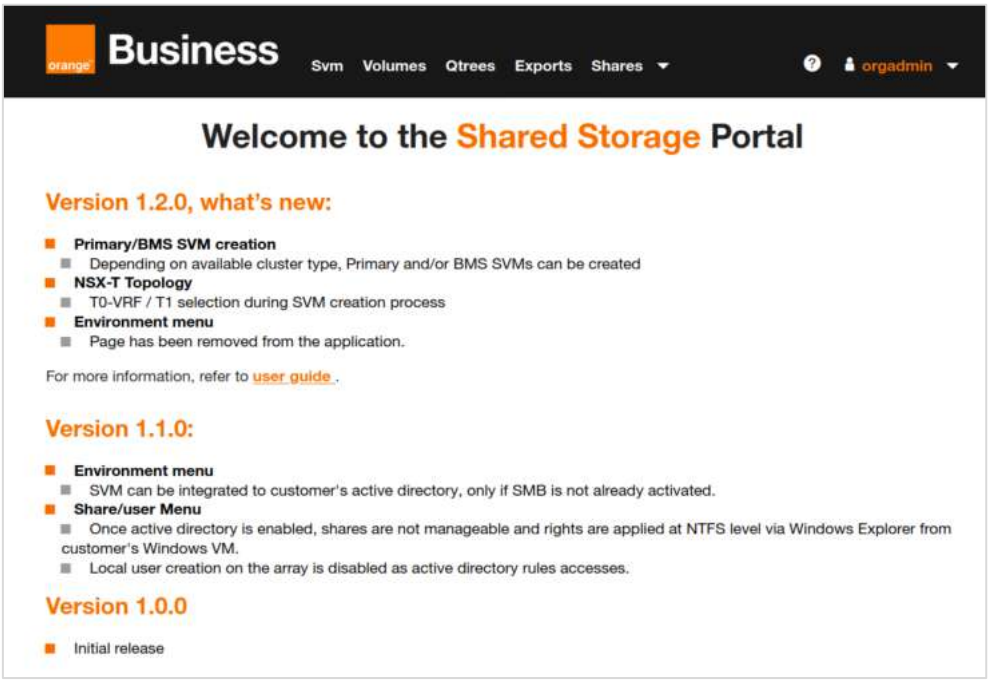


Figure 9 - Welcome page

Description:

On the org admin homepage, the top menu allows the user to access the “Svm”, “Volumes”, “Qtrees”, “Export Policies” and “Shares” pages. When clicking on the username at the top-right corner, a logout option will be displayed allowing the user to logout and be redirected to the login page.

Home page may have a “What’s new” paragraph explaining new features on the last version.

There is also a link to User documentation.

Menus are composed from left to right as:

- **Top Menu**:
  - **Svm**: Access the SVM page,
  - **Volumes**: Access the volumes and snapshot management page,
  - **Qtrees**: Access the Qtrees management page,
  - **Exports**: Access the NFS Export Policies management page,
  - **Shared** : Access to shares, user and group management page,
- **Question mark icon** : link to this user documentation,

Logout: Logout from the application. Redirect to the login page.

Figure 10 - Logout

Case 2: If network topology is not reachable.

A message is displayed when gateway is not reachable. In some cases, you may be able to manually configure network if a Tier0 exists.

This message should not be displayed if T1 – T0-VRF topology is configured.

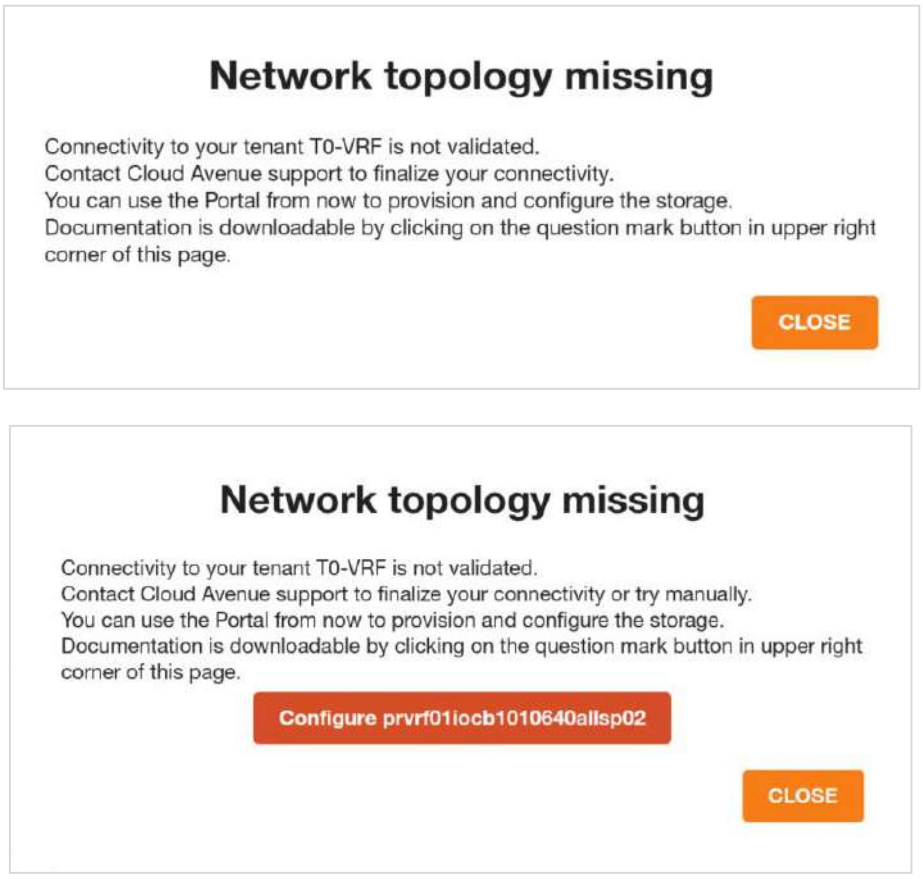


Figure 11 - Gateway not reachable error message

When you have a network topology error message, you need to contact Cloud Avenue support, in order to check, configure and associate the storage VLAN on your T0-VRF. You will need to provide your tenant name (organization name).
If one or more Tier0 exists, you may try to configure manually using the given option

3.3. Svm Page

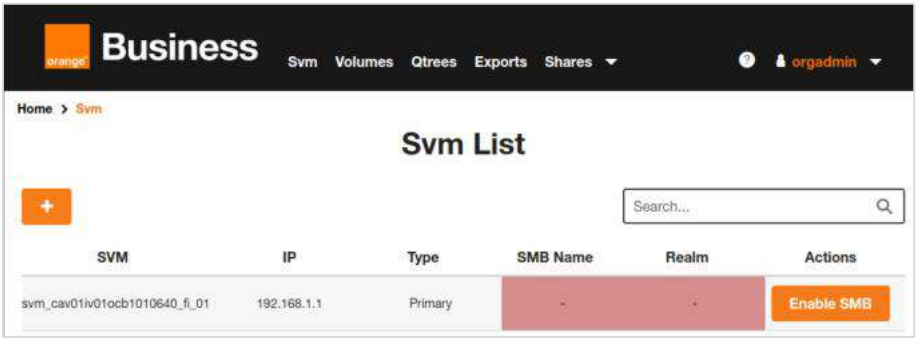


Figure 12 - SVM list (SMB not enabled)

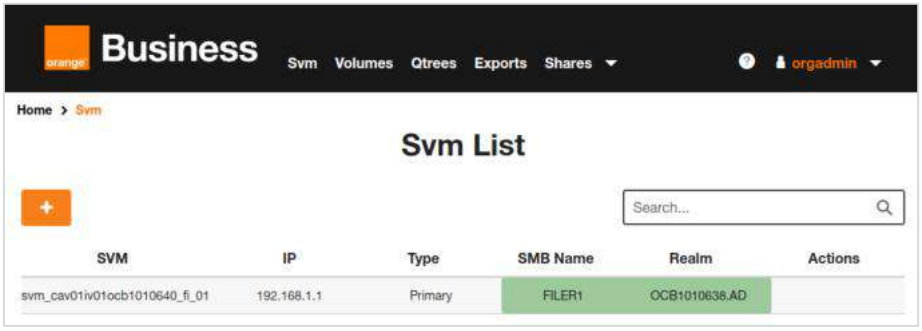


Figure 13 - SVM list with CIFS enabled

Description:

The “NetApp SVMs” tab contains the list of the user’s SVMs with their IPs and eventually the name of the SMB server. A search input allows searching for specific SVM in the list. The search is done on all of the SVM’s attributes (“SVM”, “IP”, “SMB Name” and “Workgroup”).

Search input gives the ability to filter on SVMs.

3.3.1. Enable SMB protocol on SVM

In the SVM list, you can enable SMB for each SVM:

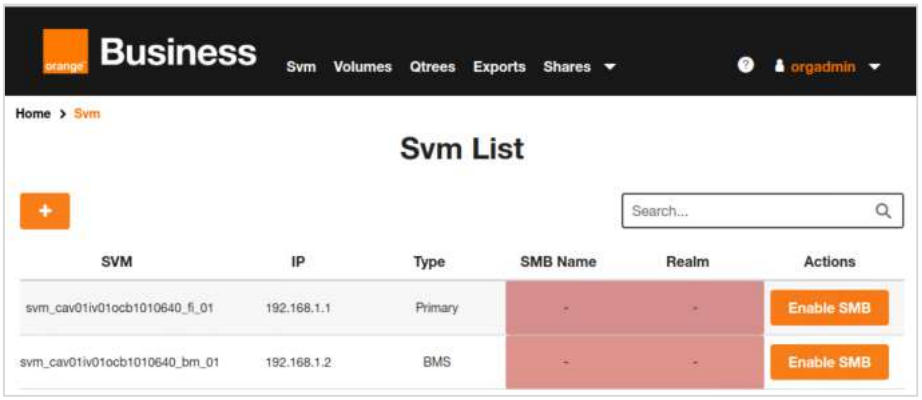


Figure 14 - SVM without SMB protocol enabled

You can see that SMB name and Workgroup are red with no info.

To enable SMB on your SVM, click button **Enable SMB** to launch its configuration.

A popup menu will appear.

At this level you chose the mode (Workgroup or Active directory). Be careful, once configuration is done, it cannot be modified except by requesting CIFS cleanup to Support Team.

As soon as a SVM has SMB configured, the “Enable SMB” button disappears.

3.3.2. Workgroup mode

By default, option Workgroup is selected.

In SMB Name field enter a name compatible with Windows Naming convention (popup gives you the limitations)

Figure 15 - Enable SMB protocol menu – Workgroup mode

Click on Create button to launch creation or Cancel button to cancel the operation. In both cases, environment menu will be displayed.

