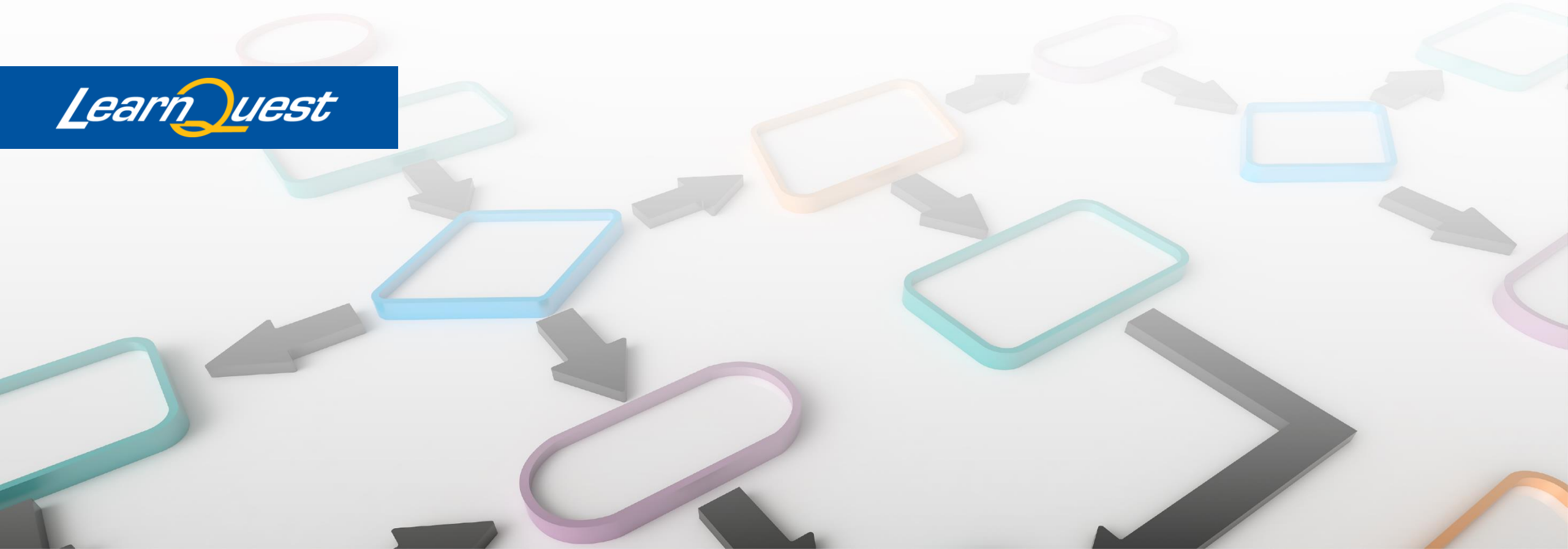
Managing Linux Systems

- 2nd Course in Linux Foundations Specialization



Administering Users and Groups

In the second module of this course, we will look at how to manage users that are authorized to use the Linux system.

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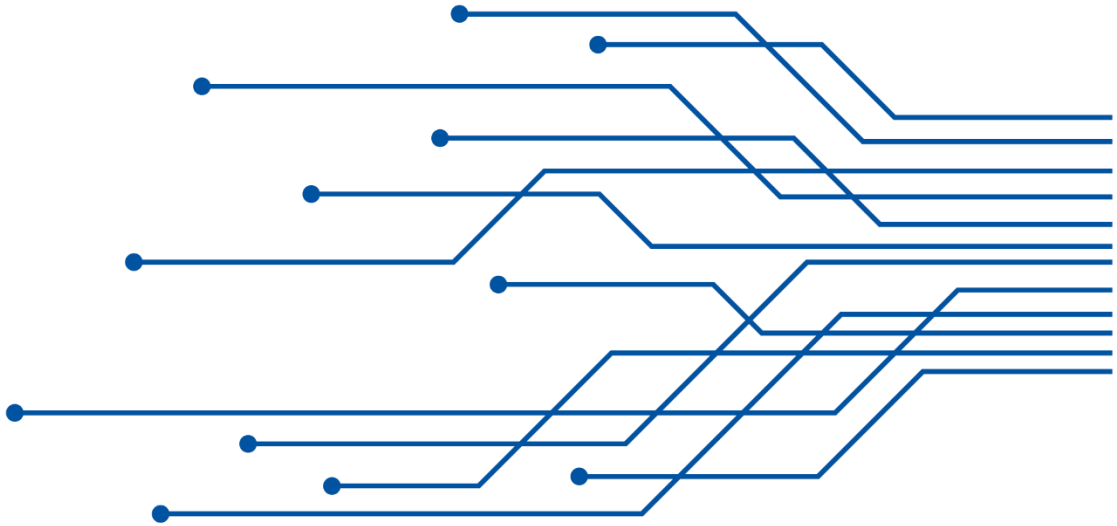


