



25D Linux Foundation Course

05 – Managing Linux Users and Groups



Overview



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- ☐ Understanding Linux users and groups
- ☐ Managing Linux user accounts
- ☐ Managing Linux group accounts



Introduction



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- ☐ Like most current OS's Linux is multiuser
- ☐ Each user is provided their own computing environment
 - Some similarities but still unique to that user
 - Different files applications and permissions
- ☐ When a user logs on:
 - Their preferences are loaded
 - Another user logs on their preferences are loaded
 - The user can log on remotely, preferences are loaded as though local



Understanding Linux Users and Groups



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❑ Because of this multi-user environment controls must be established to allow access and controls on what is accessed:

- To control access to a Linux system and the data it contains, we need to do two things:**
 - Establish users and authentication/permissions for them**
 - Establish groups and authentication/permissions for them**
 - Establish ownership and permissions**



Linux User Accounts



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☐ **How Linux user accounts work**

- **Must provide authentication credentials**
 - **Commonly username/password but could use other forms**

☐ **Where Linux user accounts are stored**

- **By default created in the /home directory**
- **Segregates users from one another**
- **Root user not in the /home it is /root**
- **Users may have access to files of other users but permissions will restrict what they can do to the file (read, write, etc.)**
- **/etc/default/useradd contains default account settings**



How Linux User Accounts Work

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❑ Viewing user information

– `finger username`

- Login
- Name
- Directory
- Shell
- Last Login

```
openSUSE:~ # finger cptamerica
Login: cptamerica           Name: Steve Rodgers
Directory: /home/cptamerica Shell: /bin/bash
Never logged in.
No Mail.
No Plan.
openSUSE:~ # finger batman
Login: batman              Name: Bruce Wayne
Directory: /home/batman    Shell: /bin/bash
Never logged in.
No Mail.
No Plan.
openSUSE:~ # finger ironman
Login: ironman             Name: Tony Stark
Directory: /home/ironman   Shell: /bin/bash
Never logged in.
No Mail.
No Plan.
```

❑ View UID of users

– `id username`

```
student@openSUSE:~> id student
uid=1000(student) gid=100(users) groups=100(users)
```

– UID for root on most distributions is 0



Where Linux Accounts Are Stored

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- ☐ **Local**
 - Default location for user accounts is `/etc/passwd` file
- ☐ **Lightweight Directory Access Protocol**
 - User accounts stored in a directory service
- ☐ **Network Information Service**
 - Provides centralized user account management
 - All systems use common `etc/passwd` and `etc/shadow` files
- ☐ **Windows Domain**
 - User accounts on a Windows domain can be used to authenticate on a Linux system



The /etc/passwd File

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```
openSUSE:~ # tail /etc/passwd
cptamerica:x:1001:100:Steve Rodgers:/home/cptamerica:/bin/bash
ironman:x:1002:100:Tony Stark:/home/ironman:/bin/bash
blackwidow:x:1003:100:Natasha Romanoff:/home/blackwidow:/bin/bash
falcon:x:1004:100:Sam Wilson:/home/falcon:/bin/bash
warmachine:x:1005:100:James Rhodes:/home/warmachine:/bin/bash
batman:x:1006:100:Bruce Wayne:/home/batman:/bin/bash
superman:x:1007:100:Clark Kent:/home/superman:/bin/bash
flash:x:1008:100:Barry Allen:/home/flash:/bin/bash
greenlantern:x:1009:100:Hal Jordan:/home/greenlantern:/bin/bash
wonderwoman:x:1010:100:Diana Prince:/home/wonderwoman:/bin/bash
```

Fields of /etc/passwd file:

- Username
- Password
- UID
- GID
- Full_Name
- Home_Directory
- Default_Shell



The /etc/shadow File



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```
openSUSE:~ # tail /etc/shadow
cptamerica:RDyth434HGhgfgytYhj8:17112:0:99999:7:::
ironman:TFDCrsdHG54Jhji87:17112:0:99999:7:::
blackwidow:OIJKtfr47tuftDFC6557:17112:0:99999:7:::
falcon:645fyтуhYGUugg78:17112:0:99999:7:::
warmachine:HGtfyttHJUYG645GFytfyt:17112:0:99999:7:::
batman:Bhbgrfd65derd33578ughhj:17112:0:99999:7:::
superman:sseXERdgUHU IH7865FDtrdtrg:17112:0:99999:7:::
flash:jiuygyitGyytfytfty4ygFt675:17112:0:99999:7:::
greenlantern:YFGythUYFG6545yfgfHG:17112:0:99999:7:::
wonderwoman:JOIjiugftr6567YGfyтуy676:17112:0:99999:7:::
```

Fields of /etc/shadow file:

