

Linux Fundamentals: A Beginner's Guide to User & Group Management in Linux

Why This Matters for Your IT Career:

Linux is everywhere— powering web servers, cloud platforms, and cybersecurity tools like Kali Linux. At its core, Linux is a multi-user system, meaning multiple people (or processes) can share the same machine. User management lets you create, modify, and remove accounts, while group management organizes users for teamwork and access control. Together, they're your first line of defense for security and efficiency:

- Create accounts for new employees
- Troubleshoot access issues
- Secure systems by managing permissions
- Organize teams with group policies

Perfect for Beginners:

No prior Linux experience needed! We'll use Kali Linux (great for practice), but these commands work on any Linux system you'll encounter in IT roles.

What This Guide Covers

This is Phase 1 of user and group management, designed for beginners with a taste of advanced concepts. We'll use Kali Linux in your VM to:

- View and Create Users: See who's on the system and add new accounts.
- Switch and Delete Users: Move between accounts and clean up when done.
- Manage Groups: Create, assign, and remove groups for organized access.

By the end, you'll confidently wield commands like `useradd`, `usermod`, and `groupdel`. Follow along, take screenshots, and share your results—I'd love to see your progress! Next up, we'll tackle permissions (Part 3), where you'll learn to lock down or share files based on these users and groups. Let's get started!

User Management

1. Viewing Users :

Command: cat /etc/passwd

What it Does:

List all users (even system accounts). Each line shows

- ⊠ Username
- ⊠ UID (User ID)
- ⊠ GID (Group ID)
- ⊠ Home directory
- ⊠ Default shell

File Actions Edit View Help

—(kali@kali)~

\$ cat /etc/passwd

```
root:x:0:0:root:/root:/usr/bin/zsh
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
_apt:x:42:65534::/nonexistent:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:998:998:systemd Network Management:/:/usr/sbin/nologin
dhcpd:x:100:65534:DHCP Client Daemon,,,:/usr/lib/dhcpd:/bin/false
_galera:x:101:65534::/nonexistent:/usr/sbin/nologin
mysql:x:102:102:MySQL Server,,,:/nonexistent:/bin/false
tss:x:103:103:TPM software stack,,,:/var/lib/tpm:/bin/false
strongswan:x:104:65534::/var/lib/strongswan:/usr/sbin/nologin
systemd-timesync:x:992:992:systemd Time Synchronization:/:/usr/sbin/nologin
_gophish:x:105:105::/var/lib/gophish:/usr/sbin/nologin
iodine:x:106:65534::/run/iodine:/usr/sbin/nologin
messagebus:x:107:106::/nonexistent:/usr/sbin/nologin
tcpdump:x:108:107::/nonexistent:/usr/sbin/nologin
miredo:x:109:65534::/var/run/miredo:/usr/sbin/nologin
_rpc:x:110:65534::/run/rpcbind:/usr/sbin/nologin
redis:x:111:110::/var/lib/redis:/usr/sbin/nologin
```

```
polkitd:x:988:988:User for polkitd:/:/usr/sbin/nologin
rtkit:x:130:131:RealtimeKit,,,:/proc:/usr/sbin/nologin
colord:x:131:132:colord colour management daemon...:/var/lib/colord:/usr/sbin/nologin
kali:x:1000:1000:kali,,,:/home/kali:/usr/bin/zsh
testuser:x:1001:1001::/home/testuser:/bin/sh
user1:x:1002:1002::/home/user1:/bin/sh
```

2. Creating a User:

Commands: `sudo useradd -m newuser` / Creates "newuser" with a home directory (-m)

```
(kali㉿kali)-[~]
$ sudo useradd -m -s /bin/bash newuser1

(kali㉿kali)-[~]
$ cat /etc/passwd | grep "newuser1"
newuser1:x:1003:1003::/home/newuser1:/bin/bash
```

The user is created.

- ❑ Without -m, the user won't have a home folder (/home/newuser).
- ❑ Commands: `sudo passwd newuser` / Sets their password

```
(kali㉿kali)-[~]
$ sudo useradd -m -s /bin/bash newuser1

(kali㉿kali)-[~]
$ cat /etc/passwd | grep "newuser1"
newuser1:x:1003:1003::/home/newuser1:/bin/bash

(kali㉿kali)-[~]
$ sudo passwd newuser1
New password:
Retype new password:
passwd: password updated successfully
```

- ❑ `passwd` is mandatory—otherwise, the user can't log in

The /etc/shadow File: Password Storage Explained

What It Is:

The `/etc/shadow` file stores encrypted passwords and security settings for user accounts. Unlike `/etc/passwd`, it's only readable by root to protect sensitive data.

