

Documentation

STORAGE VIRTUALISATION

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Preface

In terms of resiliency, we can mirror data across multiple drives along with the parity data drives with more ease in a virtualised storage environment. The physical resource would be quite troublesome in this regard. In this lab, we configured two disks for two-way mirror resiliency and a parity disk to store parity bits (though we stored actual data on this one too). Microsoft's storage spaces was used to create the storage pool in Windows 10 virtual machine.

Activity

While the VM remained in shut down mode, three different NVMe disks were created, two for mirroring and one for parity. The disks do not need to be allocated space right away as the space could also be dynamically allocated as content grows.

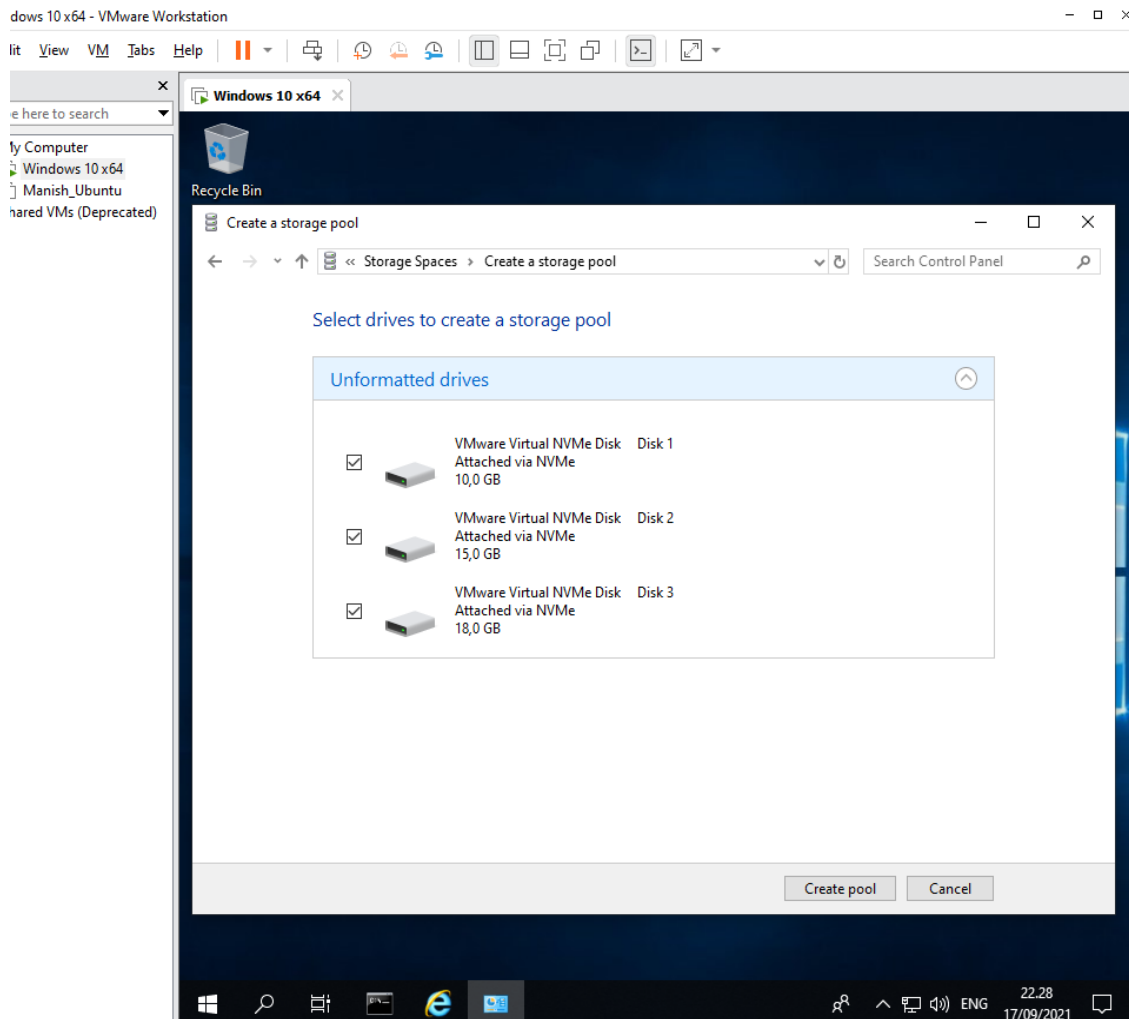


Figure: creation of NVMe disks

Using the NVMe disks, a storage pool was created. During the process we could choose the level of resiliency— in our case, two-way mirror was in question. It took two disks and offered resiliency in situation which involved failure of one of the disks that we later test at the end of this session.

