

Assignment - 1

Linux Boot process :-

- > It includes 4 phases,
- > These are

1. Bootstrap phase :- It is a sequence of events responsible for loading the Linux operating system into memory, transforming your hardware into a functional computing powerhouse.

2. Bootloader phase :- It is a critical piece of software running on an system.
It provide an interface for users to load an operating system and application.

3. Kernel phase :- control is given to kernel which is the central part all your OS and act as a mediator of hardware and software components. Kernel once loaded into RAM it always resides on RAM unit, the machine is shutdown. Once the Kernel starts its operations the first thing it do is executing INIT processes.

4. Initialization phase :- init process is the root / parent process of all the processes which runs under Linux. The first process it runs is a script at /etc/init.d which check all the system properties, hardware, display, load Kernel modules, file system, file system mounting, except all enabled to start / stop various process to own the system and make it functional.

Network configuration using Linum

IP :- To display the IP address using the hostname command

dig :- (domain information groper) is a Linum command line utility that performs DNS lookup by querying name servers and displaying the result to you

nslookup :- It is used to query DNS servers and get information about domain names and their corresponding IP addresses.

netstat :- It presents network connections, showing tables interface statistics, and multicast memberships.
It is used to diagnose network issue and service problem.

nmcli :- It is a command line tool which is used for controlling Network Manager.
It is used to display network device status, create, edit, activate / deactivate and delete network connections.

ifconfig :- This command provides information about the network devices configured on your system.

Storage Management

• Master Boot Record (MBR)

> The boot sector is also referred to as the Master Boot Record.
> It contains a partition table, which stores information on which primary partitions have been created on the hard disk so that it can then use this information to start the machine.

2. ext 3 file system

- > It prevent loss of data integrity in the event that an unclean system shutdown occurs.
- > It allow you to choose the type and level of protection that your data receives.

3. Network File System (NFS)

- > It is a protocol that allows you to set up storage locations on your network.
- > By using NFS users and programs can access files on remote systems hard drive as if it were a system almost as if they were local files.

4. samba

- > It is open-source utility that enables files sharing between machines running on a single network.
- > It enable Linux machine to share files with machine running on a single network, different operating system

5. New Technology file system (NTFS)

- > It is also sometimes called the New Technology file system.
- > It is a protocol that the Windows NT operating system uses for storing, organizing and finding files on a hard disk efficiently.

Cloud and Virtualization

1. OVF and OVA Template

The OVA is a newer version of the OVF format.

OVF is built from several files

OVA is comprised of files that were bundled together.

2. Container technology and Docker Basics

- > Container uses an init system that can manage multiple processes
- > This means entire application can run as one.

Docker Basics

- > Docker technology encourages applications to be broken down into their separate processes and provide the tools to do that.

3. Types of cloud

- > Cloud is based operating system designed to give shared hosting. provides a more stable and secure OS.

1. Public cloud

- > It managed by third parties which provide cloud service over the internet to the public.
- > These services are available as pay-as-you-go billing model.

2. Public cloud Private cloud

- > They are distributed system that work on public infrastructure and provide the users with dynamic provisioning of computing resources.
- > Private cloud provides all. G/F data, Ubuntu, Microsoft etc.

3. Hybrid cloud

- > It is a heterogeneous distributed system formed by combining facilities of the public cloud and private cloud.
- > The major drawback of private deployment is the inability to scale on-demand and efficiently address peak loads.

4. Community cloud

- > They are distributed systems created by integrating the services of different clouds to address the specific needs of an industry or business sector.
- > But sharing responsibilities among the organizations is different.
- > The infrastructure is shared between organizations that have shared concern & tasks.

5. Multi cloud

- > The use of multiple cloud computing services from different providers which allows organization to use the best suited services for their specific needs and avoid vendor lock-in.
- > This allow organization to take advantage of the different features and capabilities offered by different cloud providers.

8. NAT (Network Address Translation)

- > It enables your network to use one set of IP address for internal traffic and a second set of address for external traffic.
- > It is private network can communicate with devices on a public network without the need for each device to have its own unique IP address.
- > Types :-
 - i. static NAT
 - ii. dynamic NAT
 - iii. Port address translation (PAT)

Software Management

1. Red Hat Package Manager (RPM)

- > It is an open source program for installing, uninstalling and managing software packages in Linux.
- > It was developed on basis of the Linux Standard Base.