Command to View: `sudo cat /etc/shadow`

```
(kali㉿kali)-[~]
$ cat /etc/shadow
cat: /etc/shadow: Permission denied

(kali㉿kali)-[~]
$ sudo cat /etc/shadow
[sudo] password for kali:
root!:20167:0:99999:7:::
daemon*:20167:0:99999:7:::
bin*:20167:0:99999:7:::
sys*:20167:0:99999:7:::
sync*:20167:0:99999:7:::
games*:20167:0:99999:7:::
man*:20167:0:99999:7:::
lp*:20167:0:99999:7:::
mail*:20167:0:99999:7:::
news*:20167:0:99999:7:::
uucp*:20167:0:99999:7:::
proxy*:20167:0:99999:7:::
www-data*:20167:0:99999:7:::
backup*:20167:0:99999:7:::
...
colord!:20167:0:99999:7:::
kali:$y$j9T$sqf19SBcb2QahMt00.T2X.$MDW9pE36WgJCRF7zwf6GKo3g4V.fVW.SA4Sg3RKrb78:20167:0:99999:7:::
testuser!:20180:0:99999:7:::
user1!:20180:0:99999:7:::
```

To view shadow file we need a root privilege.

3. Switching Users

Commands: su **username**: Switches to "user" (keeps your current environment)

```
File Actions Edit View Help

(kali@kali)-[~]
$ su nextnewuser
Password:
(nextnewuser@kali)-[/home/kali]
$ whoami
nextnewuser
The user was switch to the "nextnewuser" successfully.

(nextnewuser@kali)-[/home/kali]
$ su kali
Password:
(kali@kali)-[~]
$ whoami
kali
The user was switch to the "kali" successfully.
```

When to Use Which:

- ☒ su → Quick access (but may break scripts due to environment variables).
- ☒ su - → Simulates a real login (safer for testing).
- ☒ sudo -u → Admin-friendly (no target user's password required).

4. Deleting a User

Command: sudo userdel -r newuser /Deletes "newuser" AND their home directory (-r).

```
(kali@kali)-[~]
$ sudo userdel -r newuser1
userdel: newuser1 mail spool (/var/mail/newuser1) not found
```

After deletion we can check if the user exist confirmatio n using command:cat /etc/passwd

```
redis:x:111:110::/var/lib/redis:/usr/sbin/nologin
mosquitto:x:112:113::/var/lib/mosquitto:/usr/sbin/nologin
redsocks:x:113:114::/var/run/redsocks:/usr/sbin/nologin
stunnel4:x:991:991:stunnel service system account:/var/run/stunnel4:/usr/sbin/nologin
sshd:x:114:65534::/run/ssh:/usr/sbin/nologin
dnsmasq:x:999:65534:dnsmasq:/var/lib/misc:/usr/sbin/nologin
Debian-snmpp:x:115:115::/var/lib/snmpp:/bin/false
ssllh:x:116:117::/nonexistent:/usr/sbin/nologin
postgres:x:117:118:PostgreSQL administrator,,:/var/lib/postgresql:/bin/bash
avahi:x:118:119:Avahi mDNS daemon,,:/run/avahi-daemon:/usr/sbin/nologin
nm-openvpn:x:119:120:NetworkManager OpenVPN,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
_gvm:x:120:122::/var/lib/openvas:/usr/sbin/nologin
speech-dispatcher:x:121:29:Speech Dispatcher,,:/run/speech-dispatcher:/bin/false
usbmux:x:122:46:usbmux daemon,,:/var/lib/usbmux:/usr/sbin/nologin
cups-pk-helper:x:123:123:user for cups-pk-helper service,,:/nonexistent:/usr/sbin/nologin
inetsim:x:124:124::/var/lib/inetsim:/usr/sbin/nologin
nm-openconnect:x:125:126:NetworkManager OpenConnect plugin,,:/var/lib/NetworkManager:/usr/sbin/nologin
geoclue:x:126:127::/var/lib/geoclue:/usr/sbin/nologin
lightdm:x:127:128:Light Display Manager:/var/lib/lightdm:/bin/false
statd:x:128:65534::/var/lib/nfs:/usr/sbin/nologin
saned:x:129:130::/var/lib/saned:/usr/sbin/nologin
polkitd:x:988:988>User for polkitd:/usr/sbin/nologin
rtkit:x:130:131:RealtimeKit,,:/proc:/usr/sbin/nologin
colord:x:131:132:colord colour management daemon...:/var/lib/colord:/usr/sbin/nologin
kali:x:1000:1000:kali,,:/home/kali:/usr/bin/zsh
testuser:x:1001:1001::/home/testuser:/bin/sh
user1:x:1002:1002::/home/user1:/bin/sh
nextnewuser:x:1004:1004::/home/nextnewuser:/bin/bash
The "newuser1" was delete successfully.
```

The user "newuser1" does not exist anymore.

Warning: Without -r, the home directory lingers (security risk!).

