

RAID 0

Its main objective is to improve the performance of the server, however its level of confidence is almost 0.

When you choose to use RAID 0, all disks are now accessed as one. The files are fragmented on the various discs, allowing the fragments to be read and written simultaneously.

For its configuration it is necessary to use at least two discs, apart from the disc containing the operating system.

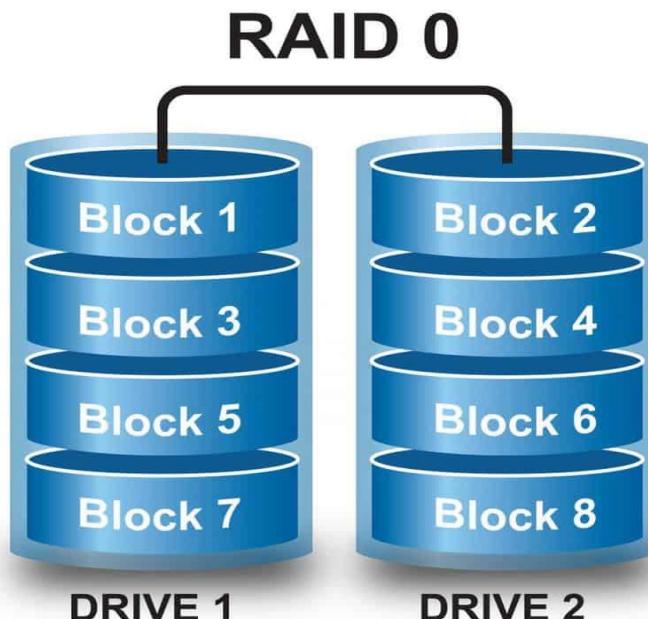


Figure 2 – How RAID 0 files are saved

RAID 0 – Configuration (Windows Server 2019)

1º Step – Create a machine on AWSEducate with the Windows Server 2019 image.

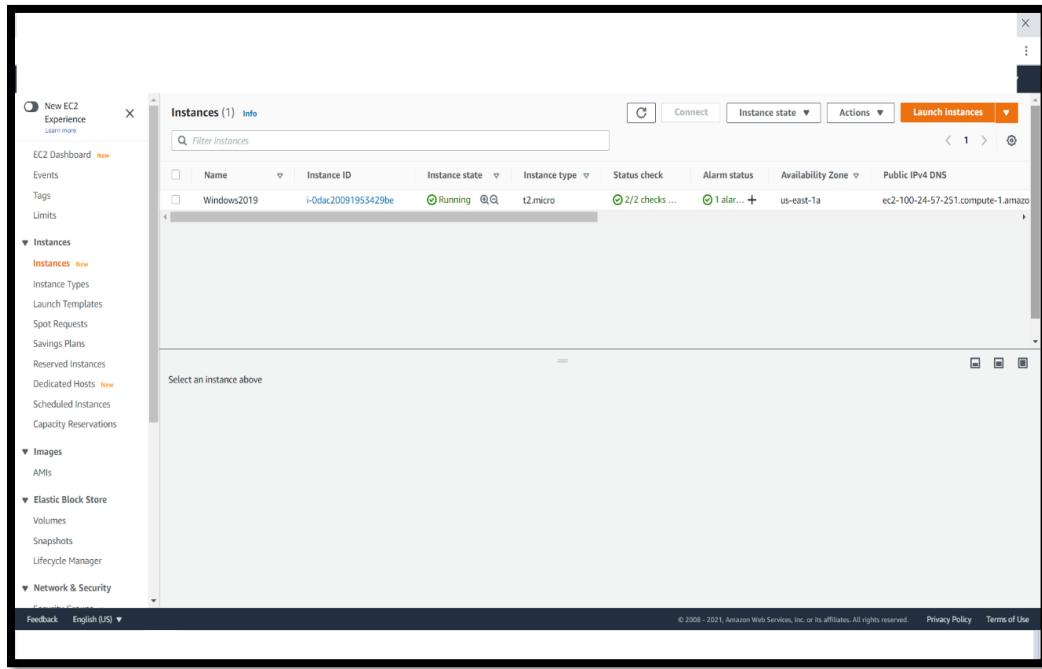


Figure 3 – Instance with Windows Server 2019

2º Step – Create two disks in AWSEducate.

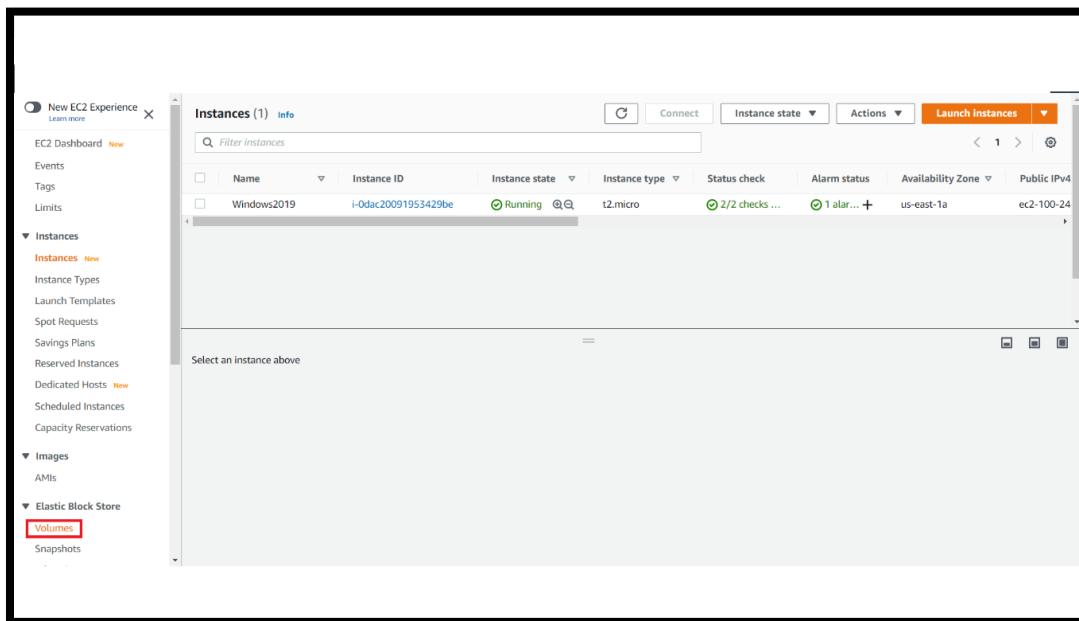


Figure 4 – Creating discs

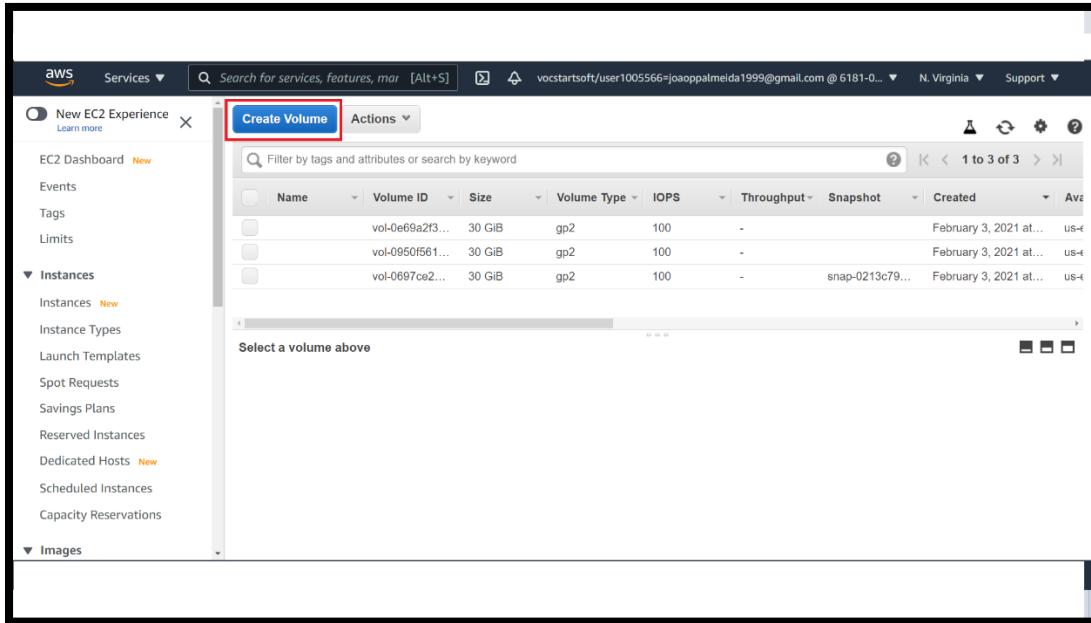


Figura 5 – Creating discs

A detailed screenshot of the 'Create Volume' configuration dialog. It includes fields for Volume Type (General Purpose SSD (gp2)), Size (3 GiB), IOPS (300 / 3000), Throughput (Not applicable), Availability Zone (us-east-1a), Snapshot ID (Select a snapshot), and Encryption (Encrypt this volume). There's also a section for adding tags with 'Key' and 'Value' fields, and a note about matching the Availability Zone. At the bottom right, there's a red box around the 'Create Volume' button.

Figura 6 – Creating discs

3º Step – Log into Windows Server 2019 and right click on the Windows Icon and click on Disk Management.

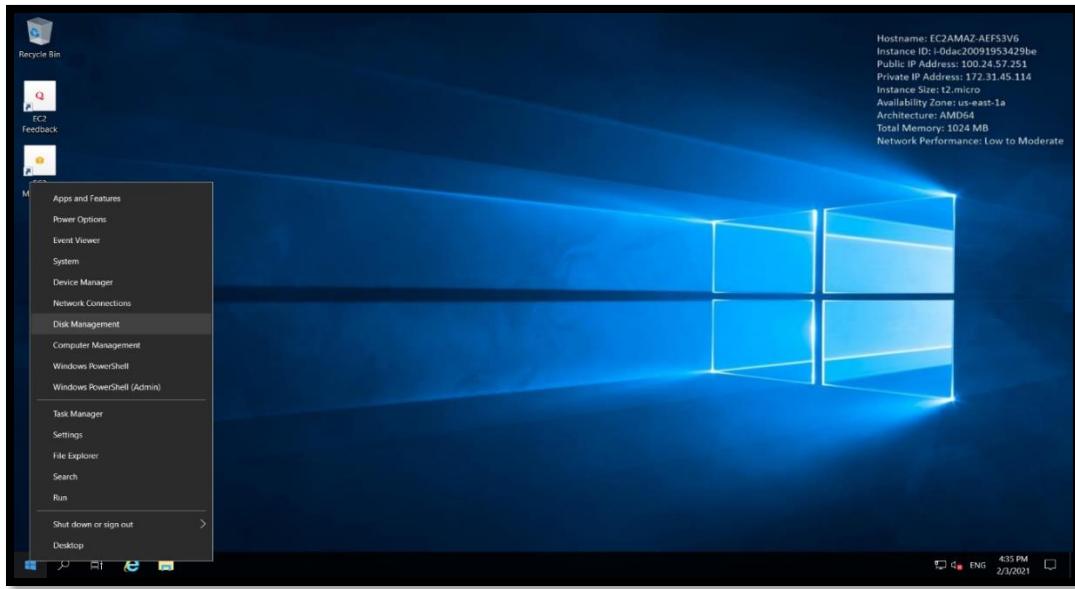


Figure 7 – Configuration of RAID 0

4º Step – Then click on one of the discs that were created on AWS and click on New Stripped Volume.

