Group Management

Groups help organize users and manage permissions effectively on Linux. This handout covers group creation, modification, deletion, and membership management.

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1. Why Use Groups?

Groups simplify permission management by assigning rights to a collection of users rather than individuals, enabling:

- **Controlled access to resources** (files, printers, etc.)
- **Enhanced system security**
- **Streamlined administration**

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2. Important Group Management Files

- `/etc/group`
  - Stores group names, IDs (GID), and secondary group memberships.
- `/etc/passwd`
  - Stores each user's primary group.

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3. Primary vs Secondary Groups

- **Primary group →** Every user has exactly one primary group.
  - Default group ownership for new files.
  - Stored in `/etc/passwd` .
- **Secondary groups →** Users can belong to zero or more secondary groups.
  - Provides additional, granular permissions.
  - Stored in `/etc/group` .

Check user groups:

```
groups username
```

Check your own groups:

```
groups
```

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4. Managing Group Membership (`usermod`)

Change user groups

- **Add secondary group(s)** to a user:

```
sudo usermod –aG groupname username
```

- **Set primary group** (replace current primary group):

```
sudo usermod -g groupname username
```

- **Replace all secondary groups** (remove unspecified groups):

```
sudo usermod -G group1,group2 username
```

Examples

- Add `alice` to the `adm` group:

```
sudo usermod -aG adm alice
```

- Remove user from a secondary group (must specify all remaining groups explicitly):

```
sudo usermod -G plugdev,lpadmin alice
```

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5. Easy Group Membership Management (`adduser` & `deluser`)

Simpler commands (Ubuntu/Debian)

- **Add user to group**:

```
sudo adduser username groupname
```

- **Remove user from group**:

```
sudo deluser username groupname
```

Example

```
sudo adduser alice adm
sudo deluser alice adm
```

> *Note: After changing groups, log out and log back in (or reboot) to ensure changes take effect.*

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6. Creating Groups (`groupadd`)

Create custom groups with optional IDs.

- Basic group creation (auto-assigned ID):

```
sudo groupadd groupname
```

- Custom group ID (`GID`):

```
sudo groupadd -g 2500 groupname
```

Example:

```
sudo groupadd -g 5000 developers
```

Check group creation:

```
grep developers /etc/group
```

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7. Modifying Groups (`groupmod`)

Modify existing groups.

- **Change group name**:

```
sudo groupmod -n newname oldname
```

- **Change group ID (careful ❗ **)**:

```
sudo groupmod -g new_GID groupname
```

Example (rename group and change GID):

```
sudo groupmod -n webdev -g 6000 developers
```

> ⚠️ *Warning:*
>
> *Changing GIDs can break file permissions, as existing files store group ownership by GID.*

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8. Deleting Groups (`groupdel`)

Delete groups (not allowed for primary groups):

```
sudo groupdel groupname
```

- Does **not** delete files associated with the group.
- Cannot delete groups assigned as a user's primary group.

Example:

```
sudo groupdel webdev
```

🔐 Important System Groups

Group Name	Description
`root`	Full administrative privileges
`sudo`	Allows members to use `sudo`
`adm`	Access system log files
`lpadmin`	Manage printers and queues
`www-data`	Web server processes and file access
`plugdev`	Mount and manage removable devices

📌 Summary of Key Commands

Command	Description
`groups username`	List groups for user
`sudo usermod -aG group user`	Add secondary group(s)
`sudo usermod -g group user`	Change user's primary group
`sudo adduser user group`	Add user to group (Ubuntu/Debian)
`sudo deluser user group`	Remove user from group (Ubuntu/Debian)
`sudo groupadd -g GID groupname`	Create new group with custom GID
`sudo groupmod -n newname oldname`	Rename group
`sudo groupmod -g new_GID groupname`	Change GID of existing group (caution!)
`sudo groupdel groupname`	Delete group (except primary groups)