Certainly! Below is a detailed guide to setting up **RAID 1** (Mirroring) on a Linux system. RAID 1 is a mirrored array, meaning it duplicates the same data on two disks. This provides redundancy — if one disk fails, the data remains safe on the other.

## **Setting Up RAID 1 on Linux**

RAID 1 provides data redundancy, as it mirrors data across two or more disks. If one disk fails, the data is still available on the other disk(s). Here's a step-by-step guide to set up RAID 1 using **mdadm**, the utility for managing RAID arrays on Linux.

### **Pre-requisites:**

* A Linux system (Ubuntu, CentOS, etc.).
* At least two unformatted disks (e.g., /dev/sdb, /dev/sdc).
* A root or sudo user to execute commands.

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

mdadm is the utility used to manage RAID arrays on Linux.

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

sudo apt install mdadm

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

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

Make sure that both disks are **unformatted** and ready to be used in the RAID array. You can list the available disks with:

sudo lsblk

Identify the disks you want to use (e.g., /dev/sdb and /dev/sdc).

### **Step 3: Create the RAID 1 Array**

RAID 1 is mirrored, meaning the same data will be written to both disks.

To create a RAID 1 array, use the following command:  
  
 sudo mdadm --create /dev/md0 --level=1 --raid-devices=2 /dev/sdb /dev/sdc

* + /dev/md0: The name of the RAID array.
  + --level=1: Specifies RAID 1 (mirroring).
  + --raid-devices=2: Defines the number of devices (disks) in the RAID array.
  + /dev/sdb /dev/sdc: The disks you are adding to the array.

**Verify RAID Array Creation:** 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:** cat /proc/mdstat

1. This will show the current status of all RAID arrays and whether they are synchronizing.

**Monitor RAID Creation:** If the RAID is still being created, you can monitor the progress:  
  
 watch cat /proc/mdstat

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

Once the RAID 1 array is created, you need to format it with a filesystem, such as **ext4**.

**Create 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 1 array to use it.

**Create a mount point**:  
  
 sudo mkdir /mnt/my\_raid1

**Mount the RAID array**:  
  
 sudo mount /dev/md0 /mnt/my\_raid1

**Verify the mount**:  
  
 df -h

This will show the disk usage of all mounted filesystems, confirming that the RAID 1 array is mounted successfully.  
  
 Alternatively, you can use:  
  
 mount | grep /mnt/my\_raid1

1. This checks if the RAID array is mounted at the desired mount point.

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

To automatically mount the RAID 1 array at boot time, 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:  
  
 sudo nano /etc/fstab

**Add the following line** to automatically mount the RAID array at boot:  
  
 UUID=f0953ff5-cd3b-47fb-bd9a-dc6693254b28 /mnt/my\_raid1 ext4 defaults 0 0

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

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

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

To check the health and status of your RAID array periodically:

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

1. This will show detailed information about the RAID array, such as its current status, devices, and RAID level.

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

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

**Unmount the RAID array**:  
  
 sudo umount /mnt/my\_raid1

**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

### **Full Command Summary for RAID 1 Setup:**

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

**Create RAID 1 Array**:  
  
 sudo mdadm --create /dev/md0 --level=1 --raid-devices=2 /dev/sdb /dev/sdc

**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\_raid1

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 1 provides redundancy**: The same data is written to both disks. If one disk fails, data remains accessible on the other.
* RAID 1 can be used for critical data storage, where high availability is needed, but disk space will be halved because data is duplicated.
* You can expand the RAID array by adding more disks, but this process requires reconfiguring the array.
* **Monitoring RAID arrays is important**: Regularly check the status of the RAID array to ensure both disks are functioning correctly.

This guide should help you set up **RAID 1** for redundancy on your Linux system. If you have any more questions or need further clarification, feel free to ask!