Each of the drives were allocated with 5GB of space. The data would be stored in both drives as a kind of back-up which is readily available in case one of the disks gets corrupted.

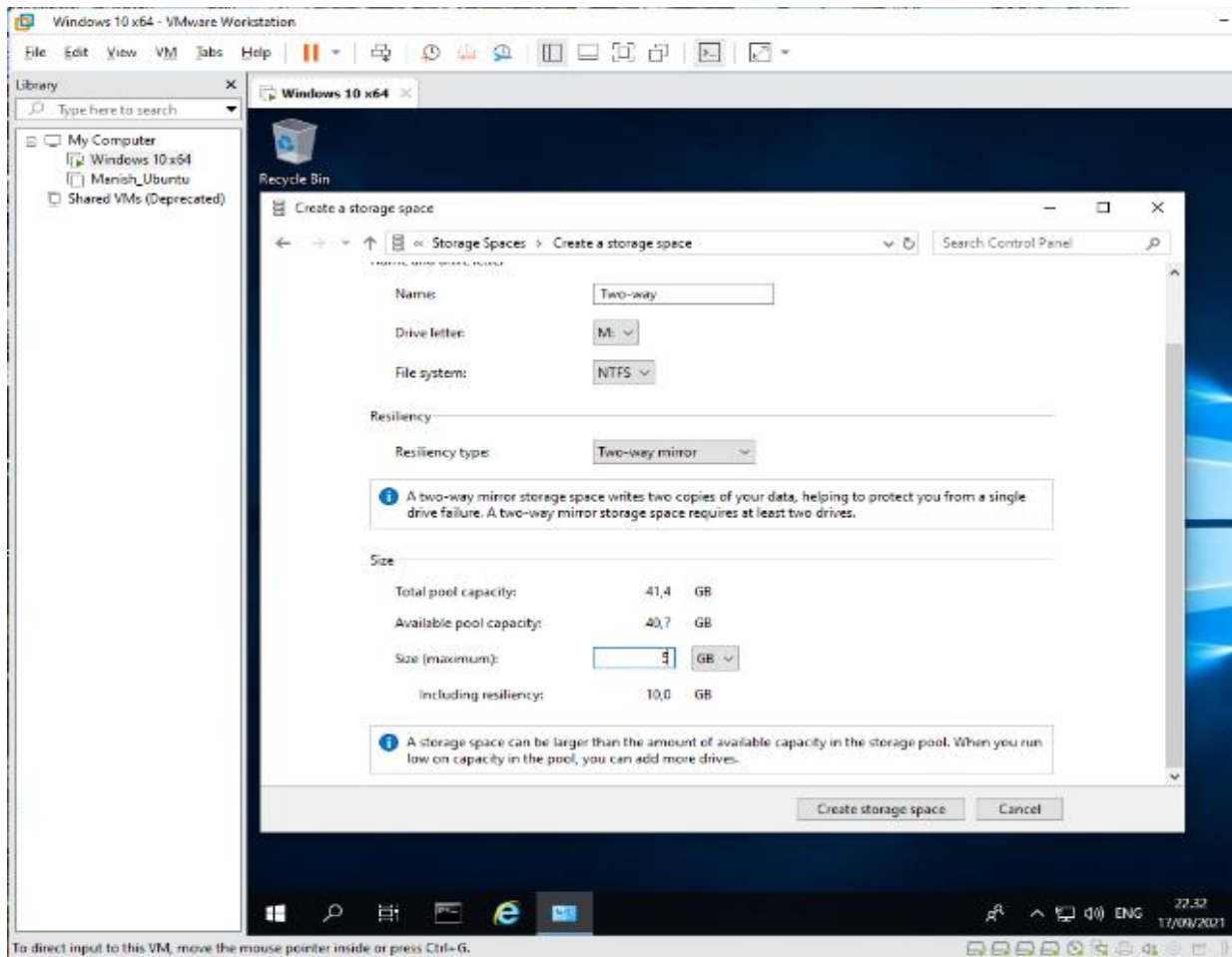


Figure: configuring drives with two-way mirror resiliency

Also, a parity disk drive was created to store data, with 5GB memory. This would also serve for the redundancy and resiliency of the data.