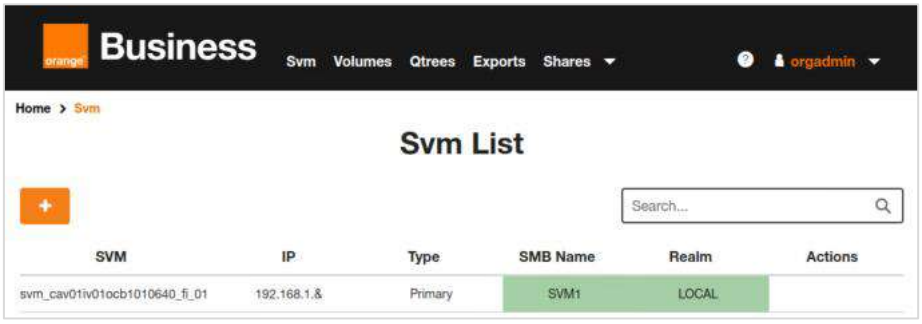


Figure 16 - SVM with SMB activated in Workgroup mode

3.3.3. Active directory mode

When you choose Active Directory option, the menu evolves and more information are needed:

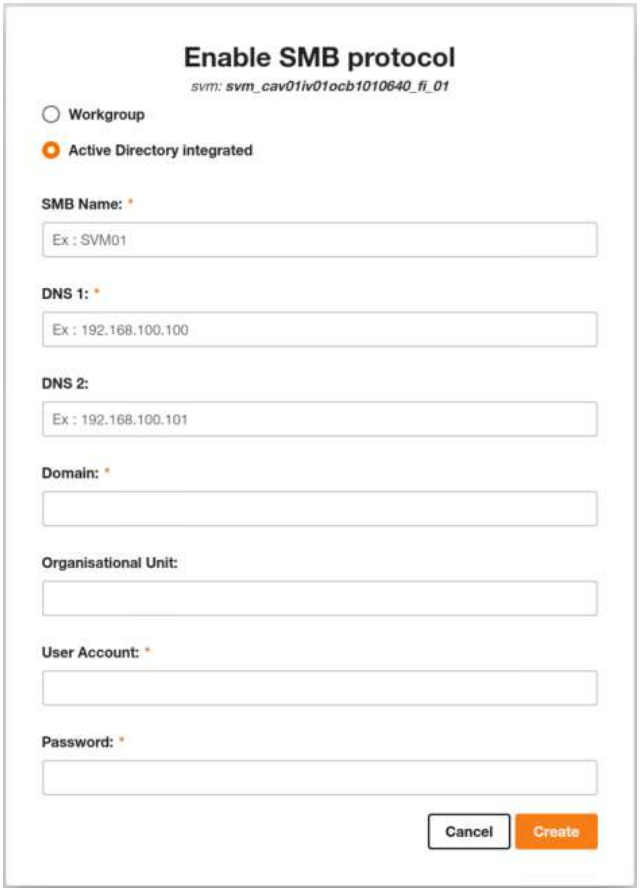


Figure 17 - Enable SMB protocol menu – Active Directory mode

Portal is configured to integrate an Active Directory domain in which Domain controller host also DNS role.

- DNS1: DNS/Domain controller
- DNS2: optional second DNS/Domain controller
- Domain : Domain fqdn (example : domain.ad)
- Organizational Unit: Optional. If empty, will be added in Computer OU (normal Active directory integration behavior).
    - Examples: “OU=servers” , “OU=SVM,OU=Computers”
- User: Account having rights to integrate a computer into the domain
- Password: Password

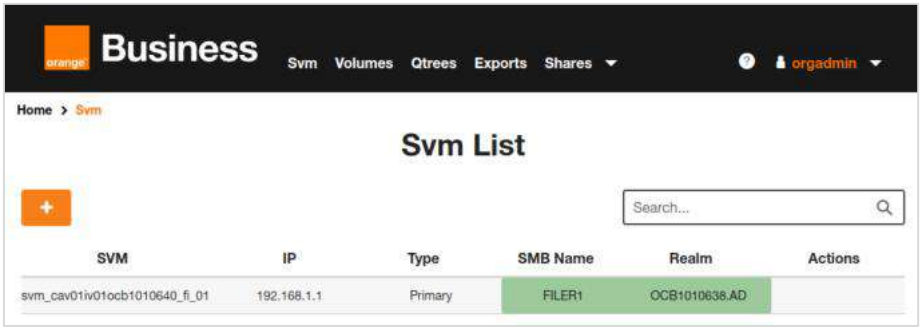


Figure 18 - SVM integrated in Active Directory

Even if SVM is integrated to the domain, Domain admins are not admin of the SVM. This is to prevent from making some action incompatible with portal (share creation not on a qtree for example)

Then domain Admins are moved to Power Users.

3.4. Volume Page

3.4.1. Volume list

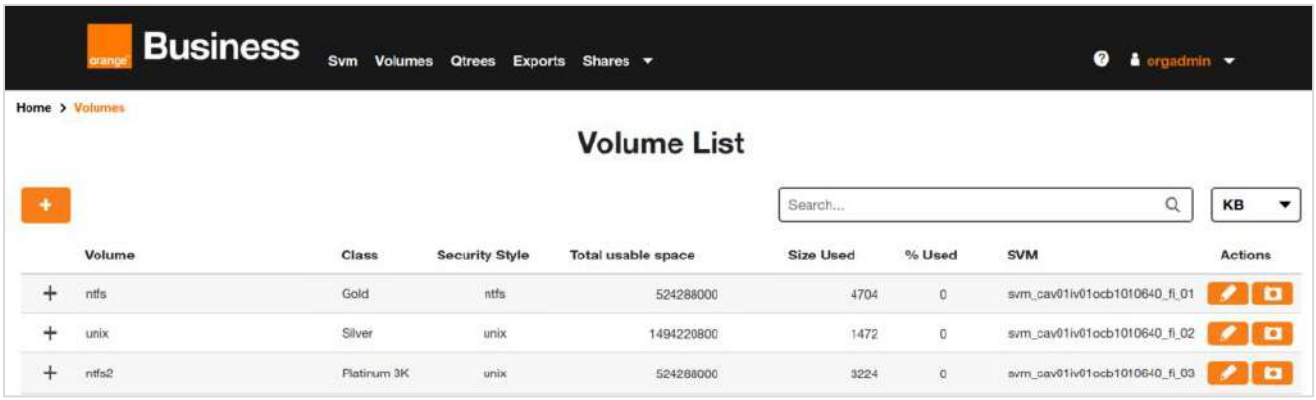


Figure 19 - Volume list page

Description:

The “Volume List” page is accessible via the “Volumes” menu and shows the paginated list of all the volumes. Only compliant volumes are displayed here. If a volume doesn’t show up, please contact support for help. By default, the list is sorted by “SVM”, “Class” and “Volume”. You can choose size unit (KB, MB, GB,TB by selecting via this icon  for “total usable space” and “Size used. A search input allows searching for specific volumes in the list. The search is done on all of the volume’s attributes (“Volume”, “Class”, “Security Style”, “Total usable space”, “Size Used”, “% Used” and “SVM”).

Volume usage warning.

You will be warned when % used reach a percentage. Orange for more than 80% and red for more than 95 % (example below)

Volume	Class	Security Style	Size	Size Used	% Used	SVM
vol_ntfs_1	Silver	ntfs	629146	578265	91	svm_fca_se_file_03

Volume	Class	Security Style	Size	Size Used	% Used	SVM
vol_ntfs_1	Silver	ntfs	597688	578318	96	svm_fca_se_file_03

Figure 20 - Volume warning examples

3.4.2. Volume details

With the availability of snapshot functionalities, new details are added for capacity management.

By clicking on the plus icon (+) in front of each volume, you will see several details:

+	vol_ntfs_1	Gold	ntfs	83886080	237776	0	svm_fca_vcan_file_03

You can click on minus icon (-) to hide details.

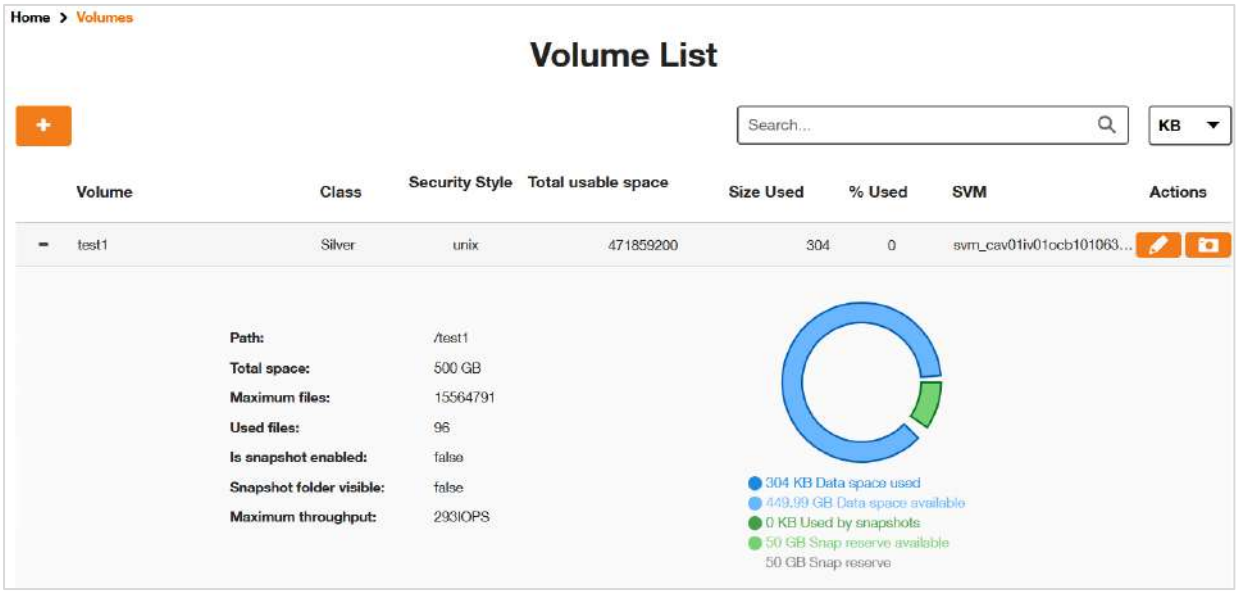


Figure 21 - Volume details

On left part:

- Volume path,
- Total space: the total space of the volume including snap reserve space if activated,
- Maximum files that can be hosted in the volume. This value is proportional to volume size,
- Number of existing files and folders,
- Snapshot enabled or not,
- Snapshot visibility from client side,
- Maximum throughput: the maximum IOPS allowed on the volume. This value is calculated on the basis of the size and the Class of storage.

