1) What is the difference between RHEL6 & RHEL5?

A. Virtualization: In RHEL 6 KVM (Kernel based Virtual Machine) was used as a hypervisor but in the earlier releases of RHEL XEN was used as a hypervisor. The main advantage of KVM is that it supports the installation of many virtual machines/operating systems like Windows, Linux, Solaris and also it is very easy to manage those virtual machines.

B. Security: RHEL6 has an enhanced version of SELinux(Security Enhanced Linux) now, Basically now the features are more improved and there are various new set of rules which are added to SELinux one of such rule/feature is of SVirt which provides security to virtual machines from hackers.

C. EXT4: It stands for Extended 4, It has various new advantages then EXT2/3 which were used in earlier version(s) of RHEL. EXT4 is comparatively more faster and easy to manage then previous file systems.

D. IPv6: RHEL6 supports IPv6.

E. NFS4: It uses NFSv4 (Network File Transfer) the latest version of NFS for the sharing of files in the network rather than NFSv3.

F. GUI: It has a far better GUI(Graphical User Interface) then RHE5 or any of its prior version(s).

NETWORK RELATED TOPICS

1) What is the IP range of class 'A' 'B' & 'C'?

A.

Class	Address Range	Supports
Class A	1.0.0.1 to 126.255.255.254	Supports 16 million hosts on each of 127 networks.
Class B	128.1.0.1 to 191.255.255.254	Supports 65,000 hosts on each of 16,000 networks.
Class C	192.0.1.1 to 223.255.254.254	Supports 254 hosts on each of 2 million networks.
Class D	224.0.0.0 to 239.255.255.255	Reserved for multicast groups.
Class E	240.0.0.0 to 254.255.255.254	Reserved for future use, or Research and Development Purposes.

2) What is the usable IP (Private IP) for class 'A' 'B' & 'C'?

A. Private IP Addresses

Class	Private Networks	Subnet Mask	Address Range
A	10.0.0.0	255.0.0.0	10.0.0.0 - 10.255.255.255
B	172.16.0.0 - 172.31.0.0	255.240.0.0	172.16.0.0 - 172.31.255.255
C	192.168.0.0	255.255.0.0	192.168.0.0 - 192.168.255.255

3) What are Port Numbers for the below?

TCP	UDP	FTP - 21	SSH - 22	TELNET 23	SMTP 25	SMTPS 465	DNS 53	BOOTPS 68	BOOTPC 67	DHCP 68-67	TFTP 69
HTTP 80	HTTPS 443	KERBEROS	SAMBA 145,139	POP3 110	POP3S 995	PORTMAP	NNTP 119	IMAP 143	IMAPS 993	LDAP 389	IPP (CUPS) 631
NFS 2049	SQUID 3128	MYSQL 3306	NRPE 5666								

4) What is the difference between "SSH" & "Telnet"?

1. SSH and Telnet commonly serves the same purpose
2. SSH is more secure compared to Telnet
3. SSH encrypts the data while Telnet sends data in plain text
4. SSH uses a public key for authentication while Telnet does not use any authentication
5. SSH adds a bit more overhead to the bandwidth compared to Telnet

5) How to change the default port for SSH?

To change specific parameters within sshd_config:

1. Log into your server as the root user.
2. Uncomment the desired line by removing the number-sign (#) and changing the value for the line. For example, the default SSH port appears in a line like this: #Port 22.

6) How to disable ROOT login on any server?

To disable root SSH login, edit /etc/ssh/sshd_config with your favorite text editor.
[root@root ~]# vi /etc/ssh/sshd_config
Change this line:
#PermitRootLogin yes
Edit to this:
PermitRootLogin no

7) How to do SSH login without any password?

Step 1: Create public and private keys using ssh-key-gen on local-host
jsmith@local-host$ ssh-keygen

Step 2: Copy the public key to remote-host using ssh-copy-id
jsmith@local-host$ ssh-copy-id -i ~/.ssh/id_rsa.pub remote-host

Step 3: Login to remote-host without entering the password
jsmith@local-host$ ssh remote-host

8) How to check the open Port in Linux server?

nmap -sT -O localhost
netstat -tuplen

9) How to get the information about open TCP ports in for Linux Server?

netstat -tplen

10) How to get the information about open UDP ports for Linux server?

netstat -uplen

11) How to check the Network Traffic in Linux?

iftop command

12) What is Proc file system?

/proc is very special in that it is also a virtual filesystem. It's sometimes referred to as a process information pseudo-file system. It doesn't contain 'real' files but runtime system information (e.g. system memory, devices mounted, hardware configuration, etc). For this reason it can be regarded as a control and information centre for the kernel. In fact, quite a lot of system utilities are simply calls to files in this directory. For example, 'lsmod' is the same as 'cat /proc/modules' while 'lspci' is a synonym for 'cat /proc/pci'. By altering files located in this directory you can even read/change kernel parameters (sysctl) while the system is running.

13) How can we configure Network Interface?

Edit network interface files in /etc/sysconfig/network-scripts/ directory and restart network services.

14) What is ROUTE Command?

route is a command used to view and manipulate the TCP/IP routing table in both Unix-like and Microsoft Windows operating systems.

15) What is NETSTAT command?

netstat (network statistics) is a command-line tool that displays network connections for the Transmission Control Protocol (both incoming and outgoing), routing tables, and a number of network interface (network interface controller or software-defined network interface) and network protocol statistics.

16) What is IOSTAT command?

iostat command is a command that used for monitoring system input/output device loading by observing the time the devices are active in relation to their average transfer rates. The iostat create reports that can be used to change system configuration to better balance the input/output between physical disks.

