

Fundamentals of UNIX & Linux for System Administrators

FUL-02: Linux User Environment

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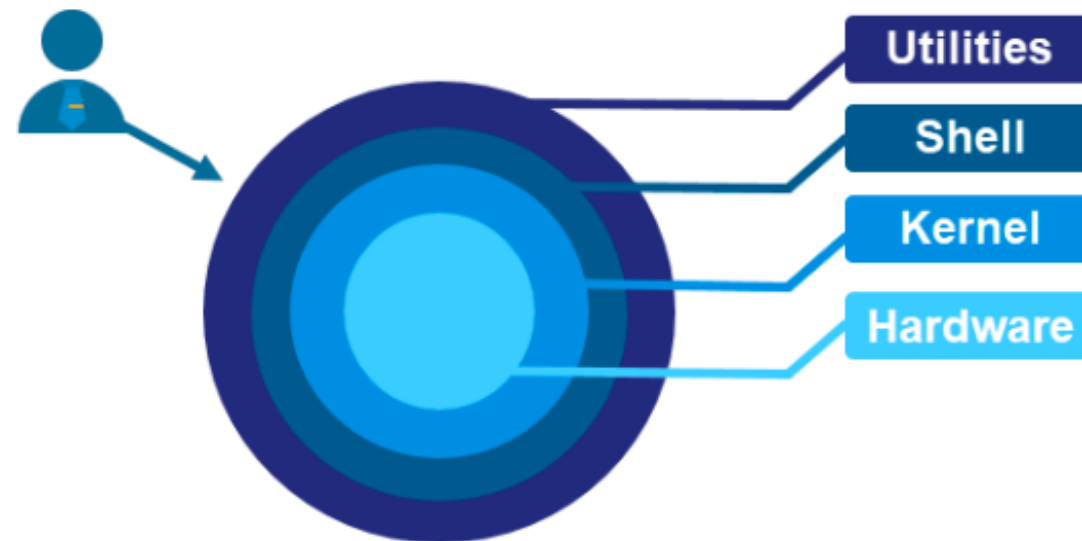
System Administrator, KENET

Agenda

- **Linux shells**
- **Linux User Management**
 - **Create new users**
 - **Deleting Users**
 - **Listing System users**
 - **Understanding Linux user groups**

What are Linux Shells?

- Linux shells are **command line interfaces** that allow **users** to interact with the **operating system kernel**. They provide powerful tools for automation, scripting, and job control.



Advantages of Linux Shells

- **Enhanced Efficiency:** Requires fewer clicks and menus for quicker task execution.
- **Flexibility and Control:** Empowers customization and task automation through shell scripts.
- **Remote Access:** Enables management of Linux systems from anywhere with internet access.

Linux Shell Structure

- **Prompt:** Symbol indicating the shell's readiness for user input, customizable to display information.
- **Command Line:** Where users input commands, ranging from simple tasks to complex operations.
- **Command Interpreter:** Responsible for interpreting and executing commands, with Bash as the default in Linux.
- **Environment Variables:** Set by the shell, storing information used by programs and scripts.
- **Command History:** Allows users to view and reuse previous commands, enhancing efficiency.
- **Shell Scripts:** Collections of commands for task automation and system administration.
- **Shell Built-Ins:** Commands integrated into the shell, handy for common tasks without external programs.

Popular Linux Shells

01

Bourne shell (sh)

- Doesn't support command history
- Can't handle logical and arithmetic operations
- Executable path is `/bin/sh /sbin/sh`
- Uses the prompt `#` for root user and `$` for regular users

02

Bourne-Again shell (bash)

- Has support for command history
- Executable path is `/bin/bash`
- Uses the prompt `#` for root user and `$` for regular users

03

C shell (csh)

- Has support for command history
- Has a syntax similar to c programming language
- Executable path is `/bin/csh`
- Uses the `#` prompt for root user and `hostname %` for regular users

04

Z shell (zsh)

- Has support for command history, spelling corrections, plugins, improved array and variable handling
- Executable path is `/bin/zsh`
- Uses the `hostname#` prompt for root user and `user@hostname location` for regular users

05

Friendly interactive shell (fish)

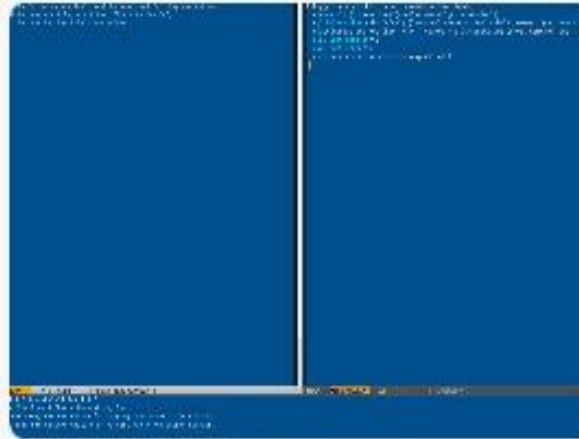
- Has support for command history
- Executable path is `/usr/bin/fish`
- Uses the prompt `root@hostname location#` for root user and `user@hostname location>` for regular users

Know your Shell



Find the Perfect Fit

Explore the characteristics and strengths of each shell to choose the most suitable one for your needs.



Master Command Line

Unlock the potential of shell scripting by understanding the commands and prompts of different shells.