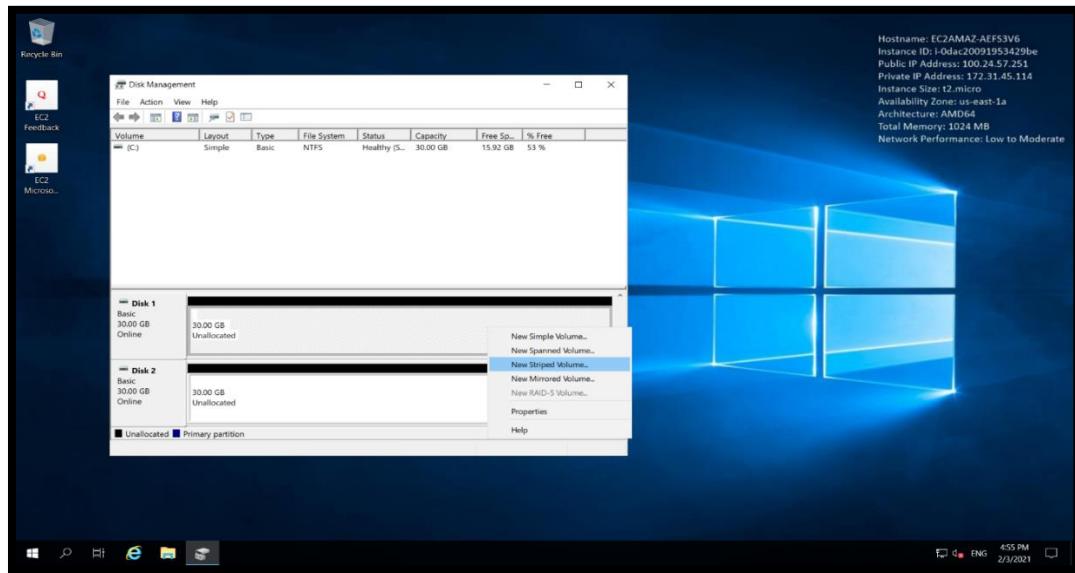


Figure 8 – Configuration of RAID 0

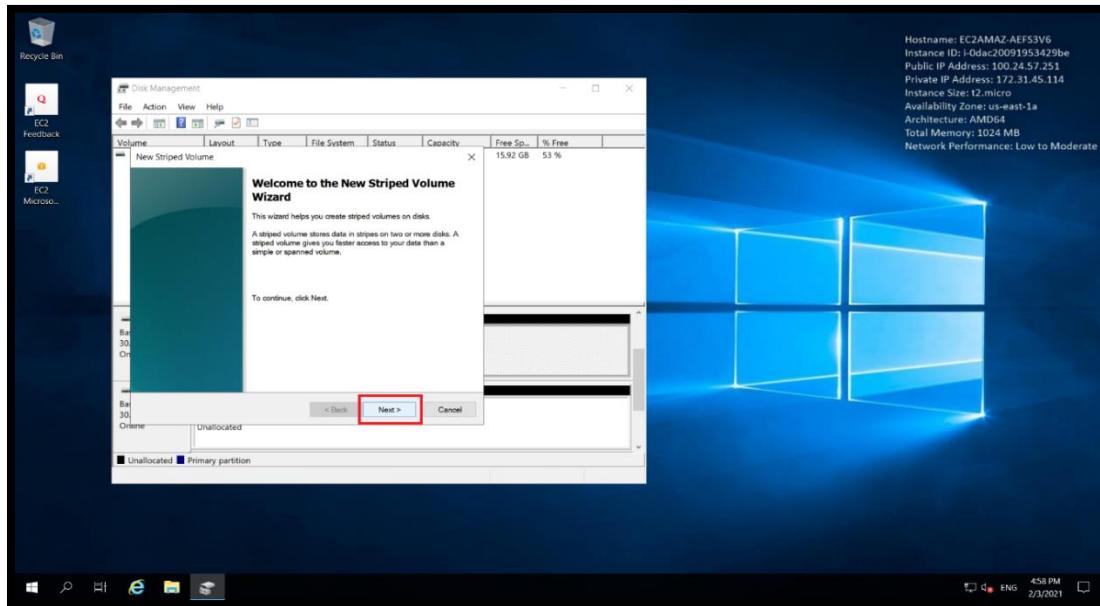


Figure 9 – Configuration of RAID 0

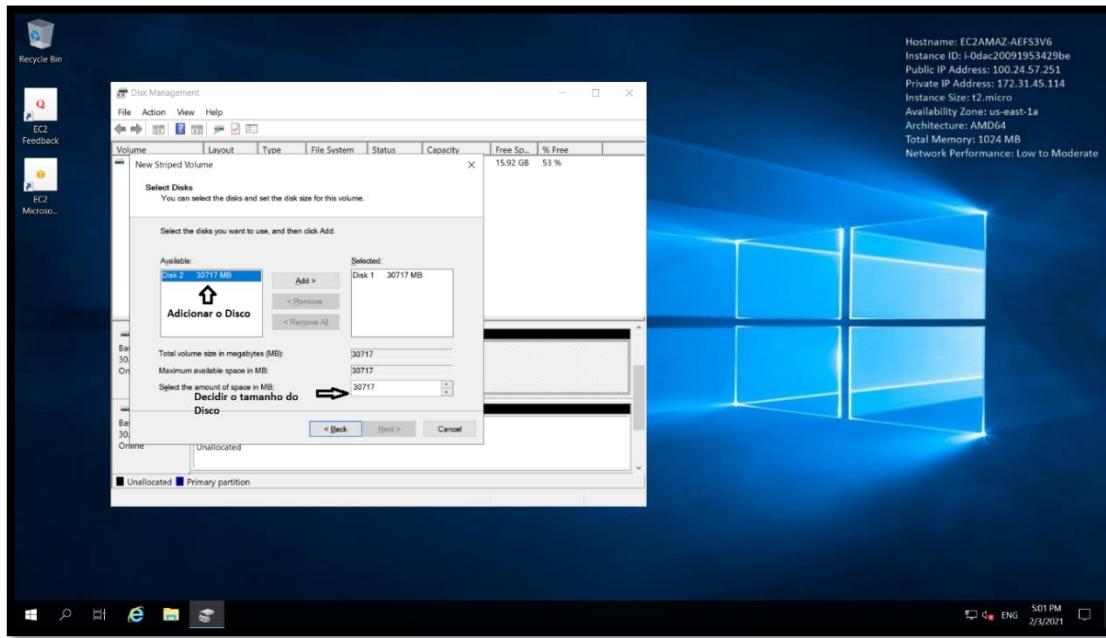


Figure 10 – Configuration of RAID 0

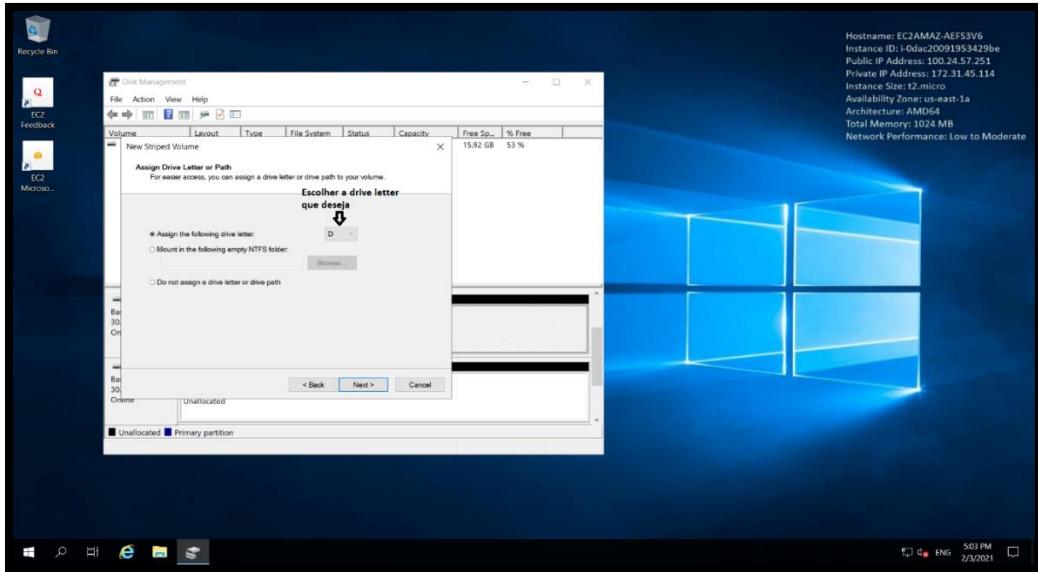


Figure 11 – Configuration of RAID 0

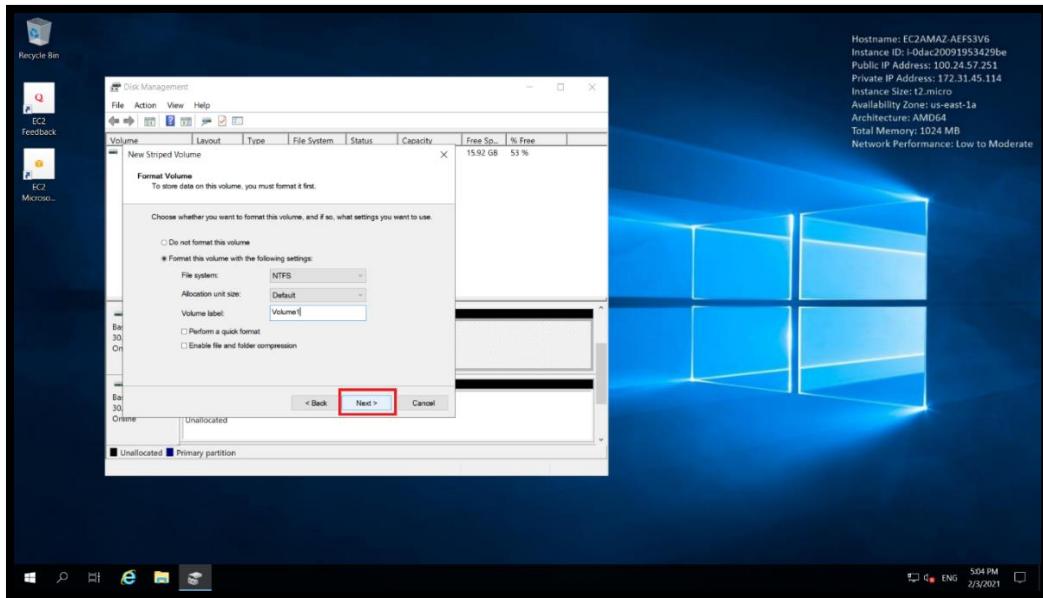


Figure 12 – Configuration of RAID 0

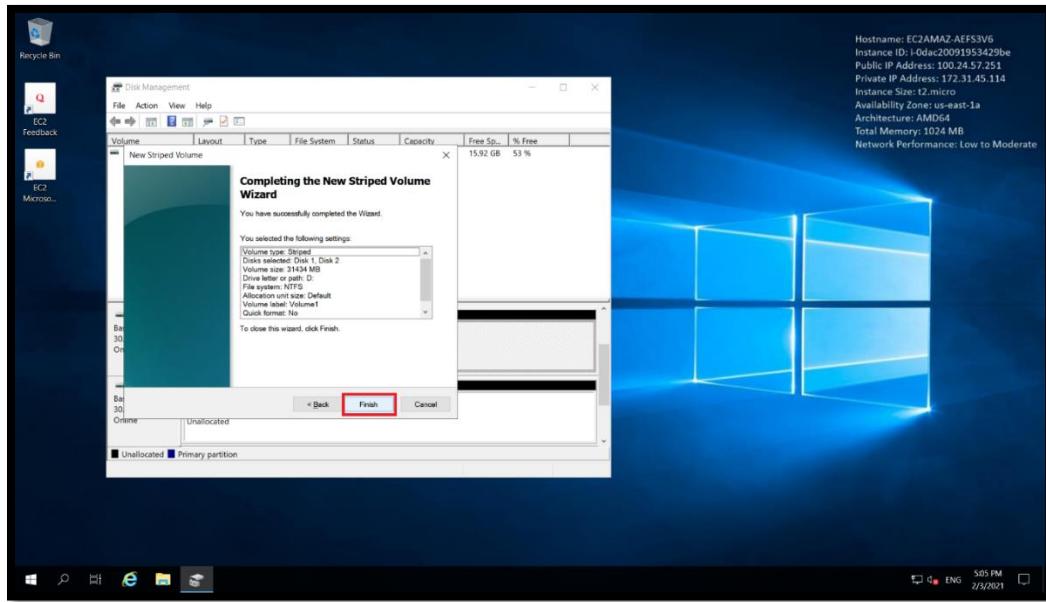


Figure 13 – Configuration of RAID 0

Finally, we can see that our RAID 0 was created.

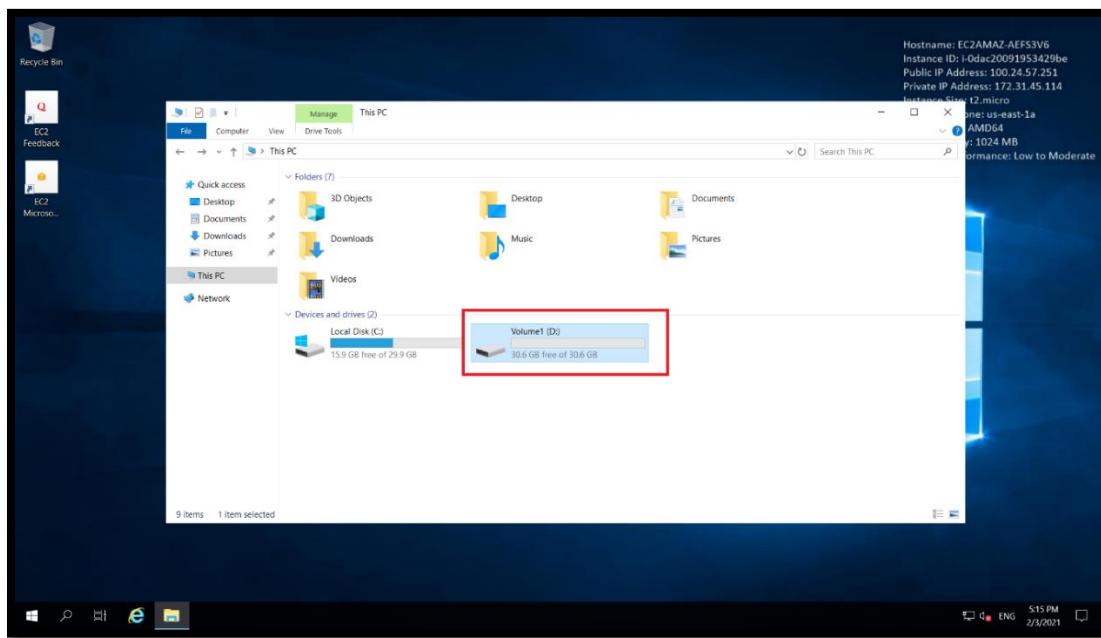


Figure 14 – Disk RAID 0 created

RAID 1

It does not offer an increase in performance, but it protects against failures. In practice, it will be like having only one disk installed, but if a disk fails for any reason, it will have a backup copy stored on the other disk.

A minimum of two disks are required to configure.

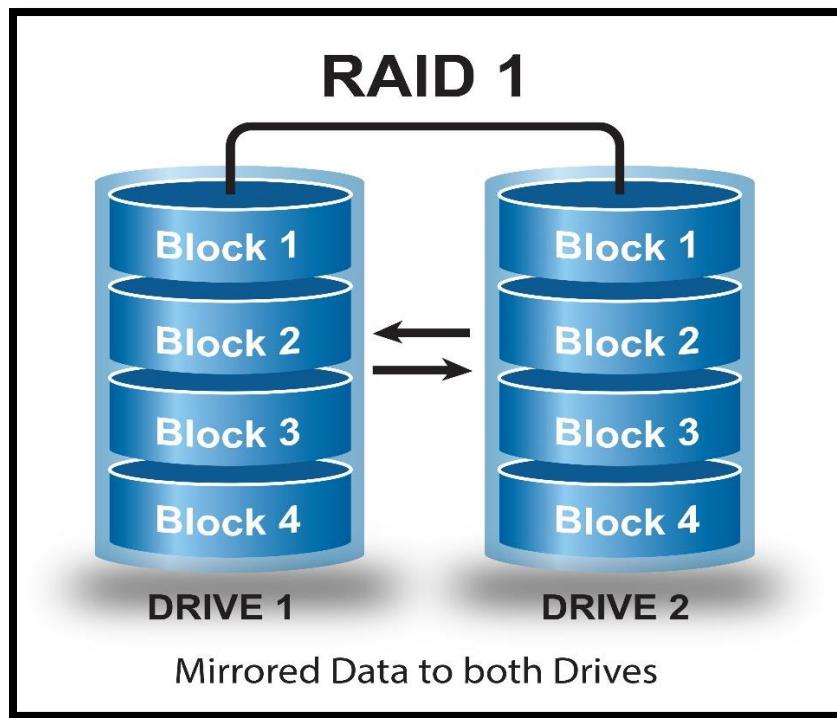


Figure 15 – Demonstration of RAID 1

RAID 1 – Configuration (Windows Server 2019)

The process that differs from RAID 1 to RAID 0 is just the following configuration shown in the image. The rest is all the same, it is up to the one who is configuring, choosing the size of the disk.

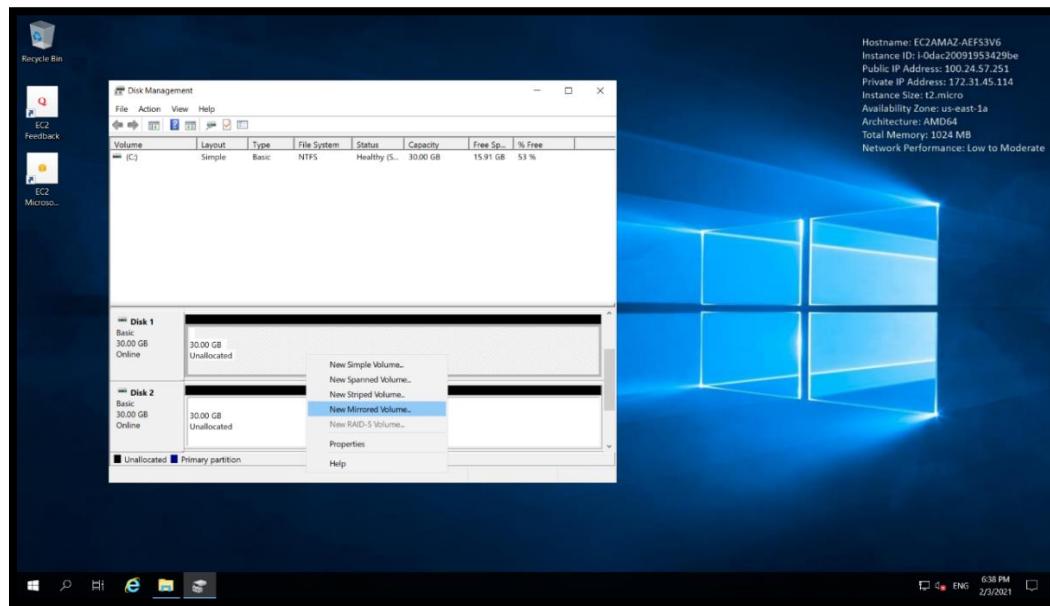


Figure 16 – Configuration of RAID 1

RAID 5

It is widely used on servers with a large number of disks. It uses an efficient method to create a layer of redundancy, sacrificing only a fraction of the space, rather than simply using half of the disks to store complete copies.

A minimum of 3 disks are required to set up.

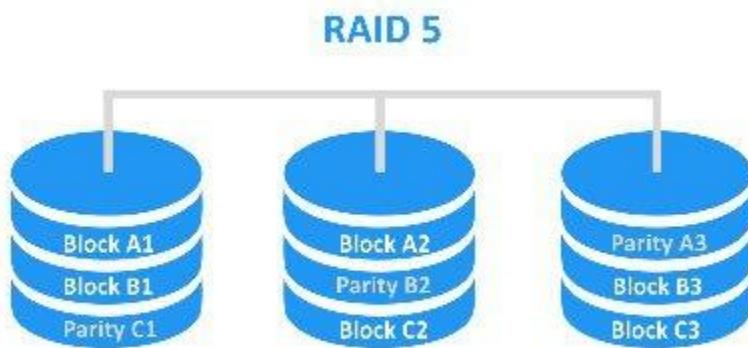


Figure 17 – Demonstration of RAID 5

RAID 5 – Configuration (Windows Server 2019)

When adding the three disks in Windows we can see that when loading on a disk, we already get the option of RAID 5 and that is where we want to click.