17) What is “LSOF” command?

lsof is a command meaning "list open files", which is used in many Unix-like systems to report a list of all open files and the processes that opened them.

18) What are the tools to verify / check network connectivity?

ping, tracert, ifconfig

19) How to know the Number of Processors in the Server?

Lscpu, nproc and less /proc/cpuinfo

20) How to know the Hard Disk make & Size in the Server?

hdparm -I /dev/sda

21) What is Ethernet Bonding?

Network bonding refers to the combination of network interfaces on one host for redundancy and/or increased throughput. Redundancy is the key factor: we want to protect our virtualized environment from loss of service due to failure of a single physical link.

22) What is advantage of Ethernet Bonding?

1. High bandwidth
2. Redundancy/resilience

23) How to create NIC bonding?

Add the below line in /etc/modprobe.conf to load the bonding module in to kernel.
alias bond0 bonding

In redhat 6.3 , you need to create new file called “bonding.conf” under /etc/modprobe.d/ with below mentioned line.
cat /etc/modprobe.d/bonding.conf
alias bond0 bonding

Now time to create a bonding interface configuration file in /etc/sysconfig/network-scripts/ directory like the below one.
cat ifcfg-bond0
#This is congiguration file for bond0.Used NIC's eth2 & eth4
DEVICE=bond0
IPADDR=192.168.10.25
NETMASK=255.255.255.0
USRCTL=no
ONBOOT=yes
BOOTPRO=none
BONDING_OPTS="mode=0 miimon=100"

Create a configuration files under “/etc/sysconfig/network-scripts/” for network interfaces if not exists.If exists,have a contents like the below one.
# cat ifcfg-eth2
DEVICE=eth2
HWADDR=00:0C:29:79:17:FA
BOOTPRO=none
ONBOOT=yes
MASTER=bond0
SLAVE=yes
USERCTL=no

Now restart the network service to load the configuration.
service network restart

Verify whether “bond0” has come up with IP or not .
cat /proc/net/bonding/bond0

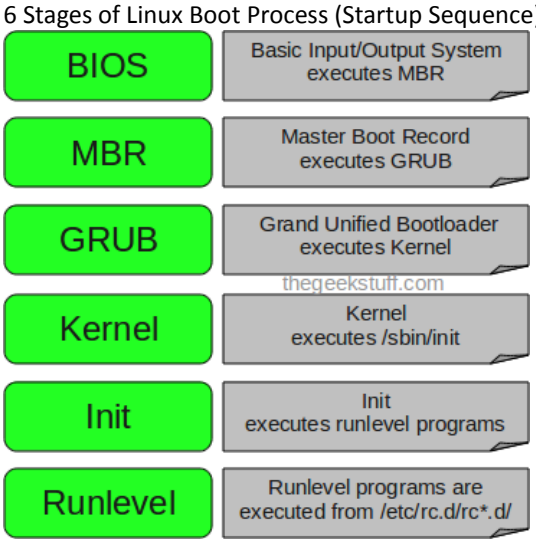
BOOTING SECTION

1) What are different run levels?

There are 7 different run levels present (run level 0-6) in Linux system for different purpose. The descriptions are given below.
0: Halt System (To shutdown the system)
1: Single user mode
2: Basic multi user mode without NFS
3: Full multi user mode (text based)
4: unused
5: Multi user mode with Graphical User Interface
6: Reboot System

2) What are booting sequence in Linux?

6 Stages of Linux Boot Process (Startup Sequence)



3) What is MBR?

The Master Boot Record (MBR) is the information in the first sector of any hard disk or diskette that identifies how and where an operating system is located so that it can be boot (loaded) into the computer's main storage or random access memory.

4) What is the default size of MBR?

512-byte

5) What is "INITRD" file in Linux?

The Linux® initial RAM disk (initrd) is a temporary root file system that is mounted during system boot to support the two-state boot process. The initrd contains various executables and drivers that permit the real root file system to be mounted, after which the initrd RAM disk is unmounted and its memory freed.

6) What is SUDO?

Sudo, the one command to rule them all. It stands for "super user do!" Pronounced like "sue dough" As a Linux system administrator or power user, it's one of the most important commands in your arsenal. Have you ever tried to run a command in terminal only to be given "Access Denied?" Well this is the command for you! But, with great power comes great responsibility! It is much better than logging in as root, or using the su "switch user" command.

KERNEL SECTION

1) What is kernel?

The kernel is the central module of an operating system (OS). It is the part of the operating system that loads first, and it remains inmain memory. Because it stays in memory, it is important for the kernel to be as small as possible while still providing all the essential services required by other parts of the operating system and applications. The the kernel code is usually loaded into a protected area of memory to prevent it from being overwritten by programs or other parts of the operating system.

Typically, the kernel is responsible for memory management,process and task management, and disk management. The kernel connects the system hardware to the application software. Every operating system has a kernel. For example the Linux kernel is used numerous operating systems including Linux, FreeBSD, Android and others.

2) Command to know the Kernel Version?

Uname -r

3) How can we tune or change the Kernel parameter?

Many kernel parameters scale relative to the value chosen for maxusers. You can change many others that affect the kernel and kernel modules by setting values for them in /etc/system. With/etc/system you can specify:

a. kernel modules to be loaded automatically
b. kernel modules not to be loaded automatically
c. root and swap devices
d. new values for kernel integer variables

4) How to upgrade the Kernel?

yum -y update kernel

5) Where the Kernel modules are located?

/lib/modules/

6) How can we list the Kernel modules?

less /proc/modules

7) How can we load a module into the Kernel?