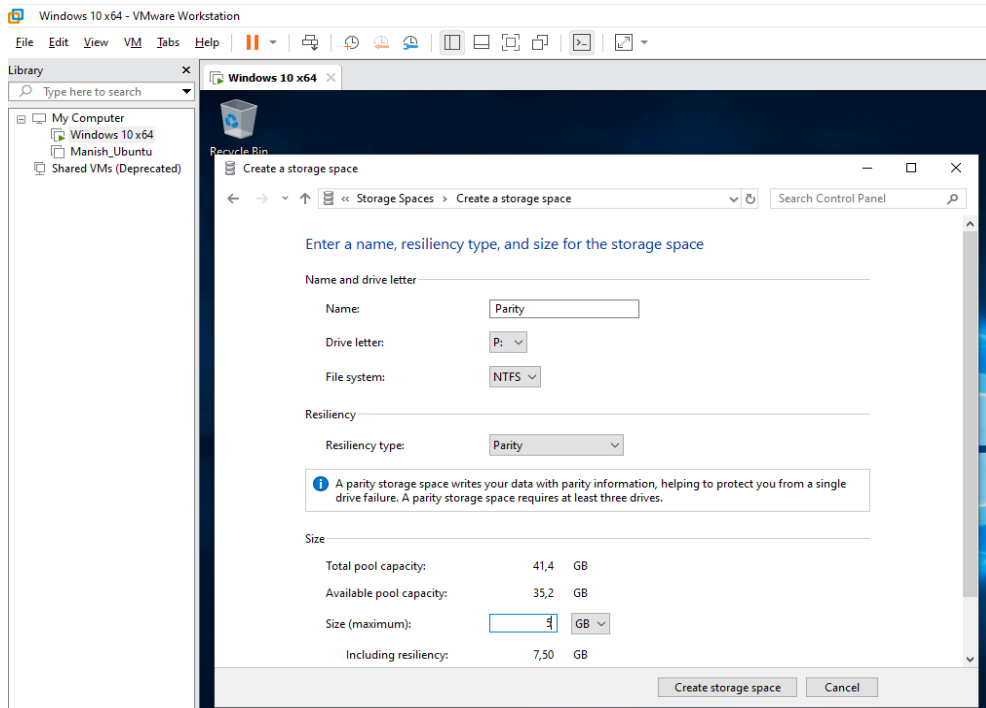


Figure: creating TWO-WAY MIRROR and PARITY

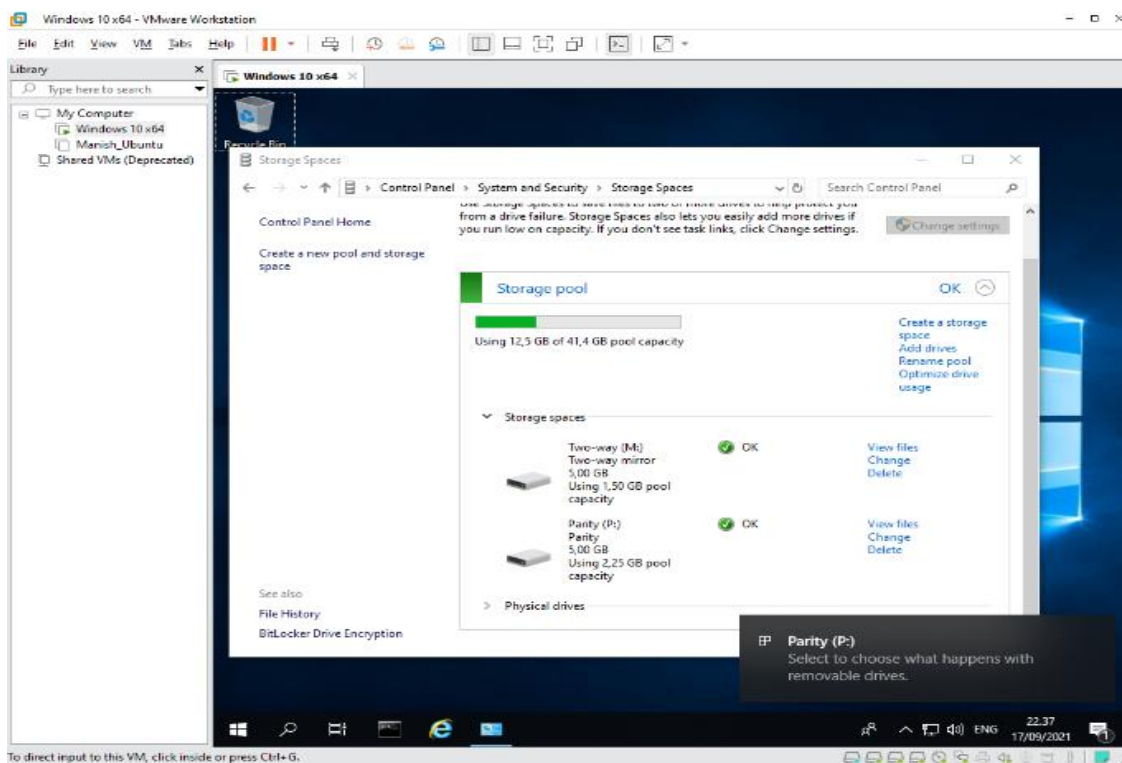


Figure: Data disks with two-way mirror resiliency and a parity disk created

The configurations of the storage spaces:

