

Lab 4: Storage Management

In this lab, we installed several roles and features for our server Desktop and configured disks and volumes to share contents within the domain with SMB sharing. We installed and configured iSCSI target and initiator in two different servers present in our environment. We learned and experimented with tools to manage disks, however, we worked mostly with the File and Storage services in the server manager. Disk Management was also handy at times.

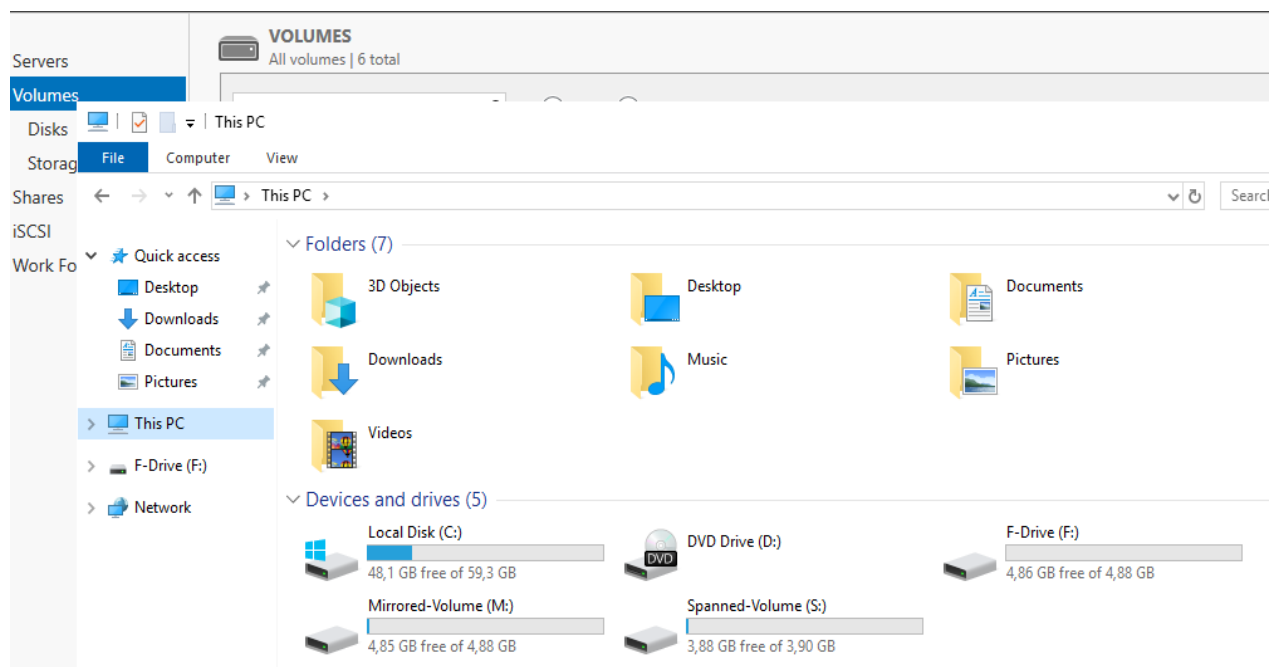


Figure1: Dynamic volumes created

Basic disks allow us to use the empty space available for that disk only. Dynamic disks allow much more functionalities and availability during failures, like Mirroring, Spanning, Parity features, and so on.