Learning Objectives

Administering Users and Groups

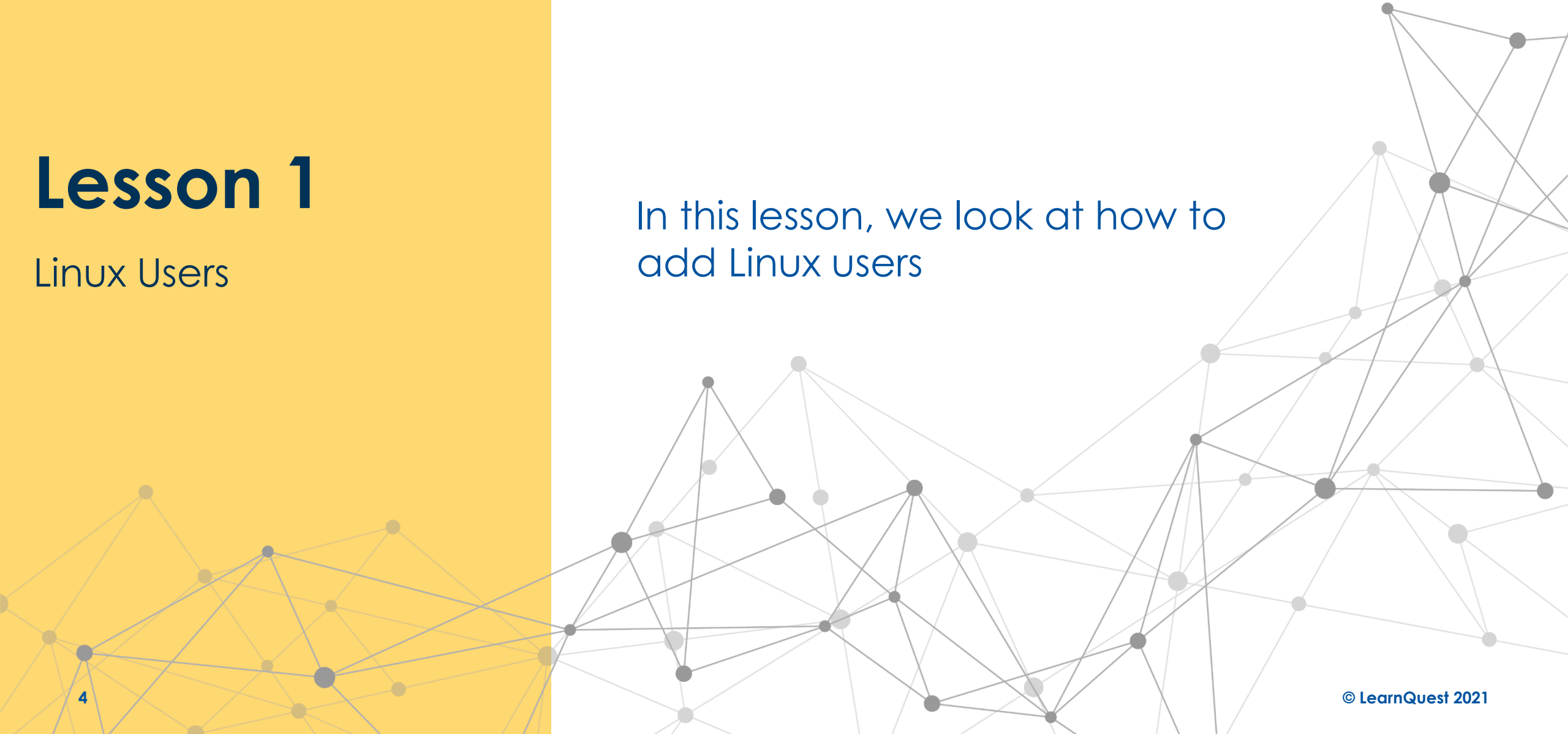
Upon completion of this module, learners will be able to:

- Add Linux Users
- Manage Linux User Groups
- Set up the Linux Environment for Users
- Interrogate Current User Information

Lesson 1

Linux Users

In this lesson, we look at how to add Linux users



Files and Directories Involved in User Creation Process

- The /etc/login.defs File
- The /etc/default/useradd File
- The /etc/skel/ Directory
- The /etc/passwd File
- The /etc/shadow File

The /etc/login.defs file

Provides default configuration information for several user account parameters. The useradd, usermod, userdel, and groupadd commands, and other user and group utilities take default values from this file.