To load a kernel module, run the modprobe <module_name> command as root.

8) What is the difference between "modprobe" & "insmode"?

modprobe is the intelligent version of insmod. insmod simply adds a module where modprobe looks for any dependency (if that particular module is dependent on any other module) and loads them.

9) How to get the information about Processor Architecture?

less /proc/cpuinfo
cat /pro/cpuinfo

10) How to get the number of Processors in the server?

nproc

11) How to check whether the system is 32 Bit or 64 Bit machine?

uname -a

12) Where the Kernels logs resides?

tail -f /var/log/messages

PERFORMANCE MONITORING

1) How to kill a job?

Kill -9 <pid>

2) What is the NICE Command?

nice runs command COMMAND with an adjusted "niceness", which affects process scheduling. A process with a lower niceness value is given higher priority and more CPU time. A process with a higher niceness value (a "nicer" process) is given a lower priority and less CPU time, freeing up resources for processes which are more demanding
Niceness values range from -20 (most favorable to the process) to 19 (least favorable to the process).

3) Explain "TOP"?

When we execute top command on linux, it shows a lot of results, here i am trying to show you to how to read it row by row.

Result Row #1:
Row 1 results shows about server up time from last reboot, currently logged in users and cpu load on server. The same output you can find using linux uptime command.

Result Row #2:
Row 2 shows the number of process running on server and there state.

Result Row #3:
Row three shows the cpu utilization status on server, you can find here how much cpu is free and how much is utilizing by system.

Result Row #4:
Row 4 shows the memory utilization on server, you can find here how much memory is used, the same results you can find using free command.

Result Row #5:
Row 4 shows the swap memory utilization on server, you can find here how much swap is being used, the same results you can find using free command.

Result Row #6 (Running Processes):
In this steps you will see all running process on servers and there additional details about them like below.

4) How to display the memory utilization status for Linux?
free -m

5) How can display the Disk Usage of Linux?
Df - Disk free.
Du - Disk Used.

JOB SCHEDULING

1) What are the differences between CRON & AT?
At schedule the task at only once. cron job is used to schedule the job. It is used for maintain the daily routing work.

2) What are the main configuration files for Cron?
File located in the every user Home directory file name ".crontab" or /etc/crontab
crontab it is refers to the cron table

3) What is the format/fields for CronTab?
Minutes:Hours:Day:Month:Day of the Week <script>

FILE SYSTEM CONCEPT

1) Command to get the Ext2 & Ext3 file system?
mke2fs /dev/hdXX
mkfs.ext3 /dev/hdXX

2) What is difference between ext2, ext3 & ext4 file systems?
ext2, ext3 and ext4 are all filesystems created for Linux. This article explains the following:

Ext2 stands for second extended file system.
a) It was introduced in 1993. Developed by Rémy Card.
b) This was developed to overcome the limitation of the original ext file system.
c) Ext2 does not have journaling feature.
d) On flash drives, usb drives, ext2 is recommended, as it doesn't need to do the over head of journaling.
e) Maximum individual file size can be from 16 GB to 2 TB
f) Overall ext2 file system size can be from 2 TB to 32 TB

Ext3 stands for third extended file system.
a. it was introduced in 2001. Developed by Stephen Tweedie.

b. Starting from Linux Kernel 2.4.15 ext3 was available.
c. The main benefit of ext3 is that it allows journaling.
d. Journaling has a dedicated area in the file system, where all the changes are tracked. When the system crashes, the possibility of file system corruption is less because of journaling.
e. Maximum individual file size can be from 16 GB to 2 TB
f. Overall ext3 file system size can be from 2 TB to 32 TB
g. There are three types of journaling available in ext3 file system.
h. Journal – Metadata and content are saved in the journal.
i. Ordered – Only metadata is saved in the journal. Metadata are journaled only after writing the content to disk. This is the default.
j. Writeback – Only metadata is saved in the journal. Metadata might be journaled either before or after the content is written to the disk.
k. You can convert a ext2 file system to ext3 file system directly (without backup/restore).

Ext4 stands for fourth extended file system.

a) It was introduced in 2008.
b) Starting from Linux Kernel 2.6.19 ext4 was available.
c) Supports huge individual file size and overall file system size.
d) Maximum individual file size can be from 16 GB to 16 TB
e) Overall maximum ext4 file system size is 1 EB (exabyte). 1 EB = 1024 PB (petabyte). 1 PB = 1024 TB (terabyte).
f) Directory can contain a maximum of 64,000 subdirectories (as opposed to 32,000 in ext3)
g) You can also mount an existing ext3 fs as ext4 fs (without having to upgrade it).
h) Several other new features are introduced in ext4: multiblock allocation, delayed allocation, journal checksum. fast fsck, etc. All you need to know is that these new features have improved the performance and reliability of the filesystem when compared to ext3.
i) In ext4, you also have the option of turning the journaling feature “off”.

3) What is the maximum Partition size for Ext2 File system?

2TB-32TB

4) What is the maximum Partition size for Ext3 File system?

2TB-32TB

5) What is the maximum file size of Ext2 File System?

2TB

6) What is the maximum file size of Ext3 File System?

2TB

7) What is Superblock?

A superblock is a record of the characteristics of a filesystem, including its size, the block size, the empty and the filled blocks and their respective counts, the size and location of the inode tables, the disk block map and usage information, and the size of the block groups

8) How to display the Superblock?

dumpe2fs /dev/sda2 | grep superblock

9) How to repair the corrupted Superblock?

