**DevOps Notes (Linux Commands)**

**Users:** A person who can access the server is known as User.

In Linux there are three types of users:

**Default or Super User:** A user who has created along with the server who can be deleted when the server got terminated or deleted.

* ‘**$**’ indicates cursor is in super user.
* ‘**#**’ indicates cursor is in root user.
* For ‘**$**’ 🡪 ‘**#**’ use ‘**sudo -i**’ command.
* For ‘**#**’ 🡪 ‘**$**’ use ‘**exit**’ or ‘**logout**’ commands.
* If the cursor is in super user use ‘**exit**’ or ‘**logout**’ commands to disconnect from the server.

**System User:** A user who has created along with the installation of software who can be deleted only when the software got terminated or deleted.

**Normal User:** A user who can access the server with the limited permeations who can be deleted at any point of time.

**Commands to create and manage a Normal User:**

‘**useradd <User Name>**’: It is used to create a user without collecting any information.

‘**adduser <User Name>**’: It is used to create a user by collecting the full information.

‘**useradd -u <Custom User ID> <User Name>**’: It is used to create a user with a custom user ID without collecting any information.

‘**adduser -u <Custom User ID> <User Name>**’: It is used to create a user with a custom user ID by collecting the full information.

‘**passwd** **<User Name>**’: It is used to set new password for a user.

‘**usermod -u <New User ID> <User Name>**’: It is used to change existing user ID to new User ID for a user.

‘**usermod -l <New User Name> <Old User Name>**’: It is used to change existing user name to new user name for a user.

‘**usermod -L <User Name>**’: It is used to lock a user.

‘**usermod -U <User Name>**’: It is used to unlock a user.

‘**userdel <User Name>**’: It is used to delete a user.

**Note:**

* In “/etc” directory by using “passwd” file we can find the list of the users.
* In “/etc” directory by using “shadow” file we can find that for which users the passwords are assigned and also we can recognize which users are locked or unlocked

**Groups:** Two or more User combined together is known as a Group.

‘**groupadd <Group Name>**’: It is used to create a new group.

‘**groupadd -u <Custom Group ID> <Group Name>**’: It is used to create a new group with custom Group ID.

‘**groupmod -g <New Group ID> <Group Name>**’: It is used to change the existing group ID to new group ID for a group.

‘**groupmod -n <New Group Name> <Existing Group Name>**’: It is used to change existing group name to new group name for a group.

‘**gpasswd -a <User Name> <Group Name>**’: It is used to add a user into a group.

‘**gpasswd -M <User Name 1>,<User Name 2>,<User Name 3> <Group Name>**’: It is used to add multiple users at a single time into a group.

‘**gpasswd -A <User Name> <Group Name>**’: It is used to make a user as an admin to a group.

‘**gpasswd -d <User Name> <Group Name>**’: It is used to remove a user from a group.

‘**groupdel <Group Name>**’: It is used to delete a group.

**Note:**

* In “/etc” directory by using “group” file we can find the list of the groups and users in these groups.
* In “/etc” directory by using “gshadow” file we can find the admins of the groups.

**Server Operations and Configurations:**

‘**hostname**’: It is used to know the host name for the server.

‘**hostname -i**’: It is used to know the Private IP of the server.

‘**hostnamectl set-hostname <New Name of the Host>**’: It is used to set new name for the host of the server.

‘**curl ifconfig.io**’: It is used to know the Public IP of the server.

‘**free -h**’: It is used to know RAM information of the server in human readable language.

‘**df -h**’: it is used to know the ROM information of the server in human readable language.

‘**htop**’: it is used to monitor the whole server.

‘**ps**’: It is used to know the procedure of the server.

‘**kill <Process ID>**’: It is used to kill a process with its Process ID.

‘**ps aux**’:It is used to know the full information of the procedure of the server.

‘**du -sh <Directory/File Name or Path>**’: It is used to know the size of the specific directory/file.

‘**w**’: It is used to know which users are connected to the server.

‘**lsof**’: It is used to list the open files in the server.

‘**init 6**’ or ‘**reboot**’: It is used to reboot the server.

‘**history**’: It is used to print the commands used before in the present session.

‘**journalctl -xe**’: It is used to find the logs of the server in the present session.

‘**apt install <Software/Tool> -y**’: It is used to install any Software/Tool by confirming with ‘yes’ option in the server which has Ubuntu Linux OS

‘**apt update**’: It is used to update the server which has Ubuntu Linux OS with latest version which is available.

‘**<Software/Tool> -v**’: It is used to print the version of the Software/Tool.