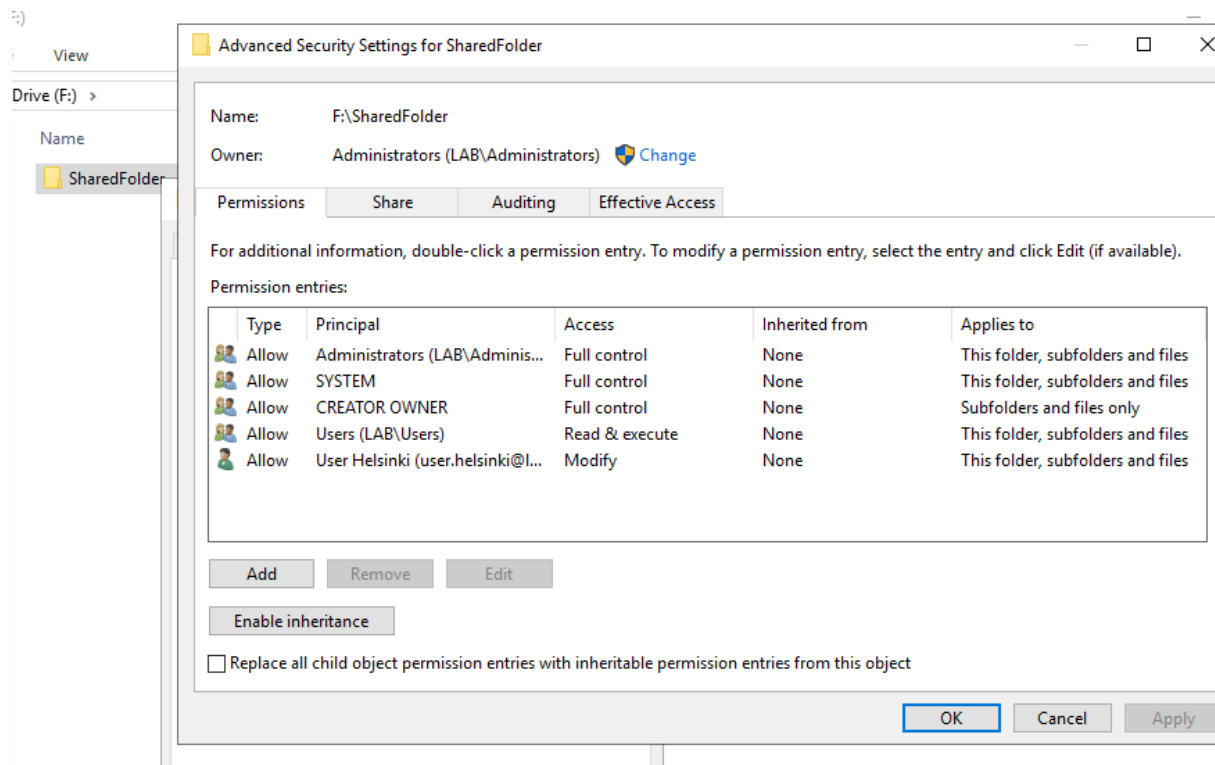


Figure2: SMB configured

Storage Spaces configuration

Due to the same problem, the NVMe disks not appearing in the primordial, I deleted the existing NVMe disks and created the SCSI disks as demonstrated in the lab guide.

VIRTUAL DISK LOCATION		VOLUME LOCATION	
Server:	serverDesktop	Server:	serverDesktop
Subsystem:	Windows Storage	Subsystem:	Windows Storage
Storage pool name:	sp1	Virtual disk:	MirrorDisk
Status:	OK	Disk:	Disk 4
Free space:	27,7 GB	Free space:	9,98 GB
VIRTUAL DISK PROPERTIES		VOLUME PROPERTIES	
Name:	MirrorDisk	Volume size:	9,98 GB
Storage tiers:	Disabled	Drive letter or folder:	M:\
Storage layout:	Mirror	Volume label:	MirrorVolume
Provisioning type:	Thin	FILE SYSTEM SETTINGS	
Total requested size:	10,0 GB	File system:	ReFS
Enclosure awareness:	None	Short file name creation:	Disabled
		Allocation unit size:	Default

As the above screenshots reveal, a storage pool of 3 disks was created. After that, a virtual disk (MirrorDisk) for the pool was also created and finally ReFS volume (MirrorVolume). The creation of parity disks was not successful. So, I had to go with the Mirror disks during this process.

The screenshot displays the Windows Server Storage Spaces management console. At the top, the 'STORAGE POOLS' section shows a single pool named 'sp1' with a capacity of 28.5 GB and 20.2 GB of free space. Below this, the 'VIRTUAL DISKS' section for 'sp1 on serverDesktop' shows a single virtual disk named 'MirrorDisk' with a capacity of 10.0 GB and 1.75 GB allocated. To the right, the 'PHYSICAL DISKS' section for 'sp1 on serverDesktop' lists three physical disks: two 15.0 GB VMWare Virtual S disks and one 5.00 GB VMWare Virtual S disk, all with an 'Automated' usage policy.