Find out superblock location for /dev/sda2:
dumpe2fs /dev/sda2 | grep superblock
Now check and repair a Linux file system using alternate superblock # 32768:
fsck -b 32768 /dev/sda2

10) How to display the Block Size of a file system?
dumpe2fs -h /dev/md2

11) How to convert file system through Ext2 or Ext3?
Converting Ext2 to Ext3
tune2fs -j /dev/hdXX

Converting Ext2 to Ext4
tune2fs -O dir_index,has_journal,uninit_bg /dev/hdXX
e2fsck -pf /dev/hdXX

Converting Ext3 to Ext4
tune2fs -O extents,uninit_bg,dir_index /dev/hdXX
e2fsck -pf /dev/hdXX

12) What is INODE number?
An inode is an entry in inode table, containing information (the metadata) about a regular file and directory. An inode is a data structure on a traditional Unix-style file system such as ext3 or ext4. Inode number also called as index number.

13) How to view the INODE number of a file?
ls -il tecadmin.txt

14) What is Hard Link?
A hard link to a file is indistinguishable from the original directory entry; any changes to a file are effectively independent of the name used to reference the file. Hard links may not normally refer to directories and may not span file systems.

15) Command to make Hard link?
ln {source} {link}

16) What is Soft Link?
A symbolic link, also termed a soft link, is a special kind of file that points to another file, much like a shortcut in Windows or a Macintosh alias. Unlike a hard link, a symbolic link does not contain the data in the target file. It simply points to another entry somewhere in the file system.

17) How to make soft Link?
$ ln -s /path/to/file1.txt /path/to/file2.txt

18) What are fields in /etc/fstab?
<device> <mountpoint> <filesystemtype><options> <dump> <fsckorder>

a. first field (/dev/hdc) is the physical device/remote filesystem which is to be described.
b. second field (/mnt/cdrom) specifies the mount point where the filesystem will be mounted.
c. third field (iso9660) is the type of filesystem on the device from the first field.
d. fourth field (noauto,ro,user) is a (default) list of options which mount should use when mounting the filesystem.
e. fifth field (0) is used by dump (a backup utility) to decide if a filesystem should be backed up. If zero then dump will ignore that filesystem. The sixth field (0) is used by fsck (the filesystem check utility) to determine the order in which filesystems should be checked.
f. If zero then fsck won't check the filesystem.

19) What are the 5th and 6th options in /etc/fstab?

fifth field (0) is used by dump (a backup utility) to decide if a filesystem should be backed up. If zero then dump will ignore that filesystem.

The sixth field (0) is used by fsck (the filesystem check utility) to determine the order in which filesystems should be checked. If zero then fsck won't check the filesystem.

20) What is difference between RSYNC & SCP?

The major difference between these tools is how they copy files.

Scp basically reads the source file and writes it to the destination. It performs a plain linear copy, locally, or over a network.

Rsync also copies files locally or over a network. But it employs a special delta transfer algorithm and a few optimizations to make the operation a lot faster. Consider the call.

Rsync will check files sizes and modification timestamps of both A and B, and skip any further processing if they match.

If the destination file B already exists, the delta transfer algorithm will make sure only differences between A and B are sent over the wire.

Rsync will write data to a temporary file T, and then replace the destination file B with T to make the update look "atomic" to processes that might be using B.

FTP RELATED TOPICS

1) What is FTP?

The File Transfer Protocol (FTP) is a standard network protocol used to transfer computer files from one host to another host over a TCP-based network, such as the Internet. FTP is built on a client-server architecture and uses separate control and data connections between the client and the server.

2) What is Active and Passive FTP?

In active mode FTP the client connects from a random unprivileged port (N > 1023) to the FTP server's command port, port 21. Then, the client starts listening to port N+1 and sends the FTP command PORT N+1 to the FTP server. The server will then connect back to the client's specified data port from its local data port, which is port 20.

In passive mode FTP the client initiates both connections to the server, solving the problem of firewalls filtering the incoming data port connection to the client from the server. When opening an FTP connection, the client opens two random unprivileged ports locally (N > 1023 and N+1). The first port contacts the server on port 21, but instead of then issuing a PORT command and allowing the server to connect back to its data port, the client will issue the PASV command. The result of this is that the server then opens a random unprivileged port (P > 1023) and sends P back to the client in response to the PASV command. The client then initiates the connection from port N+1 to port P on the server to transfer data.

3) On which port number FTP works?

20,21

4) What is the location of FTP log files?

/var/log/messages or /var/log/vsftpd.log

5) How many configuration files for FTP?

One, vsftpd.conf

6) How can we know whether FTP port is open or not?

Netstat on server, telnet or nmap from clinet to port 21.

7) How to configure FTP server?

Yum install vsftpd

Edit vsftpd.conf and start vsftpd server.

NFS RELATED TOPICS

1) What is NFS?

NFS stands for Network File System, a file system developed by Sun Microsystems, Inc. It is a client/server system that allows users to access files across a network and treat them as if they resided in a local file directory.

2) What is the difference between NFS V2 & NFS V3?

There are quite a few differences between version 2 and 3 and some of the more notable ones are:

a) Version 2 uses UDP (User Datagram Protocol) in most implementations which does not have guaranteed delivery.
b) Version 3 uses TCP (Transmission Control Protocol) that is a software layer to guarantee delivery.
c) Version 3 supports use of asynchronous writes to improve performance.
d) Version 2 supports 64-bit file sizes (vs. 32 for v2) to allow much larger files.

