Overview

This report provides information on the physical disk drives attached to a MacBook Pro (2021 Apple M1 Pro), how they are partitioned, and the volumes mounted to the root file system. Using built-in macOS utilities and terminal commands, I gathered this data, supplemented with screenshots for clarity.

The physical disk drive attached to my device is a 500.3 GB solid-state drive, identified as disk0. This drive is partitioned using the GUID Partition Scheme and is divided into three primary partitions: a 524.3 MB partition labeled disk0s1, which contains the Apple_APFS_ISC container; a 494.4 GB partition labeled disk0s2, which contains the main APFS container (disk3) for the macOS operating system; and a 5.4 GB partition labeled disk0s3, which serves as an Apple_APFS_Recovery container. The main APFS container, disk3, is further divided into multiple volumes, including Macintosh HD for the system, Data for user files, and others like Preboot, Recovery, and VM for system functions.

The root file system is mounted on the disk3s1s1 volume, which is part of the Macintosh HD volume. This volume is sealed, read-only, and journaled. Additional volumes mounted under the root file system include disk3s6 for virtual memory (VM), disk3s2 for preboot data, disk3s4 for system updates, disk2s2 for xarts, and disk2s1 for iSCPreboot.

Findings

Firstly, I used the command diskutil list on the terminal on my mac to get the list of physical disk partitions.

- **Physical Disk (disk0):**
  - Total capacity: 500.3 GB
  - Partitioned into three Apple APFS Containers:
    - **disk2** (524.3 MB): Apple_APFS_ISC
    - **disk3** (494.4 GB): Apple_APFS
    - **disk1** (5.4 GB): Recovery
- **APFS Container on disk3 (synthesized):**
  - Includes the following volumes: Macintosh HD (disk3s1), Preboot (disk3s2), Recovery (disk3s3), Data (disk3s5), VM (disk3s6)
- **Additional Disk Images:**
  - Several disk images were created by Xcode for iOS and watchOS simulators, which I recently added for my senior project class in which I am creating an IOS app with Swift. These include:
    - disk4, disk6, disk8, and disk10: Physical containers for simulators.
    - disk5, disk7, disk9, and disk11: Synthesized containers APFS volumes for simulator data.

Mounted Volumes (mount**):**

The mount command displayed the mounted volumes and their respective locations. Key observations include:

- **Root Filesystem:**
  - / is mounted on disk3s1s1, which is sealed, local, read-only, and journaled.
  - This indicates the use of System Integrity Protection (SIP) in macOS, which enhances system security.
- **Supporting System Volumes:**

  /System/Volumes/VM (disk3s6), /System/Volumes/Preboot (disk3s2), /System/Volumes/Update (disk3s4), /System/Volumes/Data (disk3s5)

3. Disk Usage (df -h**):**

The df -h command provided disk usage details for each volume. Highlights include:

- **System Volumes:**
  - Macintosh HD (disk3s1s1): Total size of 460 GiB, with 10 GiB used and 56 GiB available (16% capacity).
  - Data (disk3s5): Largest volume, with 377 GiB used (87% capacity).

Screenshots

```
jackseymour@Jacks-MacBook-Pro ~ % diskutil list
/dev/disk0 (internal, physical):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      GUID_partition_scheme                        *500.3 GB   disk0
   1:                 Apple_APFS_ISC Container disk2     524.3 MB   disk0s1
   2:                 Apple_APFS Container disk3         494.4 GB   disk0s2
   3:        Apple_APFS_Recovery Container disk1         5.4 GB     disk0s3

/dev/disk3 (synthesized):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      APFS Container Scheme -                      +494.4 GB   disk3
                                 Physical Store disk0s2
   1:                APFS Volume Macintosh HD            11.1 GB    disk3s1
   2:              APFS Snapshot com.apple.os.update-... 11.1 GB    disk3s1s1
   3:                APFS Volume Preboot                 13.0 GB    disk3s2
   4:                APFS Volume Recovery                2.0 GB     disk3s3
   5:                APFS Volume Data                    404.5 GB   disk3s5
   6:                APFS Volume VM                      2.1 GB     disk3s6

/dev/disk4 (disk image):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      GUID_partition_scheme                        +4.2 GB     disk4
   1:                 Apple_APFS Container disk5         4.2 GB     disk4s1

/dev/disk5 (synthesized):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      APFS Container Scheme -                      +4.2 GB     disk5
                                 Physical Store disk4s1
   1:                APFS Volume WatchOS 9.4 Simulator   3.9 GB     disk5s1

/dev/disk6 (disk image):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      GUID_partition_scheme                        +17.1 GB    disk6
   1:                 Apple_APFS Container disk7         17.1 GB    disk6s1

/dev/disk7 (synthesized):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      APFS Container Scheme -                      +17.1 GB    disk7
                                 Physical Store disk6s1
   1:                APFS Volume iOS 17.0.1 21A342 Si... 16.6 GB    disk7s1

/dev/disk8 (disk image):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      GUID_partition_scheme                        +8.8 GB     disk8
   1:                 Apple_APFS Container disk9         8.8 GB     disk8s1

/dev/disk9 (synthesized):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      APFS Container Scheme -                      +8.8 GB     disk9
                                 Physical Store disk8s1
   1:                APFS Volume iOS 18.1 Simulator B... 8.6 GB     disk9s1

/dev/disk10 (disk image):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      GUID_partition_scheme                        +19.5 GB    disk10
   1:                 Apple_APFS Container disk11        19.5 GB    disk10s1
```

a. Disk List Output

- Screenshot: Output of diskutil list.