- Username
- Password
- Last_Modified
- Min_Days
- Max_Days
- Days_Warn
- Disabled_Days
- Expire



pwck Utility



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pwck

- **Verifies the existence of user accounts on Linux system by checking /etc/passwd and etc/shadow**
- **Checks are made to verify that each user has:**
 - **The correct number of fields**
 - **A unique and valid username**
 - **A valid user and group identifier**
 - **A valid primary group**
 - **A valid home directory**
 - **A valid login shell**



pwck Utility



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☐ pwck Output Example:

```
openSUSE:~ # pwck
user 'mysql': directory '/var/lib/mysql' does not exist
user 'pulse': directory '/var/lib/pulseaudio' does not exist
user 'usbmux': directory '/var/lib/usbmuxd' does not exist
pwck: no changes
```

- ☐ In this example there are some errors with three accounts
- ☐ The accounts from the prior slides (batman, wonderwoman, etc) passed the check
- ☐ Great utility for admins especially when accounts are modified, etc.



Creating and Managing User Accounts from the Command Line



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☐ **useradd**

- Adding a user

☐ **passwd**

- Change an existing password on an existing account

☐ **usermod**

- Modify an existing account

☐ **userdel**

- Delete a user account



The useradd Utility



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☐ Add users to Linux system

- `useradd options username`

- **Example: useradd aquaman**

 - `useradd -c “Arthur Curry” aquaman`

☐ Configuration files for adding users

- `/etc/default/useradd`

- `/etc/login.defs`

- `/etc/skel`



useradd Options



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Option	Description
-c	Includes the user's full name
-e	Specifies the date when the user account will be disabled. Format the date as yyyy-mm-dd.
-f	Specifies the number of days after password expiration before the account is disabled
-g	Specifies the user's default group
-G	Specifies additional groups that the user is to be made a member of
-M	Specifies that the user account be created without a home directory
-m	Specifies the user's home directory
-n	Used only on Red Hat and Fedora systems. By default, these distributions create a new group with the same name as the user every time an account is created. Using this option will turn off this functionality
-p	Specifies the user's encrypted password. You can encrypt the password you want to use with the openssl passwd -crypt command
-r	Specifies that the user being created is a system user
-s	Specifies the default shell for the user
-u	Manually specifies a UID for the user



The *passwd* command



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☐ Change existing user's password

– `passwd username`

☐ View account status

– `passwd -S username`

```
openSUSE:~ # passwd -S ironman
ironman P 11/07/2016 0 99999 7 -1
openSUSE:~ # passwd -S batman
batman P 11/07/2016 0 99999 7 -1
```

Option	Description
-l	Locks the user's account. This option invalidates the user's password
-u	Unlocks a user's account
-d	Removes a user's password
-n	Sets the minimum number of days required before a password can be changed
-x	Sets the maximum number of days before a password must be changed
-w	Sets the number of days prior to password expiration when the user will be warned of the pending expiration
-i	Sets the number of days to wait after a password has expired to disable the account



The usermod Command



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☐ **May need to modify accounts**

- This can be done via usermod or file modification
- Example: `usermod -c "Bruce Wayne" batman`
- The above example would modify the already existing batman account with a full name of Bruce Wayne
- Just like with useradd, there are several options that can be used with the usermod utility
 - `-c`: edits the user's full name
 - `-g`: set's the user's default group
 - `-m`; set's the user's home directory



The usermod Command



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❑ Complete list of options for moduser

Option	Description
-c	Edits the user's full name
-e	Sets the date when the user account will be disabled. Format the date as yyyy-mm-dd
-f	Sets the number of days after password expiration before the account is disabled
-g	Sets the user's default group
-G	Specifies additional groups that the user is to be made a member of
-l	Changes the username
-L	Locks the user's account
-m	Sets the user's home directory
-p	Sets the user's password
-s	Specifies the default shell for the user
-u	Sets the UID for the user
-U	Unlocks a user's account that has been locked



The userdel Command

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☐ Remove user accounts from Linux system