3) How to Configure NFS server?

yum -y install nfs-utils nfs-utils-lib

Configuration of NFS is pretty simple. You add the directories you wish to export to the file /etc/exports.

```
mkdir /public
touch /public/nfs1 /public/nfs2 /public/nfs3
vi /etc/exports
```

Add the following line to /etc/exports:

```
/public    *(ro,sync)
```

4) **How can we view the mounted information on NFS**?

showmount -a nfs03

5) What is SYNC option in NFS?

sync in the client context makes all writes to the file be committed to the server. async causes all writes to the file to not be transmitted to the server immediately, usually only when the file is closed. So another host opening the same file is not going to see the changes made by the first host.

6) What is Hard Mounting in NFS?

If you have mounted the NFS filesystem using hard mount, it will repeatedly retry to contact the server. Once the server is back online the program will continue to execute undisturbed from the state where it was during server crash. We can use the mount option "intr" which allows NFS requests to be interrupted if the server goes down or cannot be reached. Hence the recommended settings are hard and intr options.

mount -o rw,hard,intr host.nf_server.com/home /techhome

7) What is soft Mounting on NFS?

Suppose you have mounted a NFS filesystem using "soft mount" . When a program or application requests a file from the NFS filesystem, NFS client daemons will try to retrieve the data from the NFS server. But, if it doesn't get any response from the NFS server (due to any crash or failure of NFS server), the NFS client will report an error to the process on the client machine requesting the file access. The advantage of this mechanism is "fast responsiveness" as it doesn't wait for the NFS server to respond. But, the main disadvantage of this method is data corruption or loss of data. So, this is not a recommended option to use.

mount -o rw,soft host.nf_server.com/home /techhome

SAMBA RELATED TOPICS

1) What is SAMBA?

Samba is software that can be run on a platform other than Microsoft Windows, for example, UNIX, Linux, IBM System 390, OpenVMS, and other operating systems. Samba uses the TCP/IP protocol that is installed on the host server. When correctly configured, it allows that host to interact with a Microsoft Windows client or server as if it is a Windows file and print server.

2) What are the configuration files for SAMBA?
/etc/samba/smb.conf

3) Where the daemons configuration files are located?
/usr/local/samba/lib/

4) On which Port SAMBA works?
netbios-ns - 137/tcp # NETBIOS Name Service
netbios-dgm - 138/tcp # NETBIOS Datagram Service
netbios-ssn - 139/tcp # NETBIOS session service
microsoft-ds - 445/tcp # if you are using Active Directory
Port 389 (TCP) - for LDAP (Active Directory Mode)
Port 445 (TCP) - NetBIOS was moved to 445 after 2000 and beyond, (CIFS)
Port 901 (TCP) - for SWAT service (not related to client communication)

5) How to configure SAMBA?
Samba can be configured using its config file /etc/samba/smb.conf

6) How to check the configuration files in SAMBA?
testparm /etc/samba/smb.conf

7) Where the SAMBA Log Files stored?
/var/log/

8) What is File System Used in SAMBA?
Cifs

9) How to connect SAMBA with Windows?
\\samba.server.org

DNS RELATED

1) What are the packages used for DNS?
BIND

2) What is DNS version you are using?
Bind 9

3) What are resource records?
Resource records are the data elements that define the structure and content of the domain name space. All DNS operations are ultimately formulated in terms of resource records. Resource Records (RRs) are the DNS data records.

4) What is TTL?
Time to Live

5) What is "A" record?
A record is used to resolve domain name to IP address.

6) What is "PTR" Record?
PTR record is used to resolve IP address to fqdn.

7) What is "NS" Record?
NS record points to nameserver of domain.

8) What is "SOA" Records?

A start of authority (SOA) record is information stored in a domain name system (DNS) zone about that zone and about other DNS records. A DNS zone is the part of a domain for which an individual DNS server is responsible. Each zone contains a single SOA record.

9) What is "CNAME" Records?

CNAME is used for alias or common name of a fqdn.

10) What is "MX" Records?

MX records are used to point mail ex-changer.

11) What is Port No. for DNS?

53

12) What is location of DNS configuration files?

/etc/named.conf

13) What is location of DNS resource records?

/var/named/

14) How to flush the DNS cache

/etc/init.d/named restart

15) What is recursive query?

Recursive DNS queries occur when a DNS client requests information from a DNS server that is set to query subsequent DNS servers until a definitive answer is returned to the client. The queries made to subsequent DNS servers from the first DNS server are iterative queries.

16) What is iterative query?

Iterative DNS queries are ones in which a DNS server is queried and returns an answer without querying other DNS servers, even if it cannot provide a definitive answer. Iterative queries are also called non-recursive queries.

17) On which Protocol DNS works?

Both TCP and UDP

DHCP RELATED

1) What is DHCP?

The Dynamic Host Configuration Protocol (DHCP) is a standardized network protocol used on Internet Protocol (IP) networks for dynamically distributing network configuration parameters, such as IP addresses for interfaces and services.

2) On which port DHCP works?

UDP port 67 for the DHCP server, and UDP port 68 for the DHCP client

3) What is the configuration file for DHCP?

/etc/dhcp/dhcpd.conf

4) Where the DHCP Log Files stored?

/var/log/messages or /var/log/dhcpd.log

LVM

1) What is LVM?

In Linux, Logical Volume Manager (LVM) is a device mapper target that provides logical volume management for the Linux kernel. Most modern Linux distributions are LVM-aware to the point of being able to have their root file systems on a logical volume.

2) Difference between LVM1 & LVM2?