On the right part, a graph of the used/free space categorized by live data and snapshots:

- Disk space used: live data used space,
- Data space available: space available for live data,
- Used by snapshot: space used by snapshots (can be more that snap reserve if option is set to consume more than snap reserve space for snapshots). In case there is no snap reserve or if you over consume out of snap reserve, color will be red instead of green. It is not an error; it is just informational,

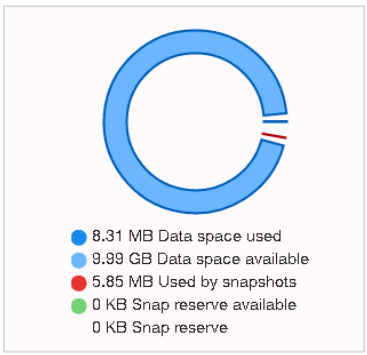


Figure 22 - Example of graphic without snap reserve

- Snap reserve available: space not consumed by snapshots in snap reserve. If trigger is volume, value will be 0 when snapshot used space is more than snap reserve,
- Snap reserve: size of the snap reserve: determined by the percent you will have set on your volume (see chapter snapshot configuration for details).

3.4.3. Volume creation

If you have less than 6 volumes created for each available SVM, on top volume list, you have a plus + icon. By clicking on it, you can create a volume.

Volume creation has several restrictions:

- You can create by your own up to 6 volumes for primary SVMs and also 6 volumes for BMS SVMs. After reaching this limitation, + icon is disabled. You can order additional ones via your commercial or support,
- Volumes you can provision on primary SVM will have a minimum size of 500GB and a maximum of 10TB (10240 GB). You can contact your Orange Business support or commercial to order bigger sizes up to 10TB per volume after validating available storage capacity. Volumes with a size above 10 TB will be capped with IOPS for a 10 TB size,
- Volumes you can provision on BMS SVM will have a minimum size of 500GB and a maximum of 30TB (30720 GB),
- If SMB is not enabled on the SVM, you are not able to produce volumes with NTFS security style.

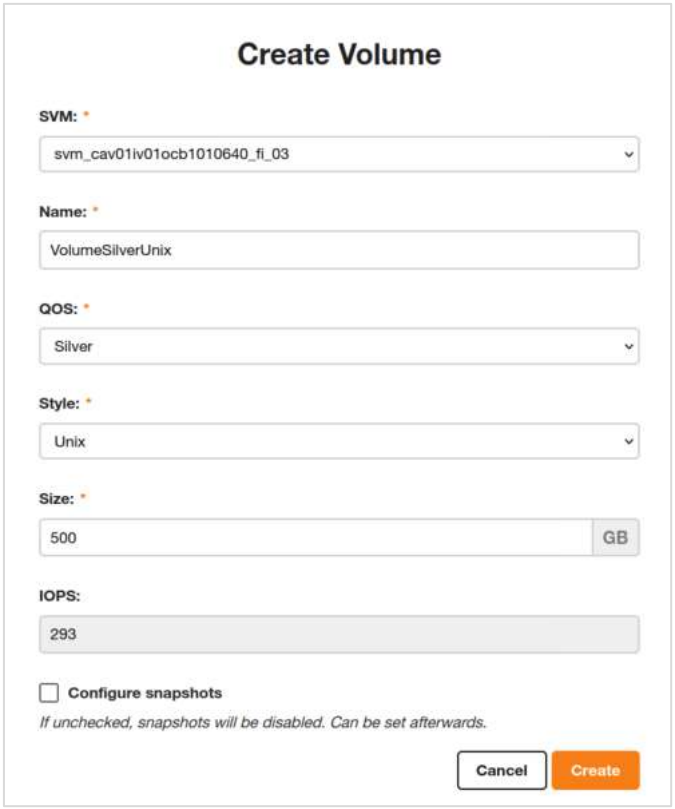


Figure 23 - Volume creation menu

The “volume Create” menu is composed of:

- **Svm: If unique, the SVM is pre-selected**

- **Volume Name**:
    - **Minimum length**: 3
    - **Maximum length**: 25
    - **Authorized characters**: a-z / A-Z / 0-9 / _
- **QoS: Select wanted storage Class policy**:
    - **Silver:** 600 IOPS/TB
    - **Gold:** 1000 IOPS/TB
    - **Platinum 3K:** 3000 IOPS/TB

    *Note: If the SVM type is BMS, the class policy is **Backup:** 300 IOPS/TB and cannot be changed*

- **Volume style**: Select the quota security style. If SMB protocol is not enabled, only Unix will be available.
    - **Unix**
    - **NTFS**
- **Size in GB**: set a value between 500GB and 10240GB for primary SVM types and between 500GB and 30720GB for BMS SVM types. If inserted value is lower or bigger, it will be changed to the nearest limit.
- **IOPS**: print the calculated IOPS based on the size and the storage class.
- **Configure snapshots checkbox:** you are able to configure snapshot policies at creation. If not checked, default values will be no snap reserve, no snapshot policy. However, you can configure it after volume creation. If checked refer to chapter 3.5 for details.
- **Cancel button**: Return to the Volume list.
- **Create button**: create volume.

When volume is created, you are redirected to Volume menu, where you can see the newly created volume.

3.4.4. NTFS rights.

Workgroup mode:

When a volume is created in workgroup mode, default rights are left (Everyone : Full Control). Rights are managed at share level with local accounts/groups.

Active directory mode:

When a volume is created in Active directory mode, rights are:

- Owner: Domain admins
- Rights: Domain Admins full control

Rights can be managed from Windows explorer from security tab.

3.4.5. Volume modification

Till you didn't exceed the limit of 6 volumes for each SVM, and for each volume size is between 500GB and 10TB (30TB for BMS), you are able to modify size. The storage class can be changed only for volumes on primary SVMs. Each volume has its modification icon:  .

If volume number is above 6 for all SVMs, all modification icons will be disabled. If one volume among the 6 does not respect above size limitation, this volume will have its modification icon disabled: .

For an eligible volume for modification, by clicking on modification icon, you will open modification menu:

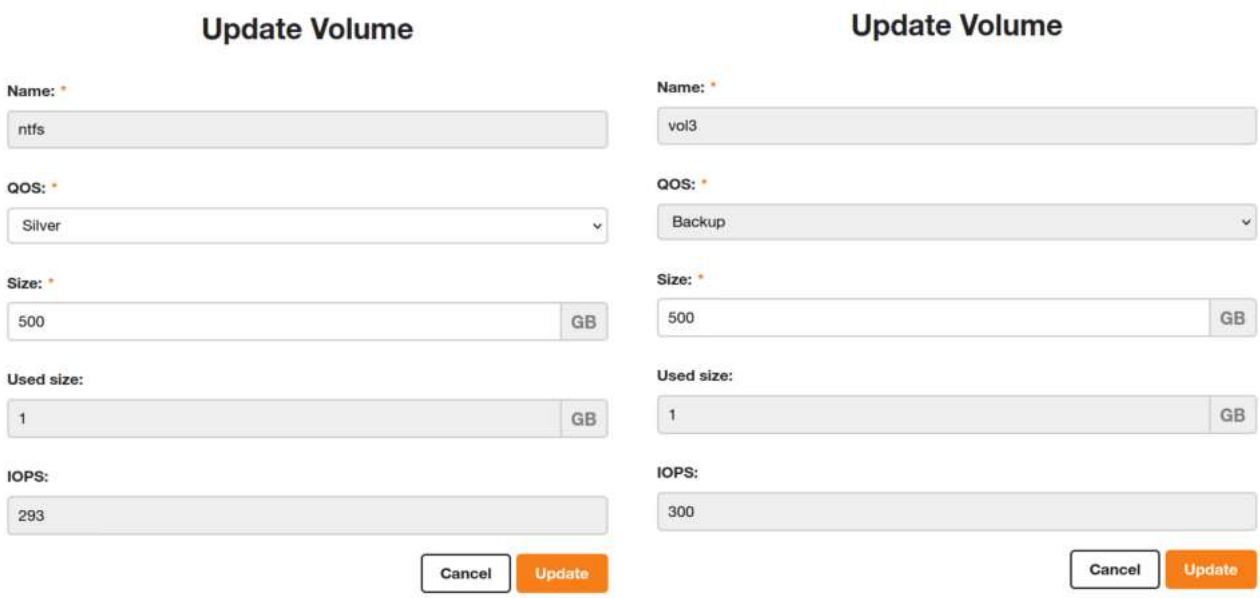


Figure 24 - Volume modification menu

The "Update volume" menu is composed of:

- **Volume Name**: the volume you selected (not modifiable),
- **QoS: Select wanted storage Class policy**:
    - **Silver:** 600 IOPS/TB
    - **Gold:** 1000 IOPS/TB
    - **Platinum 3K:** 3000 IOPS/TB

    Note: If the SVM type is BMS, the class policy is **Backup:** 300 IOPS/TB and cannot be changed

- **Size in GB**: set a value between 500GB and 10240GB for primary SVM types and between 500GB and 30720GB for BMS SVM types. If inserted value is lower or bigger, it will be resized to the nearest limit. Value cannot be lower than the actual used size mentioned below,
- **Used size in GB**: the actual used size,
- **IOPS**: print the calculated IOPS based on the size and the storage class,
- **Cancel button**: Return to the Volume list,
- **Update button**: create volume.

Click on update button to apply change or Cancel button to cancel operation. When volume is created, you are redirected to Volume menu.

3.4.6. Volume deletion

As deletion is definitive without any undo possibility, this action is not allowed. In order to delete a volume, contact your support.

3.5. Snapshots

3.5.1. Snapshot menu

In volume list, at the end of each volume line there is a camera icon. By clicking on it, you will open snapshot management menu for this volume:

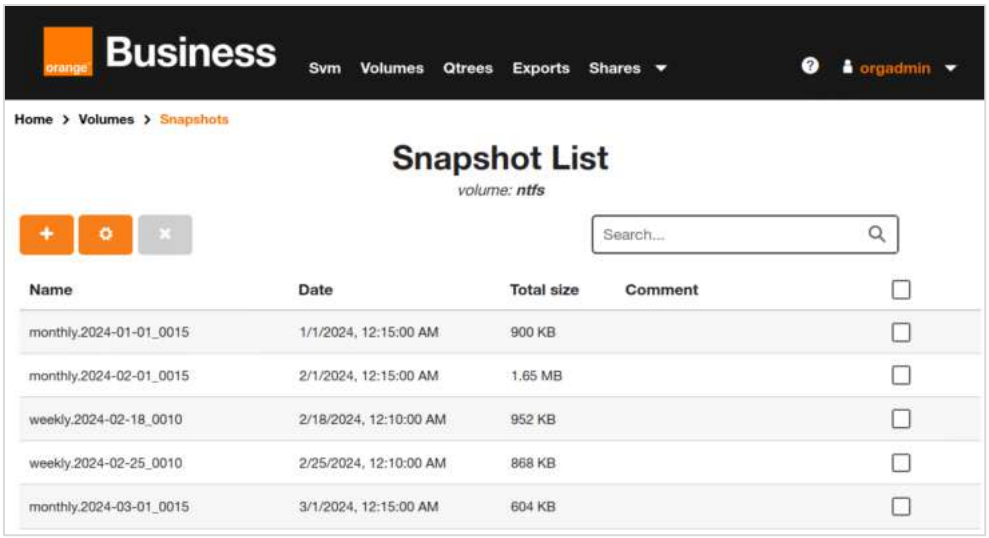


Figure 25 - Snapshot menu

Snapshot menu is composed of:

- List of snapshots, selectable for deletion. Columns are:
  - Snapshot name,
  - Creation date,
  - Size of the snapshot,
  - Comment (for manual snapshot only),
  - Selection checkbox. Multi selection is possible.
- Plus icon **(+)** at top of list to create a manual snapshot,
- Wheel Icon **(*)** at top of list to configure snapshot options,
- Deletion Icon **(X)** at top of list for snapshot deletion. Icon is greyed till a snapshot had been selected.

