Certainly! Below is a detailed step-by-step guide for setting up **RAID 5** on a Linux system. RAID 5 provides **data redundancy** and **striping** while using at least three disks. In RAID 5, data is striped across multiple disks, and parity information is distributed across all the disks. If one disk fails, the data can still be reconstructed using the parity data.

### **Pre-requisites:**

* A Linux system (Ubuntu, CentOS, etc.).
* **At least 3 unformatted disks** (e.g., /dev/sdb, /dev/sdc, /dev/sdd).
* A **root or sudo user** to execute commands.
* The mdadm utility installed (this is used to manage RAID arrays on Linux).

### **Step 1: Install mdadm (RAID Management Tool)**

**On Ubuntu/Debian**:  
  
 sudo apt update

sudo apt install mdadm

**On CentOS/RHEL**:  
  
 sudo yum install mdadm

### **Step 2: Prepare the Disks**

Ensure the disks are unformatted and not part of any existing RAID array. You can list the available disks using:

sudo lsblk

Identify the disks you want to use (e.g., /dev/sdb, /dev/sdc, /dev/sdd). Make sure they are unformatted (they should not have partitions or any data). You can use fdisk or parted to create new partitions on these disks if required.

### **Step 3: Create the RAID 5 Array**

RAID 5 requires at least **three disks**. Here’s how to create a RAID 5 array using the mdadm tool.

**Create the RAID 5 array** with three disks (/dev/sdb, /dev/sdc, /dev/sdd) using the following command:  
  
 sudo mdadm --create /dev/md0 --level=5 --raid-devices=3 /dev/sdb /dev/sdc /dev/sdd

* + /dev/md0: The name of the RAID array.
  + --level=5: Specifies RAID 5 (striping with parity).
  + --raid-devices=3: Defines the number of devices (disks) in the RAID array.
  + /dev/sdb /dev/sdc /dev/sdd: The disks you are adding to the array.

**Verify RAID Array Creation**:  
  
 After executing the command, you can verify the RAID array with:  
  
 sudo mdadm --detail /dev/md0

1. This command will provide detailed information about the RAID array, including its status, number of disks, and size.

**Check the RAID Array Status**:  
  
 You can also check the status of the RAID array by monitoring /proc/mdstat:  
  
 cat /proc/mdstat

1. This will show you whether the RAID array is synchronizing.

### **Step 4: Create a Filesystem on the RAID Array**

Once the RAID 5 array is created, you need to format it with a filesystem.

**Create an ext4 filesystem on the RAID array**:  
  
 sudo mkfs.ext4 /dev/md0

**Verify the filesystem**:  
  
 sudo blkid /dev/md0

1. This will display the filesystem type (e.g., ext4) and the UUID of the RAID array.

### **Step 5: Mount the RAID Array**

Now, you need to mount the RAID 5 array to use it.

**Create a mount point**:  
  
 sudo mkdir /mnt/my\_raid5

**Mount the RAID array**:  
  
 sudo mount /dev/md0 /mnt/my\_raid5

**Verify the mount**:  
  
 You can verify the mount with:  
  
 df -h

This will show the disk usage for all mounted filesystems, confirming that the RAID 5 array is successfully mounted.  
  
 Alternatively, use the following command to check if the RAID array is mounted at the correct location:  
  
 mount | grep /mnt/my\_raid5

### **Step 6: Make the Mount Persistent**

To ensure that the RAID 5 array is automatically mounted after a reboot, you need to add an entry to the /etc/fstab file.

**Get the UUID of the RAID array**:  
  
 sudo blkid /dev/md0

Example output:  
  
 /dev/md0: UUID="f0953ff5-cd3b-47fb-bd9a-dc6693254b28" TYPE="ext4"

**Edit /etc/fstab** to add the RAID array entry:  
  
 sudo nano /etc/fstab

**Add the following line** to automatically mount the RAID array at boot:  
  
 UUID=f0953ff5-cd3b-47fb-bd9a-dc6693254b28 /mnt/my\_raid5 ext4 defaults 0 0

**Verify the fstab entry**:  
  
 cat /etc/fstab

1. Ensure the RAID array is listed for automatic mounting at boot.

### **Step 7: Monitor the RAID Array (Optional)**

To check the health and status of your RAID 5 array periodically, you can use the following command:

**Monitor RAID array health**:  
  
 sudo mdadm --detail /dev/md0

1. This command will provide detailed information about the RAID array, including its current status, devices, and RAID level.

### **Step 8: Remove the RAID Array (Optional)**

If you need to remove the RAID array, follow these steps:

**Unmount the RAID array**:  
  
 sudo umount /mnt/my\_raid5

**Stop the RAID array**:  
  
 sudo mdadm --stop /dev/md0

**Remove the RAID array**:  
  
 sudo mdadm --remove /dev/md0

**Zero the superblock on the disks** (this removes the RAID metadata from the disks):  
  
 sudo mdadm --zero-superblock /dev/sdb1

sudo mdadm --zero-superblock /dev/sdc1

sudo mdadm --zero-superblock /dev/sdd1

### **Full Command Summary for RAID 5 Setup:**

1. **Install mdadm**:  
   * On Ubuntu/Debian: sudo apt install mdadm
   * On CentOS/RHEL: sudo yum install mdadm

**Create RAID 5 Array**:  
  
 sudo mdadm --create /dev/md0 --level=5 --raid-devices=3 /dev/sdb /dev/sdc /dev/sdd

**Verify RAID Array**:  
  
 sudo mdadm --detail /dev/md0

**Create Filesystem on RAID Array**:  
  
 sudo mkfs.ext4 /dev/md0

**Mount RAID Array**:  
  
 sudo mount /dev/md0 /mnt/my\_raid5

1. **Make Mount Persistent**:  
   * Get the UUID: sudo blkid /dev/md0
   * Edit /etc/fstab and add the entry.

**Monitor RAID Health** (Optional):  
  
 sudo mdadm --detail /dev/md0

### **Additional Notes:**

* **RAID 5 provides redundancy**: It distributes parity across all disks, so data can still be recovered in case of a single disk failure.
* **RAID 5 requires at least three disks** but can support more.
* **Data protection**: Although RAID 5 can tolerate a single disk failure, it is still essential to have regular backups.
* **Performance**: RAID 5 offers a good balance of speed and redundancy, but write speeds can be slower due to the parity calculations.

This guide should help you set up a **RAID 5 array** on your Linux system. If you need further clarification or assistance, feel free to ask!