Each line consists of a directive name and associated value.

- PASS_MAX_DAYS 99999 # Maximum number of days a password may be used.
- PASS_MIN_DAYS 0 # Minimum number of days allowed between password changes.
- PASS_MIN_LEN 5 # Minimum acceptable password length.
- PASS_WARN_AGE 7 # Number of days warning given before a password expires.
- UID_MIN 1000 # Min values for automatic uid selection in useradd
- UID_MAX 60000 # Max values for automatic uid selection in useradd
- CREATE_HOME yes # Create home directory for users
- UMASK 077 # The permission mask is initialized to this value.
- USERGROUPS_ENAB yes # This enables userdel to remove user groups if no members exist.
- ENCRYPT_METHOD SHA512 # Use SHA512 to encrypt password.

The /etc/default/useradd File

Holds several configuration defaults for new users

- GROUP=100 # default user group
- HOME=/home
- INACTIVE=-1
- EXPIRE=
- SHELL=/bin/bash # default shell for new users
- SKEL=/etc/skel # holds copies of various initialization and other files copied to the new user's home directory

/etc/skel/ Directory

The /etc/skel directory contains files and directories that are automatically copied over to a new user's home directory when such user is created by the useradd program.

A home directory is the directory on Linux that serves as the repository for a user's personal files, directories and programs, including personal configuration files.

It is the directory that a user is first in after logging into the system.

/etc/skel allows a system administrator to create a default home directory for all new users on a computer or network and make certain that all users begin with the same settings or environment.

Several user configuration files are placed in /etc/skel by default when the operating system is installed. These include .bash_profile, .bashrc, .bash_logout, dircolors, .inputrc and .vimrc.

/etc/passwd File

The /etc/passwd file stores user account information. The file is in plaintext with a row per user and fields delimited with a :.

The following columns are in the file for each account:

- Username: It is used when user logs in. It should be between 1 and 32 characters in length.
- Password: An x character indicates that encrypted password is stored in /etc/shadow file.
- User ID (UID): Each user must be assigned a user ID (UID). UID 0 (zero) is reserved for root and UIDs 1-99 are reserved for other predefined accounts. Further UID 100-999 are reserved by system for administrative and system accounts/groups.
- Group ID (GID): The primary group ID (stored in /etc/group file)
- User ID Info (GECOS): The comment field. It allows you to add extra information about the users such as user's full name, phone number etc. This field is used by finger command.
- Home directory: The absolute path to the directory the user will be in when they log in. If this directory does not exist, then user's directory becomes /
- Command/shell: The absolute path of a command or shell (/bin/bash). If shell set to /sbin/nologin and the user tries to log in to the Linux system directly, the /sbin/nologin shell closes the connection.

/etc/shadow File

Stores secure user account information. All fields are separated by a colon (:) symbol. It contains one entry per line for each user listed in /etc/passwd file.

The following columns are in the for each account:

- Username : It is the login name.
- Password : It is the encrypted password. The password should be minimum 8-12 characters long including special characters, digits, lower case alphabetic and more. Usually password format is set to idsalt$hashed, The $id is the algorithm used On GNU/Linux as follows:
  - 1 is MD5 $2a$ is Blowfish $2y$ is Blowfish 5 is SHA-256 6 is SHA-512
- Last password change : Days since Jan 1, 1970 that password was last changed
- Minimum : The number of days left before the user is allowed to change his/her password
- Maximum : The maximum number of days the password is valid
- Warn : The number of days before password is to expire that user is warned that his/her password must be changed
- Inactive : The number of days after password expires that account is disabled
- Expire : An absolute date specifying when the login may no longer be used.

Useradd Command

Edits /etc/passwd, /etc/shadow, /etc/group and /etc/gshadow files for the newly created User account.