Storage pool capacity: 41,4GB

1. *Two-way (M:) Two-way Mirror 5GB - usage 1,5GB pool capacity.*
2. *Parity (P:) Parity 5GB - usage 2,25GB pool capacity.*

The configurations of the physical drives:

1. *First NVMe Disk – 59,1% used, providing 9,76GB pool capacity*
2. *Second NVMe Disk – 40,8% used, providing 14,7GB pool capacity*
3. *Third NVMe Disk – 6,60% used, providing 17,7GB pool capacity*

Testing the resiliency

A situation was created by removing one of the disks after the VM was shut down. Upon resuming, a warning popped up about an issue in the storage pool. It said reduced resiliency as one of the disks was removed.

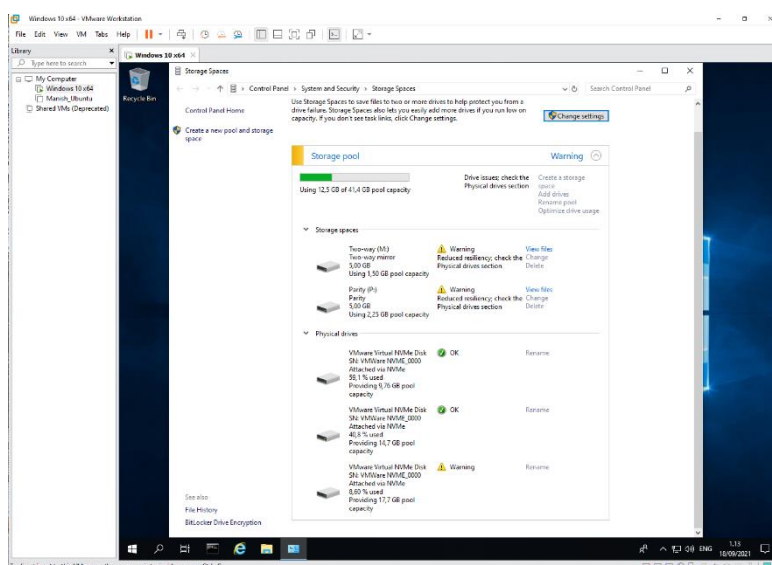


Figure: Warning about the resiliency

However, the other disk out of the two, that held actual data was still in operation and served the data. The file and its content are still the same, resilient to one of the disks' failure. Also, the parity disk holds the data sound and good.

