NJIT

Users and Permissions

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Users

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- designed for multi-user, remember Multics?
- users can be found in `/etc/passwd`
  - passwords used to be in `/etc/passwd`, now in `/etc/shadow`

/etc/passwd Format

```
root:x:0:0::/root:/bin/bash
ryan:x:1000:998:Ryan:/home/ryan:/bin/bash
nobody:x:65534:997::/nonexistent:/sbin/nologin
ntpd:x:989:997:NTP daemon user:/var/empty:/sbin/nologin
messagebus:x:987:982:D-Bus system bus user:/run/dbus:/sbin/nologin
polkitd:x:986:981:Polkit daemon user:/var/empty:/sbin/nologin
geoclue:x:985:979:GeoClue daemon user:/var/empty:/sbin/nologin
colord:x:984:978:colord daemon user:/var/empty:/sbin/nologin
avahi:x:983:977:Avahi daemon user:/var/empty:/sbin/nologin
gdm:x:982:975:GNOME Display Manager user:/sbin/nologin
sshd:x:988:983:sshd privilege separation user:/sbin/nologin
```

- username, password hash, user id, group id, friendly name, shell
- password hashes are actually in /etc/shadow

Groups

- multiple users may need the same access
- put those users in groups
- groups can be found in `/etc/group`
- users also have a primary group specified in `/etc/passwd`

Group Together Teamwork Free Photo is in the public domain

/etc/group Format

```
root:x:0:
wheel:x:999:ryan
users:x:998:
nogroup:x:997:
tty:x:996:
dialout:x:995:
kmem:x:994:
input:x:993:
video:x:992:ryan,gdm
audio:x:991:ryan
netdev:x:990:ryan
lp:x:989:
tape:x:985:
sgx:x:980:
messagebus:x:982:
polkitd:x:981:
gdm:x:975:
sshd:x:983:
```

- group name, password hash, group id, members
- group passwords are typically not used

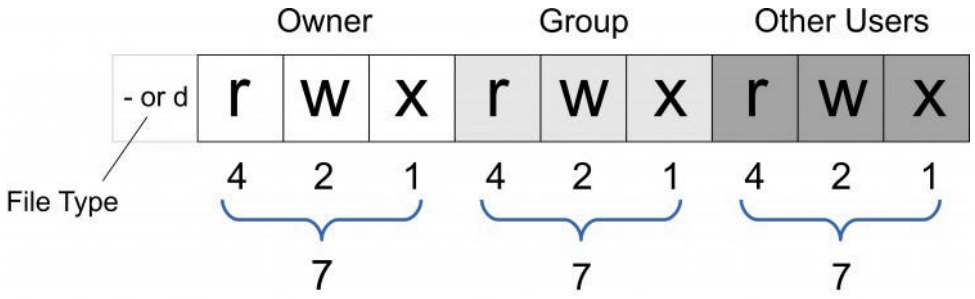
Permissions

chmod 101 is used under fair use

- every file/directory has permissions
- specified in octal, can be shown with `ls -l`

UNIX Permissions

- chmod is a utility used to modify permissions
- `chmod 666 /tmp/have-at-it.txt`
- `chmod 644 /tmp/mine-but-you-can-read-it.txt`
- `chmod 600 /tmp/mine-keep-out.txt`