- Creates and populate a home directory for the new user
- Sets permissions and ownerships to home directory

Example Usage:

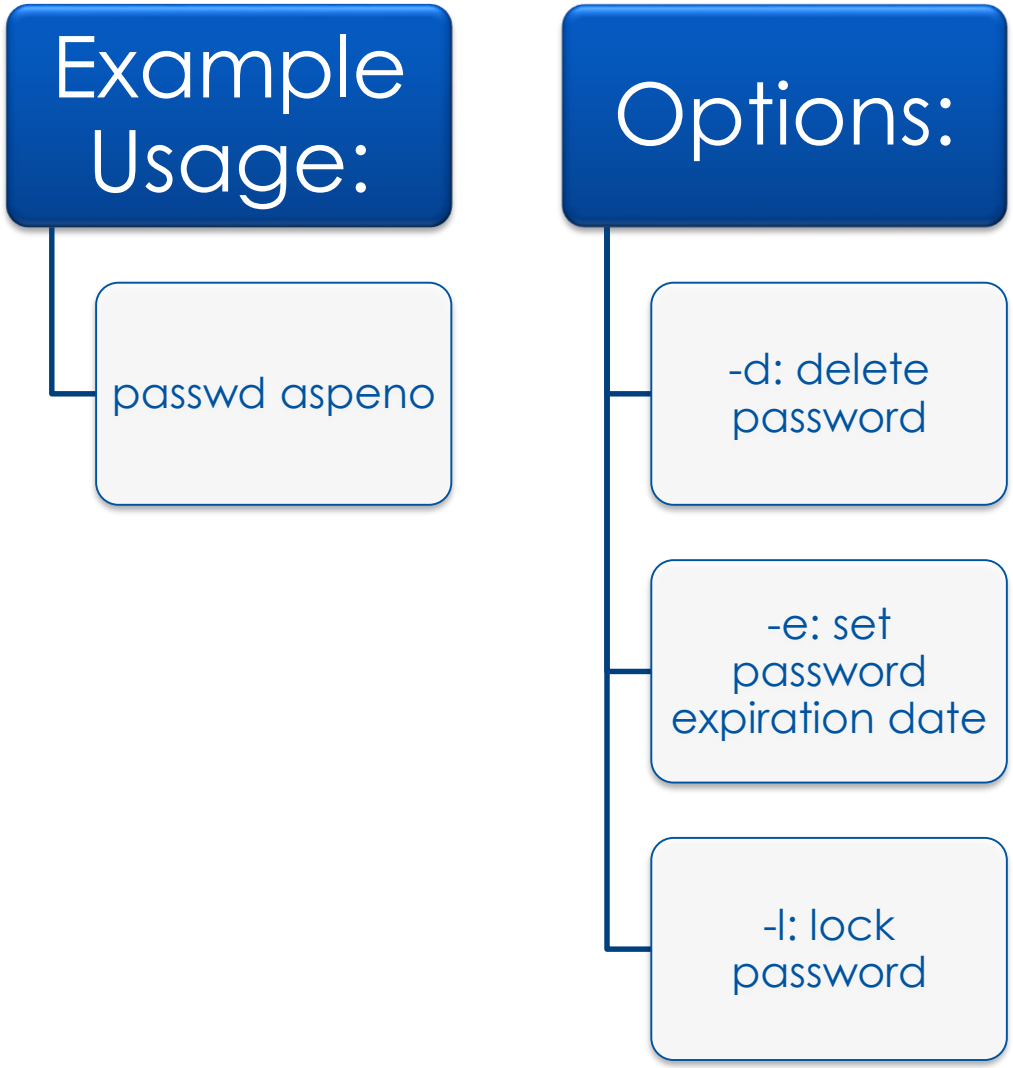
- useradd aspeno

Options:

- -d: different home directory
- -s: change shell

Passwd Command

- **Change the user account passwords.**
- **The root user reserves the privilege to change the password for any user on the system, while a normal user can only change the account password for his or her own account.**



