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How Do I Resize a Cloud Server File System?

Learn step-by-step instructions for resizing your cloud server file system. This guide covers different methods, potential issues, and best practices for seamless expansion.

Contents

Introduction

Upgrading a cloud server to a larger plan increases the virtual disk size, but existing partitions may not resize automatically. This article explains how to resize the file system on a Linux cloud server and expand the root partition to utilize the full disk space.

This article uses a Ubuntu 24.04 instance but the included instructions apply to any Linux distribution with the `fdisk` and `resize2fs` tools installed. The example server has a `55 GB` virtual disk after upgrade with the following partitions:

- `vda`: The virtual disk with 55 GB.
- `vda1`: The first partition (EFI) with 512 MB.
- `vda2`: The second partition (root file system) with 24.5 GB.

```
 NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sr0     11:0    1 1024M  0 rom
vda    253:0    0   55G  0 disk
├─vda1 253:1    0  512M  0 part /boot/efi
└─vda2 253:2    0 24.5G  0 part /
```

The `vda2` partition is 100% utilized with no free space based on the following `df -h` command output:

```
 Filesystem      Size  Used Avail Use% Mounted on
tmpfs           197M   17M  180M   9% /run
efivarfs        256K   25K  227K  10% /sys/firmware/efi/efivars
/dev/vda2        23G   23G     0 100% /
tmpfs           982M     0  982M   0% /dev/shm
tmpfs           5.0M     0  5.0M   0% /run/lock
/dev/vda1       511M  6.2M  505M   2% /boot/efi
tmpfs           197M   12K  197M   1% /run/user/0
```

You will expand the second partition (`vda2`) to fill the virtual disk while preserving data on the partition. Use this example as a general guide depending on your particular situation.

Prerequisites

Before you begin, ensure to:

- Create a new snapshot of your instance to recover the it incase of any failures.
- Attach a rescue ISO such as **Finnix** and reboot your instance.
- Access your instance using the Vultr console.

> ⚠ Warning
>
> Do not run the commands in this article directly in your active server session. Instead, boot the instance using a rescue ISO and apply the changes while the virtual disk is unmounted and not in use. You may lose data if you make a mistake while following the instructions in this article. Ensure to take a snapshot of your instance to create a backup you can use to recover the server in case of any failures. In addition, avoid making any changes to the `vda1` EFI boot partition.

Inspect the Partition Table

1. Run the following `fdisk -l` command to inspect all disks and partitions on your server.

   CONSOLE

   ```
   # fdisk -l
   ```

   Note the start and end sectors of your target `/dev/vda` virtual disk partitions similar to the following output.

   ```
   Disk /dev/vda: 55 GiB, 59055800320 bytes, 115343360 sectors
   Units: sectors of 1 * 512 = 512 bytes
   Sector size (logical/physical): 512 bytes / 512 bytes
   I/O size (minimum/optimal): 512 bytes / 512 bytes
   Disklabel type: gpt
   ```

```
Disk identifier: 6E38F556-1B5C-4438-B719-3782CAB8D459

Device       Start      End  Sectors  Size Type
/dev/vda1     2048  1050623  1048576  512M EFI System
/dev/vda2  1050624 52428766 51378143 24.5G Linux filesystem
.........................
```

Remove the Second Partition

Follow the steps below to remove the `vda2` partition without losing any existing data.

1. Run the following `fdisk` command to manage the `/dev/vda` virtual disk partitions.

   CONSOLE

   ```
   # fdisk /dev/vda
   ```

   Output:

   ```
   Welcome to fdisk (util-linux 2.34).
   Changes will remain in memory only, until you decide to write them.
   Be careful before using the write command.


   Command (m for help):
   ```

2. Enter `i` to view information about a specific partition on the `/dev/vda` disk.

   ```
   Command (m for help): i
   ```

3. Enter `2` to view information about the second partition (`vda2`) you want to delete.

   ```
   Partition number (1,2, default 2): 2
   ```

   Note the start and end sectors in your output similar to the one below.

```
         Device: /dev/vda2
          Start: 1050624
            End: 52428766
        Sectors: 51378143
           Size: 24.5G
           Type: Linux filesystem
      Type-UUID: 0FC63DAF-8483-4772-8E79-3D69D8477DE4
           UUID: 71C0247B-89D2-4590-8B81-A1089FB0154F

Command (m for help):
```

`1050624` is the start sector, and `52428766` is the end sector for the `vda2` partition, based on the output above.

