Lab Report – Lab 7

Name: Tyler Burleson Date: 3/5/2024

Summary

The goal for this lab was to familiarize us with the basic Windows file systems such as, Raid, Disk spanning, and Dynamic Disks. We started by creating a new Windows Server 2016 instance on AWS with an additional EBS (hard) drives. These EBS drives will be used to create a variety of volumes across all our disks. After getting our Windows server configured and started, we navigated to the Disk Management Tool. While we technically had 5 disks we could experiment with, we left Drive 0 alone since it housed our system. On the remaining disks we turned them online and initialized them with MBR. Next, we converted these into dynamic disks instead of their original basic disks. Now that we had dynamic disks, we were ready to play with the different volume types. We started creating a simple volume on disk 1 with 2 GB of storage. We followed the wizard to perform this and assigned it the label “Durin.” The next type we experimented with was a spanned volume. Following the same steps to open the wizard, we created a 4 GB volume across Disk 1 and 2 labeled “Elrond.” This means each of these disks independently used 2 GB of their storage. Our next step was to create a Striped Volume; by following the same process we created volume “Faramir” that spanned Disk 1 and 3. Our next style is a mirrored drive. Drive “Gandalf” was created using 2 GB from Disk 2 and Disk 3. Next, we setup a RAID 5 volume on the remaining space from Disk 1 and auto allocated space on disks 2, 3, and 4. Finally, we named this volume “Hurin.” Once this was complete, we navigated to the C:\ drive in the Windows File Explorer. Here we created a new folder named “Docs.” We then returned to the DMT and right clicked Disk 3, mounted the C:\Docs to it, and labeled it “Isildur.” Now we were able to navigate back to the File Explorer and see that the icon for our Docs folder had changed to a drive to confirm our mount worked. Once we had our mount, we created a new user called “Bob Smith” on our machine. Once bob was set up, we navigated back to the DMT, went to Isildur’s properties, and enabled quota management for the drive. This then

set a small amount of storage aside for our users as their home directory. Once this was all complete we took screenshots of our drives in File Explorer and DMT and terminated the instance.