Lesson 1 Review

The useradd command reads and updates several files

The passwd command can set a user's password

The user can run passwd on their own account

Lesson 2

Linux User Groups

In this lesson, we look at how to add and manage Linux groups

/etc/groups File

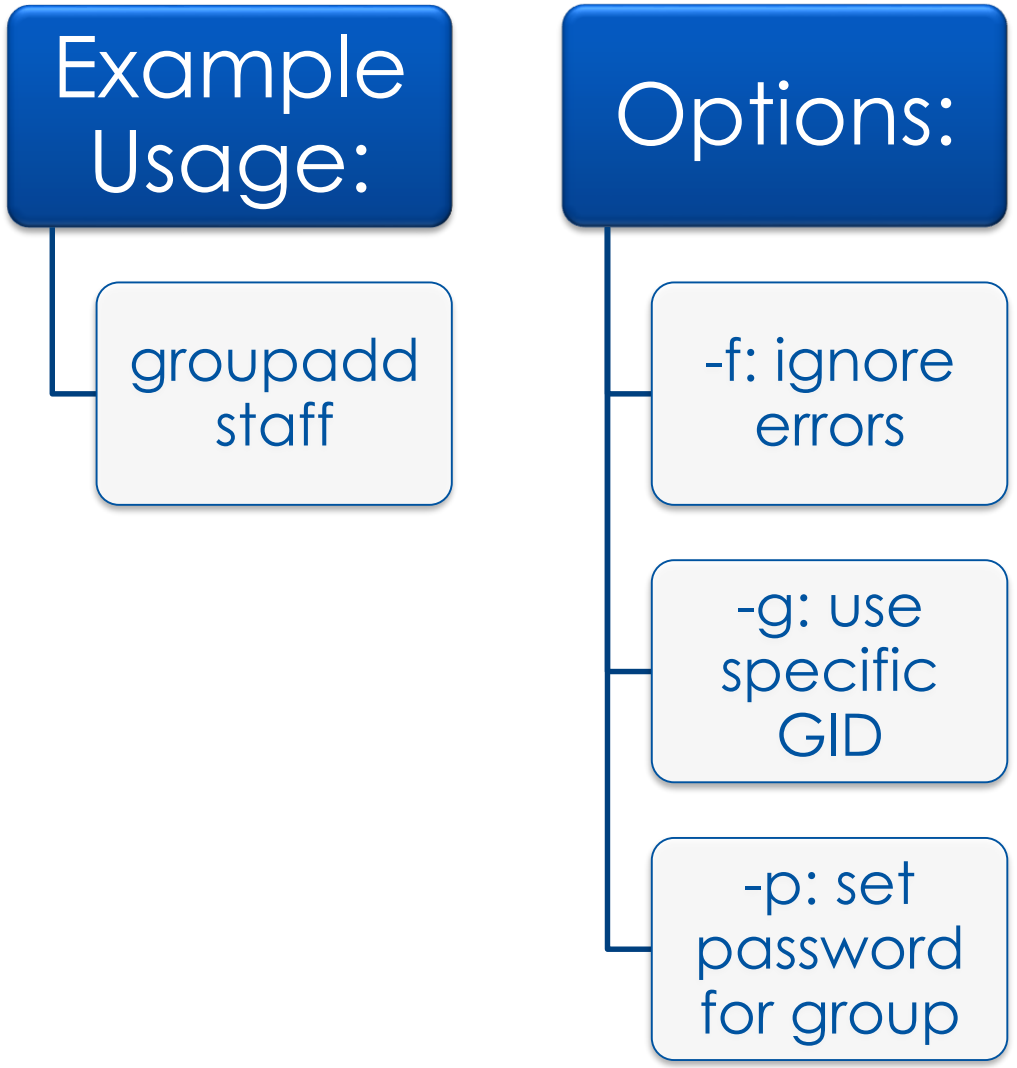
The /etc/groups file stores user group information. The file is in plaintext with a row per group and fields delimited with a :.

The following columns are in the file for each group:

- group_name: It is the name of group.
- Password: Normally empty/blank. Used with privileged groups.
- Group ID (GID): Each user must be assigned a group ID.
- Group List: List of usernames of users who are members of the group. The usernames, must be separated by commas.

Groupadd Command

- **Edits /etc/group file for the newly created user groups.**
- **The primary purpose of groups is to define a set of privileges such as reading, writing, or executing permission for a given resource that can be shared among the users within the group.**