3.5.2. Snapshot configuration menu

In snapshot menu, when you click on configuration setting button  , you will be able to set up scheduled snapshots based on predefined snapshot policies and set other options:

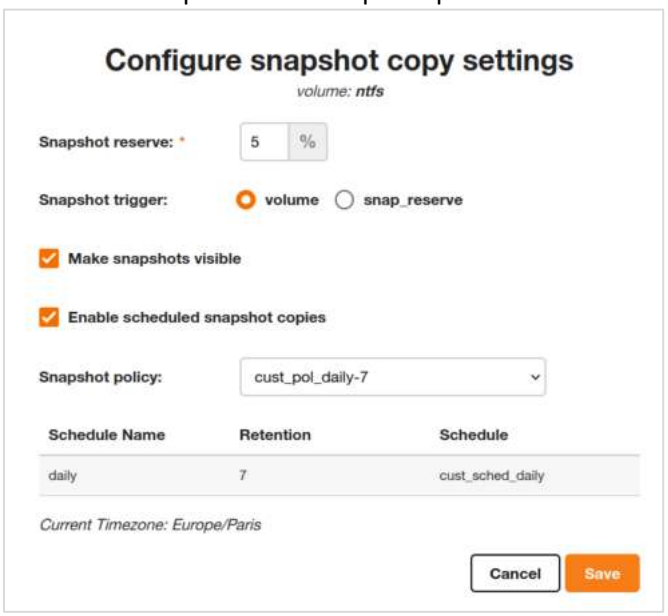


Figure 26 - Snapshot configuration menu

Description:

This Configuration snapshot menu will allow you to parameter snapshots and snap reserve behaviors.

To have a good comprehension of impact of options, refer to volume snapshots , snap reserve , and snapshot policies chapters.

- **Snap reserve:** 0 or 5 to 20 %,
- **Snapshot trigger (how snapshots are deleted)**: volume or snap reserve,
- **Make snapshots visible:** make snapshots visible from client side,
- **Snapshot policy:** select a snapshot policy within the list. This is greyed and set to none if snap reserve is set to 0 and trigger is snap reserve. Default selected snapshot policy is Cust_pol_daily-7,
- **Schedule Name:** list of different schedule names, retention and schedule.
  The name of the schedule is the prefix of the snapshot.

Examples of scheduled snapshot names:

```
daily.2019-08-23_0010
hourly.2019-04-03_1505
weekly.2019-03-24_0015
```

3.5.3. Manual snapshot creation

To create a manual snapshot from snapshot menu, click the plus icon in top of list  .

A popup will appear:

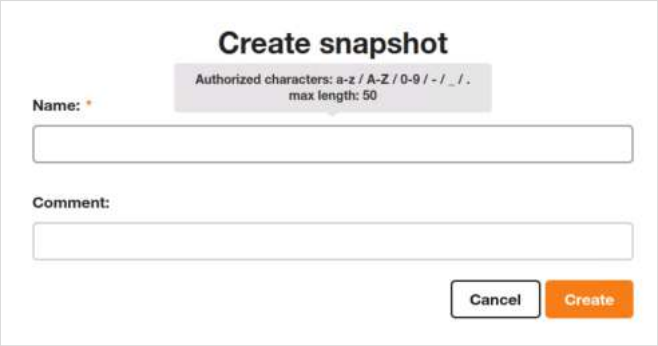


Figure 27 - Manual snapshot creation popup

Enter Name and optional comment. Click “Create” to create it or “Cancel” to cancel operation.

Inputs:

- **Name**:
  - **Maximum length**: 50
  - **Authorized characters**: a-z / A-Z / 0-9 / - / _/.
- **Comment**:
  - **Maximum length**: 100

3.5.4. Snapshot deletion

You can delete manual or scheduled snapshots at any time.

To delete snapshots, in snapshot menu, select checkbox of each snapshot you want to delete then click the delete icon in top of list  . Note that icon change from grey to red as soon as you select a snapshot. You can select all snapshots by clicking checkbox at top of list. Only snapshots listed in the current page are selected in case of multi-page list.

A popup will list selected snapshot, size of each and the total freed space.

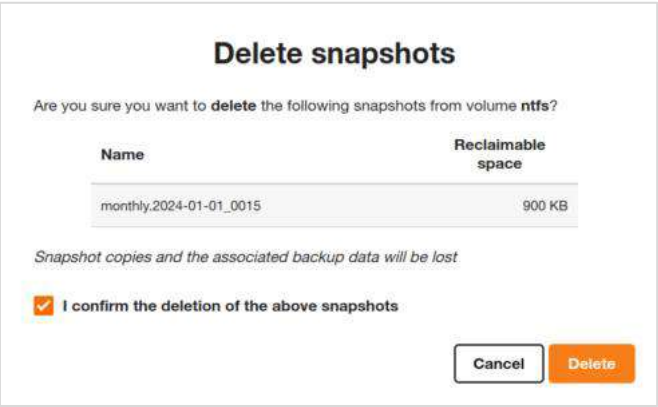


Figure 28 - Delete snapshot popup

Select checkbox to confirm deletion then click Delete. Till you don't validate, Delete button stay grey.

Click Cancel if you want to cancel deletion.

3.6. Qtree Management

3.6.1. Qtree List

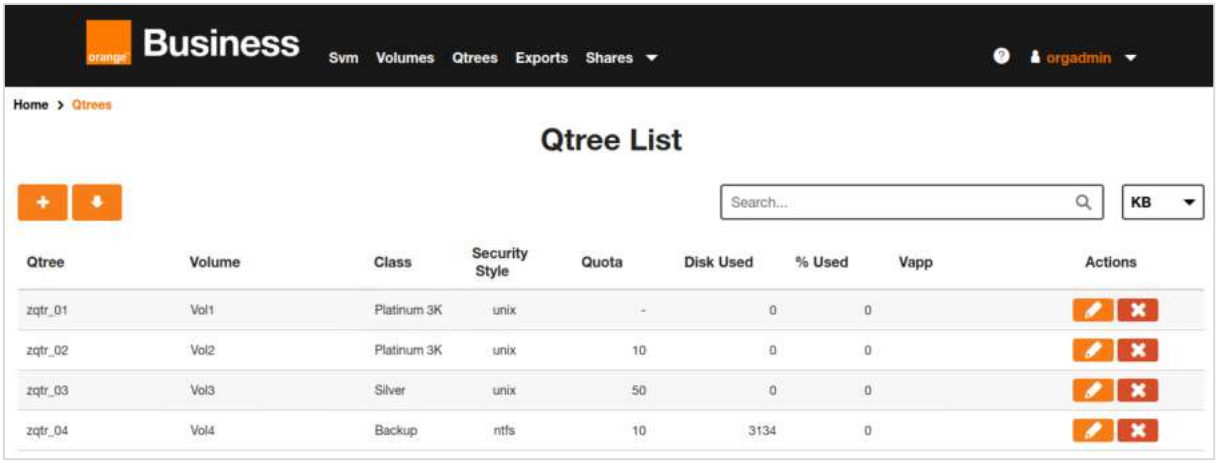


Figure 29 - Qtree list

"List Qtree" menu is composed of:

- List of Qtrees. Columns are:
  - Qtree name,
  - Owning volume name,
  - Storage class,
  - Security style,
  - Quota value,
  - Disk used,
  - %used of the quota if not unlimited. Else 0,
  - Associated Vapp.
- Edit icon ( ) for each Qtree to edit some values,
- Deletion Icon ( ) for each Qtree to delete it,
- Add Icon ( ) at top of list to create new Qtree,
- Download Icon ( ) at top of list to download Qtree list in csv format.

Description:

The "Qtree List" page is accessible via the "Qtrees" menu and shows the paginated list of all the Unix/NTFS Qtrees created on the volumes present on the "Volume List" page (Unix Qtrees on UNIX volumes, NTFS Qtrees on NTFS volumes). The "Quota" and "Disk Used" columns contain values in KB. However, a converter is available next to the search bar and allows converting these values in KB, MB, GB or TB. A quota without limit is represented by a "-" and will have a "% Used" of 0. The "plus" button redirects to the "Qtree Create"

page. In the Qtree table, the “Actions” column contains the “Edit Qtree” and “Delete Qtree” buttons for each Qtree in the list. A search input allows searching for specific Qtrees in the list. The search is done on all of the Qtrees attributes (“Qtree”, “Volume”, “Class”, “Security Style”, “Quota”, “% Used” and “Vapp”).

Refer to Qtree (go to chapter 2.6) for capacity consideration.

Quotas on Qtrees:

When quota is set, you will be warned when % used reach a percentage. Orange for more than 80% and red for more than 95 % (examples below)

Qtree	Volume	Class	Security Style	Quota	Disk Used	% Used
ntfs1_qtree1_ss_quota	ntfs1	Gold	ntfs	80	68	85

Qtree	Volume	Class	Security Style	Quota	Disk Used	% Used
ntfs1_qtree1_ss_quota	ntfs1	Gold	ntfs	71	68	96

Figure 30 - Quota warning examples

3.6.2. Create Qtree

Figure 31 - Qtree creation menu

Description:

The “Qtree Create” modal is accessible by clicking the “plus”  button on the Qtree list page. The fields followed by an asterisk (*) are all mandatories. The “Volume” and “Vapp” fields contain all the user’s volumes and Vapps. Each one of them has a search input allowing the user to filter the values displayed in those lists. The “Quota” field has a dropdown list containing different units (KB, MB, GB and TB). The quota entered in the input field will be of the same unit as the one selected in the dropdown list. To create a quota with no limit, leave the field blank. The creation of a Qtree will also create an export policy for Unix Qtrees. If an error occurs while submitting the form, it will be displayed in the form.