`-userdel username`

– Does not delete user's home directory

☐ Remove user accounts and delete user's home directory

`-userdel -r username`



The userdel Command

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□ Examples of deleting users:

```
openSUSE:~ # tail /etc/passwd
warmachine:x:1005:100:James Rhodes:/home/warmachine:/bin/bash
batman:x:1006:100:Bruce Wayne:/home/batman:/bin/bash
superman:x:1007:100:Clark Kent:/home/superman:/bin/bash
flash:x:1008:100:Barry Allen:/home/flash:/bin/bash
greenlantern:x:1009:100:Hal Jordan:/home/greenlantern:/bin/bash
wonderwoman:x:1010:100:Diana Prince:/home/wonderwoman:/bin/bash
aford:x:1012:100:Abraham Ford:/home/aford:/bin/bash
rbolton:x:1013:100:Ramsey Bolton:/home/rbolton:/bin/bash
tylannister:x:1014:100:Tywin Lannister:/home/tylannister:/bin/bash
grhee:x:1015:100:Glenn Rhee:/home/grhee:/bin/bash
```

```
openSUSE:~ # userdel -r grhee
no crontab for grhee
openSUSE:~ # userdel -r aford
no crontab for aford
openSUSE:~ # userdel -r tylannister
no crontab for tylannister
openSUSE:~ # userdel -r rbolton
no crontab for rbolton
openSUSE:~ # tail /etc/passwd
cptamerica:x:1001:100:Steve Rodgers:/home/cptamerica:/bin/bash
ironman:x:1002:100:Tony Stark:/home/ironman:/bin/bash
blackwidow:x:1003:100:Natasha Romanoff:/home/blackwidow:/bin/bash
falcon:x:1004:100:Sam Wilson:/home/falcon:/bin/bash
warmachine:x:1005:100:James Rhodes:/home/warmachine:/bin/bash
batman:x:1006:100:Bruce Wayne:/home/batman:/bin/bash
superman:x:1007:100:Clark Kent:/home/superman:/bin/bash
flash:x:1008:100:Barry Allen:/home/flash:/bin/bash
greenlantern:x:1009:100:Hal Jordan:/home/greenlantern:/bin/bash
wonderwoman:x:1010:100:Diana Prince:/home/wonderwoman:/bin/bash
```



Exercise 5-1: Managing User Accounts from the Command Line



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**Please open your Practical Exercise book to
Exercise 5-1.**

Time to Complete: 5 Minutes



How Linux Groups Work

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- ☐ **Groups allow for simple sharing of resources on Linux system**
- ☐ **Users belonging to the same group have similar permissions over all resources owned by group**
- ☐ **Groups are defined in the `/etc/group` file**
 - **Fields in `/etc/group` file**
 - **Group**
 - **Password**
 - **GID**
 - **Users**



Managing Groups from the Command Line



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☐ Add groups to Linux system

– `groupadd options groupname`

- `-g` Specifies a GID for the new group
- `-p` Specifies a password for the group

☐ Modify existing groups

– `groupmod options group`

- `-g` Changes the groups' GID number
- `-p` Changes the group's password
- `-A` Adds a user account to the group (May not be available in the distribution)
- `-R` Removes a user account from the group

☐ Delete a group from Linux system

– `groupdel groupname`



Managing Groups from the Command Line



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- ❑ Some examples of adding and modifying groups:

```
openSUSE:~ # groupadd avengers
openSUSE:~ # groupadd justiceleague
openSUSE:~ # tail /etc/group
pulse-access:x:486:
postfix:x:51:
maildrop:x:59:postfix
scard:x:485:
ntadmin:x:71:
kdm:!:484:
at:x:25:
sun:x:483:
avengers:x:1000:
justiceleague:x:1001:
```

```
openSUSE:~ # usermod -a -G justiceleague batman
openSUSE:~ # usermod -a -G justiceleague wonderwoman
openSUSE:~ # usermod -a -G justiceleague flash
openSUSE:~ # usermod -a -G justiceleague greenlantern
openSUSE:~ # usermod -a -G justiceleague superman
openSUSE:~ # usermod -a -G avengers ironman
openSUSE:~ # usermod -a -G avengers blackwidow
openSUSE:~ # usermod -a -G avengers cptamerica
openSUSE:~ # usermod -a -G avengers falcon
openSUSE:~ # usermod -a -G avengers warmachine
openSUSE:~ # tail /etc/group
pulse-access:x:486:
postfix:x:51:
maildrop:x:59:postfix
scard:x:485:
ntadmin:x:71:
kdm:!:484:
at:x:25:
sun:x:483:
avengers:x:1000:ironman,blackwidow,cptamerica,falcon,warmachine
justiceleague:x:1001:batman,wonderwoman,flash,greenlantern,superman
```

- ❑ In the following examples the groups were created and users moved into specific groups
- ❑ Multiple users can be added to groups (not done in this example)



Managing Groups from the Command Line



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❑ Removing a user from a group:

```
openSUSE:~ # tail /etc/group
pulse:x:487:
pulse-access:x:486:
postfix:x:51:
maildrop:x:59:postfix
scard:x:485:
ntadmin:x:71:
kdm:!:484:
at:x:25:
svn:x:483:
avengers:x:1000:cptamerica
openSUSE:~ # gpaswd -d cptamerica avengers
Removing user cptamerica from group avengers
openSUSE:~ # tail /etc/group
pulse:x:487:
pulse-access:x:486:
postfix:x:51:
maildrop:x:59:postfix
scard:x:485:
ntadmin:x:71:
kdm:!:484:
at:x:25:
svn:x:483:
avengers:x:1000:
```




