Login name

- Syntax
  - usernames must be unique
  - <= 32 chars
    (old systems/NIS: limit 8 chars)
  - any characters except newlines and colons

- Recommendations
  - use lower case (even though case sensitive)
  - choose easy to remember
  - avoid “handles” and cutesy nicknames

CSE 265: System and Network Administration

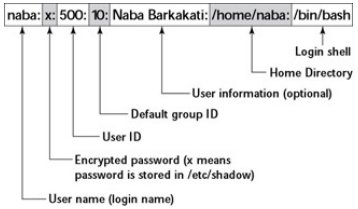
- User accounts
  - The /etc/passwd file
  - The /etc/shadow file
  - The /etc/group file
  - Adding users
  - Removing users
  - Disabling logins
  - Account management utilities
- Root powers
  - Ownership of files and processes
  - The superuser
  - Choosing a root password
  - Becoming root
  - Other pseudo-users

Encrypted passwords

- Most passwords are in /etc/shadow, not /etc/passwd
- Passwords are stored encrypted
  - Cannot be changed by hand
  - Can be copied from another account
  - Are set using passwd (or yppasswd for NIS)
- Password field should never be left blank
  - Put a star (*) in place (x for shadow usage)
  - Otherwise no pw needed!
- MD5 passwords (most distributions) can be any length
  - Other systems only use the first eight characters

The /etc/passwd file

- /etc/passwd lists all recognized users and contains:
  - login name
  - encrypted password (unless /etc/shadow used)
  - UID number
  - default GID number
  - full name, office, extension, home phone (optional)
  - home directory
  - login shell



- Examples

```
root:lga4FjuGpZ2so:0:0:The System,,x6096,:/:/bin/csh
jl:x:100:0:Jim Lane,ECT8-3,,:/staff/fl:/bin/sh
```

The /etc/shadow file

- Readable only by superuser
- Enhanced account information
- Use is highly recommended
- Use **usermod** to modify contents
- Contains:
  - Login name
  - Encrypted password
  - Date of pw change
  - Min number of days between password changes
  - Max days between pw changes
  - Num days in advance to warn
  - Num days after expiration to disable account
  - Account expiration date
  - Reserved field

UID number

- In Linux, UIDs are unsigned 32-bit integers (4B!)
  - Older systems only allowed up to 32,767
- Root is (almost always) UID 0
- Fake/system logins typically have low UIDs
  - Place real users >= 100
- Avoid recycling UIDs
  - Old files, backups are identified by UID
- Preserve unique UIDs across org
  - helpful for consistency across network filesystems

The /etc/group file

- Contains names of groups and lists each member
- Example:
  - `wheel:*:10:root,evi,garth,trent,brian`
  - Group name:encrypted password:GID:List of members, separated by commas (no spaces)
- Setting per-user groups is recommended
  - Better default security

Other fields

- default GID number
  - like UIDs, 32-bit unsigned integers
  - GID – is for the group “root”
- GECOS fields (optional) [**chfn**]
  - General Electric Comprehensive OS
  - full name, office, extension, home phone
- home directory
  - Where the user starts when the log in
- login shell [**chsh**]
  - such as sh/bash, csh/tcsh, ksh, etc.

Steps to add a user (2)

- Copy default startup files to the user's home directory
  - bash
    - .bashrc, .bash_profile
  - csh/tcsh
    - .login, .cshrc, .logout
  - X-windows
    - .Xdefaults, .Xclients, .xsession
- Need to create and store default files!

Adding users

- For small installations, adding users is simple
  - **Have user sign and date user agreement**
  - Create user account with useradd
  - Set password with passwd
  - Change defaults with usermod

Steps to add a user (3)

- Copy files to new directory

  # cp /etc/skel/.[a-zA-Z]* ~tyler

  # chmod 644 ~tyler/.[a-zA-Z]*

  # chown tyler ~tyler/.[a-zA-Z]*

  # chgrp staff ~tyler/.[a-zA-Z]*
- Cannot use **chown tyler ~tyler/.***
- Set mail home
  - might edit /etc/mail/aliases

Steps to add a user (1)