b. Mount Command Output

```
jackseymour@Jacks-MacBook-Pro ~ % mount
/dev/disk3s1s1 on / (apfs, sealed, local, read-only, journaled)
devfs on /dev (devfs, local, nobrowse)
/dev/disk3s6 on /System/Volumes/VM (apfs, local, noexec, journaled, noatime, nobrowse)
/dev/disk3s2 on /System/Volumes/Preboot (apfs, local, journaled, nobrowse)
/dev/disk3s4 on /System/Volumes/Update (apfs, local, journaled, nobrowse)
/dev/disk2s2 on /System/Volumes/xarts (apfs, local, noexec, journaled, noatime, nobrowse)
/dev/disk2s1 on /System/Volumes/iSCPreboot (apfs, local, journaled, nobrowse)
/dev/disk2s3 on /System/Volumes/Hardware (apfs, local, journaled, nobrowse)
/dev/disk3s5 on /System/Volumes/Data (apfs, local, journaled, nobrowse, protect, root data)
map auto_home on /System/Volumes/Data/home (autofs, automounted, nobrowse)
/dev/disk5s1 on /Library/Developer/CoreSimulator/Volumes/watchOS_20T253 (apfs, local, nodev, nosuid, read-only, journaled, noowners, noatime, nobrowse)
/dev/disk7s1 on /Library/Developer/CoreSimulator/Volumes/iOS_21A342 (apfs, local, nodev, nosuid, read-only, journaled, noowners, noatime, nobrowse)
/dev/disk9s1 on /Library/Developer/CoreSimulator/Cryptex/Images/bundle/SimRuntimeBundle-72D26144-F04F-4D1D-96E4-98F9D325698A (apfs, local, nodev, nosuid, read-only, journaled, noowners, noatime, nobrowse)
/dev/disk11s1 on /Library/Developer/CoreSimulator/Volumes/iOS_22B81 (apfs, sealed, local, nodev, nosuid, read-only, journaled, noowners, noatime, nobrowse)
/dev/disk1s1 on /System/Volumes/Update/SFR/mnt1 (apfs, local, journaled, nobrowse)
/dev/disk3s1 on /System/Volumes/Update/mnt1 (apfs, sealed, local, journaled, nobrowse)
jackseymour@Jacks-MacBook-Pro ~ %
```

- Screenshot: Output of mount.

c. Disk Usage

```
jackseymour@Jacks-MacBook-Pro ~ % df -h
Filesystem      Size    Used   Avail Capacity iused ifree %iused  Mounted on
/dev/disk3s1s1  460Gi    10Gi   56Gi    16%  488k  592M    0%   /
devfs           217Ki   217Ki     0Bi   100%   752     0  100%   /dev
/dev/disk3s6    460Gi   2.0Gi   56Gi     4%       2  592M    0%   /System/Volumes/VM
/dev/disk3s2    460Gi    12Gi   56Gi    18%    1.6k  592M    0%   /System/Volumes/Preboot
/dev/disk3s4    460Gi   662Mi   56Gi     2%     309  592M    0%   /System/Volumes/Update
/dev/disk2s2    500Mi   6.0Mi  482Mi     2%       1  4.9M    0%   /System/Volumes/xarts
/dev/disk2s1    500Mi   5.4Mi  482Mi     2%      29  4.9M    0%   /System/Volumes/iSCPreboot
/dev/disk2s3    500Mi   2.2Mi  482Mi     1%      57  4.9M    0%   /System/Volumes/Hardware
/dev/disk3s5    460Gi   377Gi   56Gi    87%    3.4M  592M    1%   /System/Volumes/Data
map auto_home     0Bi     0Bi     0Bi   100%       0     0     -   /System/Volumes/Data/home
/dev/disk5s1    3.9Gi   3.6Gi  259Mi    94%     289k  2.6M   10%   /Library/Developer/CoreSimulator/Volumes/watchOS_20T253
/dev/disk7s1     16Gi    15Gi  471Mi    98%     498k  4.8M    9%   /Library/Developer/CoreSimulator/Volumes/iOS_21A342
/dev/disk9s1    8.2Gi   8.0Gi  245Mi    98%      13  2.5M    0%   /Library/Developer/CoreSimulator/Cryptex/Images/bundle/SimRuntimeBundle-72D26144-F04F-4D1D-96E4-98F9D325698A
/dev/disk11s1   18Gi    18Gi  447Mi    98%     452k  4.8M    9%   /Library/Developer/CoreSimulator/Volumes/iOS_22B81
/dev/disk1s1    5.0Gi   1.6Gi  3.3Gi    33%      58   35M    0%   /System/Volumes/Update/SFR/mnt1
/dev/disk3s1   460Gi    10Gi   56Gi    16%  488k  592M    0%   /System/Volumes/Update/mnt1
jackseymour@Jacks-MacBook-Pro ~ %
```

- Screenshot: Output of df -h.

d. System Information/ Storage

MacBook Pro

Volume Name	Free	Capacity	Mount Point
Data	60.67 GB	494.38 GB	/System/Volumes/Data
iOS 17.0.1 21A342 Simulator	493.4 MB	17.12 GB	/Library/Developer/CoreSimulator/Volumes/iOS_21A342
iOS 18.1 Simulator	489.3 MB	19.47 GB	/Library/Developer/CoreSimulator/Volumes/iOS_22B81
iOS 18.1 Simulator Bundle	257.2 MB	8.84 GB	/Library/Developer/CoreSimulator/Cryptex/Images/bundle/SimRuntimeBun
Macintosh HD	60.67 GB	494.38 GB	/System/Volumes/Update/mnt1
Macintosh HD	60.67 GB	494.38 GB	/
WatchOS 9.4 Simulator	271.1 MB	4.15 GB	/Library/Developer/CoreSimulator/Volumes/watchOS_20T253

References

Terminal Reference: Apple Developer

Official macOS Disk Utility Guide: https://support.apple.com/guide/disk-utility/welcome/mac