Group Management

1. Viewing groups

Commands: `cat /etc/group` # Lists all groups (GID + members)

```
(kali@kali)-[~]  
$ cat /etc/group  
root:x:0:  
daemon:x:1:  
bin:x:2:  
sys:x:3:  
adm:x:4:kali  
tty:x:5:  
disk:x:6:  
lp:x:7:  
mail:x:8:  
news:x:9:  
uucp:x:10:  
man:x:12:  
proxy:x:13:  
kmem:x:15:  
dialout:x:20:kali  
fax:x:21:  
voice:x:22:  
cdrom:x:24:kali  
floppy:x:25:kali  
tape:x:26:  
sudo:x:27:kali  
audio:x:29:kali
```

```
kali:x:1000:  
vboxsf:x:134:kali  
kaboxer:x:135:kali  
testuser:x:1001:  
user1:x:1002:  
nextnewuser:x:1004:
```

The user are not assigned to any specific group here.

2. Creating a Group

Command: `sudo groupadd myteam` # Creates "myteam" (auto-assigns GID)

File Actions Edit View Help

```
(kali@kali)-[~]  
$ sudo groupadd techteamm  
[sudo] password for kali:
```

```
(kali@kali)-[~]  
$
```

Lets verify using command: `cat /etc/group | grep "groupname"`

```
(kali@kali)-[~]  
$ cat /etc/group | grep "techteam"  
techteam:x:1005:
```

The "techteam" group exist.

```
(kali@kali)-[~]  
$
```

The group has been successfully created.

3. Adding a User to a Group

Command: `sudo usermod -aG groupname newuser` # Adds "newuser" to "groupname"

Critical Flag:

❑ `-aG` ensures the user is appended to the group. Without `-a`, it overwrites all other groups

Lets create some of new users to add to the group as shown in the example below:

```
File Actions Edit View Help

(kali@kali)-[~]
$ sudo useradd -m -s /bin/bash helpdesk
(kali@kali)-[~]
$ sudo useradd -m -s /bin/bash cybersecurity
(kali@kali)-[~]
$ sudo useradd -m -s /bin/bash redteam
(kali@kali)-[~]
$ sudo useradd -m -s /bin/bash blueteam
(kali@kali)-[~]
$
```

Lets create a new users to add to the group.

Now lets add the user to the group using command: `sudo usermod -aG groupname newuser`

```
File Actions Edit View Help

(kali@kali)-[~]
$ sudo usermod -aG techteam cybersecurity
(kali@kali)-[~]
$ sudo usermod -aG techteam helpdesk
(kali@kali)-[~]
$ sudo usermod -aG techteam blueteam
(kali@kali)-[~]
$ sudo usermod -aG techteam redteam
(kali@kali)-[~]
$ cat /etc/group | grep "techteam"
techteam:x:1005:cybersecurity,helpdesk,blueteam,redteam
```

We added the user to the group "techteam"

The users has been added to the group successfully.

4. Deleting a Group

Command: `sudo groupdel groupname` # Deletes "group"

```
(kali㉿kali)-[~]  
$ sudo groupadd newhires  
  
(kali㉿kali)-[~]  
$ sudo useradd -m hire1  
  
(kali㉿kali)-[~]  
$ sudo useradd -m hire2  
  
(kali㉿kali)-[~]  
$ sudo usermod -aG newhires hire1  
  
(kali㉿kali)-[~]  
$ sudo usermod -aG newhires hire2  
  
(kali㉿kali)-[~]  
$
```

Lets create a user and add them to a specific group.

We created a new group and new user

First lets check if the group exist using view group command: `cat /etc/group`

```
testuser:x:1001:  
user1:x:1002:  
nextnewuser:x:1004:  
techteam:x:1005:cybersecurity,helpdesk,blueteam,redteam  
helpdesk:x:1006:  
cybersecurity:x:1007:  
redteam:x:1008:  
blueteam:x:1009:  
managementteam:x:1010:hiringmanager,staffmanager  
hiringmanager:x:1011:  
staffmanager:x:1012:  
newhires:x:1013:hire1,hire2  
hire1:x:1014:  
hire2:x:1015:  
techteamm:x:1016:
```

The "newhires" group exist.

now lets delete the group that we just created using command : `sudo groupdel groupname`

```
(kali㉿kali)-[~]  
$ sudo groupdel newhires  
[sudo] password for kali:  
  
(kali㉿kali)-[~]  
$
```

Lets Verify if the removal of group using command: `cat /etc/group | grep "groupname"`

```
File Actions Edit View Help  
  
(kali㉿kali)-[~]  
$ cat /etc/group |grep "newhires"  
  
(kali㉿kali)-[~]  
$
```

The "newhires" group is deleted successfully.

The group has been successfully removed / deleted.