Features	LVM1	LVM2
RHEL AS 2.1 support	No	No
RHEL 3 support	Yes	No
RHEL 4 support	No	Yes
Transactional metadata for fast recovery	No	Yes
Shared volume mounts with GFS	No	Yes
Cluster Suite failover supported	Yes	Yes
Striped volume expansion	No	Yes
Max number PVs, LVs	256 PVs, 256 LVs	2**32 PVs, 2**32 LVs
Max device size	2 Terabytes	8 Exabytes (64-bit CPUs)
Volume mirroring support	No	Yes, in Fall 2005

3) How many volume groups can be created on LVM?

4) How to create an LVM?

```
pvcreate /dev/sda1 /dev/sdb1 /dev/sdc1
vgcreate new_vol_group /dev/sda1 /dev/sdb1 /dev/sdc1
lvcreate -L 2 G -n new_logical_volume new_vol_group
```

5) How to extend LV in LVM?

```
vgextend vg_tecmint /dev/sda1
lvextend -l +4607 /dev/vg_tecmint/LogVol01
resize2fs /dev/vg_tecmint/LogVol01
```

6) How to reduce LV in LVM?

```
umount -v /mnt/tecmint_reduce_test/
e2fsck -ff /dev/vg_tecmint_extra/tecmint_reduce_test
resize2fs /dev/vg_tecmint_extra/tecmint_reduce_test 8GB
lvreduce -L -8G /dev/vg_tecmint_extra/tecmint_reduce_test
lvdisplay vg_tecmint_extra
mount /dev/vg_tecmint_extra/tecmint_reduce_test /mnt/tecmint_reduce_test/
```

7) How to remove the LVM?

```
vgremove my_volume_group
pvremove /dev/ram15
```

8) What is Physical Extent (PE)?

Each physical volume is divided chunks of data, known as physical extents, these extents have the same size as the logical extents for the volume group.

When LVM allocates disk space to a logical volume, it automatically creates a mapping of the logical extents to physical extents. This mapping depends on the policy chosen when creating the logical volume. Logical extents are allocated sequentially, starting at zero, for each logical volume.

9) What is the default size of Physical Extent?

4 MB

10) What is Logical Extent?

Each logical volume is split into chunks of data, known as logical extents. The extent size is the same for all logical volumes in the volume group.

11) What is default chunk size of LVM?

4 MB

12) How to scan the LVM's Physical Volumes, Volume Groups and Logical Volumes?

Pvscan
Vgscan
Lvscan

13) How to take LVM snapshot?

lvcreate -L10G -s -n rootsnapshot /dev/server1/root

14) How to display LVM statistics?

lvmstat -l lv00

RAID

1) What is RAID?

RAID is a Redundant Array of Inexpensive disks, but nowadays it is called Redundant Array of Independent drives. Earlier it is used to be very costly to buy even a smaller size of disk, but nowadays we can buy a large size of disk with the same amount like before. Raid is just a collection of disks in a pool to become a logical volume.

2) What is RAID-0?

Stripe is striping data across multiple disk at the same time by dividing the contents. Assume we have two disks and if we save content to logical volume it will be saved under both two physical disks by dividing the content. For better performance RAID 0 will be used, but we can't get the data if one of the drive fails. So, it isn't a good practice to use RAID 0. The only solution is to install operating system with RAID0 applied logical volumes to safe your important files.

RAID 0 has High Performance.
Zero Capacity Loss in RAID 0. No Space will be wasted.
Zero Fault Tolerance (Can't get back the data if any one of disk fails).
Write and Reading will be Excellent.

3) What is RAID-1?

RAID Mirroring means an exact clone (or mirror) of the same data writing to two drives. A minimum two number of disks are more required in an array to create RAID1 and it's useful only, when read performance or reliability is more precise than the data storage capacity.

Features of RAID 1:

A) Mirror has Good Performance.

B) 50% of space will be lost. Means if we have two disk with 500GB size total, it will be 1TB but in Mirroring it will only show us 500GB.
C) No data loss in Mirroring if one disk fails, because we have the same content in both disks.
D) Reading will be good than writing data to drive.

4) What is RAID-5?

In RAID 5, data strips across multiple drives with distributed parity. The striping with distributed parity means it will split the parity information and stripe data over the multiple disks, which will have good data redundancy.
For RAID Level it should have at least three hard drives or more. RAID 5 are being used in the large scale production environment where it's cost effective and provide performance as well as redundancy.

Pros and Cons of RAID 5:

a) Gives better performance
b) Support Redundancy and Fault tolerance.
c) Support hot spare options.
d) Will loose a single disk capacity for using parity information.
e) No data loss if a single disk fails. We can rebuilt from parity after replacing the failed disk.
f) Suits for transaction oriented environment as the reading will be faster.
g) Due to parity overhead, writing will be slow.
h) Rebuild takes long time.

5) How to create RAID-1?

mdadm --create /dev/md0 --level=mirror --raid-devices=2 /dev/sd[b-c]1

6) How to create RAID-5?

mdadm --create /dev/md0 --level=5 --raid-devices=3 /dev/sdb1 /dev/sdc1 /dev/sdd1

7) What is maximum number of physical drive recommend in RAID5 set?

Seven

8) What happens when disk fails on RAID5?

Because of parity, information all data are available in case one of the disks fails. If extra (spare) disks are available, then reconstruction will begin immediately after the device failure. However if two hard disks fail at same time, all data are LOST. In short RAID 5 can survive one disk failure, but not two or more.

USER MANAGEMENT

1) What is Shell in Linux?

Shell is an command language interpreter that executes commands read from the standard input device (keyboard) or from a file. Shell is not part of system kernel, but uses the system kernel to execute programs, create files etc. Most common shell in Linux

2) Where the user's information stored?