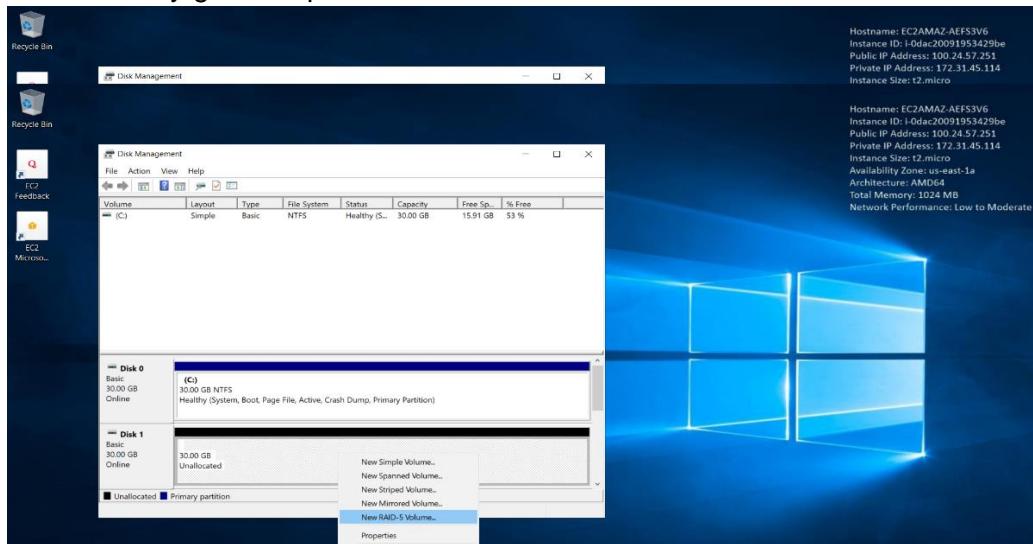


Figure 18 – Configuration of RAID 5

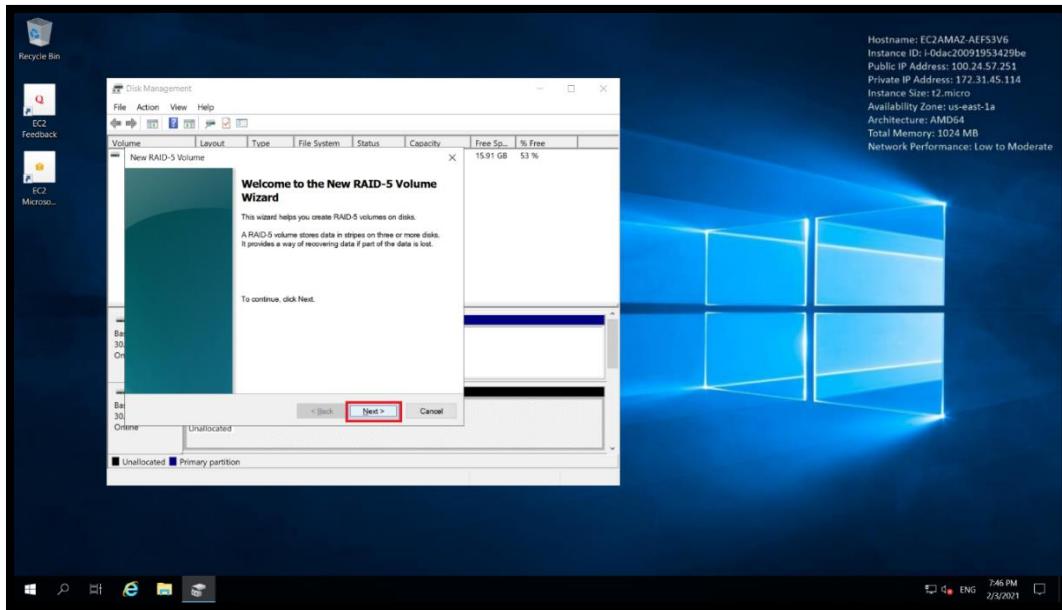


Figure 19 – Configuration of RAID 5

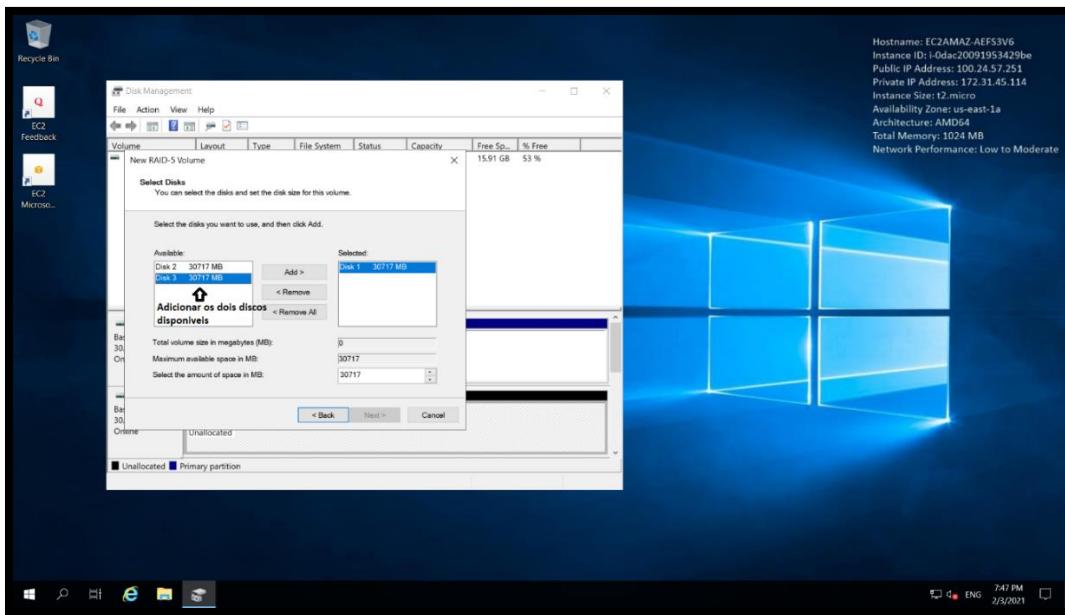


Figure 20 – Configuration of RAID 5

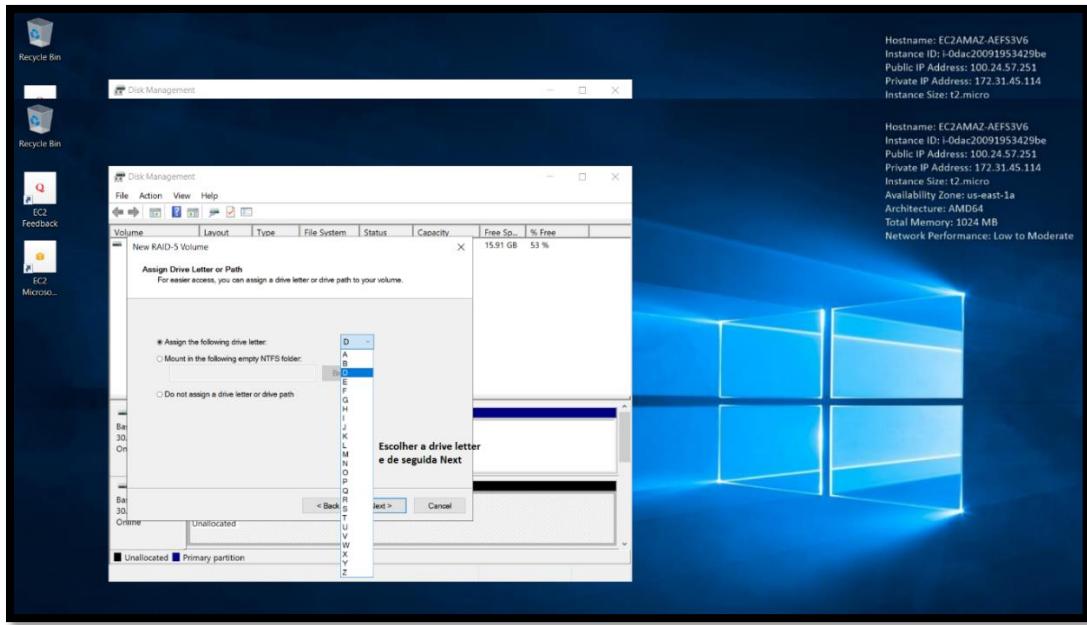


Figure 21 – Configuration of RAID 5

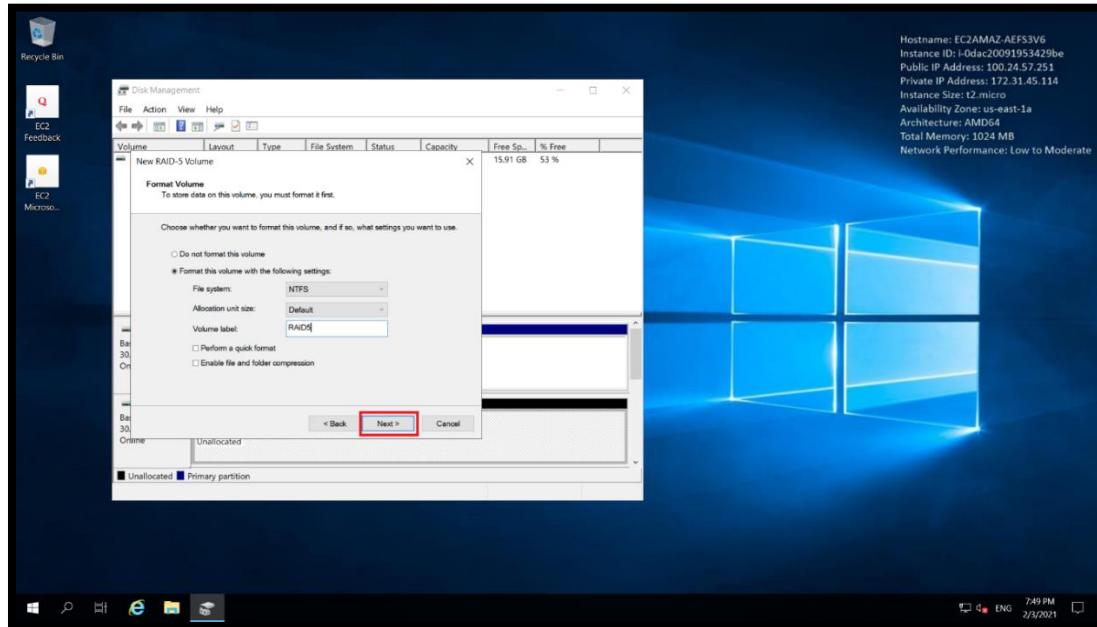


Figure 22 – Configuration of RAID 5

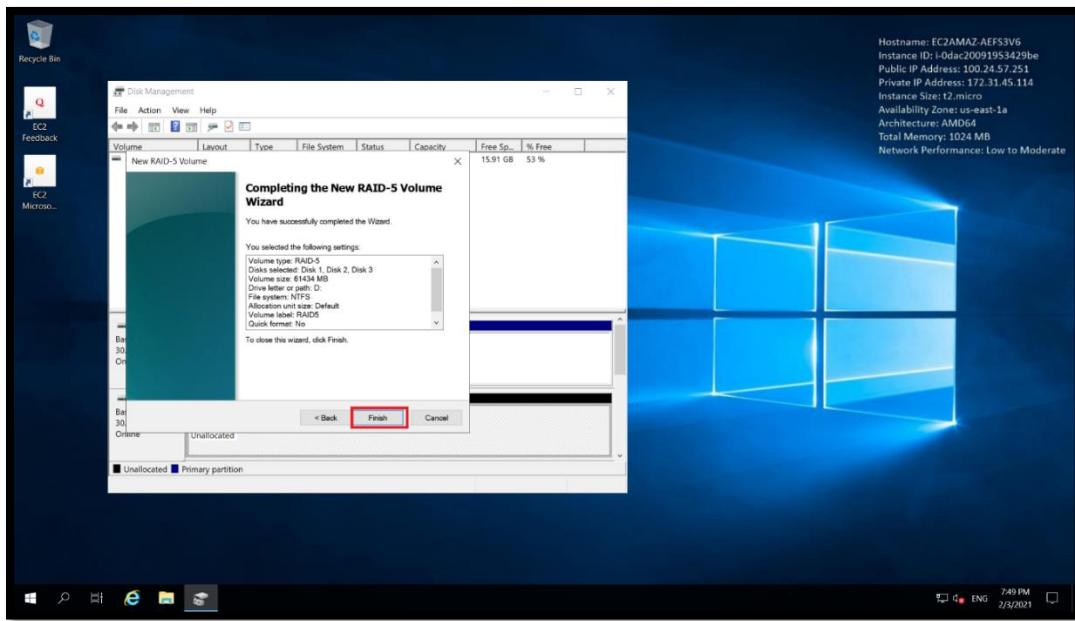


Figure 23 – Configuration of RAID 5

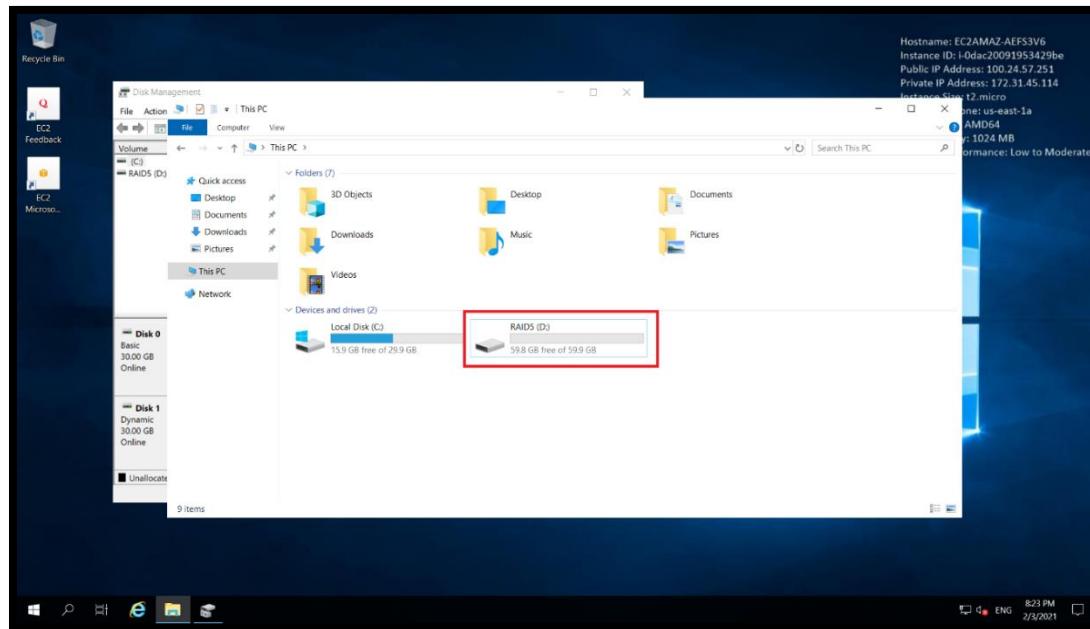


Figure 24 – Disk RAID 5 created

RAID 10

This implementation is the combination of RAID 0 with RAID 1. The data is segmented through groups of mirrored disks. This technology is the most used in servers that need a good performance and a good redundancy.

A minimum of four disks are required to configure.

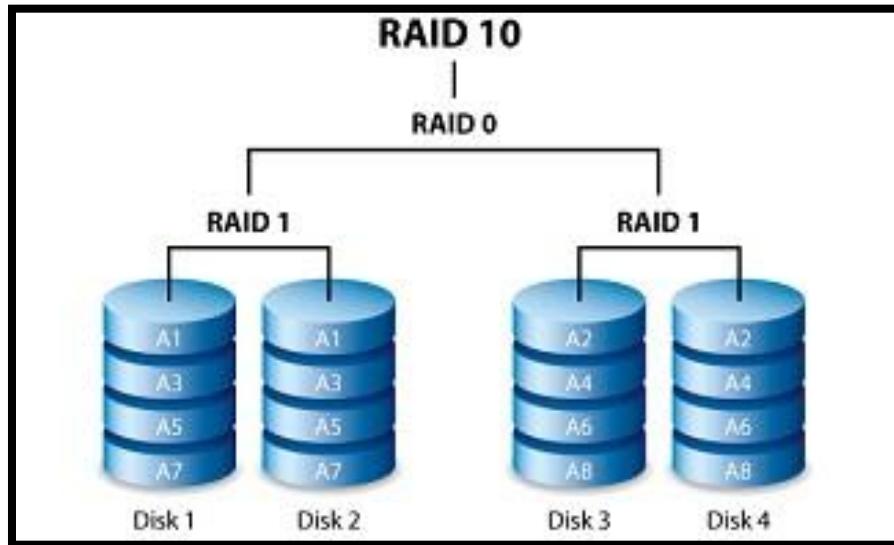


Figure 25 – RAID 10

The RAID 10 process is different from the rest we've done so far, since the disks are separated into group disks with each group having two disks. For that we have to use a resource called Storage Spaces.

RAID 10 – Configuration (Windows Server 2019)

1º Step – Initialize the Disks in Disk Management.

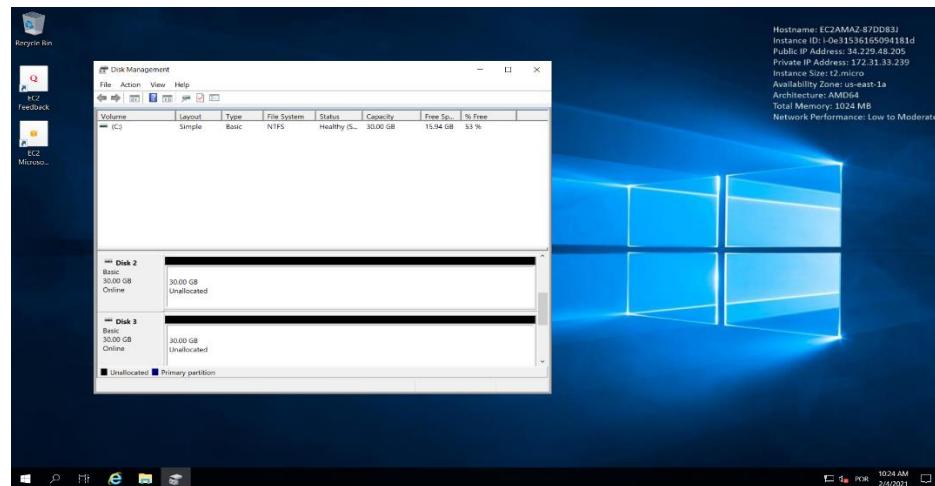


Figure 26 – Disk Initialization

2º Step – Open Server Manager and go to File and Storage Services.