Primary vs Secondary Group

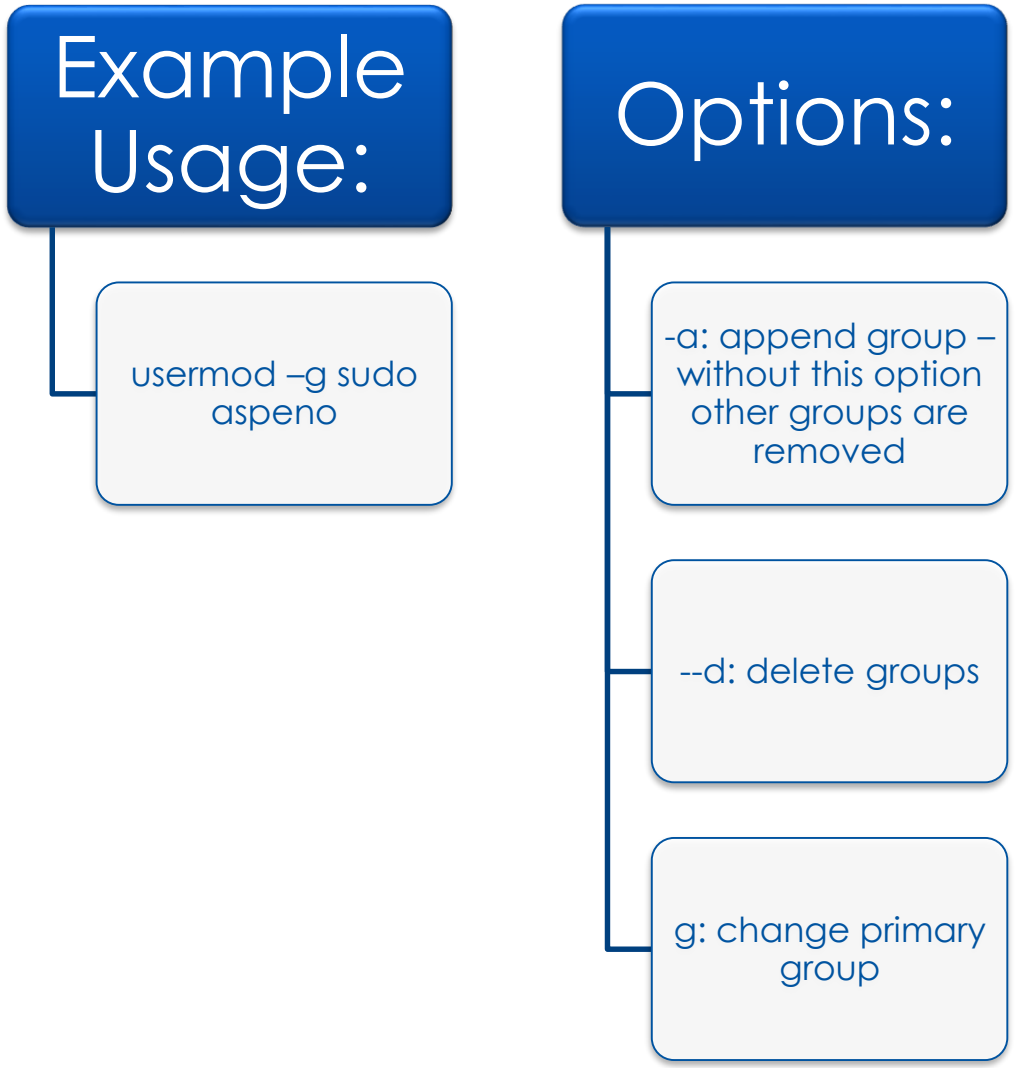
The Primary group – When a user creates a file, the file's group is set to the user's primary group.

Secondary or supplementary group - Allows you to grant certain file permissions to a set of users who are members of the group.

Each user can belong to exactly one primary group and zero or more secondary groups.

Usermod Command to Add User to Group

The usermod command allows you to modify a user.



Lesson 2 Review

When a user creates a file, the file's group is set to the user's primary group.