2. Advanced Package Tool (APT)

- > It uses to manage Linux software packages.
- > The apt command line tool provides a higher-level user interface for end users with intuitive commands, resulting behaviours, and security features.

3. Tar.gz and .tar.bz2 Packages

- > It used to package file together for backup or distribution purpose.
- > It contains multiple files also known as tarball.

4. curl and wget

- > curl upload and download resources.
- > wget primarily downloads files.

User and Group Management

commands

- i. useradd - create new user
- ii. usermod - modify user information
- iii. userdel - delete user.
- iv. passwd - change password
- v. whoami - who am i
- vi. groupmod - modifies groupname, GID, password
- vii. groupdel - delete group
- viii. su - grant a shell
- ix. id - display user UID and group GID and groups
- * /etc/passwd :- password file format
- * /etc/shadow :- encrypted password
- * /etc/group files :- group files format

Service management

systemd :-

- > It is a system that is designed specifically for the Linux Kernel. It replace the sysvinit process to become the first process with PID=1, which get enclosed in user space during the Linux start-up process.
- > systemctl and service commands
- > They both are vital and extremely similar with systemctl being a more versatile and powerful command.
- > It allows users to configure and interact with system services but they belong to different initialization system.

Scheduling and Automation

I. cron

- > It is an unattended program that runs continuously in the background and wakes up to handle periodic service requests when triggered.

II. Job control command

- > It is a feature of the Linux shell that allows you to manage multiple processes all within a single shell session.
- > fg command is a key part of job control.

III. kill command

- > It is used to send a signal to process, typically to terminate it.
- > It can use it by specifying the process ID (PID) of the process you want to terminate.

Linux services

1. Network Time Protocol (NTP)

- > It is a protocol designed to time-synchronize a network of machines.
- > NTP runs on User Datagram Protocol (UDP).
- > which ~~uses~~ runs on IP.
- > NTP version 3.
- > It allows the synchronization of system clocks from desktops to servers.

2. SSH

- > It is a network communication protocol that enables two computers to communicate (e.g. HTTP).
- > which is the protocol used to transfer hypertext such as web pages) and share data.

Apache and Nginx

- > The two most common open source web servers in the world.
- > They are responsible for handling over 50% of traffic on the internet.
- > Both are solutions are capable of handling diverse workloads and working with other software to provide a complete web stack.

Certificate Authority (CA)

- > It is a trusted entity that issues secure sockets layer (SSL) certificates.
- > These digital certificates are data files used to cryptographically link an entity with a public key.
- > It is entity that stores, signs and issues digital certificates.

Domain Name System (DNS)

- > It is the phonebook of the internet.
- > It is a hostname to IP address translation service.
- > DNS is a distributed database implemented in a hierarchy of name servers.
- > It is an application layer protocol for message exchange between clients and servers.
- > It is required for the functioning of the internet.

Dynamic Host Configuration Protocol (DHCP)

- > It is a client/server protocol that automatically provides an Internet protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway.

Authentication servers

- > It manages process that allows access to a network, application or system.
- > ~~Each authentication~~

Proxy server

- > It is an intermediary server that receives data from an internet source, such as a webpage on behalf of a user.
- > Provides gateway between user and the internet.

Virtual Private Network (VPN)

- > Establish connection between your computer and a remote server owned by a VPN provider.
- > It establishes network connection when using public network.

Monitoring server

- > It is the systematic tracking, measuring or observing of process and operation on a server.
- > It is an important aspect of the entire network performance monitoring and IT operations management process if your network has Linux server.

Database server

- > It is used to store and manage database that are stored on the server, and to provide data access for authorized users.

Mail server

- > It sends message from one mail client to another.
- > It also known as email client.
- > It is a web based application that receives and stores email message.

Load Balancers

- It improves application performance by increasing response time and reducing network latency.
- They perform several critical tasks such as the following :
- Distributed the load evenly between servers to improve application performance.
- Redirect client requests to a geographically closer server to reduce latency.