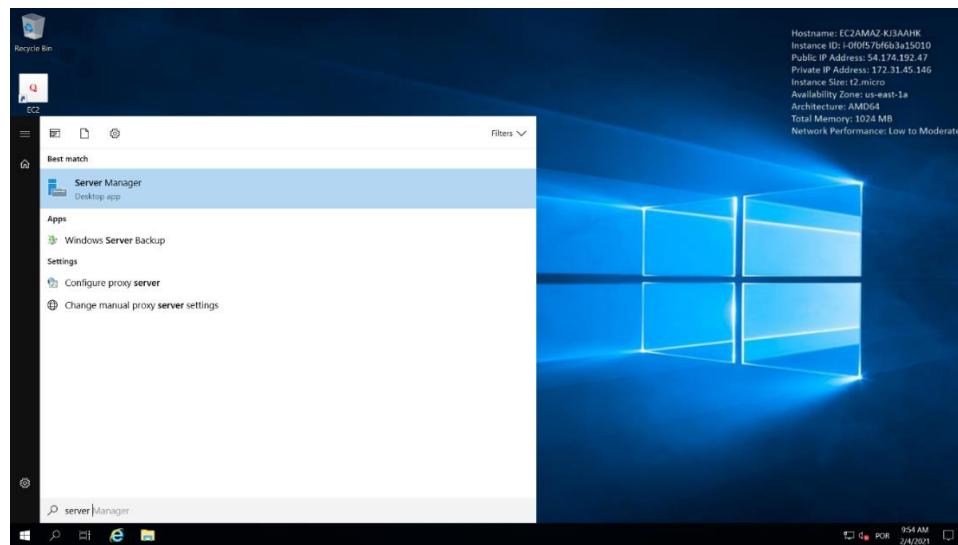


Figure 27 – Configuration of RAID 10

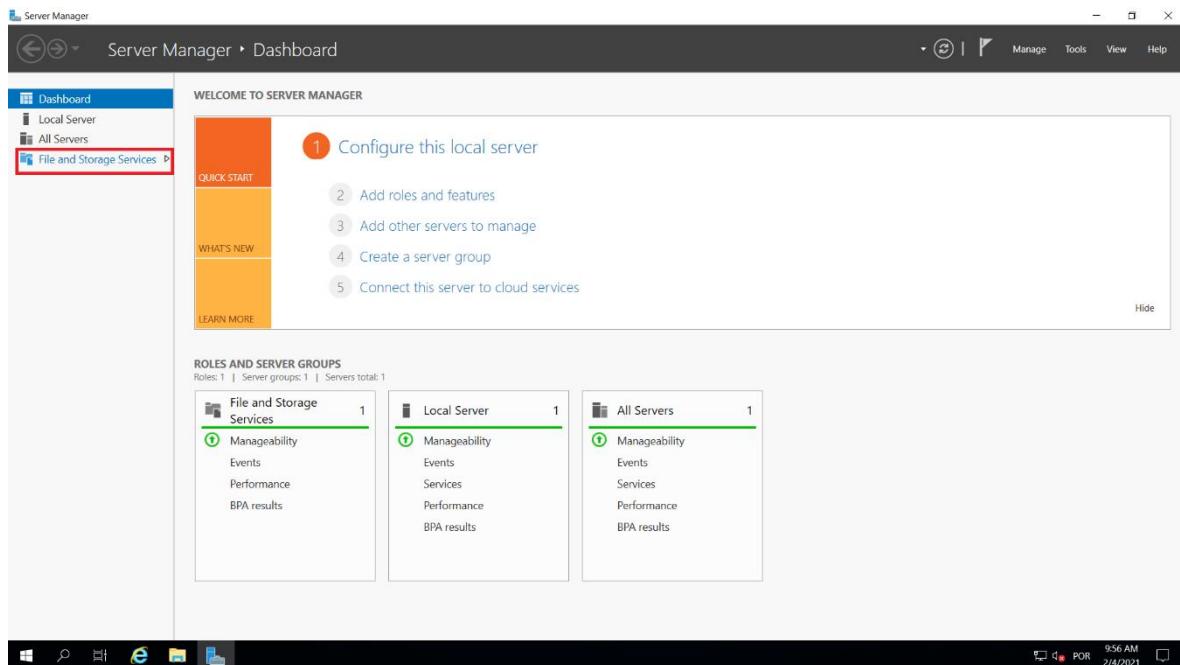


Figure 28 – Configuration of RAID 10

3º Step – Go to the Storage Pool and create a new Storage Pool.

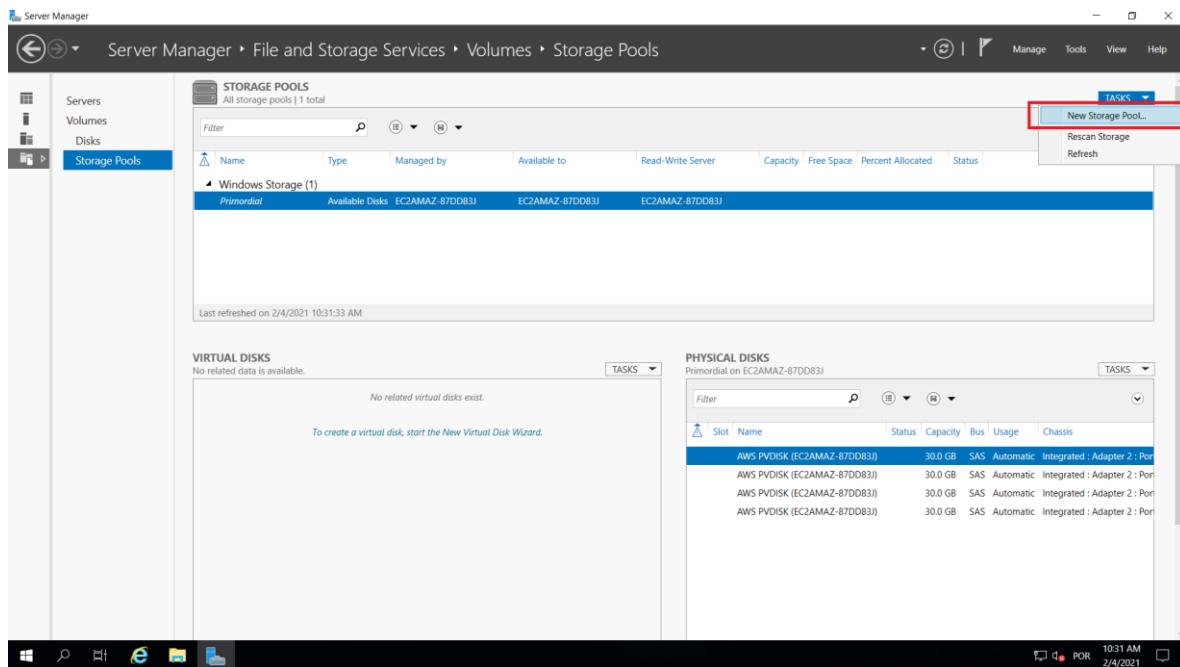


Figure 29 – Configuration of RAID 10

4º Step – Click Next and specify a new one for the Storage Pool.

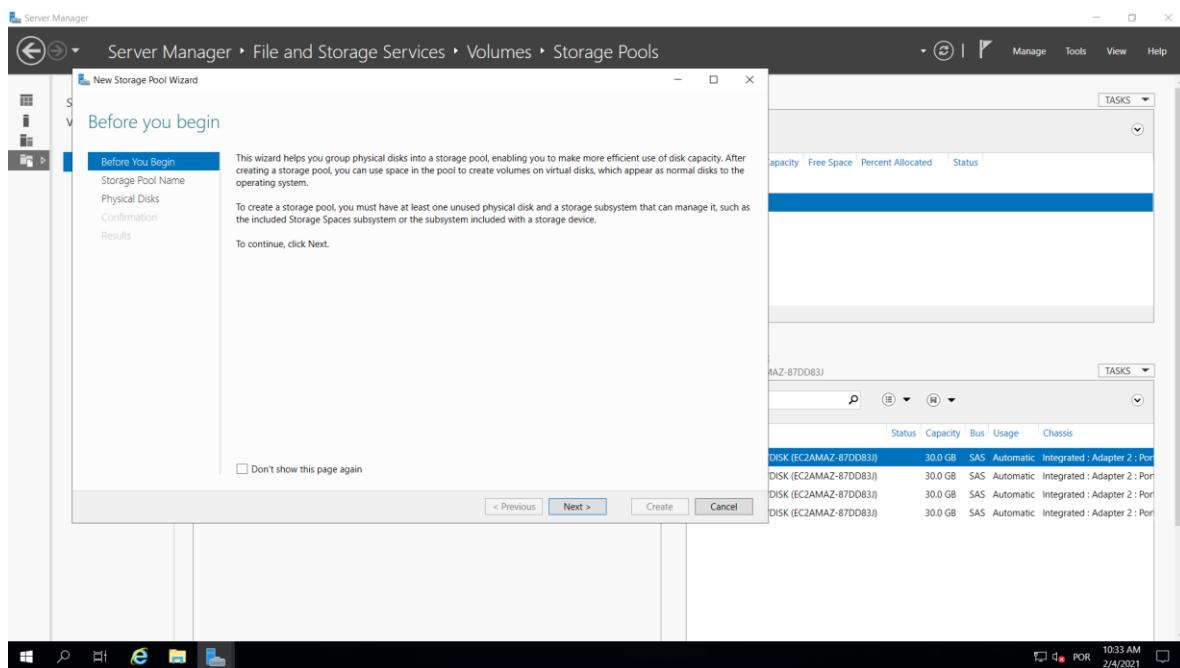


Figure 30 – Configuration of RAID 10

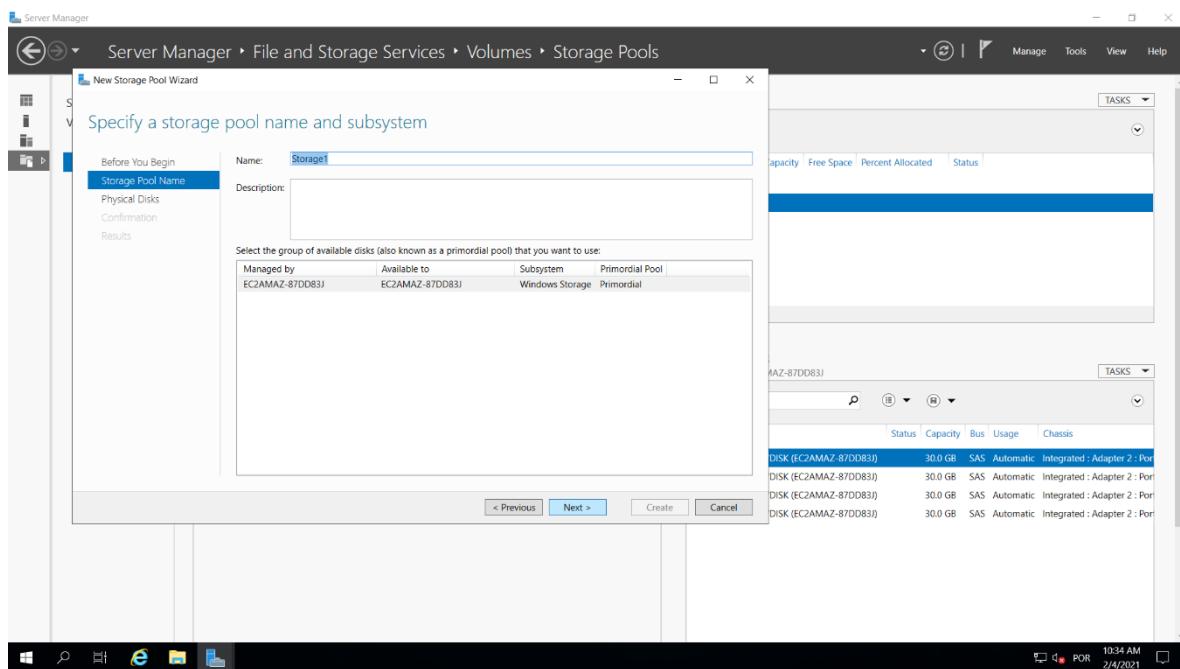


Figure 31 – Configuration of RAID 10

5º Step – Select the disks for the given group, then click Next and create the Storage Pool.

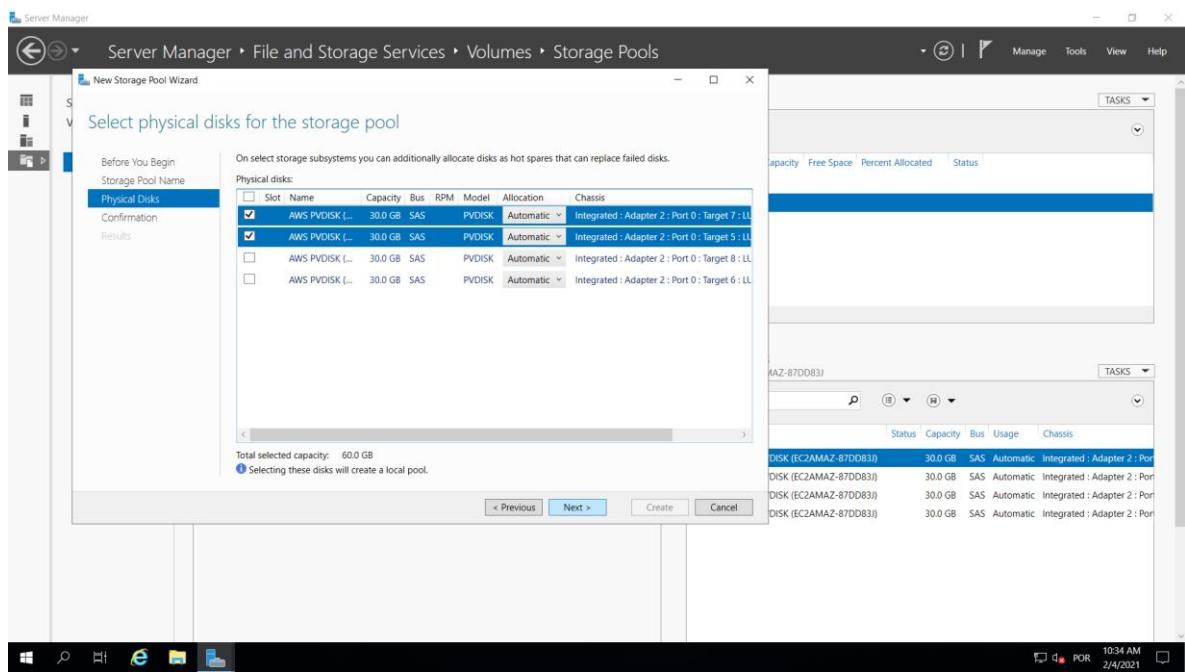


Figure 32 – Configuration of RAID 10

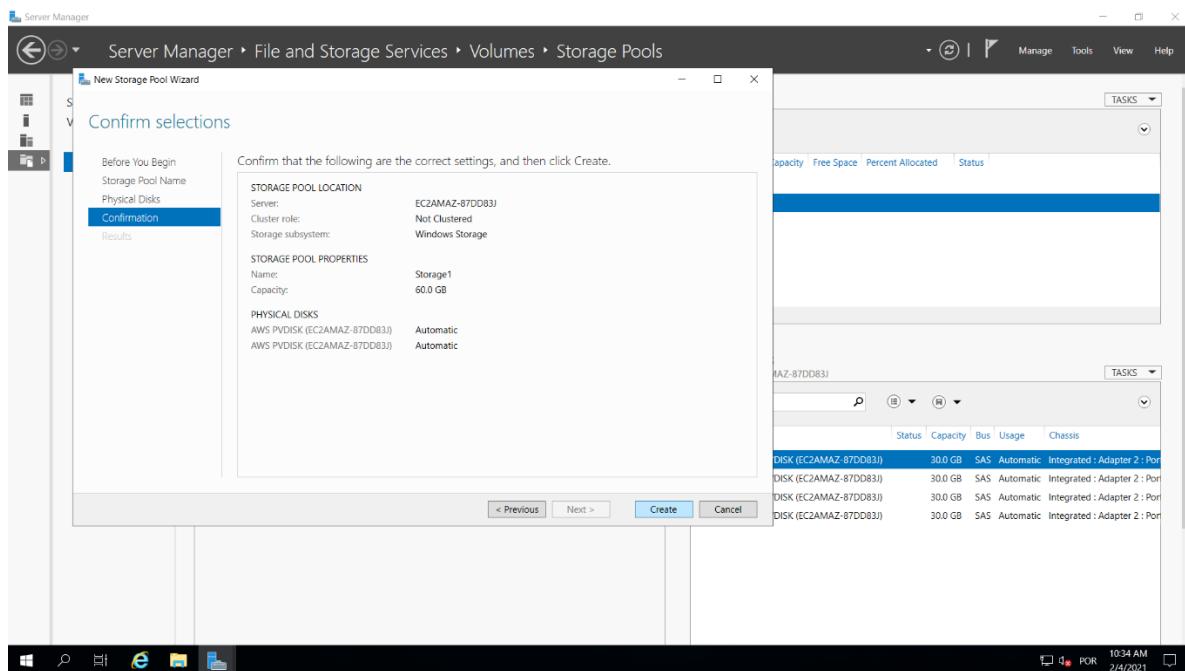


Figure 33 – Configuration of RAID 10

6º Step – Then the same process of creating a new Storage Pool is repeated, specifying a different one and selecting the remaining two disks for the other group.