‘**systemctl <Option> <Service>**’: It is used to control the services in the server.

* There are several options to control the services in the server.

1. ‘**start**’: It is used to start a service.
2. ‘**stop**’: it is used to stop a service.
3. ‘**enable**’: It is use to enable a service.
4. ‘**restart**’: It is used to restart a service.
5. ‘**disable**’: It is used to disable a service.
6. ‘**status**’: It is used to know the status of a service.

**Note:**

* In “/etc” directory by using “os-release” file we can find the full information of the OS of the server.
* In “/proc” directory by using “cpuinfo” file we can find the full information of the CPU of the server.
* In “/proc” directory by using “meminfo” file we can find the full information of the memory.

**Files:**

‘**cat <File Name or Path>**’: It is used to print the file content.

‘**rm <File Name>**’: It is used to delete files.

Files can be created as Empty and Non-empty files.

1. **Empty File:**

‘**touch <File Name>**’: It is used to create an empty file.

1. **Non-empty files:** Non-empty files can be created with structured data and Non-structured data.

**Non-structured Data Files:**

‘**cat** **>** <**File Name**>’: It is used to create a non-empty file with non-structured data and also used to replace the present data of the file with new data.

‘**cat >>** <**File Name**>’: It is used to append the new data to the old data in the file.

‘**cat** <**File(1…n)**> **>>** <**File(m)**>’: It is used to append the data from source files to destination file.

‘**cat** <**File(1….n)**> **>** <**File(m)**>’: It is used to replace the data of the destination file with source files data.

**Structured Data Files:** File with Structured data can be created and managed by ‘**vi**’ tool.

‘**vi <File Name/Path>**’: It is used to open a new or existing file in ‘**vi**’ tool.

**‘vi’** Commands**:** In ‘**vi**’ tool there are three modes:

* Command Mode: Initially after entering into ‘**vi**’ tool we always enter into command mode. In this mode we can do multiple operations. We can enter to this mode by click on ‘Esc’ in any mode

‘**gg**’: it is used to move the cursor to first line in the file.

‘**G**’: It is used to move the cursor to last line in the file.

‘**<Specific Line Number>gg**’: It is used to move the cursor to specific line.

‘**x**’: It is used to remove letter by letter.

‘**dw**’: it is used to remove word by word.

‘**dd**’: it is used to remove the line where the cursor is located.

‘**<Specific Line Number>dd**’: It is used to remove the specific number of line from where the cursor is located.

‘**yy**’: It is used to copy the line where the cursor is located.

‘**p**’: It is used to paste the line where the cursor is located.

‘**/<Specific Letter or Word or Pattern>**’: It is used to search any letter/word/pattern in the file.

‘n’: It is used to search in forward direction.

‘N’: It is used to search in backward direction.

* Insert Mode: In this mode we can enter/modify/delete data in the file. We can enter to this mode by clicking on ‘i’ in command mode.

Extended Command Mode: In this mode we can save the file and quit from ‘**vi**’ tool. We can enter this mode by clicking on ‘Esc+Shift+:’ in any mode.

‘**w**’: It is used to save the data in the file.

‘**q**’: It is used to quit from ‘**vi**’ tool.

‘**q!**’: It is used to forcefully quit from ‘**vi**’ tool.

‘**wq**’: It is used to save the data in the file and quit from ‘**vi**’ tool.

‘**wq!**’: It is used to save the data in the file and forcefully quit from ‘**vi**’ tool.

‘**x**’: It is used to forcefully save the data in the file and forcefully quit from ‘**vi**’ tool.

‘**se nu**’: It is used to show the numbers of the line in the file.

**Directory Operations:**

‘**mkdir <Directory Name>**’: It is used to create an empty directory.

* If we give spaces between directory name to another directory name it can create multiple directories at a time.

‘**mkdir -p <Nested Directory Path (D/d/a)>**’:It is used to create nested directories.

* If we give spaces between nested directory to nested directory it will create multiple directories in the nested format.

‘**pwd**’: It is used to know the present location of the cursor.

‘**ls**’: It is used to list the contents at present working directory without hidden files/directories.

‘**ls <Directory Name or Path>**’: It is used to list the contents without hidden files/directories at destination directory.

‘**ls -R**’: It is used to list the contents at present working directory in nested format.

‘**ls -R <Directory Name/Path>**’: It is used to list the contents at destination directory in nested format.

‘**ls -a**’: It is used to list the contents at present working directory with hidden files/directories.