User's information are stored in /etc/passwd.

3) How many fields are in /etc/password file?

The field are as follows:
1.Name
2. password
3. UID
4. GID
5. GECOS
6. GECOS
7. directory

8. shell

4) What is the default permission of /etc/passwd file?
/etc/passwd : 644

5) Where the user's password stored?
/etc/shadow

6) How many fields are in /etc/shadow file?
Username : It is your login name.
Password : It is your encrypted password. The password should be minimum 6-8 characters long including special characters/digits and more.
Last password change (lastchanged) : Days since Jan 1, 1970 that password was last changed
Minimum : The minimum number of days required between password changes i.e. 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 (after that user is forced to change his/her password)
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 : days since Jan 1, 1970 that account is disabled i.e. an absolute date specifying when the login may no longer be used.

7) What is the default permission for shadow file?
/etc/shadow : 400

8) Where the groups are stored?
/etc/group

9) How many fields are in /etc/group?
group_name: It is the name of group. If you run ls -l command, you will see this name printed in the group field.
Password: Generally password is not used, hence it is empty/blank. It can store encrypted password. This is useful to implement privileged groups.
Group ID (GID): Each user must be assigned a group ID. You can see this number in your /etc/passwd file.
Group List: It is a list of user names of users who are members of the group. The user names, must be separated by commas.

10) How to get the user's who currently logged in on the system?
w command - Shows information about the users currently on the machine, and their processes

11) What is UMASK?
In computing, umask is a command that determines the settings of a mask that controls how file permissions are set for newly created files. It also may refer to a function that sets the mask, or it may refer to the mask itself, which is formally known as the file mode creation mask

12) What is the preferred UMASK value for a system?
022

13) What is Sticky Bit?
A sticky bit is a permission bit that is set on a directory that allows only the owner of the file within that directory or the root user to delete or rename the file. No other user has the needed privileges to delete the file created by some other user.

14) How to set a Sticky Bit?

Use chmod command to set the sticky bit. If you are using the octal numbers in chmod, give 1 before you specify other numbered privileges, as shown below. The example below, gives rwx permission to user, group and others (and also adds the sticky bit to the

15) What is a PAM file?
The Pluggable Authentication Module (PAM) API exposes a set of functions that application programmers use for security-related functions like user authentication, data encryption, LDAP, and more.

16) Where the configuration files resides?
The directory /etc/pam.d/ contains the PAM configuration files for each PAM-aware application. In earlier versions of PAM, the file /etc/pam.conf was used.

17) What are the fields of PAM files?
The fields are, in order: service name, facility name, control flag, module name, and module arguments. Any additional fields are interpreted as additional module arguments.
/etc/pam.conf
login auth required pam_nologin.so no_warn

18) How to enforce users to keep stronger password?
The default pam_cracklib PAM module provides strength-checking for passwords. It rejects the password if any one of the following conditions found:
Palindrome - Is the new password a palindrome of the old one?
Case Change Only - Is the new password the the old one with only a change of case?
Similar - Is the new password too much like the old one?
Simple - Is the new password too small?
Rotated - Is the new password a rotated version of the old password?
Already used - Was the password used in the past? Previously used passwords are to be found in /etc/security/opasswd.

19) How can we lock the user's account?
passwd -l {username}

20) How can we unlock the user's account?
passwd -u username

21) How can we force users to change their password at next logon?
chage -d 0 {user-name}

22) How can we change the UID for the user?
usermod -u UID username

23) How can we add user in a group?
useradd -G {group-name} username

24) How to delete a user?
Userdel username

25) How to delete the user along with the home directory?
Userdel –r username

WEB SERVERS - APACHE & TOMCAT

1) What is APACHE?

Apache is a freely available Web server that runs on most UNIX-based operating systems (such as Linux, Solaris, Digital UNIX, and AIX), on other UNIX/POSIX-derived systems (such as Rhapsody, BeOS, and BS2000/OSD), on AmigaOS, and on Windows 2000.

2) What is the current Version of Apache you are using?

Apache HTTP Server 2.4.17.

3) How to check the Apache's web server test page?

To check if apache is serving the default page point your browser to http://localhost. If you haven't a GUI you can access your server with curl localhost which will print on your stdout the HTML code of your default page.

4) Which authentication methods used in Apache?

1. Basic authentication
2. Digest authentication
3. Form-based authentication

5) What is the Virtual Hosting? What are IP based & Name based virtual Hosting?

Virtual hosting is a method for hosting multiple domain names (with separate handling of each name) on a single server (or pool of servers). This allows one server to share its resources, such as memory and processor cycles, without requiring all services provided to use the samehost name. Using Apache Virtual Host, you can run several websites on the same server.

With the IP based virtual hosting, you can assign a separate IP for each domain on a single server, these IP's can be attached to the server with single NIC cards and as well as multiple NICs. whereas With the name based virtual hosting you can host several domains/websites on a single machine with a single IP. All domains on that server will be sharing a single IP. It's easier to configure than IP based virtual hosting, you only need to configure DNS of the domain to map it with its correct IP address and then configure Apache to recognize it with the domain names.

6) Where the configuration file path for Secure Virtual Hosting?

/etc/httpd/conf.d/ssl.conf

7) How can we enable SSL in Apache?