7º Step – When creating the second Storage Pool, create a Virtual Disk and select the first Storage Pool.

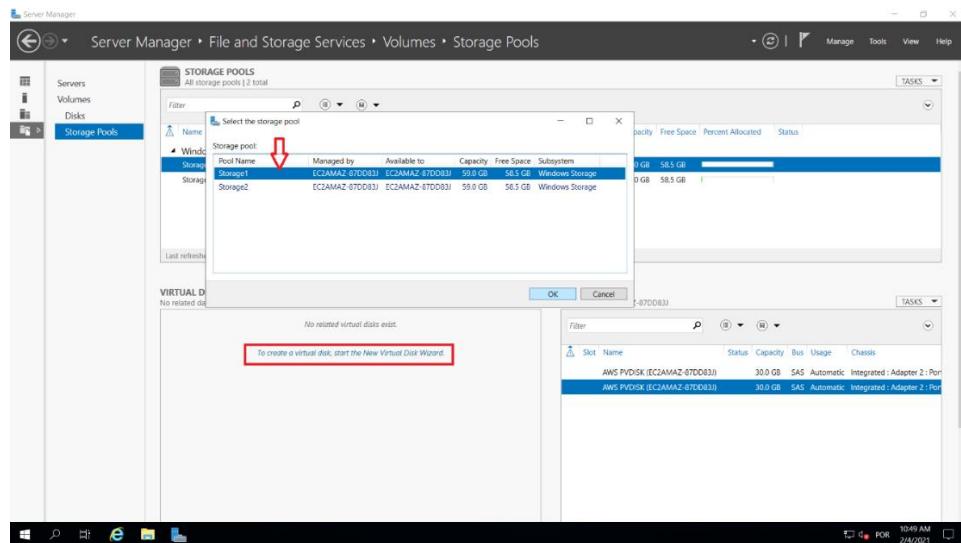


Figure 34 – Configuration of RAID 10

8º Step – Then click Next and specify a name for the Virtual Disk.

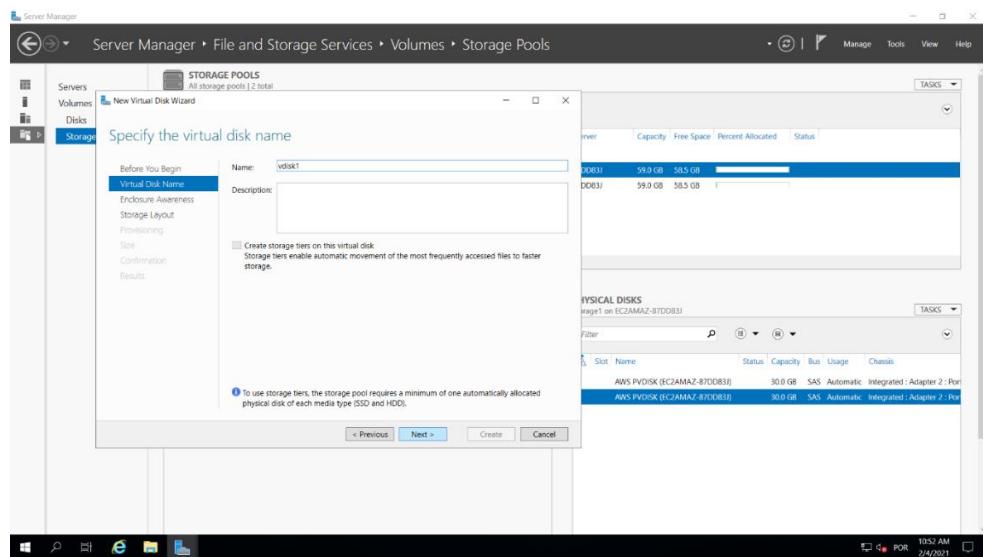


Figure 35 – Configuration of RAID 10

9º Step – Choose Mirror to obtain the mirroring characteristic between the storage.

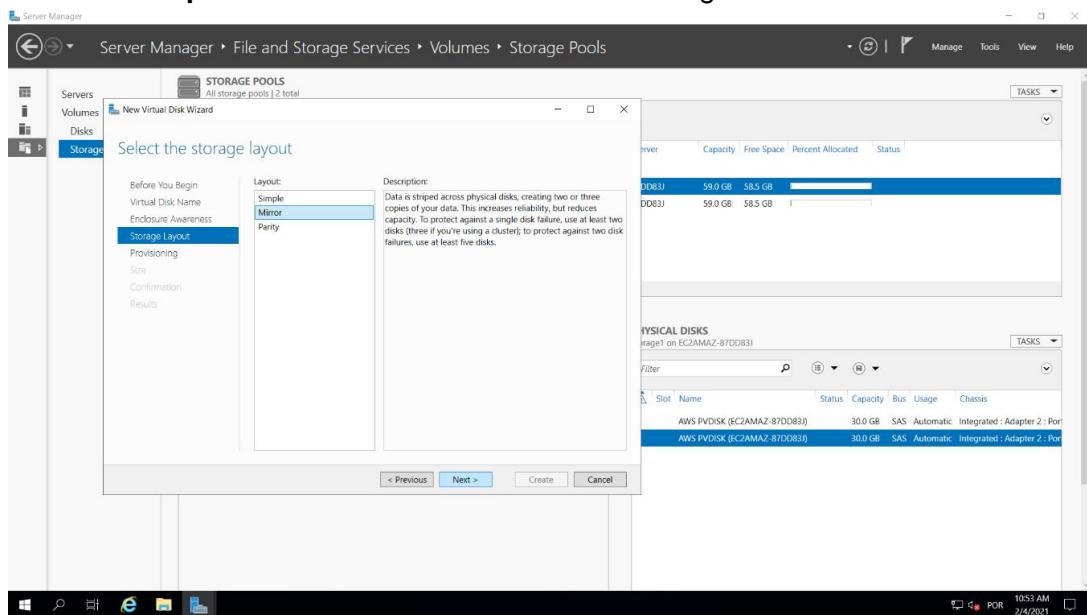


Figure 36 – Configuration of RAID 10

10º Step – Click Next, select the disk size you want and finally, Create.

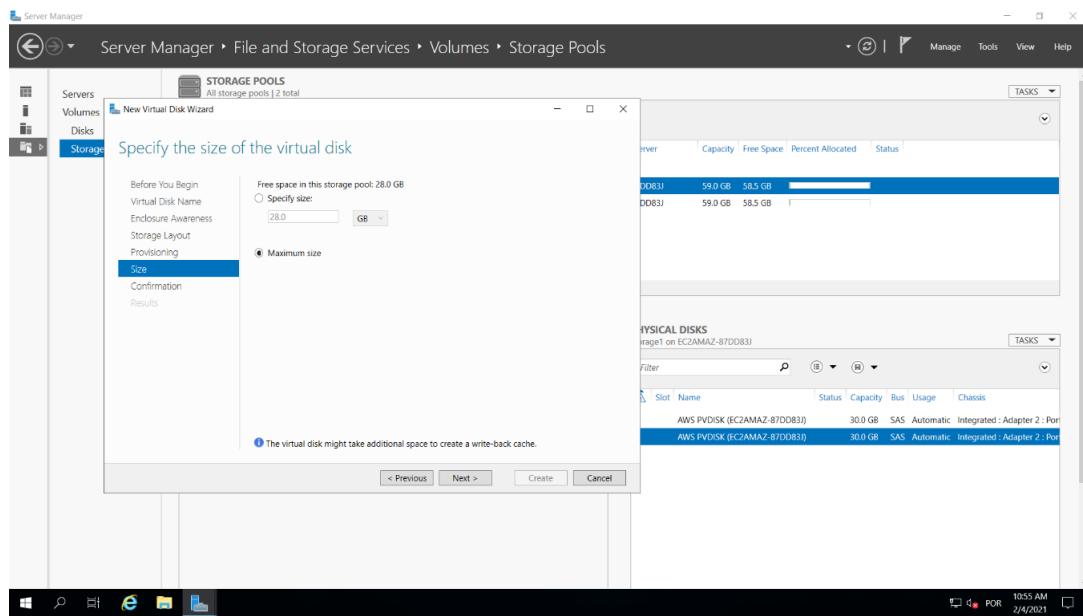


Figure 37 – Configuration of RAID 10

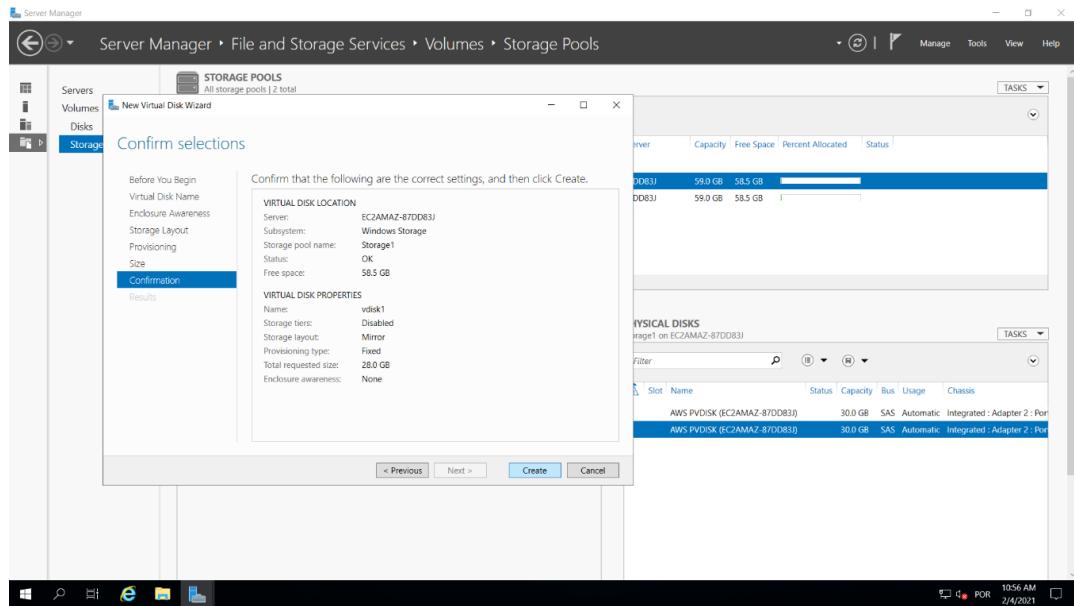


Figure 38 – Configuration of RAID 10

11º Step – Create a new Virtual Disk for the second Storage Pool side.

12º Step – Then, go to Disk Management and we can see that our created virtual disks are there, and now we want to strip the disks.

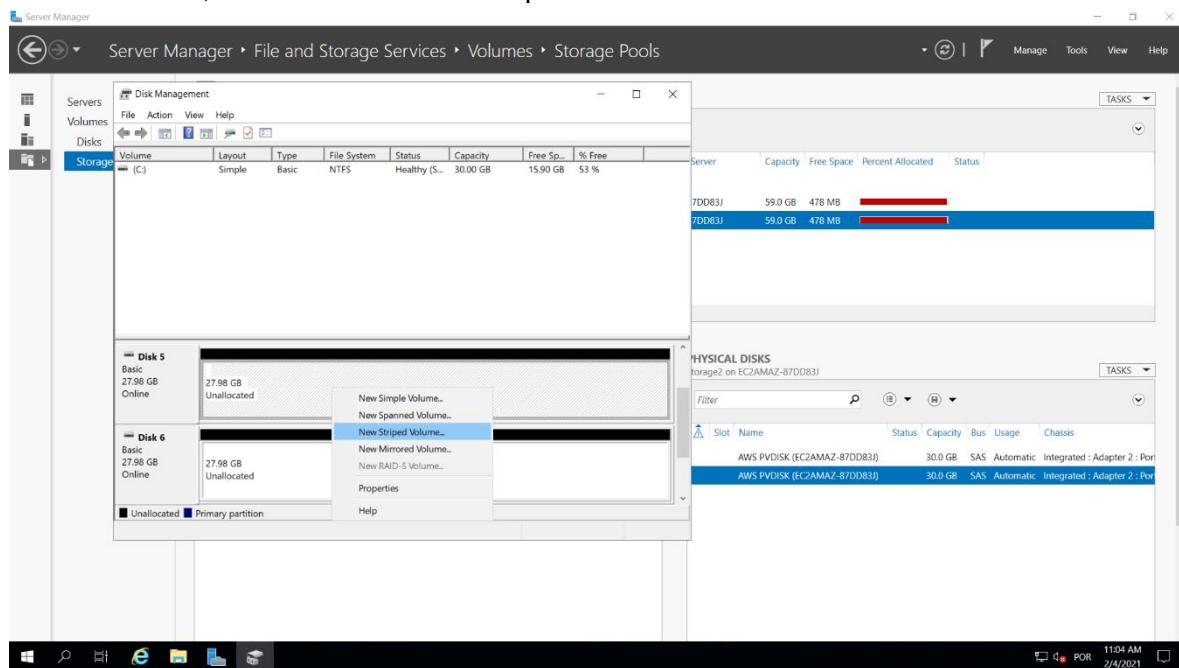


Figure 39 – Configuration of RAID 10

And repeat the same process as RAID 0, adding disk 6 to disk 5, specifying the name of the Volume and the drive letter and thus creating a disk with RAID 10.

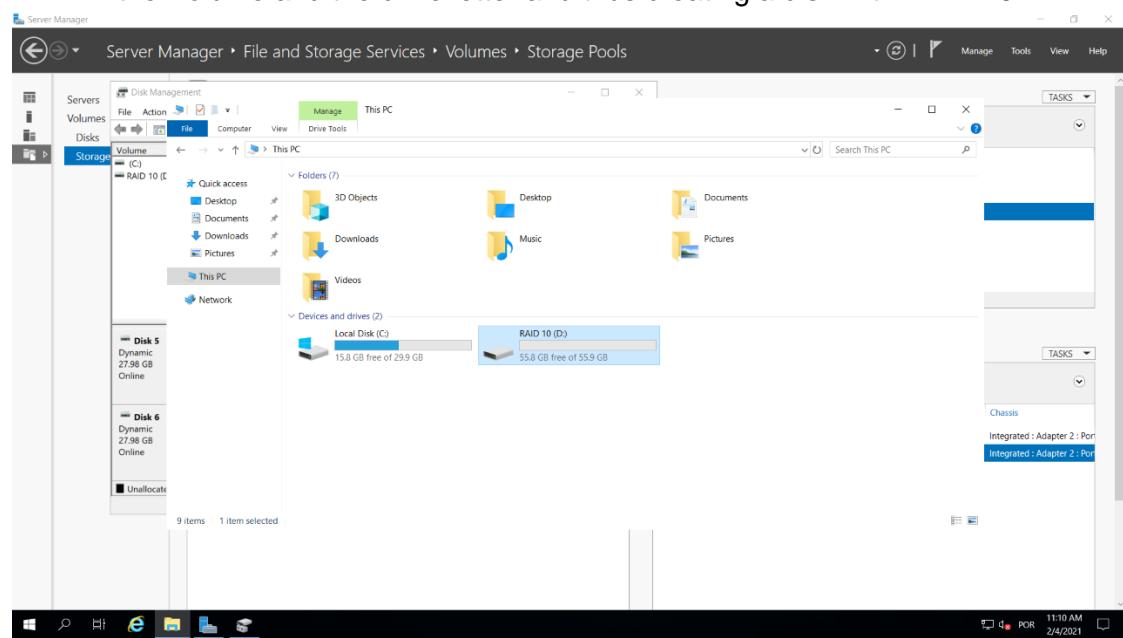


Figure 40 – Disk creation with RAID 10

RAID 0 – Configuration (Windows 10)

1º Step – After initializing the disks in Disk Management go to Manage Storage Spaces and create a new Storage Pool, selecting the disks.