‘**ls -a <Directory Path/Name>**’: It is used to list the contents at present working directory with hidden files/directories at the destination directory.

‘**cd <Directory Name or Path>**’: It is used to move the cursor location from present working directory to destination directory.

‘**cd**’: It is used to move the cursor from present working directory location to root directory location.

‘**cd ..**’: It is used to move the cursor from present working directory to its parent directory.

‘**cp <Source File Path> <Destination File Path>**’: It is used to copy files from source location to destination location.

‘**cp -rf <Source Path> <Destination Path>**’: It is used to copy file or directories from source location to destination location recursively forcefully.

‘**mv <Source Path> <Destination Path>**’: It is used to move files or directories from source location to destination location.

‘**mv <Old File/Directory Name/Path> <New File /Directory Name/Path>**’: It is used to rename the files/directories.

‘**rmdir <Empty Directory Name or Path>**’: It is used to delete the empty directories.

‘**rm -rf <File/Directory Name/Path>**’: It is used to delete the files/directories (Non-empty or Empty).

**Filtering Commands:**

‘**grep <Letter/Word/Pattern> <File Name>**’: It is used to print the file content and highlight the searching letter/word/pattern with case-sensitive condition.

* There are some options to filter and print the content of the file with ‘**grep**’ command: Syntax - ‘**grep <Option> <Letter/Word/Pattern> <File Name>**’

1. ‘**-c**’: It is used to count the number of lines where the finding letter/word/pattern is found.
2. ‘**-i**’: It is used to find the letter/word/pattern without case-sensitive condition.
3. ‘**-e**’: It is used to fund multiple letters/words/patterns at a time.
4. ‘**-v**’: It is used to print the file content without the lines containing given letter/word/pattern.
5. ‘**-n**’: It is used to print the line numbers with content in the lines with given letter/word/pattern.
6. ‘**-o**’: It is used to print the lines with the given letter/word/pattern only.
7. ‘**-l**’: It is used to check whether the given letter/word/pattern is contained in the given file.

‘**sort <File Name>**’: It is used to sort and print the contents of the file in ascending order according to the first column numbers and letters.

* There are some options to sort and print the content of the file with ‘**sort**’ command: Syntax - ‘**sort <Option> <File Name>**’

1. ‘**-n**’: It is used to sort and print the contents of the file in ascending order according to the numbers and letters value.
2. ‘**-r**’: It is used to sort and print the contents of the file in descending order according to the first column numbers and letters.
3. ‘**-nr**’: It is used to sort and print the contents of the file in descending order according to the numbers and letters value.

‘**sed s/<Old Letter**/**Word**/**Pattern>/<Replacement Letter**/**Word**/**Pattern>/g <File Name>**’: It is used to replace an old letter/word/pattern with replacement letter/word/pattern in a file and print the contents of the file with replacement letter/word/pattern.

‘**cut -b <Column Numbers with** ‘**,**’ **and** ‘**-**’**> <File Name>**’: It is used to print the contents of the file with the given column numbers accordingly.

‘**awk ‘{print$1$2$3….$n}’ <File Name>**’: It is used to print the words of the every line in a file according to the numbers after ‘**$**’ symbol.

‘**paste <File 1> <File 2> ….. <File n>**’: It is used to print the contents of the file by combining the data of the given files according to the columns of the files respectively.

‘**more <File Name>**’: It is used to print the data of the file like pages with percentage wise.

**Networking Commands:**

‘**ping <Private IP>**’: It is used to check the status and speed of the internet to the server private IP.

‘**ip r**’: It is used to check the how many routes are connected to the server.

‘**traceroute <URL>**’: It is a tool used to check the details through the URL to which servers does our server is connecting through which user and which IP of our server and know the latency.

‘**dig <URL>**’: It is a tool used to check DNS information of the URL coming to the server.

‘**nslookup <URL>**’: It is used to check the IP and MAC addresses of the of the servers which are accessible through the URL from our server.

‘**ifconfig**’: It is a tool used to check the information of our network configurations of our server.

‘**curl <URl>**’: It is used to browse within the server or give the source code of the URL.

‘**nenstat -tnulp**’: It is used to check the listen state of the allowed ports.

‘**telnet <Public IP> <Port>**’: It is used to check does the server is connecting to the public IP through the allowed port.

‘**wget <Download URL Link>**’: It is used to download any file by using download URL link of the file.

**Static Applications Deployment Tools:**

* ‘nginx’ is a web server which can be commonly installed and used across all Linux OS’s.
* ‘apache2’ is a web server which can be installed and used in Ubuntu Linux OS.
* ‘httpd’ is a web server which can be installed and used in Amazon Linux OS.