Vapp association is only informative for management purpose. Associating a Vapp to a Qtree doesn’t grant any access. This will be done with export policies for NFS and share access for Windows shares.

The “Share” field is only enabled and mandatory when a NTFS volume is selected in the “Volume” list. A share will be created with a name corresponding to the provided value when creating a NTFS Qtree.

The “Qtree Create” menu is composed of:

- **Name**:
  - **Minimum length**: 3
  - **Maximum length**: 30
  - **Authorized characters**: a-z / A-Z / 0-9 / - / _
- **Volume selection**
- **Volume Search input**: Search the volume list,
- **Share**:
  - **Minimum length**: 3
  - **Maximum length**: 30
  - **Authorized characters**: a-z / A-Z / 0-9 / - / _
- **Quota**:
  - **Authorized characters:** 0-9
- **Quota unit dropdown button**: Select the quota unit,
- **Vapp Search input**: Search the Vapp list,
- **Save button**: Create the Qtree. Redirects to the Qtree list,
- **Back to list button**: Return to the Qtree list.

3.6.3. Edit Qtree

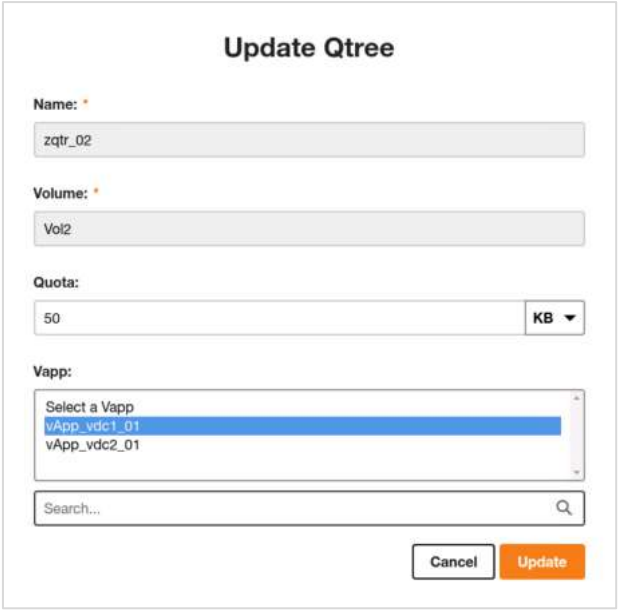


Figure 32 - Qtree modification menu

Description:

The “Edit Qtree” page is accessible by clicking an “Edit Qtree”  button on the Qtree list page. The “Name” and “Volume” fields cannot be modified. The “Vapp” field contains all the user’s Vapps and has a search input allowing the user to filter the values displayed in the list. The “Quota” field has a dropdown list containing different units (KB, MB, GB and TB). The quota entered in the input field will be of the same unit as the one selected in the dropdown list. To set a quota with no limit, the user must leave the field blank. If an error occurs while submitting the form, it will be displayed in the form.

The “Qtree Edit” menu is composed of:

- **Quota**:
  - **Authorized characters:** 0-9
- **Quota unit dropdown button**: Select the quota unit,
- **Vapp selection** : select Vapp,
- **Vapp Search input**: Search the Vapp list,
- **Save button**: Update the Qtree. Redirects to the Qtree list,
- **Back to list button**: Return to the Qtree list.

3.6.4. Delete Qtree

Figure 33 - Confirmation popup before deleting a qtree

Description:

Popup accessed from the "Qtree List" page. When clicking on a "Delete Qtree" button, a confirmation popup will appear and, if the user confirms, will delete the Qtree and all data and objects associated with it (Quota, NFS Export Policy with its export rules for UNIX, Vapp link, SMB share for NTFS).

3.7. Export Policy Management (UNIX Qtrees)

3.7.1. Export Policy List

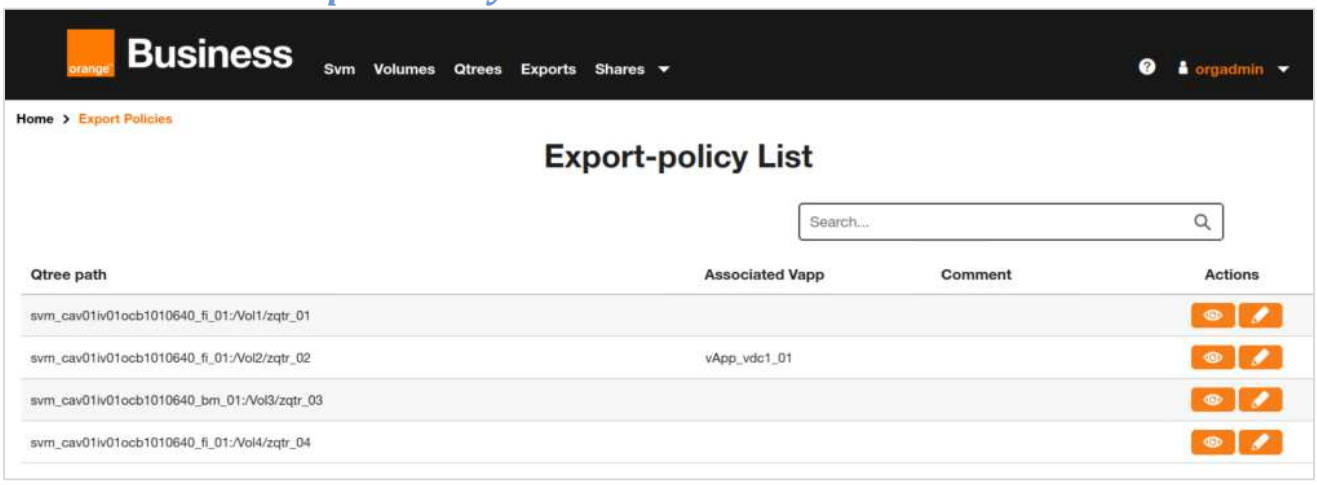


Figure 34 - Export Policy List page

Description:

Rule : 1 Qtree = 1 export policy

The "Export Policy List" page is accessible via the "Exports" menu and contains the paginated list of all the export policies. In the export policy table, the "Actions" column contains the "Edit export rules" and "Edit export policy" buttons for each export in the list.

A search input allows searching for specific exports in the list. The search is done on all of the exports' attributes ("Qtree path", "Associated Vapp" and "Comment").

3.7.2. Edit Export Policy

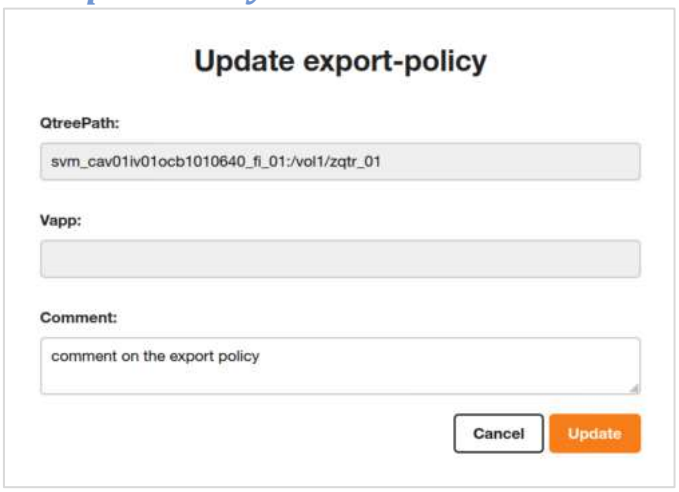


Figure 35 - Edit Export Policy Page

Description:

This page is accessible by clicking an “Edit Export Policy” button on the export policy page. The “Qtree Path” and “Vapp” fields cannot be modified. Vapp can be modified in Qtree menu. If an error occurs while submitting the form, it will be displayed in the form.

By clicking on “Save” button, you update export policy.

By clicking “Cancel” button, you go back to exports list without saving.

3.8. Export Rule Management

3.8.1. Export Rule List

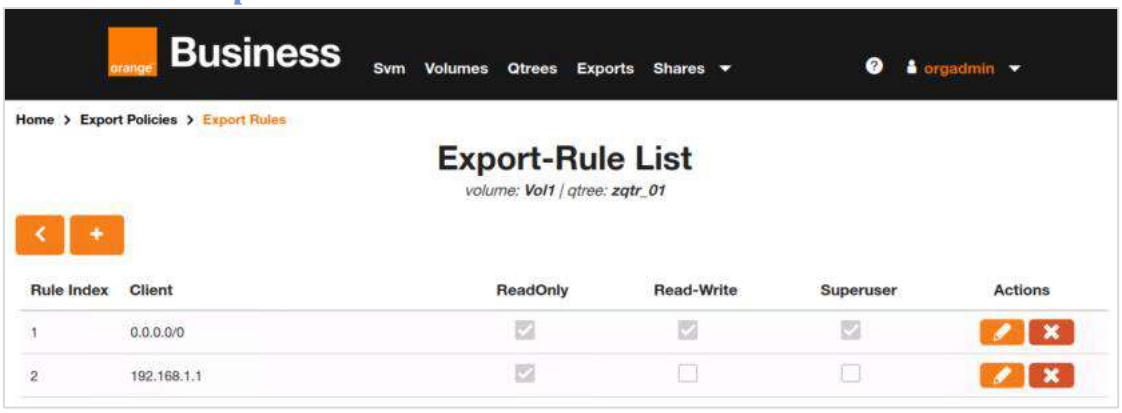


Figure 36 - Export Rule List

Description:

Export rules are used only for NFS on Unix Qtrees.

The “Export Rule List” page is accessible by clicking an “Edit Export Rules” button on the “export policy list” page . It contains the list of all the export rules of the selected policy. Rules are analyzed in ascendant index order. Thus, if a rule matches, the following ones are omitted. The “plus” button opens a popup to create a new export rule. In the export rules table, the “Actions” column contains the “Edit export rule” and “Delete export rule” buttons for each rule in the list.

Back to list button make return to export policies list.

Rule matching example:

Rule Index	Client	ReadOnly	Read-Write	Superuser	Actions
1	0.0.0.0/0	☑	☐	☐	
2	192.168.1.1	☑	☑	☑	

Figure 37 - Export Rules matching example.

Given the above rules and a device with IP 192.168.1.1, the first rule will match and device will only have the R/O of this one (all rules after the matching one are omitted). Thus, second rule will be never checked. Rule order must then be inverted to allow IP 192.168.1.1 R/W access.