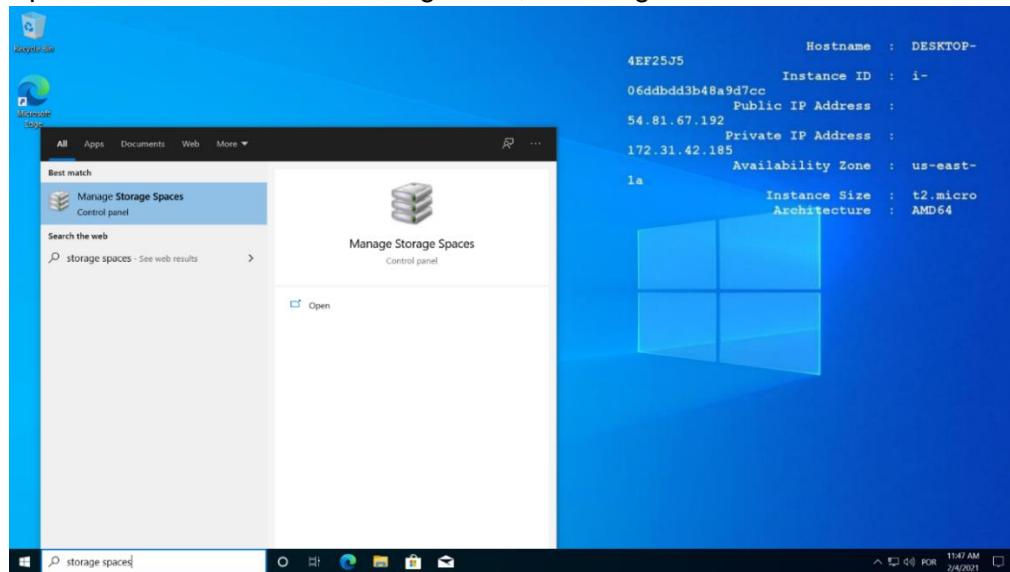


Figure 41 – Configuration RAID 0

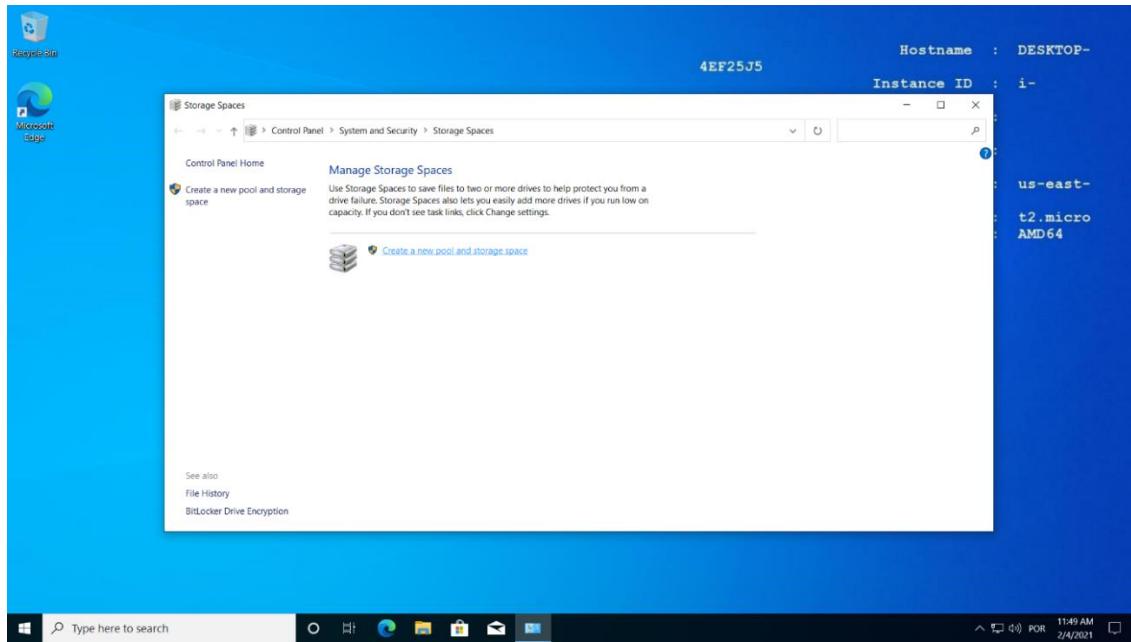


Figure 42 – Configuration RAID 0

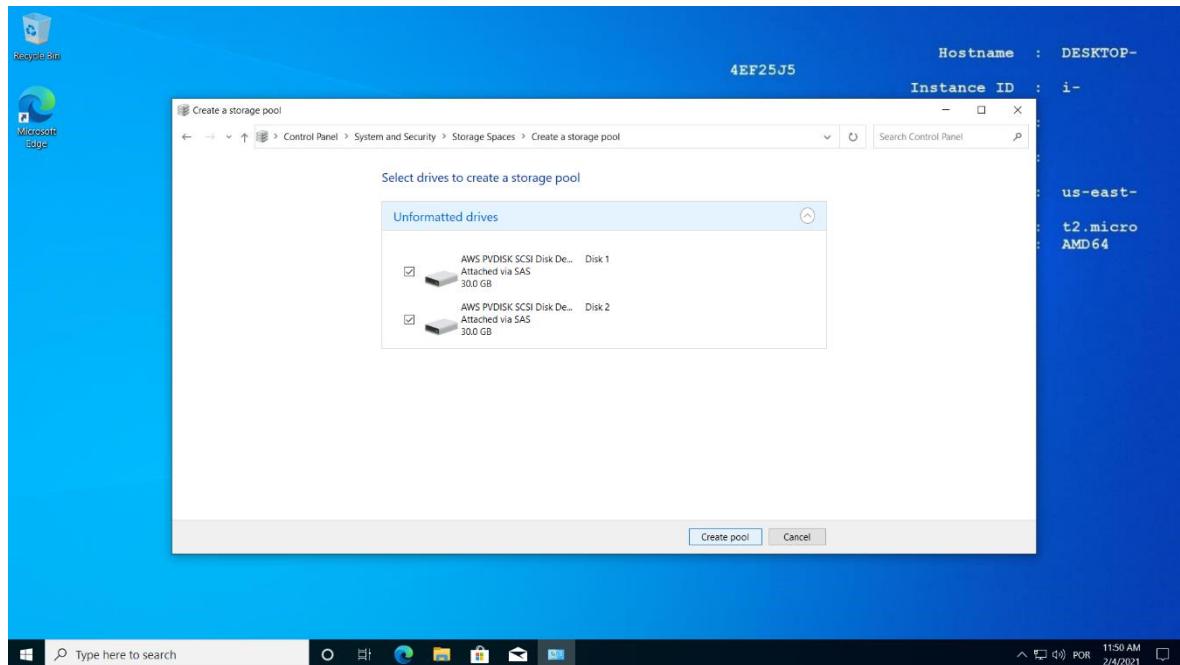


Figure 43 – Configuration RAID 0

2º Step – Specify the name of the Storage Pool, choose the drive letter, and select Simple (no resiliency) and then Create Storage Space.

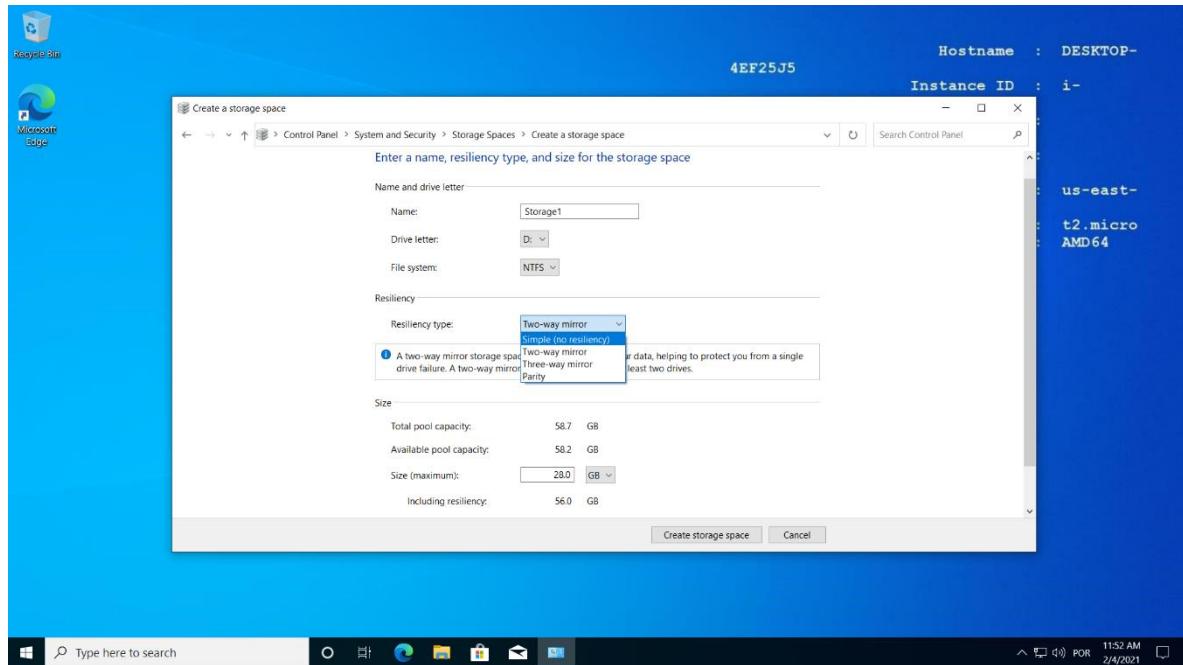


Figure 44 – Configuration RAID 0

And we can see that our RAID 0 was created.

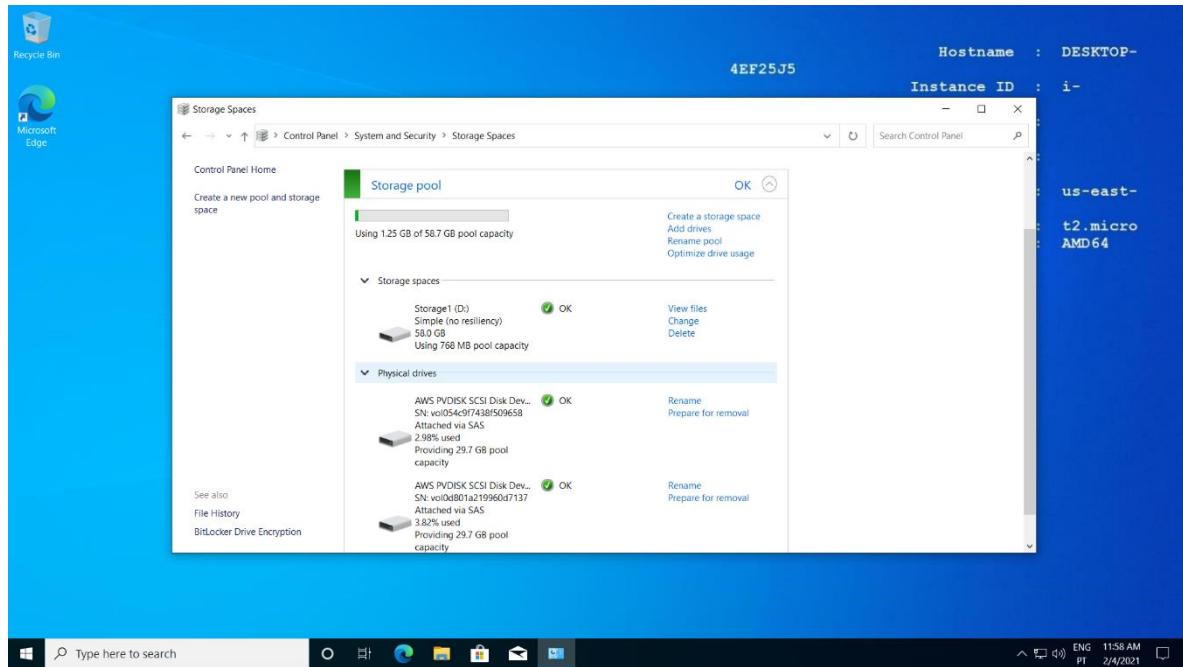


Figure 45 – Configuration RAID 0

Raid 1 – Configuration (Windows 10)

The process that differs from RAID 0 to RAID 1 is that instead of being Simple (no resiliency), the option is Two-Way Mirror.

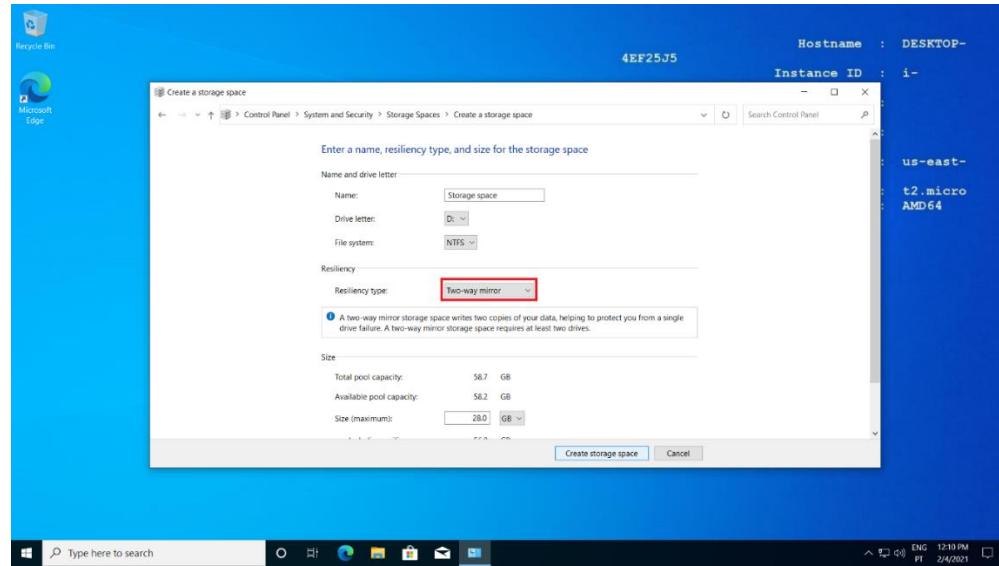


Figure 46 – Configuration RAID 1

RAID 5 – Configuration (Windows 10)

A minimum of 3 disks are required and the other characteristic that differs from the previous RAID is the type of resilience that is the parity.

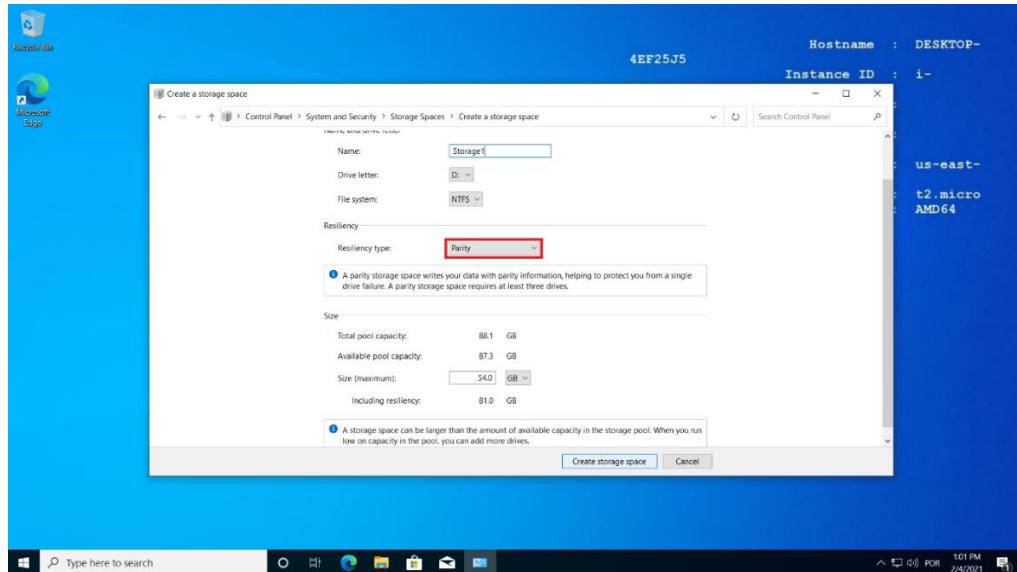


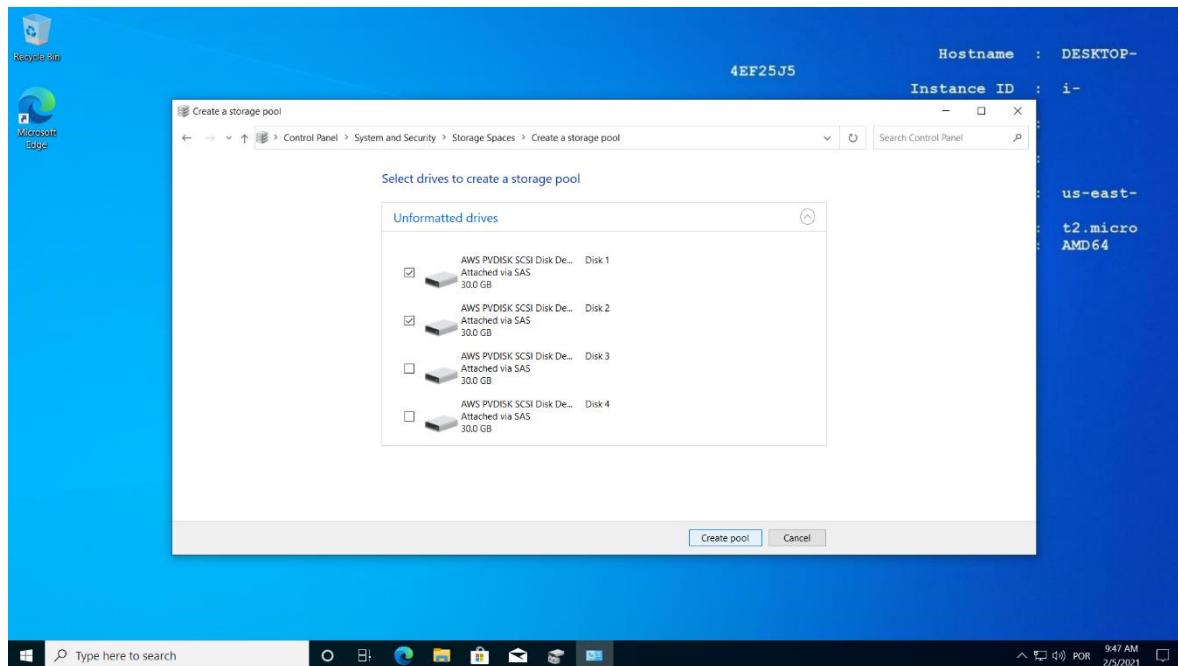
Figura 47 – Configuration RAID 5

RAID 10 – Configuration (Windows 10)

4 disks are required for this type of RAID.