**NodeJS Application Deployment Tools:**

**NodeJS Tools**: These tools are used to resolve the compatibilities between server and deploying application and these tools can be used by the command ‘**node**’.

**Node Package Manager Tools**: These tools are used to resolve the compatibility issues between deploying application and NodeJS tools and these tools can be used by the command ‘**npm**’.

**Package Manage Monitor Tools**: These tools are used to run the deployed applications in the server and these tools can be installed using NPM tools to resolve the compatibility issues between PM2 tools and NodeJS tools. These tools can be used by the command ‘**pm2**’.

**Serve Tool:** It is used to serve the Frontend NodeJS Applications to PM2 tools to run the applications and can be used in the command as ‘**serve**’.

**Supporting Tools to Deploy the Applications:**

‘**git clone <HTTP GitHub URL>**’: It is a tool used to get the repositories from GitHub to the server.

‘**unzip <File Name/Path> -d <Destination Path>**’: It is a tool which is used to unzip a file to a destination path.

**File Permissions and Ownerships:**

‘(**ls -lrth**)/(**ls -l**) **<File Name>**’: It is used to know the files complete information in long list format with normal files.

‘(**ll**)/(**ls -al**) **<File Name>**’: It is used to know the files complete information in long list format with normal files and hidden files too.

* In long list format we see the below output for any file/directory:

**-rwxr--r-- <>** **<User as Owner> <Group as Owner> <Size> <Creation Month/Date/Time> <File Name>**

**drw-r--r--** **<> <User as Owner> <Group as Owner> <Size> <Creation Month/Date/Time> <Directory Name>**

1. In the above information in first column ‘**d**’ indicates directory and ‘**-**‘ indicates file.
2. From 2-4 columns indicates the User level permissions which is denoted by ‘**u**’.
3. From 5-7 columns indicates the Group level permissions which is denoted by ‘**g**’.
4. From 8-10 columns indicates the Other level permissions which is denoted by ‘**o**’.
5. Here ‘**r**’ indicates read permission, ‘**w**’ indicated write permission and ‘**x**’ indicates execute permission.

‘**chmod**’: It is used to change the permissions of the files/directories.

* There are two way two use this command:

**Letters Format:**

‘**chmod u(+/-)**(**rwx**)**,g(+/-)**(**rwx**)**,o (+/-)**(**rwx**) **<File Name>**’: It is used to change the permissions of the files in letters format.

**Numbers Format:** In this format by using 1-7 numbers the permissions will decide.

* ‘**1**’ indicates execute permission.
* ‘**2**’ indicates write permission.
* ‘**3**’ indicates write and execute permission.
* ‘**4**’ indicates read permission.
* ‘**5**’ indicates read and execute permission.
* ‘**6**’ indicates read and write permission.
* ‘**7**’ indicates read, write and execute permission.

‘**chmod <1-7 numbers for User level><1-7 numbers for Group level><1-7 numbers for Other level> <File Name>**’: It is used to change the permissions of the files/directories in numbers format.

‘**chown -R <User Name>:<Group Name> <File Name>**’: It is used to change the ownership of the files in User and Group Level.

**Links:** A chain connection between two or more files if any modifications are done to one file in the chain will also apply to the other files in the chain.

* There are two types of links:

**Hard Link:**

’**ln <Source File Name/Path> <Linked File with New Name/Path>**’: It is used to create a file with hard link.

* In Hard link if the source file is deleted the link will remain in working state.

**Soft Link:**

‘**ln -s <Source File Name/Path> <Linked File with New Name/Path>**’: It is used to create a file with soft link.

* In Soft link if the source file is deleted the link will collapse.
* In long-list format for a soft link file in first column we can find letter ‘**l**’ which indicates the file is a soft link file which always shows the all permissions in all levels by default and also we can find that for which file the soft link file is linked.

**Server Migration:** Connection between servers to transfer file from one server to another server.

‘**scp -i “<Security Key>” <File Name/Path from Source Server> <Destination Server Username>@<Destination Server Public IP>:<Path in Destination Server>**’: It is used to transfer files from Source server to Destination Server.

**Prerequisites:**

* Check does the Source and Destination servers were connecting with ‘**ping**’ command.
* The Destination Server Security Key should be configured in Source Server and while executing the ‘**scp**’ command the cursor location should be located Destination Server Security Key Path.
* While giving the Path in Destination server make sure that every directory in the path should contain Write and Execute permissions at Other level.