1.111.1
Manage users and group accounts and related system files
Weight 4

Linux Professional Institute Certification — 102

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Outline

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2 Objectives

Description of Objective

Candidate should be able to *add*, *remove*, *suspend* and *change* user accounts. Tasks include to add and remove groups, to change user/group info in passwd/group databases. The objective also includes creating *special purpose* and *limited accounts*.

Key files, terms, and utilities include:

/etc/passwd — text file containing user account information

/etc/shadow — text file containing user password information

/etc/group — text file containing groups

/etc/gshadow — text file that may contain group passwords

chage — change user password expiry information

gpasswd — change group membership, group passwords

groupadd — create a new group

groupdel — delete an existing group

groupmod — modify a group

grpconv — moves all group password information to `/etc/gshadow`

grpunconv — creates group from group and gshadow and then removes gshadow.

passwd — set or change passwords to authenticate users

pwconv — moves all user password information from `/etc/passwd` to `/etc/shadow`

pwunconv — moves all password information from `/etc/shadow` to `/etc/passwd` then deletes `/etc/shadow`

useradd — create a new user account

userdel — delete an existing user account

usermod — modify a user account

3 Account information files

The account information files

/etc/passwd — text file containing user account information

/etc/shadow — text file containing user password information

/etc/group — text file containing groups

/etc/gshadow — text file that may contain group passwords

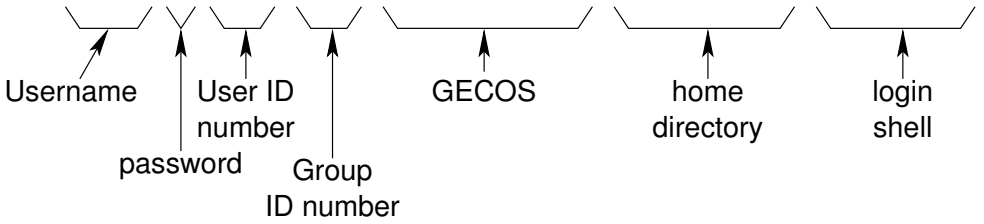
- Note that all are simple text files that can be edited with an editor (best to use `vipw` and `vigr` so that file is not edited while others are changing it)
- These are for *local* accounts only: network accounts may be obtained through LDAP, Samba or active directory through Winbind, NIS or NIS+ or Hessiod, to name a few.

3.1 /etc/passwd

/etc/passwd

- The `passwd` file is documented with `$` **man 5 passwd** ↩
- Each line of the file corresponds to one user; here is mine:

```
nicku:x:1000:1000:Nick Urbanik:/home/nicku:/bin/bash
```



3.2 Fields in /etc/passwd

Fields in /etc/passwd

user name — account name. Tradition has it in lower case.

password — This is always ‘x’ unless you have run `pwunconv` to move the hashed password from the `shadow` file back here. You can change it to a star ‘*’ to *disable* the account *if `shadow` is not used*

user ID number — an integer that uniquely identifies a particular user to the system. Call it UID

group ID number — an integer that uniquely identifies the *primary group* of this user to the system.

GECOS — holds the user’s actual name, and perhaps their phone number, or any information about the user you like! Called GECOS for hysterical reasons: read

`$` **man 5 passwd** ↩

home directory — after the user logs in, this directory is made their current directory

login shell — after logging in, the user has this shell. Usually the shell should be listed in `/etc/shells`

More about the passwd fields

- The computer identifies files, processes, ... by the UID and GID.
- the passwd file (or its equivalent) is the only link to the account name.
- the group ID number links the account to the one group that (by default) owns files and processes created by the user
- Although you can suspend an account to prevent logging in by replacing the login shell with something like /bin/false or /bin/nologin, a user can su to this account.

4 The /etc/group file

The /etc/group file

- Here are two lines from my /etc/group file:

```
nicku:x:1000:
linusgames:x:516:linus,pam,nicku
```

- The first says group with GID 1000 has the name nicku. It has no members, except for the user for whom this is the primary group ID
- The second line maps the group name linusgames to the GID 516. It has the members with user names linus, pam and nicku.

4.1 Primary and Secondary Groups

Primary Group

- Every user has a *primary group*
- This is the default group attached to any files or processes created by the user
- A member can belong to any number of *secondary groups*
- An example from earlier: nicku has a primary group called nicku and a secondary group called linusgames.
- You can change your group to any of your other groups with the newgrp command.

newgrp: Changing to other Groups

- A group may have a password associated with it
  - I do not recommend shared passwords, hence do not use group passwords
  - A shared secret remains a secret only if no one else is interested
- The password is put into /etc/gshadow
- If group has a password associated with it, a user who is not a member can change to this group using the newgrp command by entering the password when prompted.
- group members can change their current group to a group they are a member of using the newgrp command regardless of whether there is a password with that group.
- Group passwords are created using the gpasswd command.