3.8.2. Create Export Rule

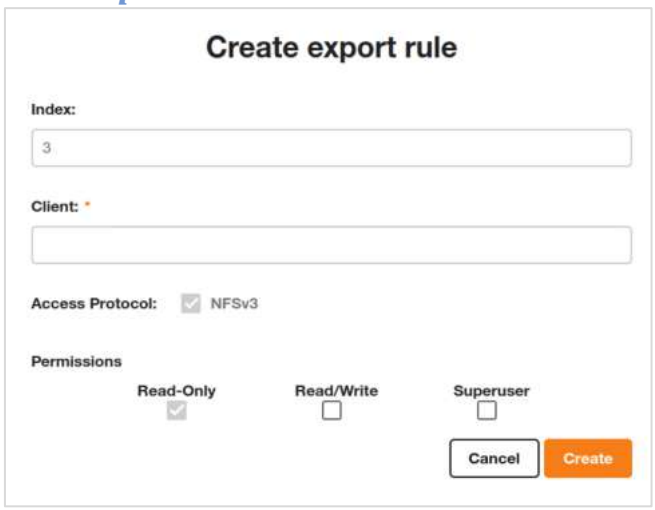


Figure 38 - Export Rule creation popup

Description:

Export rules offer only NFS V3 protocol based on sys security protocol.

To create a new rule, click on “plus” button on the “Export rule list” page. A new popup page will be shown. The fields followed by an asterisk (*) are all mandatories. The index field will take for value the actual number of rules + 1 by default. If an index greater than this value (or lower than 0) is entered, the index will change to this value after submission. The “Access Protocol” and “Read-Only” fields are selected by default as minimum access and cannot be changed. If an error occurs while submitting the form, it will be displayed at the top of the screen.

Validation:

- **Index**:
  - **Authorized characters:** 0-9
- **Client**:
  - **Pattern authorized:**
    - Domain name preceded by the “.” Character,
    - Host name,
    - FQDN,
    - IPv4 address,
    - IPv4 address with a subnet mask expressed as a number of bits (192.168.0.0/255.255.0.0),
    - IPv4 address with a network mask (192.168.1.0/24).

    For the 3 first lines SVM must be integrated to a domain, or have some DNS nameservers (not part of Shared Storage Portal)

Multiple clients are separated by a coma (192.168.1.1, 192.168.1.2)

3.8.3. Edit Export Rule

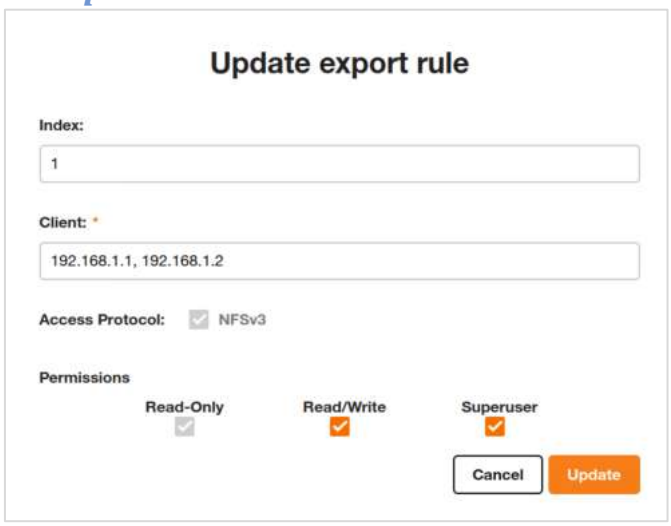


Figure 39 - Export rule modification popup

Description:

Popup accessed by clicking the “Edit Rule” button on the “Export rule list” page and used to update a rule. The fields followed by an asterisk (*) are all mandatories. The “Access Protocol” and “Read-Only” fields are selected by default and cannot be changed. If an error occurs while submitting the form, it will be displayed at the top of the screen.

To quickly update the index of a rule (e.g.: switch rule 2 with rule 1), you can drag and drop the rows of the rule list directly and order them this way.

Validation:

- **Index**:
  - **Authorized characters:** 0-9
- **Client**:
  - **Pattern authorized**
    - Domain name preceded by the "." Character,
    - Host name,
    - FQDN,
    - IPv4 address,
    - IPv4 address with a subnet mask expressed as a number of bits (192.168.0.0/255.255.0.0),
    - IPv4 address with a network mask (192.168.1.0/24).

    Multiple clients are separated by a coma (192.16.1.1, 192.168.1.2).

UI Element:

- **Save button**: Update the current rule. Redirects to the rule list.

3.8.4. Delete Export Rule

Figure 40 - Delete export rule popup

Description:

Popup accessed from the "Export Rule List" page. When clicking on a "Delete rule" button, a confirmation popup will appear and, if the user confirms by clicking on Delete, will delete the export rule. After suppression, all indexes will be recalculated. If customer clicks on Cancel button, deletion is canceled.

3.9. Share Management (SMB)

Refer to chapter SMB shares for details of its implementation on the portal.

3.9.1. Share List

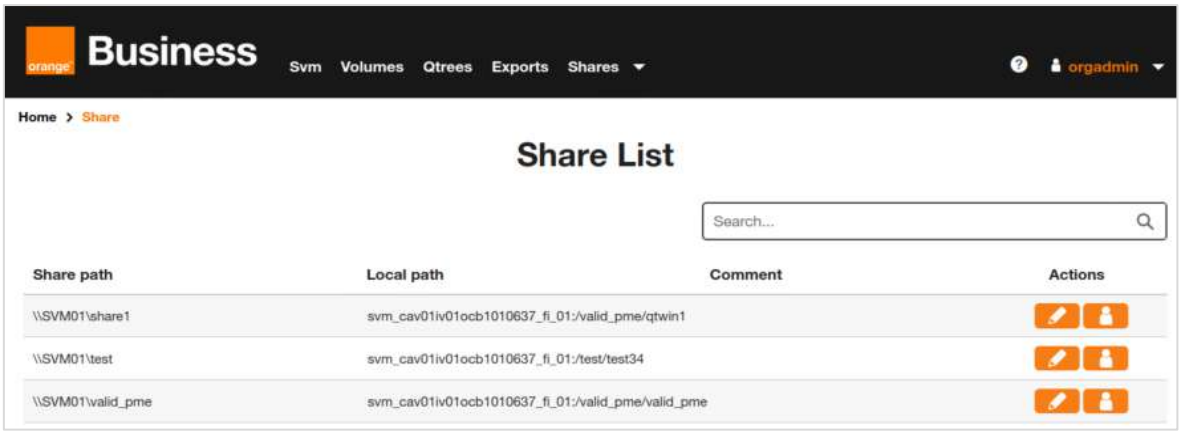


Figure 41 - Share List menu – Workgroup mode

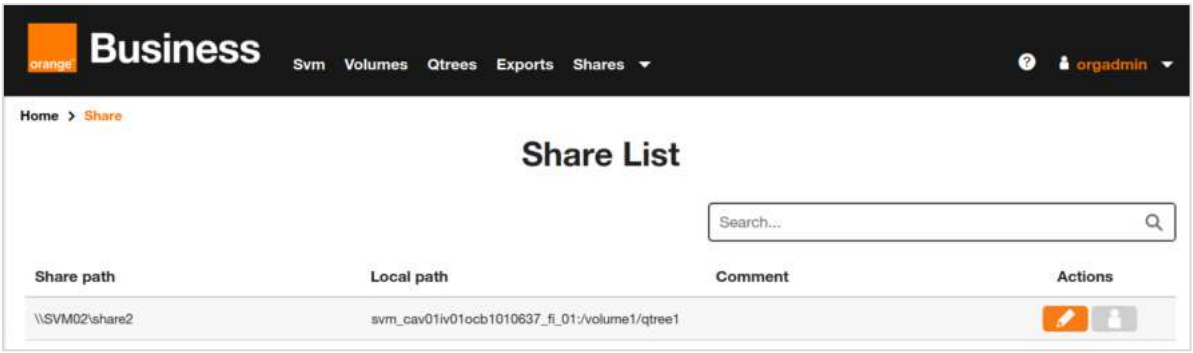


Figure 42 - Share List menu – Active Directory mode

Description:

The “Share List” page is accessible via the “Shares => Share List” menu and contains the paginated list of all the shares. A search input allows searching for specific shares in the list. The search is done on all the share’s attributes (“Share path”, “Local path” and “Comment”).

At the end of each line, you have an Update share button and a Manage ACL button.

- **Update share button**: Open a popup to update the current share,
- **Manage ACL button (Workgroup mode)**: Manage ACL of the current share. In active directory mode this button is greyed.

3.9.2. Update Share

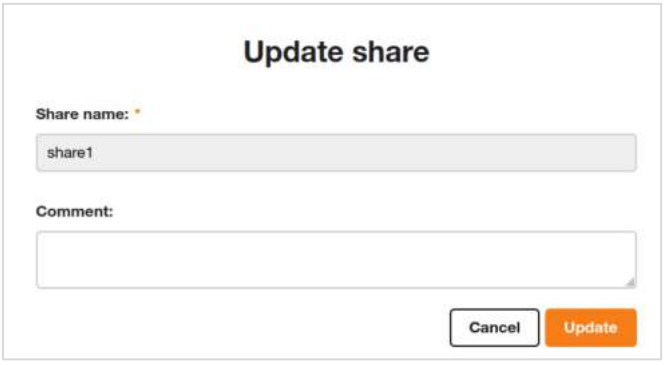


Figure 43 - Update share popup

Description:

Popup accessed by clicking the “Update share” button on the “Share list” page and used to update a share. The “Share name” field cannot be changed. You save modification by clicking on save button and cancel modifications by clicking on cancel button. Both returns you back to share list menu.

Comment: **Maximum length**: 256

3.9.3. Manage ACL (Workgroup mode only)

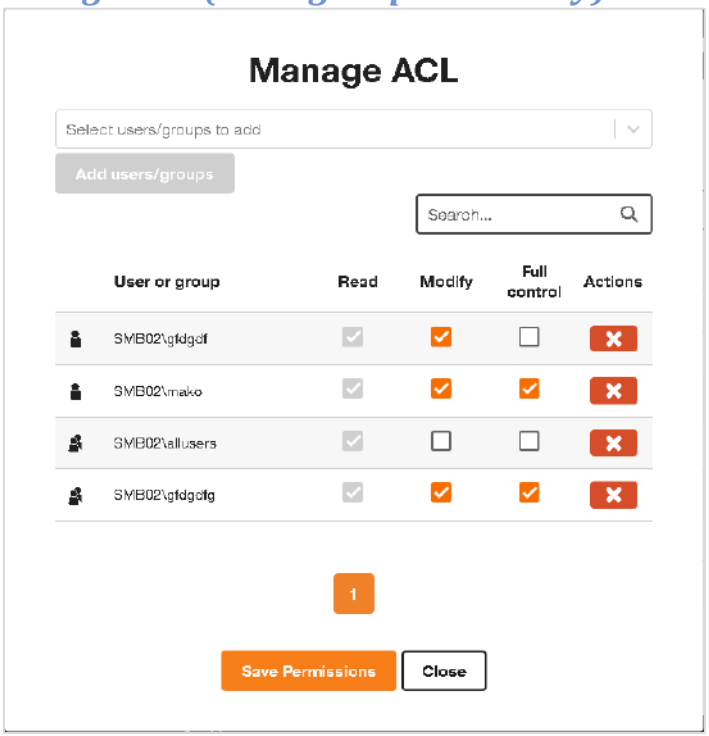


Figure 44 - Manage ACL popup

Description:

Popup accessed by clicking the “Manage ACL” button on the “Share list” page and used to manage the current share’s ACL. The top field is used to add one or several users or groups at the same time for the

current share (possible to either click on a user/group in the list or use the auto-completion feature). The selected users/groups will be added when pressing the “Add users/groups” button and will have the “Read” permission by default. Note that Add users/group button remains grey till you select a user or group. A user/group can be removed by clicking the delete button on the right.