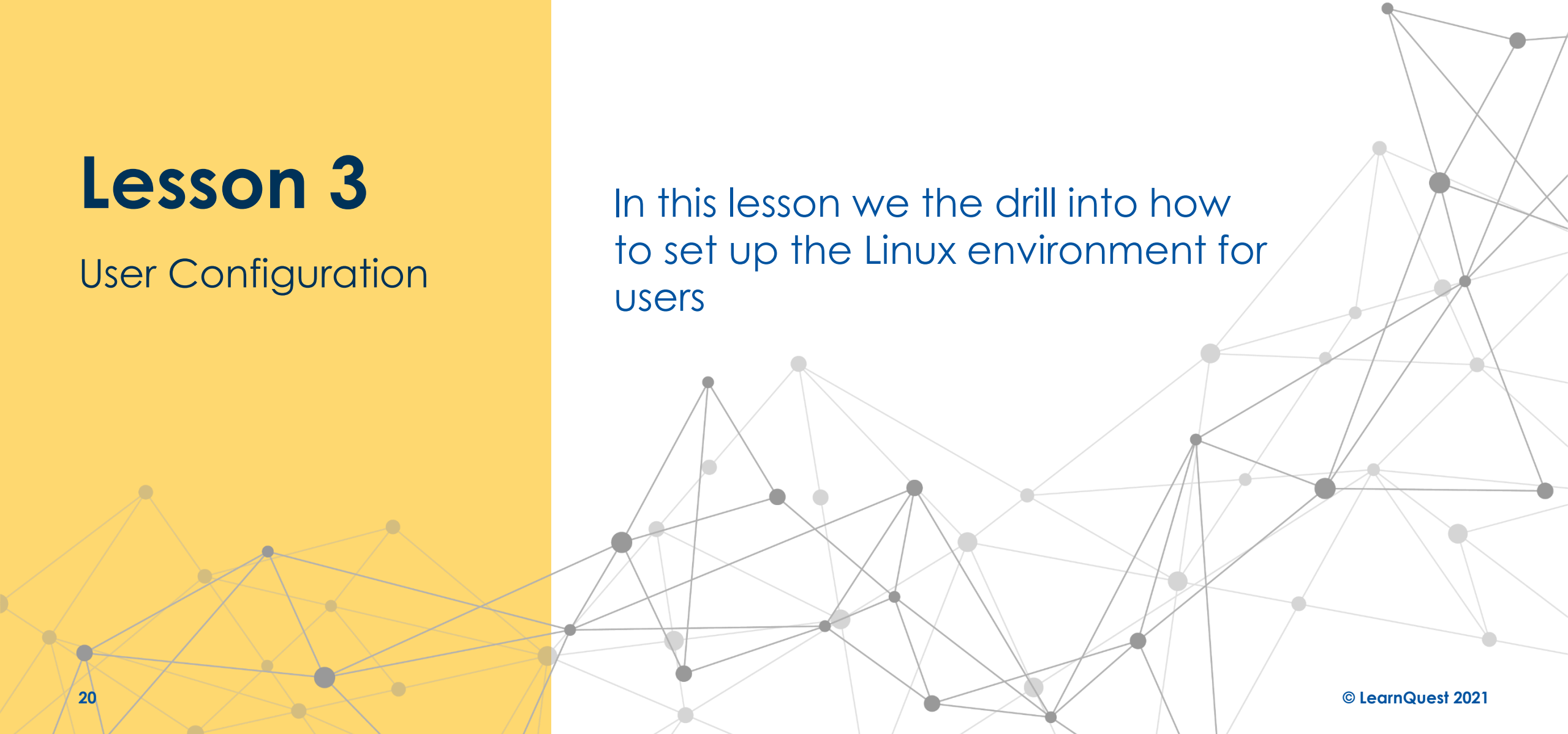
Each user can belong to exactly one primary group.

Each user can belong to zero or more secondary groups.

Lesson 3

User Configuration

In this lesson we the drill into how to set up the Linux environment for users



Bash Parameters

Environment variables store information about

- Shell session
- Working environment

A few user environment variables:

- HISTSIZE
- PATH
- PS1

Stored in environment files

Environment Files

Can start a Bash shell in these ways:

- Default login shell (logging into a tty# terminal)
- Interactive shell (opening a terminal emulator in GUI)
- Noninteractive shell (running a shell script)

Method used determines environment files employed

User Entries

User files modify shell environment for only that user

First environment file found in $HOME used; the rest are ignored:

- .bash_profile
- .bash_login
- .profile

.bash_rc is run:

- Typically called from preceding list or
- Anytime a noninteractive shell is started

Global Entries

- Global files modify shell environment for all users and include the following:
  - The /etc/profile file
  - Files within the /etc/profile.d/ directory
  - The /etc/bashrc or the /etc/bash.bashrc file

Lesson 3 Review

User Entries affect just the one user

Global Entries affect all users

Environment files are different depending on the login method

Lesson 4

Query User Information

In this lesson, we look at how we can interrogate current user Information in Linux

User Query Tools

Several utilities allow you to audit which users are currently accessing the system as well as users who have accessed it in the past.

You can also verify the account name you are using at present and review various information concerning user accounts.

- whoami
- who
- w
- id
- last

Whoami Command

Displays what user account you are currently using.

Example Usage:

```
whoami
```

Who Command

View information concerning your own account or look at every current user on the system. Shows all the current system users, the terminal they are using, the date and time they entered the system, and in cases of remote users, their remote IP address.