1º Step – Check that the disks are initialized.

2º Step – Create a Storage Pool. Select the two disks to form a group.



Figur3 48 – Configuration RAID 10

3º Step – Specify the name of the Storage and by the type of resilience as Two-Way Mirror.

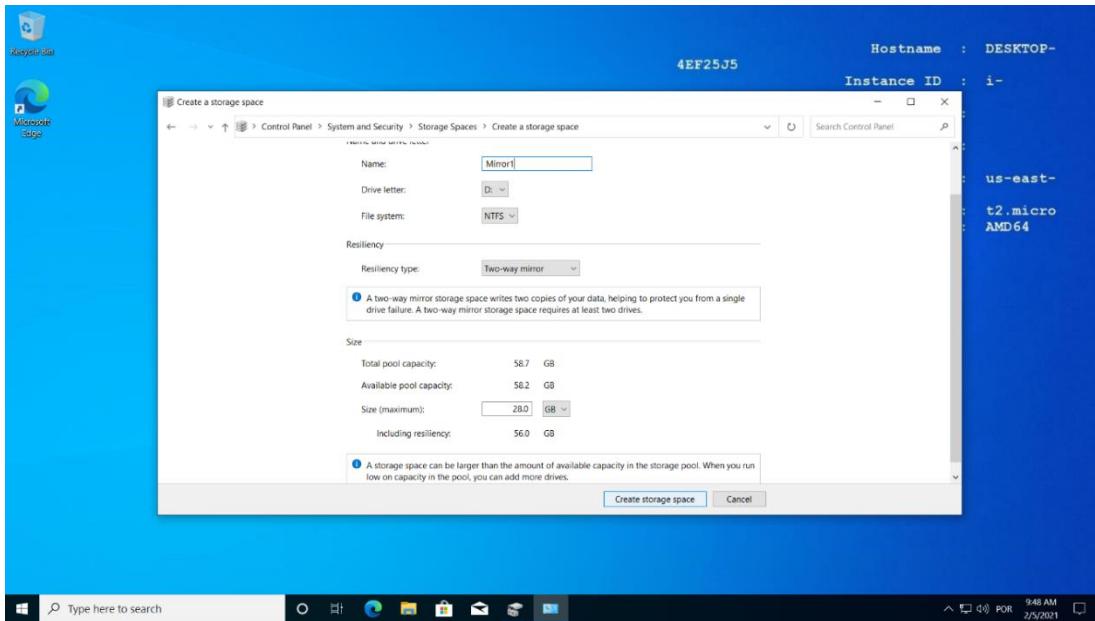


Figure 49 – Configuration RAID 10

4º Step – Create a new Storage Pool with the remaining two disks to form a new group with the same Two-Way Mirror resilience.

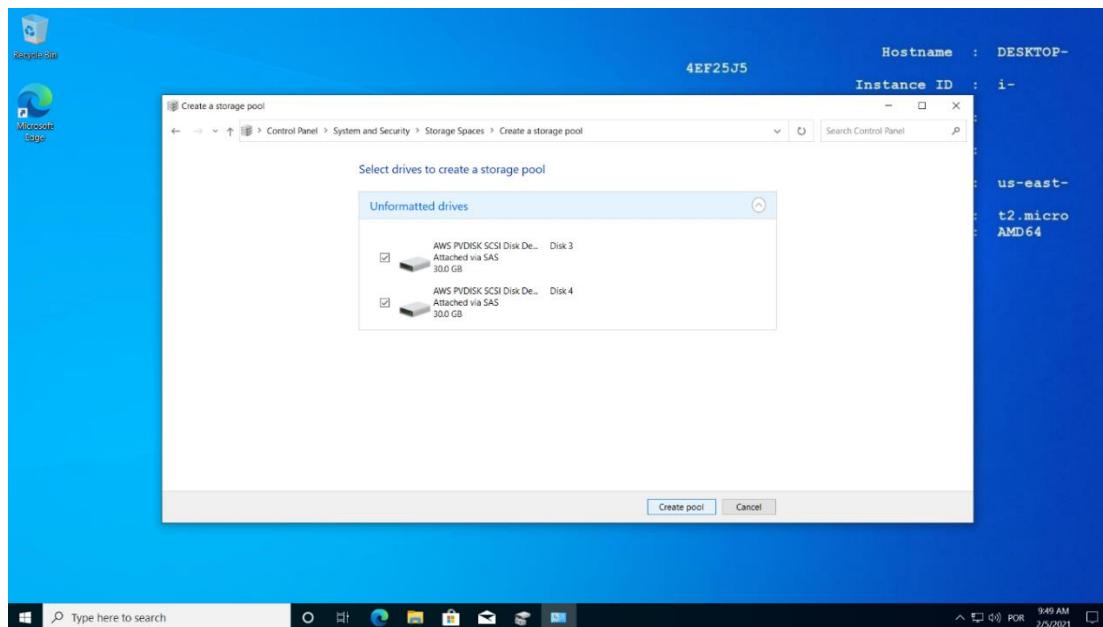


Figure 50 – Configuration RAID 10

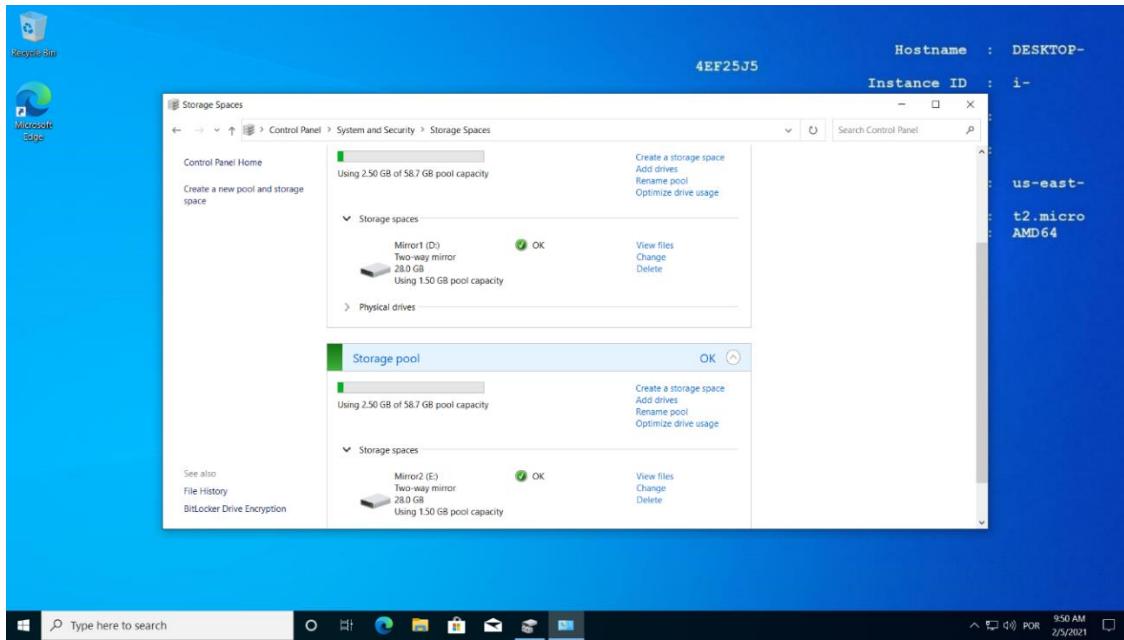


Figure 51 – Configuration RAID 10

5º Step – After creating the two Storages Pool, go to Disk Management and Delete Volume to the two disks (Mirror 1, Mirror 2) that we created in the Storage Pool.

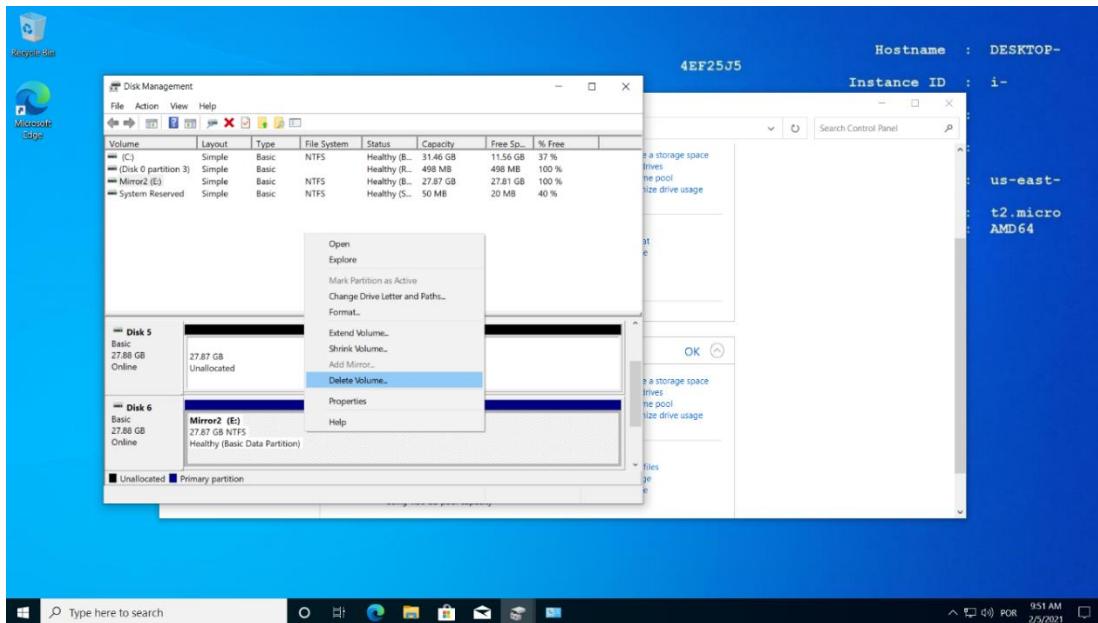


Figure 52 – Configuration RAID 10

6º Step – Create a Stripped Volume and add the two disks from the Storage Pool.

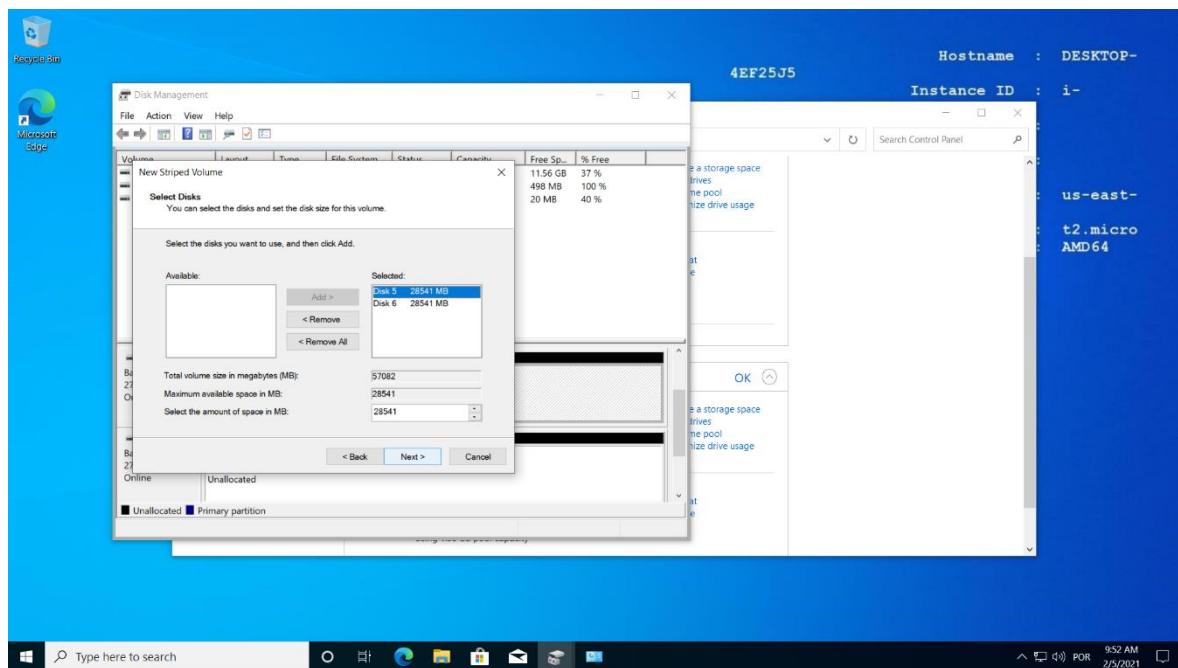


Figure 53 – Configuration RAID 10

BitLocker

It is a tool that allows you to encrypt your computer's hard disk, protecting documents and files from unauthorized access. It transforms information into encrypted characters and can only be decrypted with the decryption key.

In addition, it ensures the integration of files, detecting data changes.

It is not possible to configure BitLocker in Software Raid.

BitLocker – Configuration (Windows10)

1º Step – Create a Simple Volume.

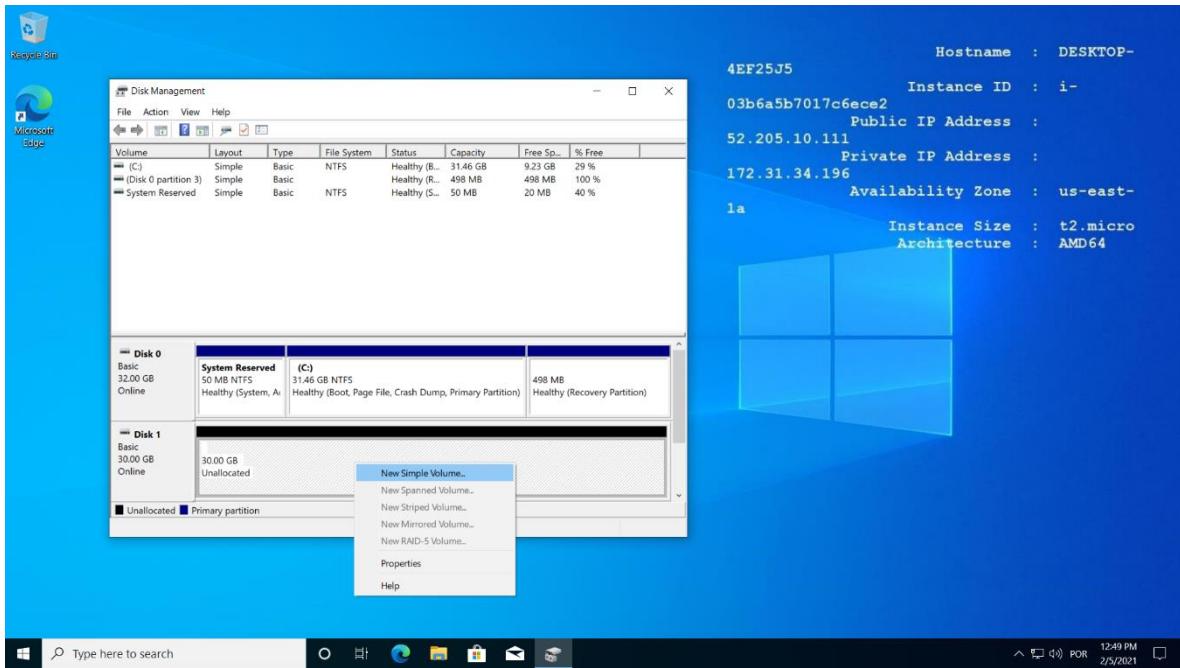


Figure 54 – Configuration BitLocker

2º Passo – Then click on the Volume that was created and click on Turn on BitLocker.

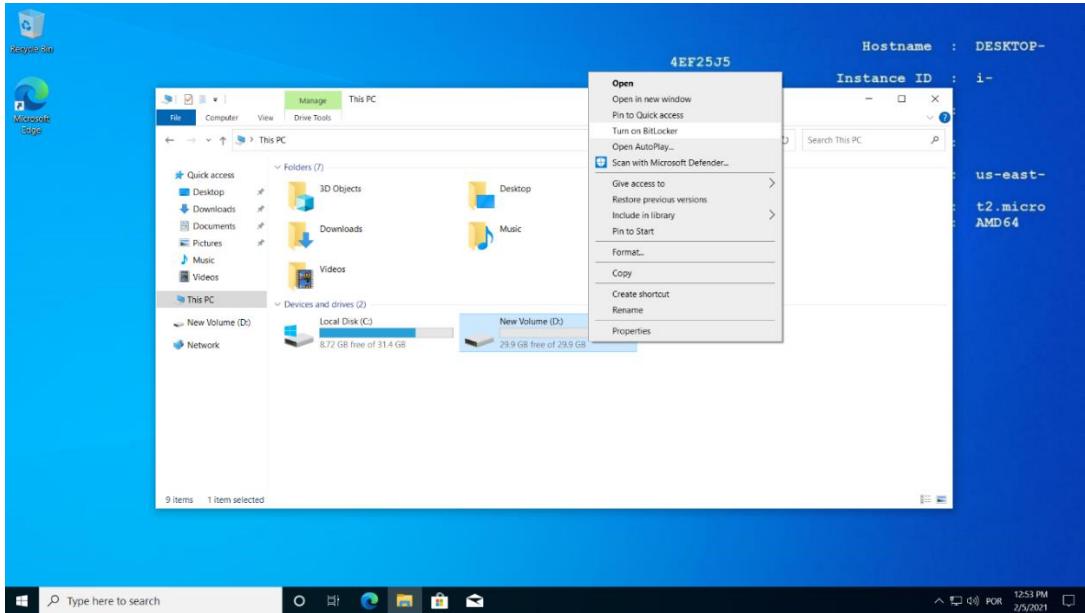


Figure 55 – Configuration BitLocker

3º Step – Choose the option of how we want to unlock the disc.