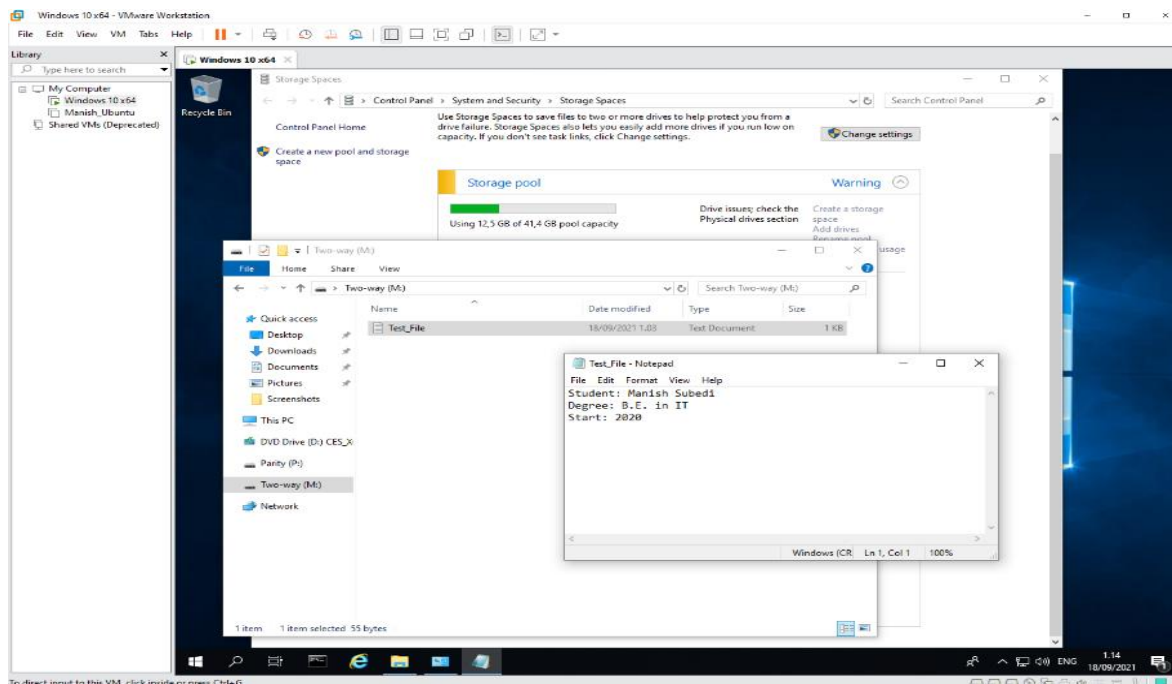


Figure: Data in the parity disk

Adding a new drive to the pool could also be easily done. The data would be spread across the new drive to solve the resiliency issue, time would depend on the size of the data. A new NVMe disk was first created before adding it to the storage pool to resolve the resiliency issue in this lab session.

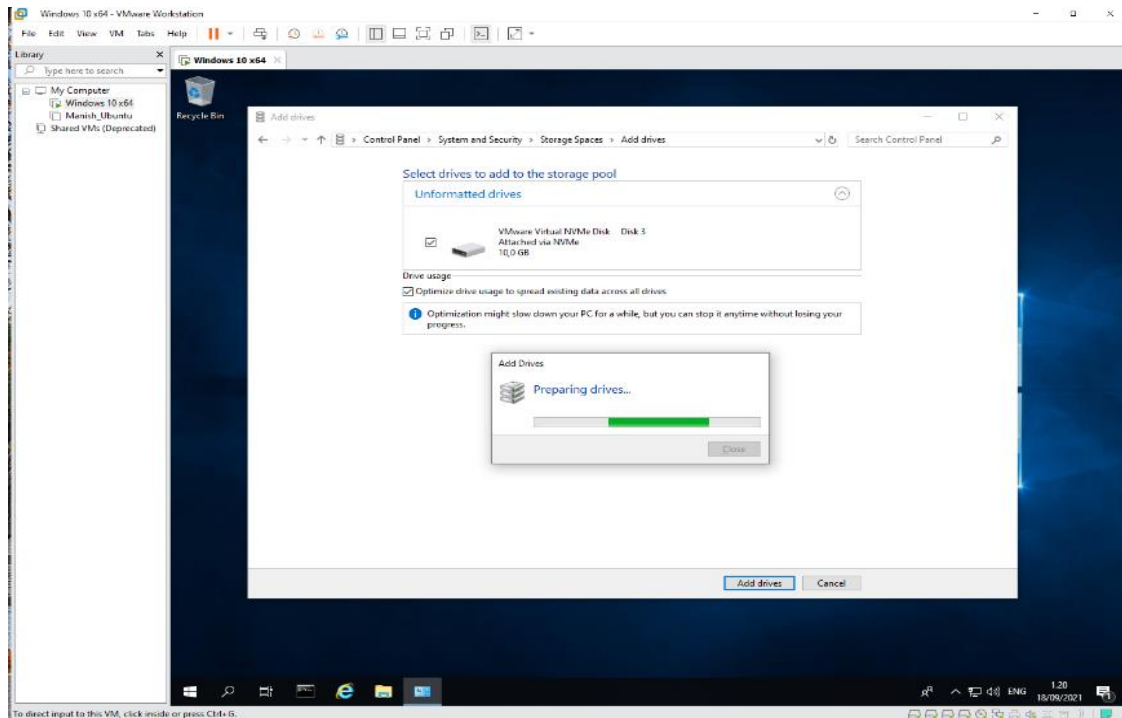


Figure: Resolving the disk failure and resiliency issue

CONCLUSION

The more drives are in use, more resilient the storage system is. Data can be recovered from the parity drives in case of data loss from actual drives too. In the above scenario, we saw that mirroring and parity disks can help avoiding catastrophic events for a company when critical data is in question. This solution comes at reduced cost, agility and in no time. We created a storage pool in minutes, removed one of them and created another one to serve the pool instantly.

STORE VIRTUALISATION offers resiliency during disk failure. This is one of the most vital features in addition to high availability, easy implementation of policies, easy configuration and reduced cost to mention a few.