Managing Groups from the Command Line



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❑ Example of deleting a group:

```
openSUSE:~ # groupdel avengers
openSUSE:~ # groupdel justiceleague
openSUSE:~ # tail /etc/group
rtkit:x:488:
pulse:x:487:
pulse-access:x:486:
postfix:x:51:
maildrop:x:59:postfix
scard:x:485:
ntadmin:x:71:
kdm:!:484:
at:x:25:
svn:x:483:
openSUSE:~ # tail /etc/passwd
cptamerica:x:1001:100:Steve Rodgers:/home/cptamerica:/bin/bash
ironman:x:1002:100:Tony Stark:/home/ironman:/bin/bash
blackwidow:x:1003:100:Natasha Romanoff:/home/blackwidow:/bin/bash
falcon:x:1004:100:Sam Wilson:/home/falcon:/bin/bash
warmachine:x:1005:100:James Rhodes:/home/warmachine:/bin/bash
batman:x:1006:100:Bruce Wayne:/home/batman:/bin/bash
superman:x:1007:100:Clark Kent:/home/superman:/bin/bash
flash:x:1008:100:Barry Allen:/home/flash:/bin/bash
greenlantern:x:1009:100:Hal Jordan:/home/greenlantern:/bin/bash
wonderwoman:x:1010:100:Diana Prince:/home/wonderwoman:/bin/bash
```

Exercise 5-2: Managing Groups from the Command Line



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**Please open your Practical Exercise book to
Exercise 5-2.**

Time to Complete: 5 Minutes



Summary



U.S. ARMY CYBER CENTER OF EXCELLENCE

- ☐ Understanding Linux users and groups
- ☐ Managing Linux user accounts
- ☐ Managing Linux group accounts



Questions

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Questions?



Check on Learning



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Question 1

Which of the following commands will display the UID of a user named pparker when entered at the shell prompt?

- A. id pparker
- B. finger pparker
- C. UID pparker
- D. Info pparker



Check on Learning



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Question 2

You need to look at the file used to store user accounts on a system for local authentication. Which of the following files are you looking for?

- A. /etc/shadow**
- B. /etc/user**
- C. /etc/passwd**
- D. /etc/local/accounts**



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Question 3

Which of the following files has user account passwords stored as a hash?

- A. `/etc/shadow`
- B. `/etc/users`
- C. `/etc/passwd`
- D. `/etc/local/accounts`



Check on Learning



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Question 4

Consider the following entry in the `/etc/passwd`:

```
tyrlannister:x:1000:100:Tyrion Lannister:/home/tyrlannister:/bin/bash
```

What is the primary group for this user? (Choose two)

- A. ksanders
- B. home
- C. 1000
- D. 100
- E. users
- F. videos



Check on Learning



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Question 5

Consider the following entry in the `/etc/shadow` file:

`lcage:&6fVUH7^&RF65df65^#&S#&Npu:13481:30:60:7:-1::`

How often must Luke Cage change his password?

- A. Every 30 days
- B. Every 60 days
- C. Every 7 days
- D. This feature is disabled



Check on Learning



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Question 6

You need to create a new user account on a Linux system for Peter Parker named spiderman. Peter's password should be set (encrypted) to "4&*[^]y^tg^ft" and his home directory created in /home/spiderman. Which of the following commands accomplish this?

- A. `useradd -c "Peter Parker" -m -p "4&*[^]y^tg^ft" spiderman`
- B. `usermod "Peter Parker" -p "4&*[^]y^tg^ft" spiderman`
- C. `useradd spiderman`
- D. `useradd spiderman -c "Peter Parker" -m -p 4&*[^]y^tg^ft`



Check on Learning



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Question 7

A user named Lois Lane recently married and changed her last name to Kent. You need to change her username on her Linux system. Which command will do this?

- A. `usermod -l "llane" -c "Lois Kent" lkent`
- B. `usermod -l "lkent" -c "Lois Kent" llane`
- C. `useradd lkent`
- D. `usermod -c "llane" -l "lkent" Lois Lane`



Check on Learning



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Question 8

You need to delete a user account named jsnow from your Linux system and remove his home directory contents due to his watch ending. Which of the following commands will accomplish this?

- A. `userdel jsnow`
- B. `usermod --delete --rmhome jsnow`
- C. `userdel -r jsnow`
- D. `userdel --rmhome jsnow`



Check on Learning



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Question 9

Which file is used to store group information on a Linux system that has been configured to use local authentication?

- A. /etc/groups**
- B. /etc/Group**
- C. /etc/groupinfo**
- D. /etc/group**



Check on Learning



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Question 10

Which of the following commands can be used to add the user hquinn to a group named villians on a linux system? (Choose two)

- A. `groupadd -A "hquinn" villians`
- B. `groupmod -A "hquinn" villians`
- C. `usermod -a -G villians hquinn`
- D. `groupmod -R "hquinn" villians`
- E. `groupmod editors -A "hquinn"`