Screen Shots

Figure 1

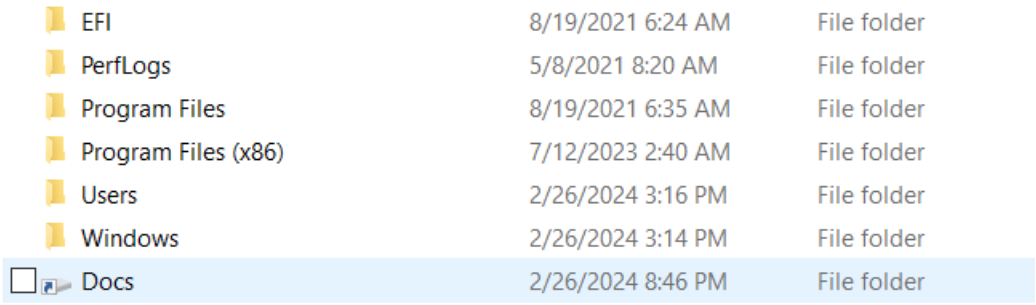

Figure 2

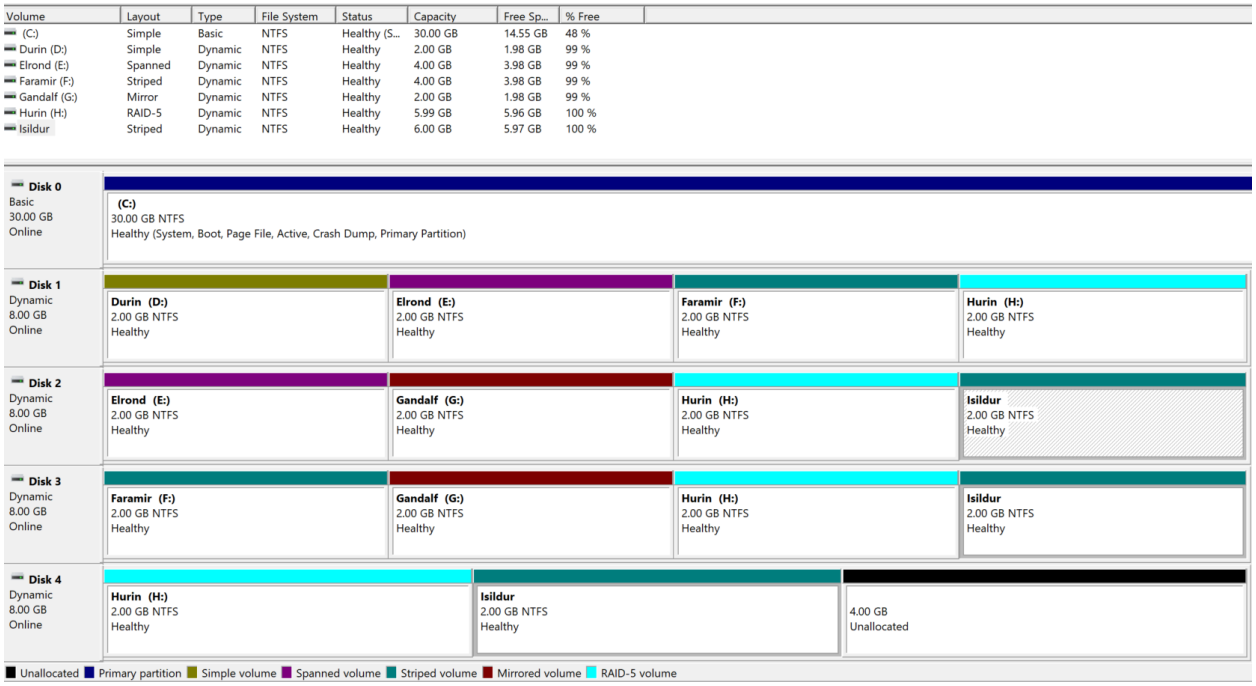

Figure 3

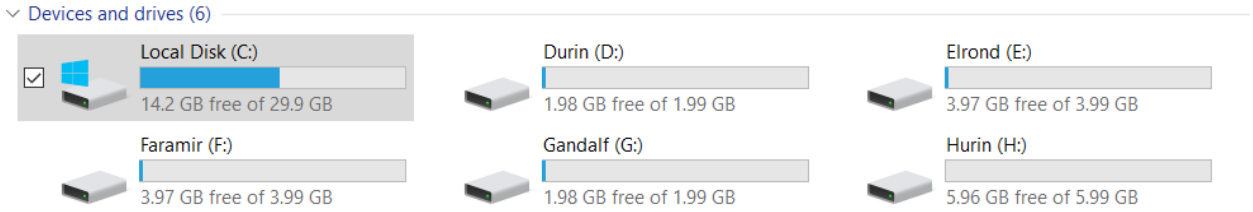

Figure 4

Research Questions

1. For each of the following, describe the features of the volume type and when/why an admin would use it
    a. Simple Volume
        i. A simple volume is a virtual portion of a physical disk and simulates a new drive. This can work independently from other portions of the disk. A common use is installing the OS on one portion and data on another section.
    b. Spanned Volume
        i. A spanned volume is a dynamic volume spread across more than one disk. This provides storage capacity across multiple drives but has no fault tolerance.
    c. Mirrored Volume
        i. A mirrored volume is a form of storage that keeps an exact copy of another volume. This is a good strategy for mission critical data.
    d. RAID-5 Volume
        i. RAID 5 stripes disks with parity. This means data is written across all drives in blocks and if one fails you can replace it and rebuild the drive. This is a common practice on large scale file servers to prevent data loss.
    e. Striped Volume
        i. Stripped Volumes distribute data across at least 2 disks to provide increased performance. This is how Raid 0 functions, however if a drive fails, then the data is lost.

2. Why would mounting a folder to a volume (C:\Docs) be beneficial?
    a. This hides the complexity of the storage structure and can make it easier for a user to access certain data.

3. What are some differences between Basic Disks and Dynamic Disks?
    a. Basic Disks use partitions to organize data while Dynamic Disks use volumes. This means Basic Disks are limited to four partitions while a Dynamic one could have an infinite number (if the OS didn't limit it.)

4. Discuss the pros and cons of using Software RAID vs. Hardware RAID
    a. Software raids are usually cheaper and more compatible, but recovering data from a bad drive can be challenging. Hardware Raid is more expensive and requires a separate controller from the OS but tends to have better performance and is easier to recover data.

5. With respect to Figure 12 above, why does volume G have half the capacity of E? If you recall, we allocated 2048 MB when we created each
    a. G is a mirrored drive. This means half of the disk's capacity is used by copied data.

6. We allocated 2 GB of disk space to each of the four disks composing the H: drive. Why, then, does File Explorer show only 6 GB of available space?
    a. H is set up as a RAID-5 Volume, this means the extra 2 GB is used for parity in case a recovery is needed.