“Modify” and “Full control” permissions can be changed with the checkboxes. All changes done on the permissions will be saved **only** when pressing the “Save permissions” button. As its names means, “Save Permission” button only save permission modification, not adding or removing user or group.

A search input is available to search the ACL list on the “User or group” attribute.

3.10. Share User Management (Workgroup mode only)

3.10.1. User list

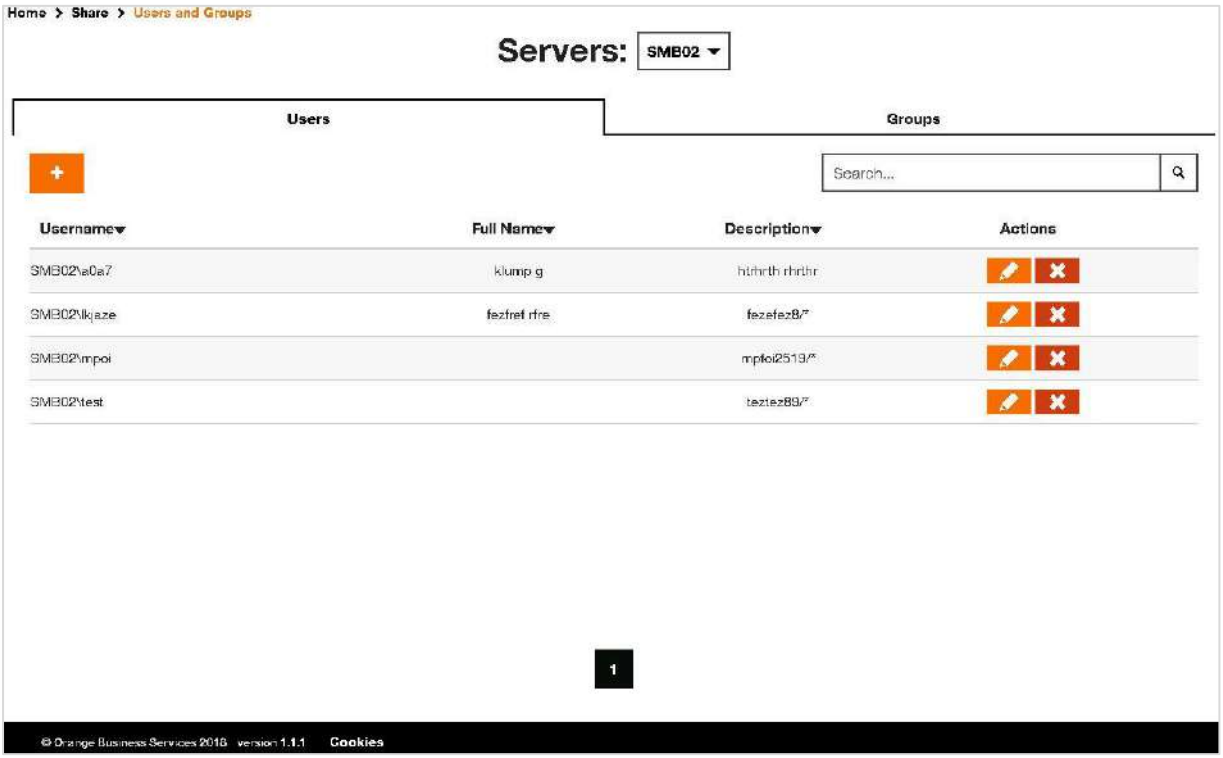


Figure 45 - User list

Description:

Page accessed via the “Share => Users and Groups” menu. The “Users” tab shows the paginated list of the selected share’s local users. The “plus”  button opens the “Create User” popup. In the user table, the “Actions” column contains the “Update user”  and “Delete user”  buttons for each user in the list. A search input allows searching for specific users in the list. The search is done on all the user’s attributes (“Username”, “Full Name” and “Description”).

If you have more than one SVM, you can select with the drop-down menu on the Top of the list the SVM to manage. Each SVM has its own users and groups and cannot be shared.

3.10.2. Create User

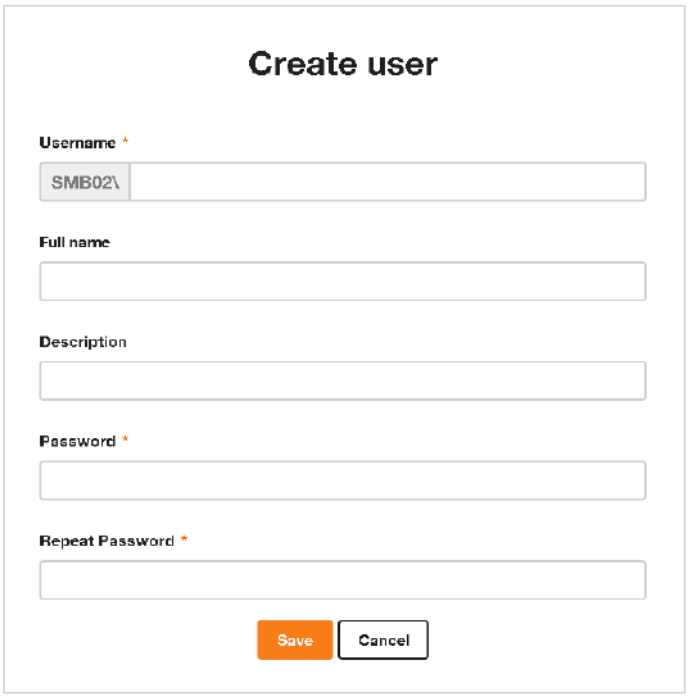


Figure 46 - Create user popup

Description:

Popup accessed by clicking the “plus” button on the “User” page and used to create a new user. The fields followed by an asterisk (*) are all mandatories. The “Password” and “Repeat Password” fields must match. After filling fields, click Save to create, or Cancel to cancel operation.

Validation:

- **Username**:
  - **Unauthorized characters:** / \ [ ] : ; | = , + * ? < >
  - **Max length:** 20
- **Full Name**
  - **Max length** : 255
- Description
  - **Max length** : 255
- **Password**:
  - **Cannot contain the username**
  - **Min length: 6**
  - **Max length: 20**
  - **Must contains at least 3 of the following**
    - Uppercase character(s)
    - Lowercase character(s)
    - Number(s) 0-9
    - Special character(s): ~ ! @ # $ % ^ & * _ - + = `| ( ) [ ] : ; “ ‘ < > , . ? /

3.10.3. Update User

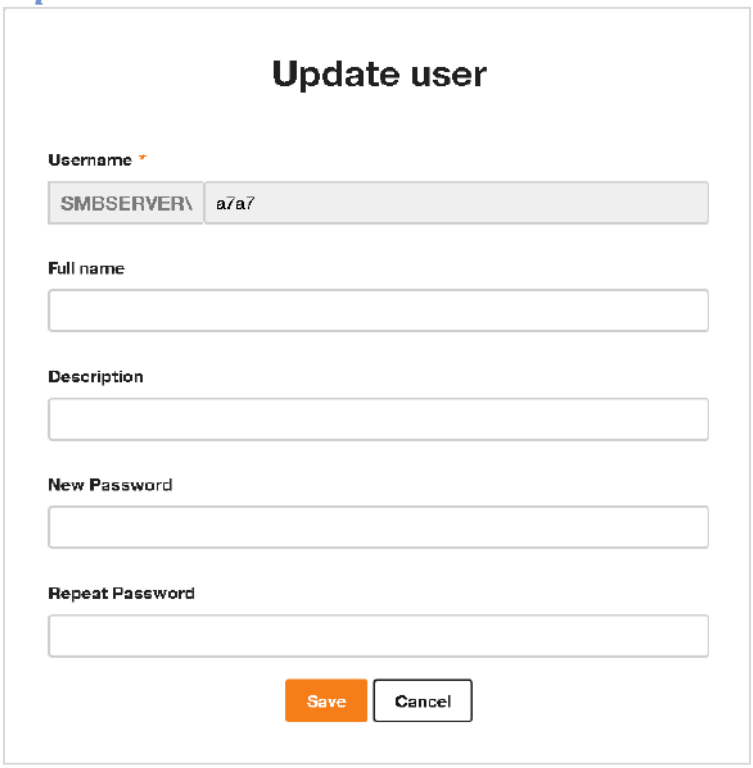


Figure 47 - Update user

Description:

Popup accessed by clicking the “Edit User” button on the “User” page and used to update a user. User Name cannot be changed. In case of changing the password, the “Password” and “Repeat Password” fields must match. User Name cannot be changed. After modifying fields, click Save to create, or Cancel to cancel operation.

Validation:

- Full **Name**
  - **Max length**: 255
- Description
  - **Max length**: 255
- **Password**:
  - **Cannot contain the username**
  - **Min length: 6**
  - **Max length: 20**
  - **Must contains at least 3 of the following:**
    - Uppercase character(s)
    - Lowercase character(s)
    - Number(s) 0-9
    - Special character(s): ~ ! @ # $ % ^ & * _ - + = `| ( ) [ ] : ; “ ‘ < > , . ? /
    - Special character(s): ~ ! @ # $ % ^ & * _ - + = `| ( ) [ ] : ; “ ‘ < > , . ? /

3.10.4. Delete User

Figure 48 - Delete user popup

Description:

Popup accessed from the “User List” page. When clicking on a “Delete user” button, a confirmation popup will appear. Click Delete button to delete user or Cancel to cancel operation.

3.11. Share Group Management (Workgroup mode only)

To ease user management, you can create groups. The behavior of groups is Windows local group behavior.