Name	Type	Managed by	Available to	Read-Write Server	Capacity	Free Space	Percent Alloc
sp1	Storage Pool	serverDesktop	serverDesktop	serverDesktop	28,5 GB	20,2 GB	

Name	Status	Layout	Provisioning	Capacity	Allocated	Volume
MirrorDisk	Mirror	Thin		10,0 GB	1,75 GB	M:

Slot	Name	Status	Capacity	Bus	Usage
	VMware, VMWare Virtual S (server...)		15,0 GB	SAS	Automa
	VMware, VMWare Virtual S (server...)		10,0 GB	SAS	Automa
	VMware, VMWare Virtual S (server...)		5,00 GB	SAS	Automa

Figure: Mirrored Disks created

The data deduplication feature was installed on the serverDesktop.

The screenshot shows the 'View installation progress' window for the 'Data Deduplication' feature. It indicates that the feature installation is in progress, with a progress bar showing approximately 50% completion. The installation started on 'serverDesktop.lab.manish'. Below the progress bar, a list of installed features is shown, including 'File and Storage Services', 'File and iSCSI Services', and 'Data Deduplication'.

View installation progress

Feature installation

Installation started on serverDesktop.lab.manish

File and Storage Services
File and iSCSI Services
Data Deduplication

The iSCSI target disk was configured on the serverDesktop and iSCSI initiator on the other server.

The screenshot shows two panels from the Windows File and Storage Services console. The top panel, 'iSCSI VIRTUAL DISKS', shows a single virtual disk 'M:\iSCSIVirtualDisks\iSCSIIdisk01.vhdx' on 'serverDesktop' with a size of 2.00 GB, connected to 'iscsitarget' on 'serverCore'. The bottom panel, 'iSCSI TARGETS', shows a target 'iscsitarget' on 'serverDesktop' with Target IQN 'iqn.1991-05.com.microsoft:serverdesktop-iscsitarget-target', connected to 'serverCore' with Initiator ID 'IQN:iqn.1991-05.com.microsoft:servercore.lab.manish'.

Path	Status	Virtual Disk Status	Target Name	Target Status	Initiator ID	Size
serverDesktop (1)						
M:\iSCSIVirtualDisks\iSCSIIdisk01.vhdx	Connected		iscsitarget	Connected	IQN:iqn.1991-05.com.microsoft:servercore.lab.manish	2,00 GB

Name	Server Name	Target IQN	Target Status	Initiator ID	Last Login
iscsitarget	serverDesktop	iqn.1991-05.com.microsoft:serverdesktop-iscsitarget-target	Connected	IQN:iqn.1991-05.com.microsoft:servercore.lab.manish	23.2.2022

Figure: iSCSI target and initiator configured

The screenshot shows the 'DISKS' and 'VOLUMES' sections of the Windows File and Storage Services console. The 'DISKS' section lists disks for 'serverCore' and 'serverDesktop'. The 'VOLUMES' section shows a single volume 'M:' on 'serverDesktop'. The 'STORAGE POOL' section shows 'sp1' with a capacity of 28.5 GB, 29% used, and a subsystem of 'Windows Storage'.

Number	Virtual Disk	Status	Capacity	Unallocated	Partition	Read Only	Clustered	Subsystem	Bus Type	Name
serverCore (2)										
1		Online	2,00 GB	0,00 B	MBR				iSCSI	MSFT Virtual HD
0		Online	60,0 GB	0,00 B	GPT				NVMe	VMware Virtual NVMe...
serverDesktop (2)										
0		Online	60,0 GB	0,00 B	GPT				NVMe	VMware Virtual NVMe...
4	MirrorDisk	Online	10,0 GB	0,00 B	GPT			Windows S...	Storage S...	MirrorDisk