Scripting with Ease

Learn the art of writing efficient shell scripts using the features and capabilities of your chosen shell.

Linux User Management

- Importance of User management
- Different account types,
- Creating/deleting accounts
- Passwords, groups, and best practices.



ARCH USER



**FEDORA/CENTOS
USER**



UBUNTU USE



DEBIAN USER



**SLACKWARE
USER**



MINT USER



User Management

Why User Management is Important

1

Security



- Proper user management ensures only **authorized** users have access, reducing the risk of breaches.

2

Resource Allocation



- Effective user management allows for efficient resource allocation, maximizing system performance.

3

Accountability



- Individual user accounts allow for better **traceability** and **accountability** of actions performed on the system.

Different Types of User Accounts

Root/Administrative

The most powerful account with full system control.

Has user id of 0 and belong to the group id 0
`/root`

Service and System

Special purpose accounts for system services or operating system processes.

System Accounts are created during OS Installation.

Service accounts are created and configured by the package manager upon installation of the service software.

Don't have a home folder or a default shell.
`/sbin/nologin` to refuse logins

Regular User

Standard non-privileged account for daily tasks. Can Gain administrative rights by [using the sudo or su command.](#)

Have a 4-digit user id with the first starting at 1000

Have a default shell - in most linux distros
`bash`

`/home/user1`

Guest

A temporary account for guests with limited access rights.

Creating and Deleting User Accounts

1

Create

Use the "**adduser**" command to create new user accounts. You can also use the "**useradd**" command to create a user.

2

Delete

The "**deluser**" command removes user accounts, offering options to keep or delete user files. You can also use the "**userdel**" command to delete a user.

```
root@joy-HP-EliteBook-840-G3:/home/joy# deluser grace
Removing user `grace' ...
Warning: group `grace' has no more members.
Done.
```

```
root@joy-HP-EliteBook-840-G3:/home/joy# adduser grace
Adding user `grace' ...
Adding new group `grace' (1001) ...
Adding new user `grace' (1001) with group `grace' ...
Creating home directory `/home/grace' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for grace
Enter the new value, or press ENTER for the default
  Full Name []:
   Room Number []:
    Work Phone []:
    Home Phone []:
      Other []:
Is the information correct? [Y/n] y
root@joy-HP-EliteBook-840-G3:/home/joy#
```

Assigning and Changing User Passwords

1

Assign

Set a password for a user with the "**passwd**" command, either as root or by the user themselves.

2

Change

Allow users to modify their passwords with "**passwd**", promoting security and user autonomy.

```
root@joy-HP-EliteBook-840-G3:/home/joy# passwd joy
New password:
Retype new password:
passwd: password updated successfully
root@joy-HP-EliteBook-840-G3:/home/joy#
```

Listing System Users

- `cat /etc/passwd`
- Using the “`who`” command to list connected users on a system.

`/etc/passwd` columns

| | | | | | | | | | | | | |
|----------|---|----------|---|-----|---|-----|---|---------|---|----------------|---|------------|
| root | : | x | : | 0 | : | 0 | : | root | : | /root | : | /bin/bash |
| ↑ | | ↑ | | ↑ | | ↑ | | ↑ | | ↑ | | ↑ |
| username | | password | | UID | | GID | | Comment | | Home Directory | | Shell Used |

Understanding Linux User Groups

- Groups allow efficient management and granting of permissions to multiple users at once - permissions to system resources, files etc
- **Primary group** - A group that is generated automatically while creating a new user.
- **Secondary group** - This is a group that can be created at any point.

N/B

A user must have a primary group but can belong to more than one secondary group.

Creating and Assigning Linux User Groups

1

Create a group

Use the "**addgroup or groupadd**" command to create a new group.

2

Assigning a user to a group

the "**usermod -aG *group_name *username**"
command

```
-HP-EliteBook-840-G3:/home/joy# usermod -aG otuya joy  
-HP-EliteBook-840-G3:/home/joy#
```

```
root@joy-HP-EliteBook-840-G3:/home/joy# addgroup otuya  
Adding group `otuya' (GID 1001) ...  
Done.  
root@joy-HP-EliteBook-840-G3:/home/joy#
```

N/B - Only users with administrator privileges can add or delete groups

Listing Linux System Groups

- `cat /etc/passwd`
- `cat /etc/gshadow`

`/etc/group` columns

sudo : x : 24 : devconnected,bob

↑ ↑ ↑ ↑

group name password GID Users in the group

Important Linux Group - SUDO, ADMIN

- Sudo is an acronym for “**Superuser do**”
- The **/etc/sudoers** file is used to grant system wide permissions to users in the sudo and admin group
- Use the **sudo** command to have administrator privileges

```
joy@joy-HP-EliteBook-840-G3:~$ sudo su  
root@joy-HP-EliteBook-840-G3:/home/joy#
```

ACTIVITY



- **Create a User**
`adduser user1`
- **Create a group**
`addgroup group1`
- **Add user1 to group1**
`usermod -aG group1 user1`
- **List system users** `/etc/passwd` file
`cat /etc/passwd`
- **Examine the contents of** `/etc/shadow` file
`cat /etc/shadow`



Q & A

References

- <https://phoenixnap.com/kb/linux-shells#ftoc-heading-1>
- <https://devconnected.com/how-to-list-users-and-groups-on-linux/>
- https://www.microfocus.com/documentation/open-enterprise-server/2023/acc_linux_svcs_lx/lumsecurity.html

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