Example Usage:

- who

Options:

- am i
- mom likes

The w Command

The w command first displays a line showing the following information:

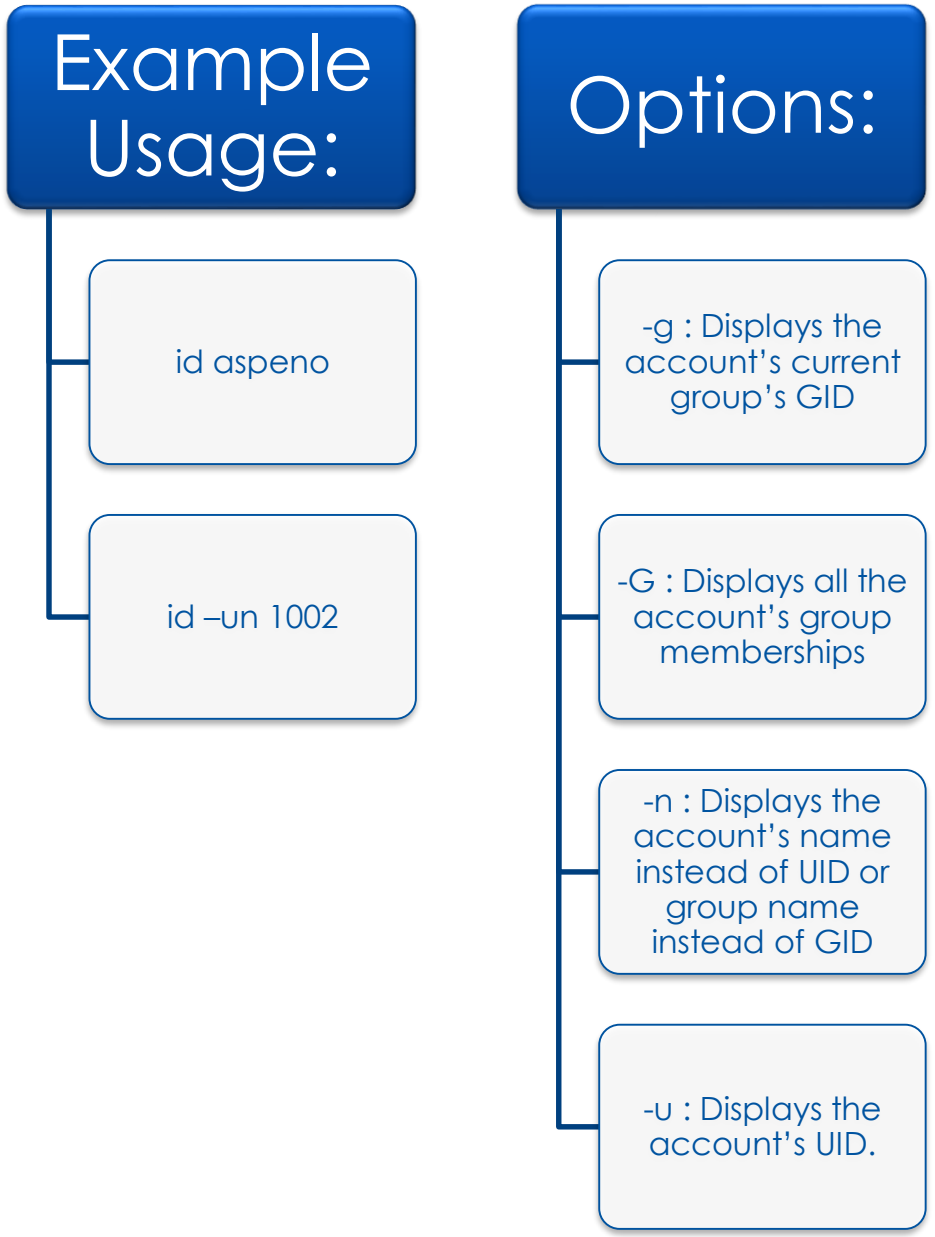
- The current time
- How long the system has been up
- How many users are currently accessing the system
- The CPU load averages for the last 1, 5, and 15 minutes

The next several lines concern current system user information. The columns are as follows:

- USER: The account's name
- TTY: The account's currently used terminal
- LOGIN@: When the user logged into the account
- IDLE: How long it has been since the user interacted with the system
- JCPU: How much total CPU time the account has used
- PCPU: How much CPU time the account's current command (process) has used
- WHAT: What command the account is currently running

Id Command

- **The id utility allows you to pull out data concerning the current user process.**
- **It displays information for any account whose identification is passed as an argument.**
- **The command provides a one-line summary.**



Lesson 4 Review

You can use whoami or who am i to see the currently logged in user

When you are feeling down you can run who mom likes

The w command will show a lot of data about current users