Volume	Status	Provisioning	Capacity	Free Space	Deduplication Rate	Deduplication Savings	Percent Used
serverDesktop (1)							
M:	Thin		9,94 GB	8,81 GB	0%	0,00 B	<div><div></div></div>

sp1	
Capacity:	28,5 GB
29% Used	<div><div></div></div>
Subsystem:	Windows Storage
Servers:	serverDesktop
Volumes:	M:

Figure: File and Storage Services\Disks - window showing both servers and the disks

Advanced Security Settings windows for the shared folder (showing permissions)

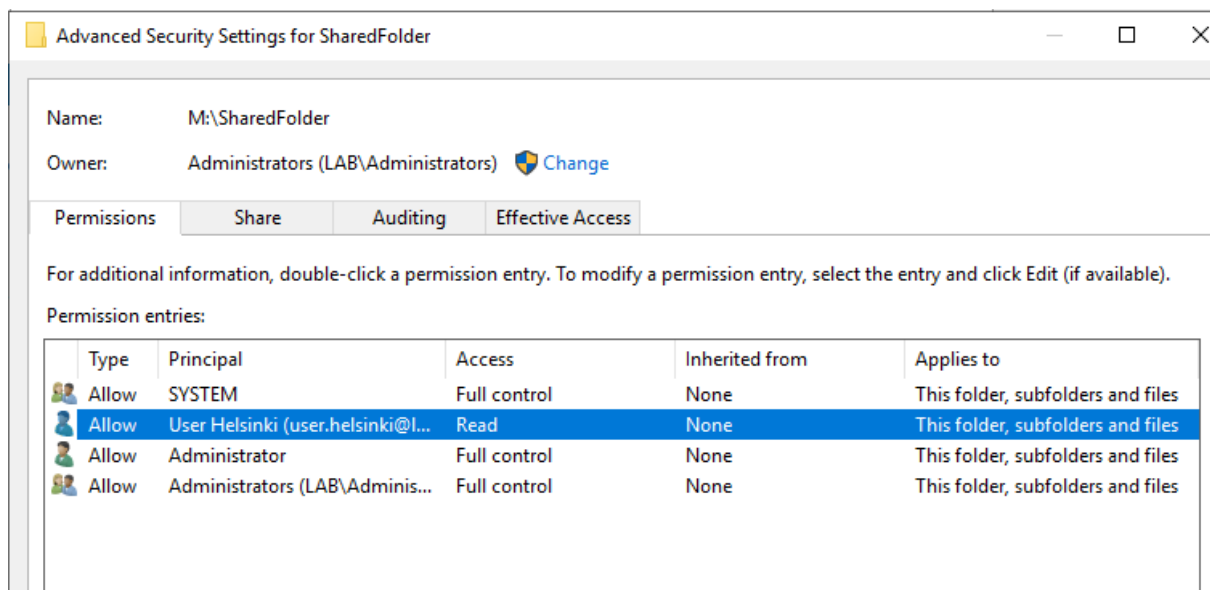


Figure: Permissions for SharedFolder

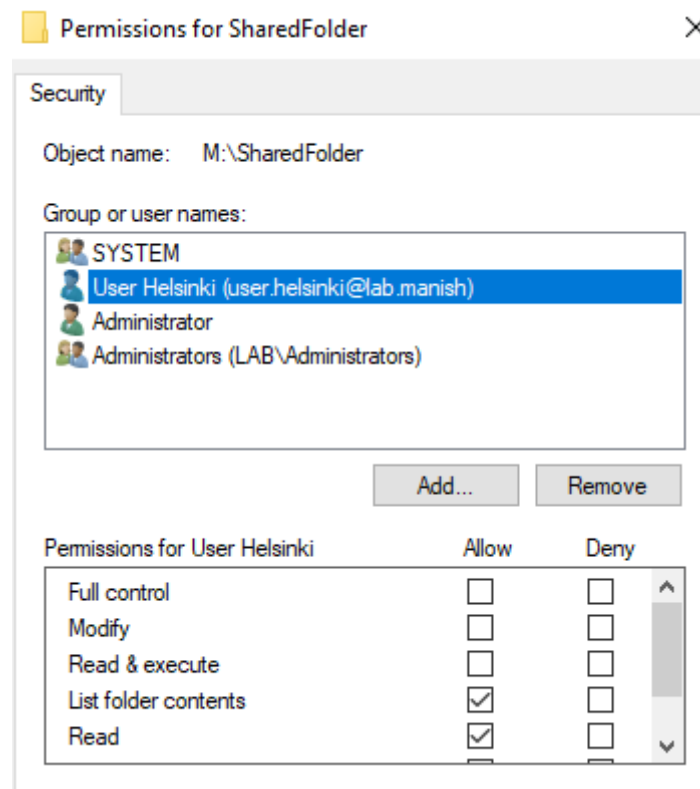


Figure: Permissions for SharedFolder

The shared folder is now visible in the Windows 10 workstation

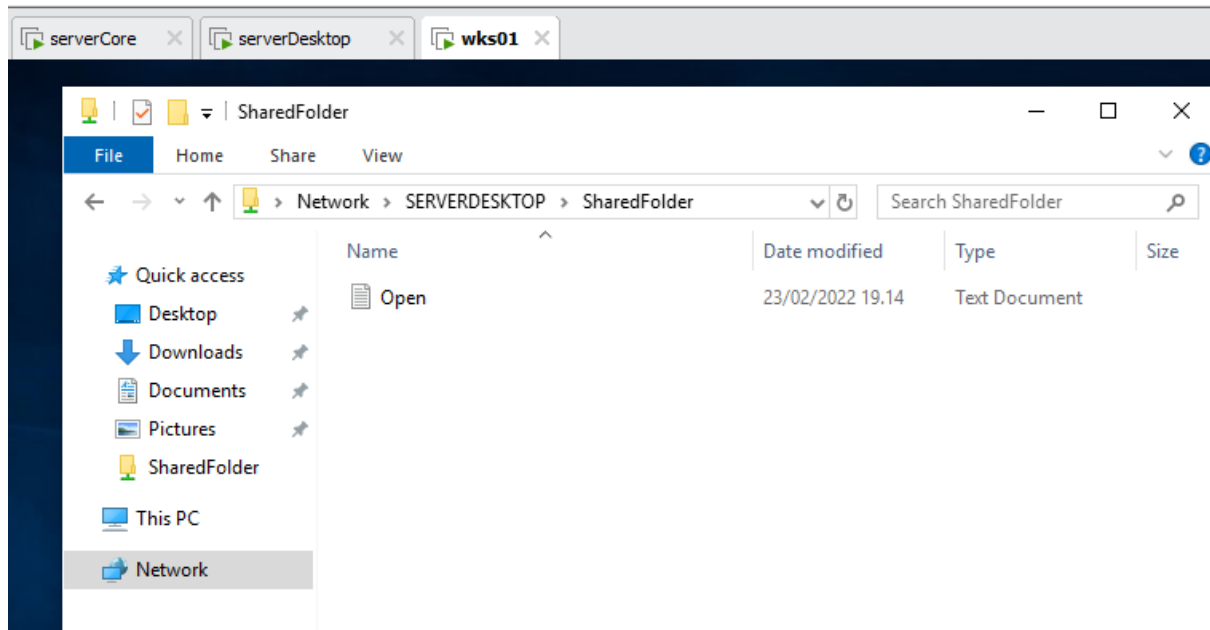


Figure: File explorer – windows 10

Conclusion and Reflections

Storage pool can be created from multiple disks.

Data deduplication feature optimizes the storage by compressing the duplicate data and reducing space usage.

In real-life environment, it is not a good practice to configure all the features on the same server.

There are 2 sets of permissions for file systems: share permissions and NTFS permissions. To access the shared files, both permissions must allow access.

All the users in the environment with trusted accounts are authenticated users.

iSCSI – Internet Small Computer Systems Interface transmits blocks over TCP/IP

CHAP – Challenge Handshake Authentication Protocol periodically verifies the identity of the client by using a three-way handshake