5 The /etc/shadow file

/etc/shadow must be readable only by root

- The /etc/shadow file must be *readable only by root*
- This is to avoid other people getting a copy of all the hashed passwords and running Crack or John the Ripper to recover passwords at leisure

```
$ ls -l /etc/shadow ↩
-rw-------  1 root root 2085 Aug 24 13:13 /etc/shadow
```

Fields in /etc/shadow

From $ **man 5 shadow** ↩ the nine fields are:

- login name
- encrypted password
  - This is incorrect, wrong,... and makes me splutter!!
  - It is a *hash* of the password
  - Prefix with an exclamation mark '!' to *disable an account temporarily*.
- days since Jan 1, 1970 that password was last changed
- days before password may be changed
- days after which password must be changed

- days before password is to expire that user is warned
- days after password expires that account is disabled
- days since Jan 1, 1970 that account is disabled
- a reserved field

6 Making accounts

Making a user account

Any method of creating an account goes through the following steps (assuming the use of local files to hold account information)

1. Find the next available UID and GID numbers, or use the ones provided, checking they are unique
2. Add an entry to the `/etc/passwd` and `/etc/shadow` files using all the information provided, including a hash of the password into `/etc/shadow`
3. Create the home directory
4. Create a mail spool file `/var/spool/mail/`⟨*username*⟩
5. Copy the files and directories from `/etc/skel` to the home directory
6. Change the ownership of the home directory and all its contents to the user, and the group ownership to the primary group of the user
7. Change the ownership of the mail spool file to the user, and make the group owner equal to `mail`

6.1 `useradd`, `adduser`

`/usr/sbin/useradd`

- On Red Hat/Fedora (and some other UNIX systems), `useradd` does all the above, although you need to create a hash of the password beforehand
- On Debian systems, the program `adduser` is more capable, and `useradd` less so
- See `$` **`man useradd`** ↩ , `$` **`man adduser`** ↩
- Make an account for me:


```
$ sudo useradd -c "Nick Urbanik" nicku ↩
$ sudo passwd nicku ↩
Changing password for user nicku.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
```

Differences between Debian and Red Hat `useradd`

- On Debian systems, you need to specify the `-m` option to `useradd` or the home directory will not be created.
- People use `adduser` instead on Debian systems.

6.2 Modifying an account with `usermod`

`/usr/sbin/usermod`

- You can modify the account parameters in the `/etc/passwd` file for an existing account using `usermod`.
- See `$` **`man usermod`** ↩

7 Creating a group

`/usr/sbin/groupadd`

- You can create a new group with: `$` **`sudo groupadd`** ⟨*groupname*⟩ ↩
- Note that `useradd` (and `adduser` on Debian/Ubuntu) will automatically create the primary group for a user if it does not already exist

8 Deleting a group

`/usr/sbin/groupdel`

- You can remove an existing group with: `$` **`sudo groupdel`** ⟨*groupname*⟩ ↩

9 Adding a user to a group

Adding a user to a group

- It may seem that `usermod` is the best tool, but it actually removes the user from any groups not specified!
- Use `gpasswd` instead `:-)`
- Syntax: `#` **`gpasswd -a`** ⟨*user*⟩ ⟨*group*⟩ ↩
- To add the user `nicku` to the group `linusgames` without removing `nicku` from any existing group memberships:

```
$ sudo gpasswd -a nicku linusgames ↩
```

10 `userdel`: deleting a user account

`/usr/sbin/userdel`

- To delete the `nicku` account *including the home directory*:

```
$ sudo userdel -r nicku ↩
```

11 Suspending an account

Suspending an account

- You can suspend ("lock") a `shadow` account by inserting an exclamation mark '`!`' in front of the password field in `/etc/shadow` using `vipw`
- ... or you can use `$` **`sudo passwd -l`** ⟨*username*⟩ ↩ to do the same thing
- You can unlock the account by removing the '`!`' either manually with `vipw` or with `$` **`sudo passwd -u`** ⟨*username*⟩ ↩

12 Setting the password expiry information

Setting the password expiry information

- The easiest program to use for this is `chage`
- You can also use `passwd` to change some password information.
- Ordinary users can use `$` **`chage -l`** ↩ to read the account aging information for their own account.

13 Creating special purpose accounts

Creating special purpose accounts

- A number of special system accounts are needed:, e.g.,

```
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
news:x:9:13:news:/etc/news:
uucp:x:10:14:uucp:/var/spool/uucp:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
gopher:x:13:30:gopher:/var/gopher:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
vcsa:x:69:69:virtual console memory owner:/dev:/sbin/nologin
nscd:x:28:28:NSCD Daemon:/:/sbin/nologin
rpm:x:37:37::/var/lib/rpm:/sbin/nologin
haldaemon:x:68:68:HAL daemon:/:/sbin/nologin
netdump:x:34:34:Network Crash Dump user:/var/crash:/bin/bash
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
rpc:x:32:32:Portmapper RPC user:/:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
mailnull:x:47:47::/var/spool/mqueue:/sbin/nologin
smmsp:x:51:51::/var/spool/mqueue:/sbin/nologin
pcap:x:77:77::/var/arpwatch:/sbin/nologin
xfs:x:43:43:X Font Server:/etc/X11/fs:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
gdm:x:42:42::/var/gdm:/sbin/nologin
```

- These accounts generally have a user ID that is lower than some particular value
- Use the user ID numbers and names recommended by the distribution to avoid unintentional conflicts
  - See `/usr/share/doc/setup-*/uidgid` on Red Hat/Fedora systems

14 Creating limited accounts

Creating limited accounts

- Network servers such as Apache, Sendmail, Postfix, Samba, Bind, ntpd,... all run under special accounts that have limited access to the system
- You may need to create accounts for users who are just there for accessing email by POP3 or IMAP, or just for Samba
- To do this: create an account with a login shell of `/bin/false` (or possibly `/sbin/nolog` and a disabled password.

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