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TRAINING

Partitioning Storage Devices

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Overview

Storage devices aren't used directly by the operating system. Instead, they are usually carved up into smaller pieces called partitions, where each partition contains different types of data. For instance, there is often a partition for system files, a partition for home directories, a partition for boot up information, and a partition for swapping. If the entire disk is to be used for the same type of data, it is made into a single partition with 100 percent of the disk's capacity.

Partition information is stored in one of two ways: in a Master Boot Record (MBR) or a GUID Partition Table (GPT). MBR has been around since the 1980s, when hard disks were much smaller. It has a maximum partition size of 2TB, only supports up to 4 primary partitions (and many more logical partitions). The UEFI BIOS specification introduced GPT as a way of managing partitions, though it can be used with legacy BIOSes as well. GPT can support partitions of (almost) any size, with up to 128 primary partitions.

Key Ideas

Partition: Hard disks are partitioned before use. A partition can include a part of a disk, or the whole disk.

GPT: GUID Partition Table is how most operating systems track disk partition structure.

MBR: Master Boot Records are an old way of telling operating systems about the partition structure of a hard disk.

parted: A utility for creating and managing disk partitions, can handle disks of any size. Works with MBR and GPT disks.

Example Scenario

Practice by using parted to create a new partition that you could use as an additional swap partition.

Now Do It

1. Start the parted utility in interactive mode using the parted command.
   # parted

2. Use the print all command to show information about all of the disks and partitions in the system.
   (parted) print all

3. Use the select command to select a disk with available space (any disk where the difference between the disk size and the end of the last partition is greater than 0). If there is no partition table table on the disk, then the partition information will be

empty.
(parted) select /dev/sdX
Where X is the disk you are selecting.

4. If there is no partition table on the disk, use the mklabel command to create a GPT partition table. If there is a partition table (GPT or otherwise), skip this step.

5. (parted) mklabel gpt

6. Use the mkpart command to create a partition.
(parted) mkpart
The mkpart command interactively prompts you for partition information including: name for a GPT partition OR partition type (primary, logical, or extended MBR partition), start is the beginning of the partition and end is the end of the partition. Start and end are both given in MB

7. Use the print command to verify the partition table contains the new partition.
(parted) print

8. Use the quit command to exit the parted utility.
(parted) quit

If you remember nothing else...

If your disk already has partitions on it, that means it already has either an MBR or GPT partition table. Using print all in the interactive mode of parted shows information about all disks and partitions, not just the disk you have selected. Make sure you've selected the correct disk before you begin making changes to its layout.

Answer Key

1. Start parted to open the parted prompt:
   # parted
   (parted)

2. Example output from listing all the devices:
   (parted) print all
   Model: ATA VBOX HARDDISK (scsi)
   Disk /dev/sda: 8590MB
   Sector size (logical/physical): 512B/512B
   Partition Table: msdos
   Disk Flags:

Number	Start	End	Size	Type	File system	Flags
1	1049kB	525MB	524MB	primary	xfs	boot
2	525MB	8590MB	8065MB	primary		lvm

   ...

   Error: /dev/sde: unrecognised disk label
   Model: ATA VBOX HARDDISK (scsi)
   Disk /dev/sde: 4194kB
   Sector size (logical/physical): 512B/512B
   Partition Table: unknown
   Disk Flags:

3. Select the device you will be creating a partition on:
   (parted) select /dev/sdX
   Using /dev/sde

4. Make a partition table if it doesn't have one:
   (parted) mklabel
   New disk label type? gpt

5. Make a new partition:
   (parted) mkpart
   Partition name? []? john
   File system type? [ext2]? ext4
   Start? 0
   End? 4

6. Check to see that the partition was created:
   (parted) print
   Model: ATA VBOX HARDDISK (scsi)
   Disk /dev/sde: 4194kB
   Sector size (logical/physical): 512B/512B
   Partition Table: gpt
   Disk Flags:

```
Number  Start   End     Size    File system  Name  Flags
1       17.4kB  4177kB  4160kB               john
```

7. Quit parted:

```
(parted) quit
```

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