- Edit the /etc/passwd and /etc/shadow files to define account
  - Use **vipw** to lock and edit with $EDITOR
- Set an initial password

  # passwd user
- Create, chown, and chmod the user's home directory

  # mkdir /home/staff/tyler

  # chown tyler.staff /home/staff/tyler

  # chmod 700 /home/staff/tyler

Disabling logins

- Sometimes you need to temporarily disable a login
- Can't just put a star in front of encrypted pw
  - Might still be able to log in via network w/out pw
- Current practice
  - Replace shell with program explaining status and instructions on how to fix

Steps to add a user (4)

- Edit /etc/group file
  - Add to relevant groups
- Might set disk quotas with edquota
- Verify new login
  - log in as new user
  - execute **pwd** and **ls -la**
- Notify new user of account and initial password
  - get signed AUP
- Record account status and contact information

Account management utilities

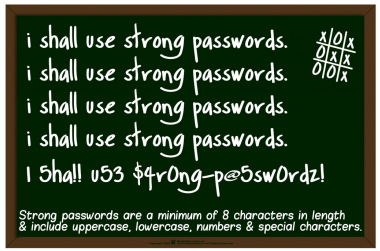
- Basic utilities
  - **useradd** – adds to passwd and shadow files
  - **usermod** – changes existing passwd entry
  - **userdel** – remove user, opt. delete home dir
  - **groupadd, groupmod, groupdel** operate on /etc/group
- Common to write custom **adduser** and **rmuser** scripts

Removing users

- Generally with **userdel**
  - Set disk quota to zero
  - Remove user from local databases or phone lists
  - Remove from aliases file (or add forwarding)
  - Remove crontab file and any pending at jobs
  - Kill any running processes
  - Remove temporary files in /var/tmp or /tmp
  - Remove from passwd, shadow, and group files
  - Remove home directory (backup first) and mail spool

Choosing a root password

- Any password? Not if you want it to be difficult to crack.
- Should be
  - At least eight characters (more may not be helpful)
  - Not easily guessed or found by trial and error
  - Memorable (so you don't need to write it down)
  - A seemingly random sequence of letters, digits, & punctuation
  - **Shocking nonsense!**
    - Memorable, unguessable, unique, undisclosed
    - Mpmgg!: "Mollusks peck my galloping genitals!"

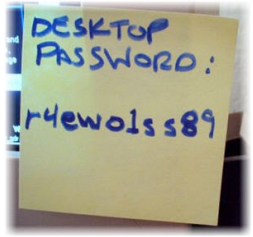


The superuser

- The root account has UID of 0
  - Can change the name and create other users with same UID; neither recommended
- The superuser (any process with effective UID 0) can perform **any** valid operation on **any** file or process.
- All other users are "normal"

Changing the root password

- Should be performed
  - At least every three months
  - Every time someone who might know the password leaves the site
  - Whenever you think security might be compromised
  - On a day when you will remember the new pw!



Restricted operations

- Superuser privileges are required for:
  - Changing the root directory of a process with chroot
  - Creating device files
  - Setting the system clock
  - Raising resource usage limits and process priorities
  - Setting the system's hostname
  - Configuring the network interfaces
  - Opening privileged network ports (<= 1024)
  - Shutting down the system
  - Changing process UID and GID (only one way)
    - Example: login

su

- **su**: substitute user identity (switch users)
  - Without args, su prompts for root password and then starts root shell
  - Logs who became root and when
  - Can also **su *username***
    - if you know the pw, or are root already
  - Use "**su –**" to execute new user's shell
    - Otherwise new PATH is not established
  - Good idea to use full pathname to **su** (why?)
    - Linux: /bin/su
    - Solaris: /sbin/su

Becoming root

- You can log in as root
  - No record of what operations were performed
    - Often you'll want a record!
      - When the root user was a colleague who is unavailable
      - When you can't remember exactly what you did
      - When the access was unauthorized and you want to know what was done
  - No record of who was root
- Typically want to disable root logins except at console

sudo

- sudo: a limited su
  - When you want to provide limited root-privileges
  - **sudo <program to be executed>**
    - Checks /etc/sudoers for authorization
    - Asks for user's password
    - Logs command executed, person, time, and directory
    - Executes command
    - Additional sudo commands can be executed without password for another five minutes
    - Example:
      - sudo /bin/cat /etc/sudoers