Unix File Permissions is used under fair use

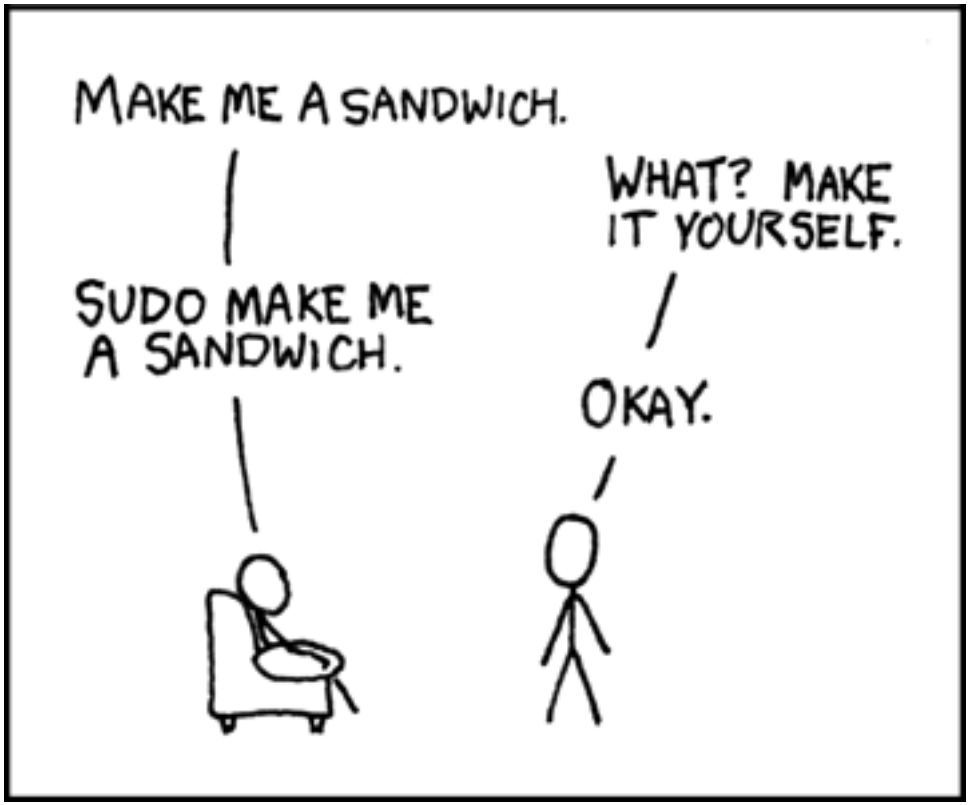
useradd/userdel/usermod

- editing `/etc/passwd`, `/etc/shadow`, and `/etc/group` can go poorly
- these basic commands let you add, delete, and modify users from the command line
- `useradd ryan -g users`: Add a user named ryan in the group users
- `usermod ryan -a -G sudoers`: Add ryan to the sudoers group too
- `userdel ryan`: Delete ryan
- man pages: useradd , usermod , and userdel
- these are *low-level* commands and they may not handle things like home directories!

chown/chmod

- chmod was already covered
- chown lets you change the owner *and* group:
  `chown ryan:devs roadmap.py`
- both of these have *recursive* options
- man pages: chown , chmod
- WARNING: Users need to re-login to have their groups updated!

su/sudo



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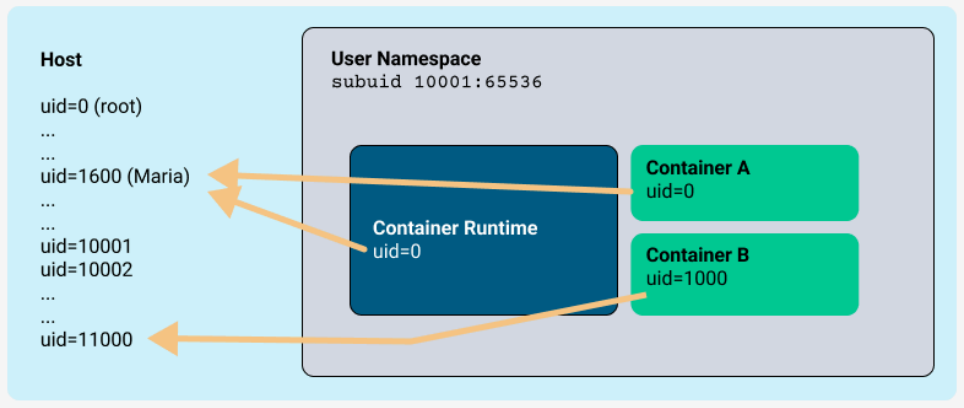
- su lets you run a shell (or a command) as any user
- su requires you to enter the root password
- sudo lets you run commands typically as root
- sudo requires you to enter your password and your username needs to be in the /etc/sudoers file or the `wheel/sudoers` group

groups

- shows you the groups you are in by default: `groups`
- can also show you the groups someone else is in: `groups ryan`
- Debian System Groups

UID, GID, subuid, and subgid

- UID, user id, and GID, group id, are integers that represent a user and a group respectively
- UID zero is for the root user
- processes get the UID of the person who ran it
- UIDs and GIDs are stored in the filesystem to manage access
- `/etc/subuid` and `/etc/subgid` allows the superuser to give certain users a range of subordinate UID and GID mappings
- this allows users to build namespaces with UNIX permissions and run rootless containers



User and Group ID Translation is used under fair use