Edit virtual host config. Restart apache

```
<VirtualHost 192.168.0.1:443>
DocumentRoot /var/www/html2
ServerName www.yourdomain.com
SSLEngine on
SSLCertificateFile /path/to/your_domain_name.crt
SSLCertificateKeyFile /path/to/your_private.key
SSLCertificateChainFile /path/to/DigiCertCA.crt
</VirtualHost>
```

8) How to check the Apache configuration?

```
# Fedora, RHEL, CentOS, OSX
    httpd –t
 # Debian, Ubuntu
    apache2ctl –t
 # MacOS
   apachectl -t
```

9) How to check the Apache Virtual Host Configuration?

```
# Fedora, RHEL, CentOS, OSX
    httpd –t
 # Debian, Ubuntu
    apache2ctl –t
```

```
# MacOS
  apachectl -t
```

10) Where the Apache log files created?
/var/log/httpd/

11) What is the default document root of Apache?
/var/www/html/

12) What is DirectoryIndex in Apache?
The DirectoryIndex directive sets the list of resources to look for, when the client requests an index of the directory by specifying a / at the end of the directory name. Local-url is the (%-encoded) URL of a document on the server relative to the requested directory; it is usually the name of a file in the directory. Several URLs may be given, in which case the server will return the first one that it finds. If none of the resources exist and the Indexes option is set, the server will generate its own listing of the directory.

DirectoryIndex index.html index.txt /cgi-bin/index.pl

13) What standard port to allow access to regular and secure Web Sites?
80, 443

14) How to monitor the server performance in Apache?
mod_status is an Apache module which helps to monitor web server load and current httpd connections with an HTML interface which can be accessible via a web browser.
Apache's mod_status shows a plain HTML page containing the information about current statistics of web server state including.

a. Total number of incoming requests
b. Total number of bytes and counts server
c. CPU usage of Web server
d. Server Load
e. Server Uptime
f. Total Traffic
g. Total number of idle workers
h. PIDs with respective client and many more.

15) What is KeepAlive in Apache?
Keep-Alive is a header that maintains a persistent connection between client and server, preventing a connection from breaking intermittently. Also known as HTTP keep-alive, it can be defined as a method to allow the same TCP connection for HTTP communication instead of opening a new connection for each new request.

16) What is MPM?
Apache came the Multi Process Modules, or MPMs. The MPMs change the basic functionality of the web server. They do this by modifying how Apache listens to the network, accepts and handles requests.

Multi-Processing Modules (MPMs) are responsible for binding to network ports on the machine, accepting requests, and dispatching children to handle the requests.

17) What is default MPM for Apache?
Apache 2.2 - prefork
Apache 2.4 - event

18) What is the difference between PREFORK & WORKER MPM?

Prefork MPM uses multiple child processes with one thread each and each process handles one connection at a time.
Worker MPM uses multiple child processes with many threads each. Each thread handles one connection at a time.
On most of the systems, speed of both the MPMs is comparable but prefork uses more memory than worker.

STORAGE RELATED

1) What is HBA?

A host bus adapter (HBA) is a circuit board and/or integrated circuit adapter that provides input/output (I/O) processing and physical connectivity between a host system, or server, and a storage and/or network device.

2) What is WWN in storage?

A World Wide Name (WWN) or World Wide Identifier (WWID) is a unique identifier used in storage technologies including Fibre Channel, Advanced Technology Attachment (ATA) or Serial Attached SCSI (SAS).

3) What is LUN?

In computer storage, a logical unit number, or LUN, is a number used to identify a logical unit, which is a device addressed by the SCSI protocol or Storage Area Network protocols which encapsulate SCSI, such as Fibre Channel or iSCSI.

4) How LUNs work with SCSI?

LUN setup varies by system. A logical unit number is assigned when a host scans a SCSI device and discovers a logical unit. The LUN identifies the specific logical unit to the SCSI initiator when combined with information such as the target port identifier. Although the term LUN is only the identifying number of the logical unit, the industry commonly uses LUN as shorthand to refer to the logical unit itself.

The logical unit may be a part of a storage drive, an entire storage drive, or all of parts of several storage drives such as hard disks, solid-state drives or tapes, in one or more storage systems. A LUN can reference an entire RAID set, a single drive or partition, or multiple storage drives or partitions. In any case, the logical unit is treated as if it is a single device and is identified by the logical unit number. The capacity limit of a LUN varies by system.

A LUN is central to the management of a block storage array in a storage-area network (SAN). Using a LUN can simplify the management of storage resources because access and control privileges can be assigned through the logical identifiers.

5) What are initiators?

In computer data storage, a SCSI initiator is the endpoint that initiates a SCSI session, that is, sends a SCSI command. The initiator usually does not provide any Logical Unit Numbers (LUNs).

6) What are targets?

On the other hand, a SCSI target is the endpoint that does not initiate sessions, but instead waits for initiators' commands and provides required input/output data transfers. The target usually provides to the initiators one or more LUNs, because otherwise no read or write command would be possible.

7) What are “Failover” & “Failback” in cluster?

Failover is the process of shifting I/O and its processes from a primary location to a secondary DR location. This typically involves using a vendor's tool or a third-party tool of some type that can temporarily halt I/O, and restart it from a remote location.

This will temporarily halt I/O, suspending data copying and mirroring activity that may be going on from the primary location to the secondary location. This will then bring applications and I/O up from that remote location.

During activity at the remote site, changes are usually tracked so that their original location can be re-synchronized and restored to service by just replicating the data between the start and end of the DR event back to the primary

location when it comes back up. Failback is the process of re-synchronizing that data back to the primary location, halting I/O and application activity once again and cutting back over to the original location.

8) How to scan a new FC_LUN on Linux?

echo "1" > /sys/class/fc_host/host0/issue_lip

9) How to scan a new SCSI-Disk on Linux?

echo "- - -" > /sys/class/scsi_host/host0/scan