Being root

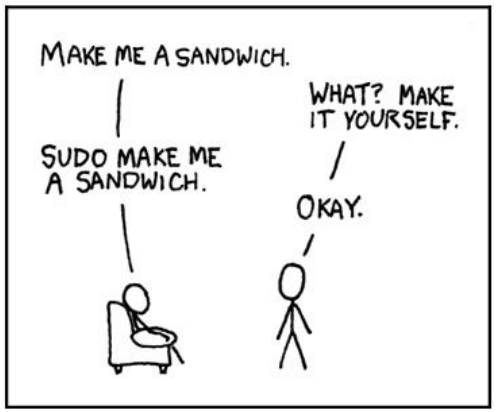
- Responsibilities!
  - Do not give out root password
  - Do not create new accounts with UID 0
  - Use root account for admin work only
  - Change root password often
  - Do not leave root shell unattended
  - Be extra careful!
  - Perhaps more, depending on policies at location

sudoers discussion

- Each permissions line includes
  - Users to whom the line applies
  - Hosts on which the line applies
  - Commands that the users can run
  - Users as whom the commands can be executed
- Use visudo to edit
  - If EDITOR environment variable set correctly
  - Locks file
  - Checks changes you made
- Example:

  % sudo -u operator /sbin/dump 0u /dev/hda2

Famous XKCD



sudo advantages

- Accountability – commands are logged
- Operators can do chores without root privileges
- Real root password can be known to very few people
- **sudo** is faster to use than **su** or logging in as root
- Privileges can be revoked without changing root pw
- A complete list of users with root is maintained
- Less chance of a root shell being left unattended
- A single file can control access for an entire network

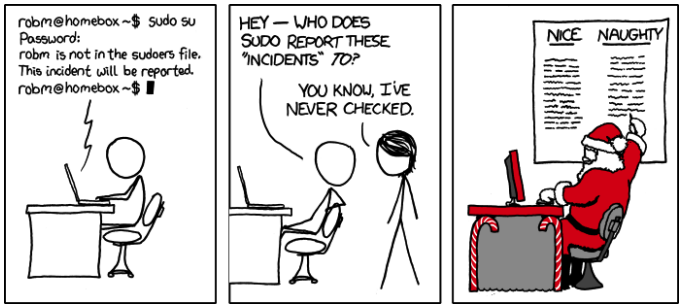
Example sudoers file

```
# Define aliases for machines in CS & Physics departments
Host_Alias    CS = tigger, anchor, piper, moet, sigi
Host_Alias    PHYSICS = eprince, pprince, icarus

# Define collections of commands
Cmnd_Alias DUMP = /sbin/dump, /sbin/restore
Cmnd_Alias PRINTING = /usr/sbin/lpc, /usr/bin/lprm
Cmnd_Alias SHELLS = /bin/sh, /bin/csh/, /bin/bash, /bin/ash

#Permissions
mark, ed  PHYSICS = ALL
herb      CS = /usr/local/bin/tcpdump : PHYSICS = (operator) DUMP
lynda     ALL = (ALL) ALL, !SHELLS
%wheel    ALL, !Physics = NOPASSWD: PRINTING
```

Other pseudo-users

- bin
  - Legacy owner of system commands
- daemon
  - Owner of unprivileged files and processes
- nobody
  - Account for remote roots of NFS systems
    - They often can't stay UID 0!
    - They need to be mapped to something

sudo logging



Group passwords

- The **newgrp** command allows a user to change the default group
  - Starts a new shell
  - If the group has a password, it will prompt for the password
    - Sometimes might give access, even if user not in list (varies)
- Group passwords are antiquated and not recommended
  - Must copy and paste password info
  - Group passwords are world readable
- RH/Fedora Linux has **gpasswd** command to set group password, put into /etc/gshadow, and more

sudo disadvantages

- /etc/sudoers file is everything!
- Users with **sudo** privileges must protect their accounts as if they were root!
- Command logging can be avoided by starting a shell, or running some program that allows shell escapes

sudo bang bang