4. Enter `d` to delete a partition.

```
Command (m for help): d
```

5. Enter `2` to delete the second partition (`vda2`).

```
Partition number (1,2, default 2): 2
```

Output:

```
Partition 2 has been deleted.
```

Create a New Partition

Follow the steps below to create a new partition and preserve data using the same start sector while keeping the existing ext4 signature.

1. Enter `n` to create a new partition.

```
Command (m for help): n
```

2. Enter `2` to create the second partition.

```
Partition number (2-128, default 2): 2
```

3. Verify that the default first sector value matches your original `vda2` partition value and press `Enter`. If the default value is different, enter your original `vda2` start sector value instead.

```
First sector (1050624-115343326, default 1050624):
```

4. Press `Enter` to use the suggested last sector value that fills the entire available disk space.

```
Last sector, +/-sectors or +/-size{K,M,G,T,P} (1050624-115343326, default
115341311):
```

   Output:

```
Created a new partition 2 of type 'Linux filesystem' and of size 54.5 GiB.
```

5. Enter `n` when prompted to remove the existing ext4 signature and press `Enter`.

```
Partition #2 contains a ext4 signature.

Do you want to remove the signature? [Y]es/[N]o: n
```

Write the Changes to Disk

Follow the steps below to write and apply the partition changes you performed in the previous steps to your virtual disk.

1. Enter `w` to write the partition changes to the disk.

```
Command (m for help): w
```

   Output:

```
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

2. Use the `lsblk` command to view the modified partition table of the disk.

```
CONSOLE
# lsblk
```

Output:

```
.......
vda    254:0    0    55G  0 disk
├─vda1 254:1    0   512M  0 part
└─vda2 254:2    0  54.5G  0 part
```

Resize the File System

Follow the steps below to test the file system of the second partition (vda2) and resize it to fill the new partition.

1. Check the `vda2` partition for errors and corrupted nodes.

```
CONSOLE
# e2fsck -f /dev/vda2
```

Enter `y` when prompted to fix any blocks on the partition similar to the output below.

```
/dev/vda2: recovering journal
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
Pass 5: Checking group summary information
```

```
Free blocks count wrong (4096, counted=4601).
Fix<y>?
```

2. Run the following `resize2fs` command to expand the file system and use the full size of the new `vda2` partition.

```
CONSOLE
# resize2fs /dev/vda2
```

Output:

```
resize2fs 1.47.1 (20-May-2024)
Resizing the filesystem on /dev/vda2 to 14286336 (4k) blocks.
The filesystem on /dev/vda2 is now 14286336 (4k) blocks long.
```

Remove the Rescue ISO and Reboot the Server

Access your instance's management page, remove the rescue ISO, and reboot the instance. Then, follow the steps below to test the changes made to your server's disk partitions.

1. Run the following `lsblk` command in your server's terminal session to verify the new partition table.

```
CONSOLE
$ lsblk
```

Output:

```
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sr0     11:0    1 1024M  0 rom
vda    253:0    0   55G  0 disk
```

```
├─vda1 253:1    0  512M  0 part /boot/efi
└─vda2 253:2    0 54.5G  0 part /
```

2. Use the `df -h` command to view the disk usage information and verify that the `vda2` partition is resized.

   CONSOLE

   ```
   $ df -h
   ```

   Your output should be similar to the below.

   ```
   Filesystem      Size  Used Avail Use% Mounted on
   tmpfs           197M  1.2M  196M   1% /run
   efivarfs        256K   34K  218K  14% /sys/firmware/efi/efivars
   /dev/vda2        52G   23G   26G  47% /
   tmpfs           982M     0  982M   0% /dev/shm
   tmpfs           5.0M     0  5.0M   0% /run/lock
   /dev/vda1       511M  6.2M  505M   2% /boot/efi
   tmpfs           197M   12K  197M   1% /run/user/0
   ```

   The `vda2` partition usage is `47%` as compared to `100%` before resizing based on the above output.

Conclusion

You have resized your server's file system and preserved all existing data. If you added or removed partitions, adjust the mount points in the `/etc/fstab` file. For more information and disk resizing options, please visit the following documentation resources.

- fdisk(8) — Linux manual page
- resize2fs(8) — Linux manual page


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