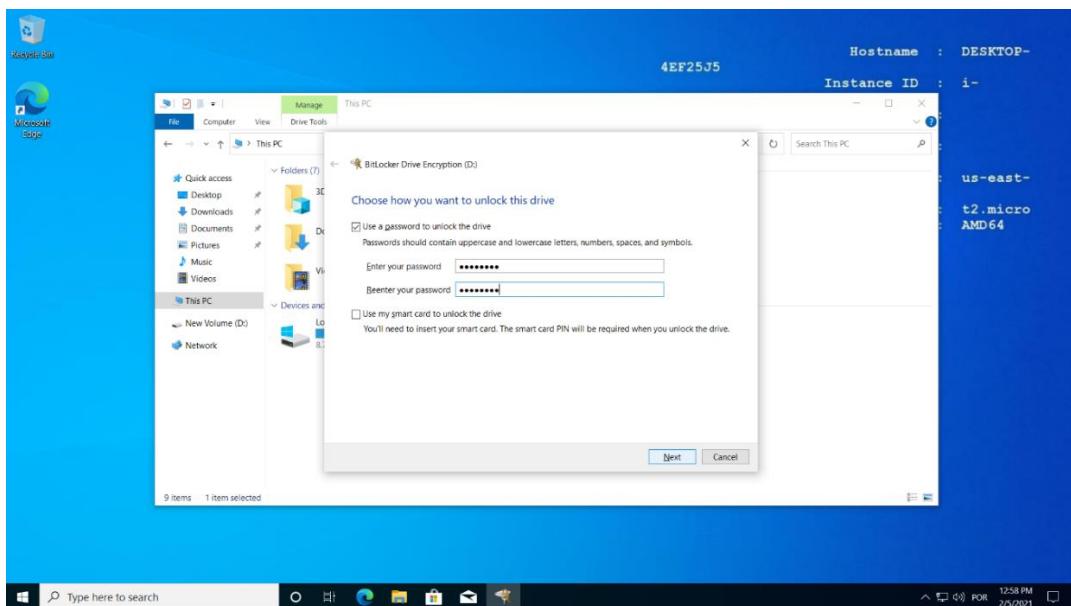


Figure 56 – Configuration BitLocker

4º Step – Choose where we want to keep the recovery key.

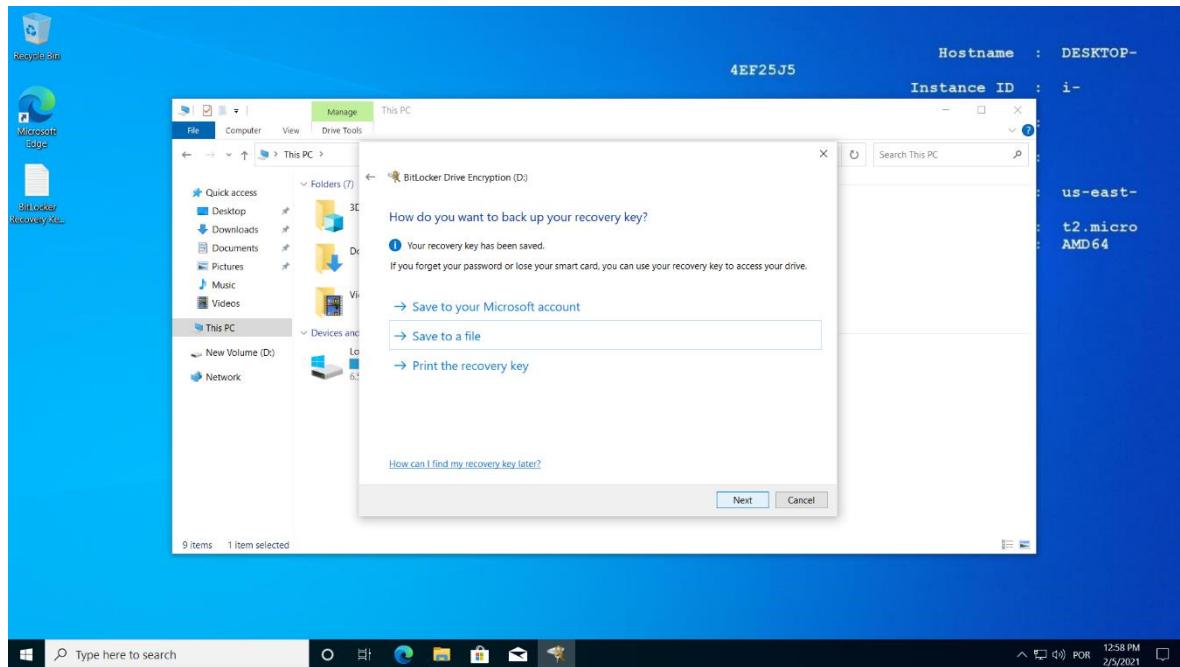


Figure 57 – Configuration BitLocker

5º Step – Choose how we want to encrypt the disk.

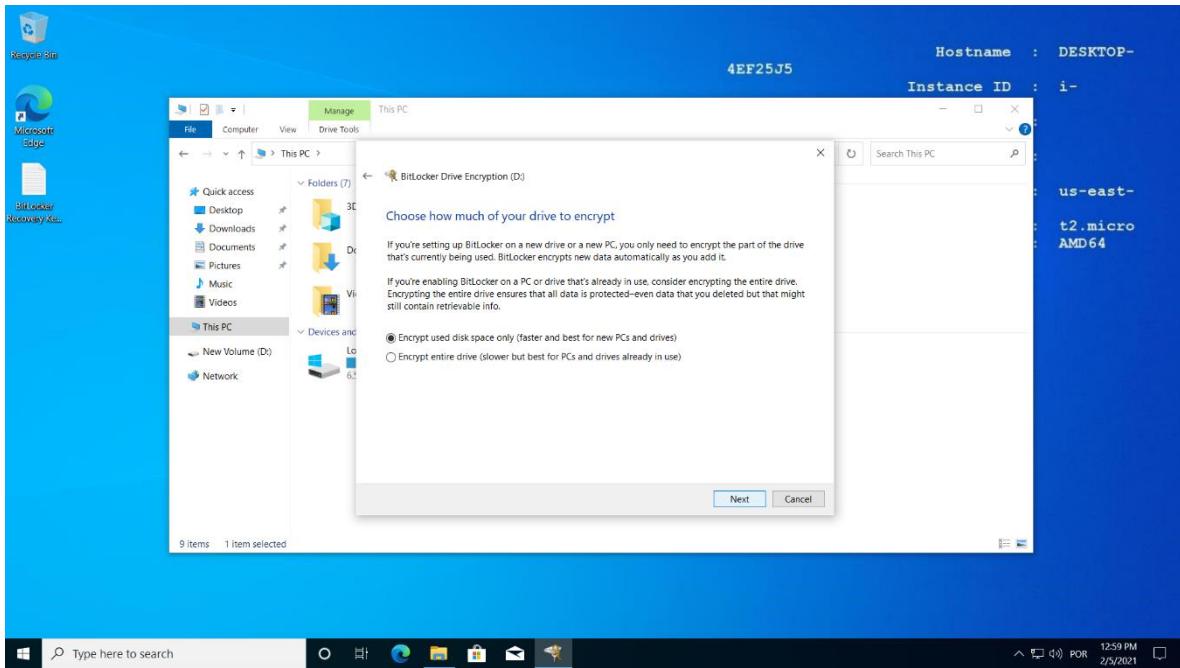


Figure 58 – Configuration BitLocker

6º Step – Choose the encryption mode we want to use.

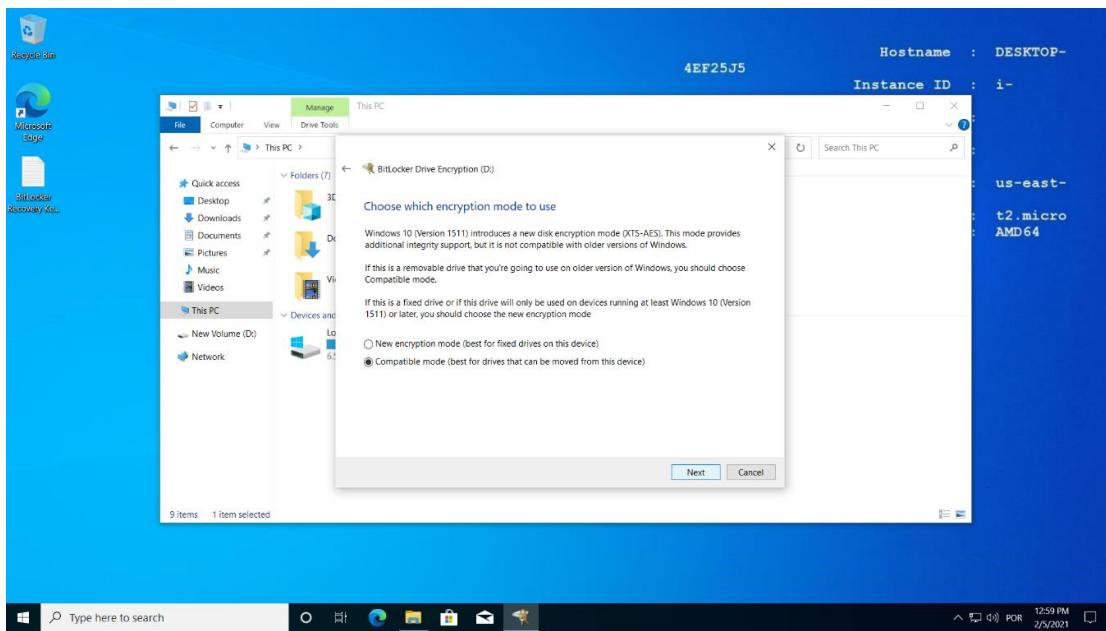


Figure 59 – Configuration BitLocker

7º Step – Begin the encryption process.

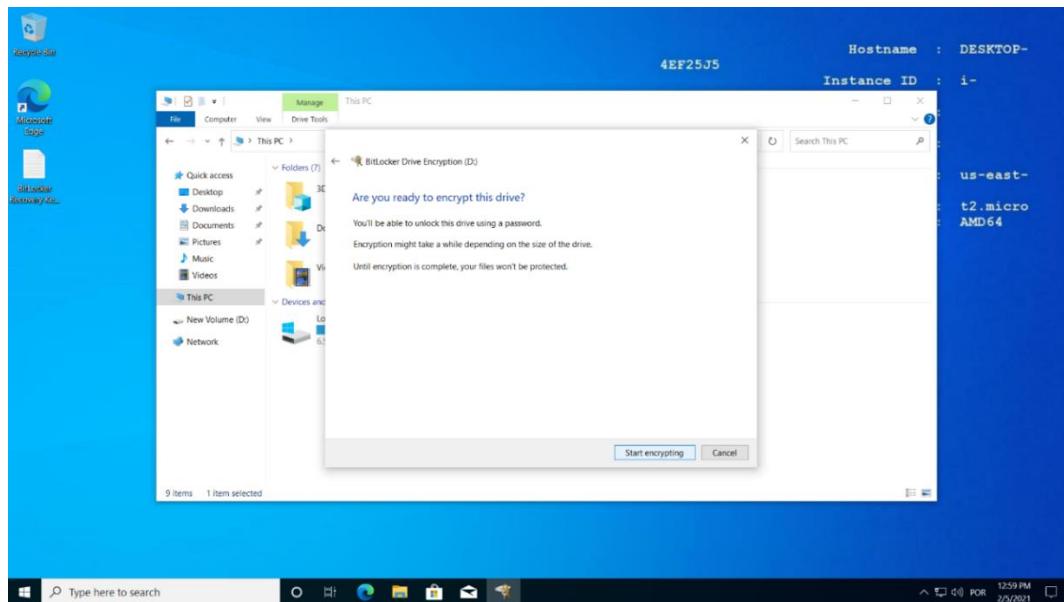


Figure 59 – Configuration BitLocker

We can see that there is already a padlock on the disk. To complete the configuration, we have to restart the computer.

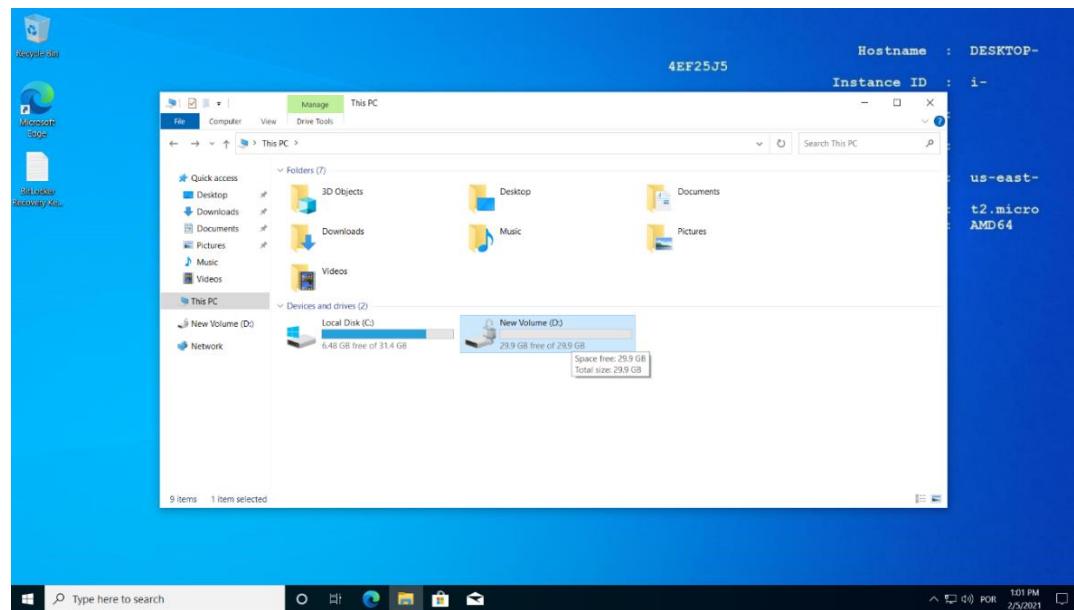


Figure 60 – Configuration BitLocker

After the computer has restarted and updated, we can see that BitLocker is already running and when we try to access the Disk (D :), it asks for the password to unlock the disk.

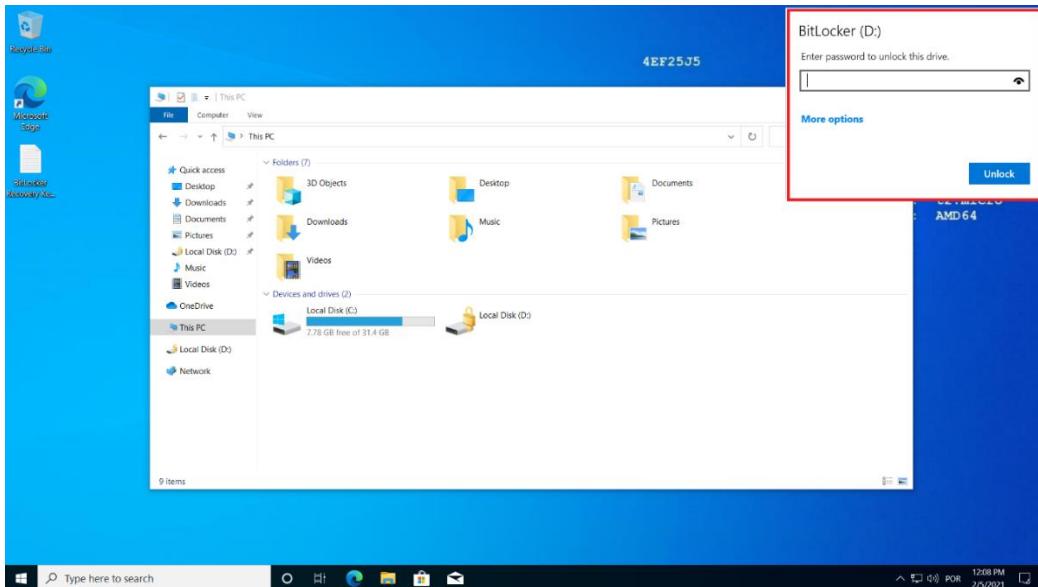


Figure 61 – Configuration BitLocker