3.11.1. Group list

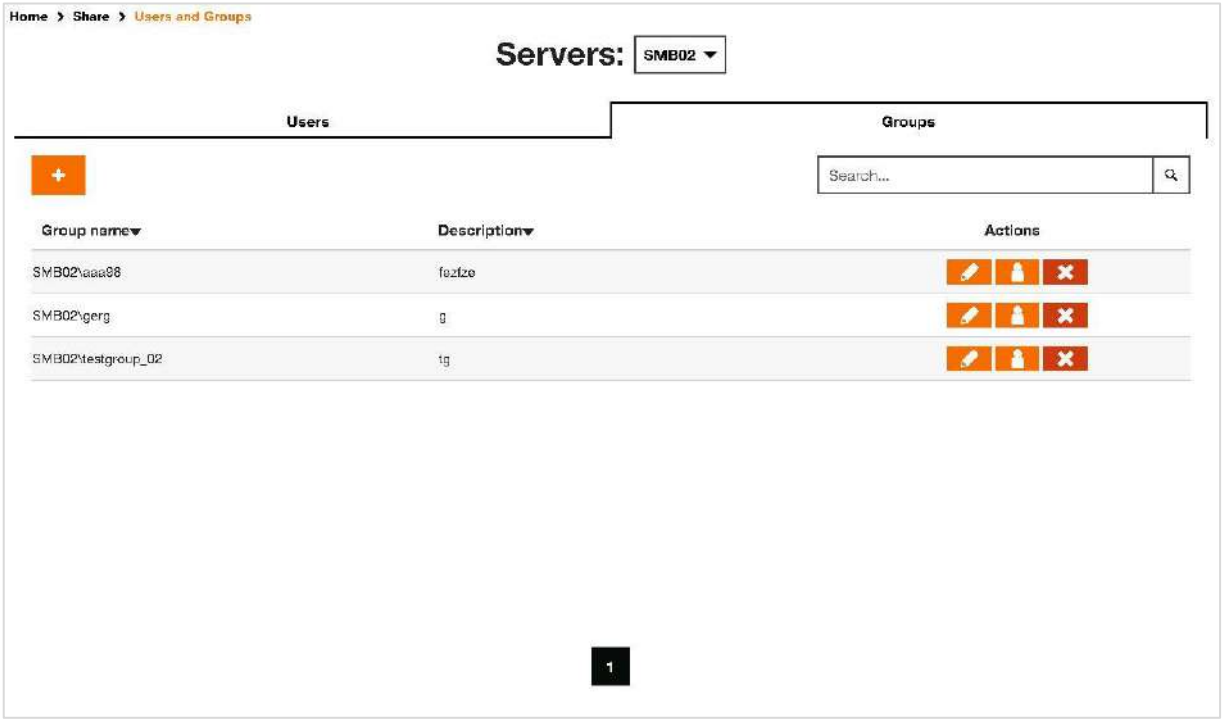


Figure 49 - Group list

Description:

Page accessed via the “Share => Users and Groups” menu. The “Group” tab shows the paginated list of the selected share’s local group.

You can create a new group by clicking, at top of list, the “plus” button. It opens the “Create Group” popup.

In the group table, the “Actions” column contains the “Update group”, “Manage users” and “Delete group” buttons for each group in the list. A search input allows searching for specific groups in the list. The search is done on all of the group’s attributes (“Group name” and “Description”).

UI Element:

- **Create Group button**: Open “Create Group” popup,
- **Update Group button**: Open “Update Group” popup,
- **Delete Group button**: Delete the group,
- **Search input**: Search the Group list.

3.11.2. Create Group

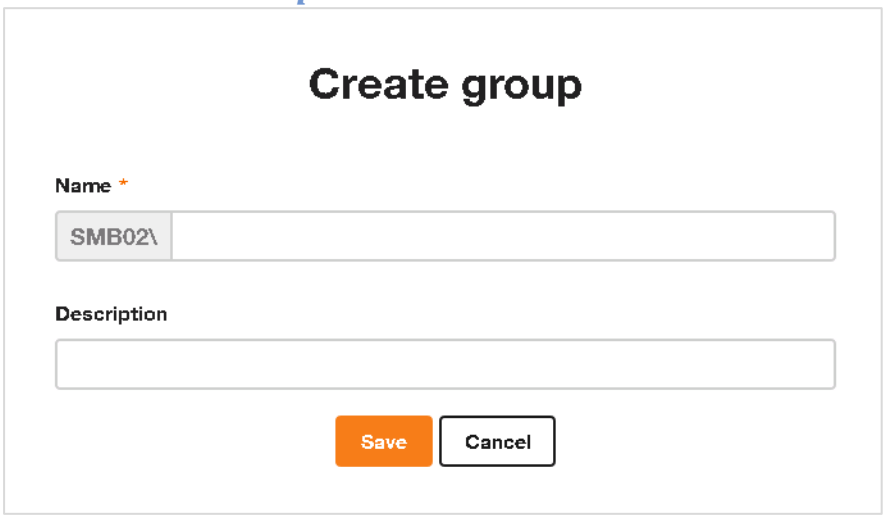


Figure 50 - Create group popup

Description:

Popup accessed by clicking the “plus” button on the “Group” page and used to create a new group. The fields followed by an asterisk (*) are all mandatories. After filling fields, click Save to create, or Cancel to cancel operation.

Validation:

- **Name**:
  - **Max length:** 20
- **Description**:
  - **Max length:** 255

3.11.3. Update Group

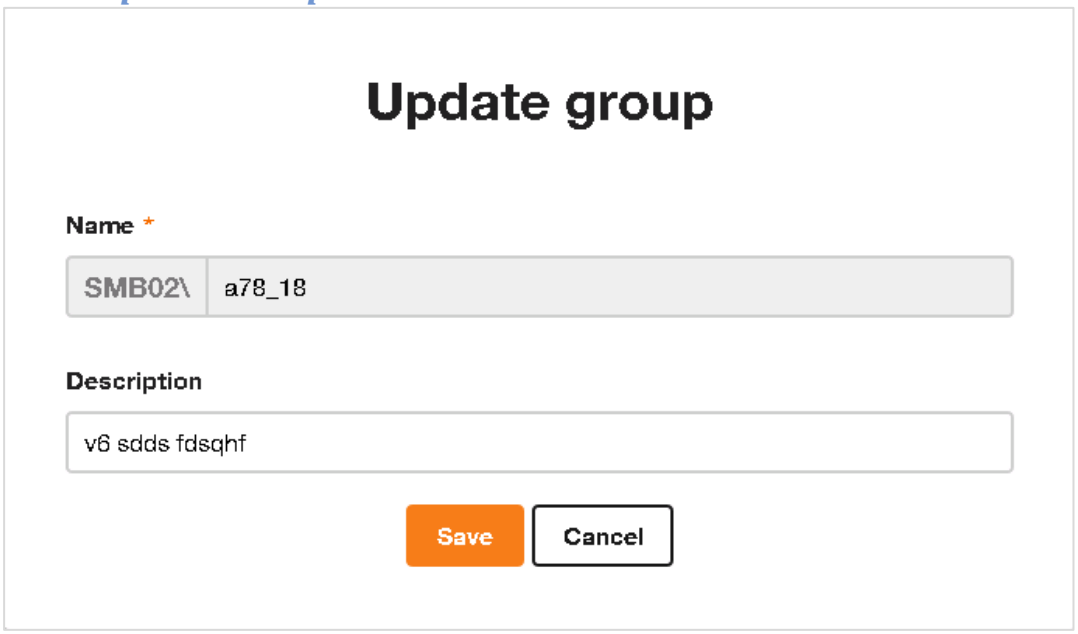


Figure 51 - Update group popup

Description:

Popup accessed by clicking the "Edit Group" button on the "Group" page and used to update a group. Group name cannot be changed.

Validation:

- **Description**: **Max length:** 255

3.11.4. Delete Group

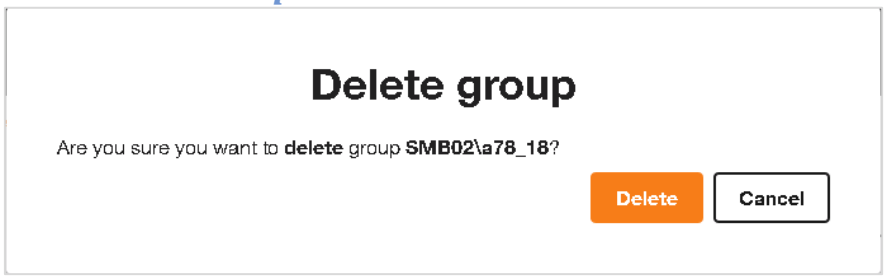


Figure 52 - Delete group popup

Description:

Popup accessed from the "Group List" page. When clicking on a "Delete group" button, a confirmation popup will appear and, if the user confirms, will delete the current group.

3.11.5. Manage users

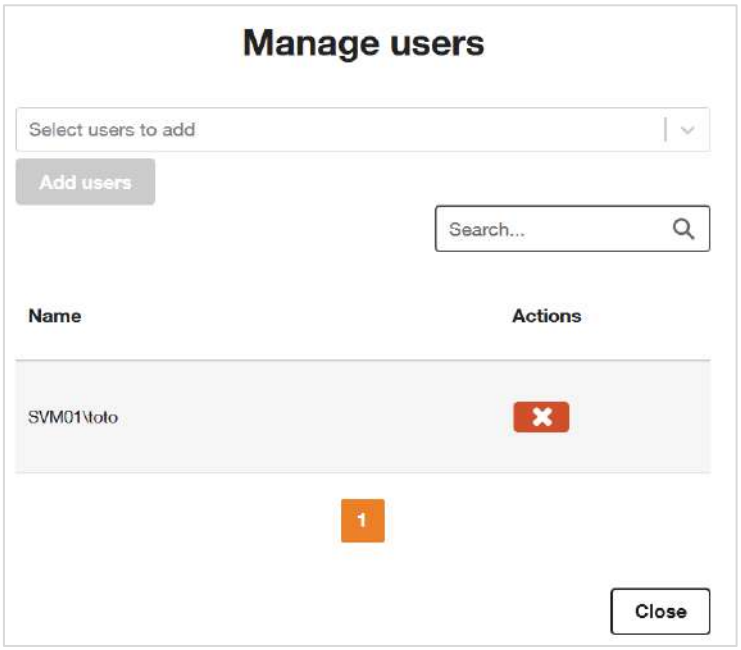


Figure 53 - Manage group membership

Description:

Popup accessed by clicking the “Manage Users” button on the “Group” page and used to manage the current group’s users. The top field is used to add one or several users at the same time for the current group (possible to either click on a user in the list or use the auto-completion feature). Users will be added when pressing the “Add users” button.

A user can be removed by clicking the delete button.

A search input is available to search in the user list on the “Username” attribute.