

What is devOps ?

DevOps is a culture that u are adapting in your organisation , it improve the organisation to deliver its application.

To improve the delivery its should be automated , also look for quality and monitoring .
To insure if there is a issue in the quality is known to use , monitoring the build for feedback .

Also testing u can not ensure the quality and the monitoring is correct or not .

Why devOps ?

Development + operational

SDLC ?

Design -> develop -> test

Planning(requirements) ->defining (software requirement specification document)-> designing (HLD,LLD)—>**building->testing->deploy**

Building(developers)->testing(QE engineers)_—> deploy all these three is seen by (DEV_OPS)

DevOps engineer ensure that all these three step should execute at faster pace .
Every thing is automated without manual interaction .

Virtual Machines :

End goal is efficiency in devOps , use resource efficiency .

Server: all of the application is hosted in public server so that public access the application .

U buy 4 server each server is 100 gb ram etc. and u are deploying a app of 4 gb wasting the entire resources .

Then come the virtualisation concept in picture ->

U buy a physical servers from HP or IBM or Microsoft -> in one physical server u will install a hypervisor which is a software that will help u set up virtual machine .
U are dividing the server into logical partition logical isolation into different Virtual machines .

U added efficiency as a devOps engineer by automating this setup .

Popular hypervisor = VM ware , Xen

Each virtual machine will have there own cpu , memory and also there own hardware so one vm is not depending on other vm for hardware .

Virtual Machine part 2

AWS : u will create a virtual machine and ec2 instance

Azure : same .

Importance of automation :

Efficiency -> AWS EC2 api , user will create the script and 10 ec2 instance user will talk to this AWS EC2 api .

Manually u may commit some errors but if automating the process u are avoiding the error and saving the time.

Developer at AWS provide 100 of services -> they write AWS api of AWS EC2 api is responsible to receiving the request and that request should be valid , authenticated(should have access to the AWS account) and authorised (have access to those services).

Your script has to make the api call with AWS that is matching all these three criteria . As the output of this script u will get the AWS EC2 instance .

Script can be of multiple types . :

1.AWS CLI , AWS API , AWS CFT(cloud format template) , terraform (can automate in multiple cloud platform) all these are directly calling the AWS API

Who is writing these AWS API developers in amazon they are exposing this EC2 instance via a API .

What is the infrastructure automation tool u are using >???

AWS Cloud development kit -> it is more advance than terraform , best for automation in AWS .

Hybrid cloud pattern

Google cloud platform leads in AI ML , kubernetes .

AWS CLI :

Login to the virtual machine .

This is not convenient . -> every time connect to the vm via a AWS GUI.

U need to connect via your own pc terminal .

```
(base) vishaldwivedi@vishals-MacBook-Air-2 ~ % ssh -i  
/Users/vishaldwivedi/Downloads/demoKey.pem ubuntu@3.106.206.0
```

Again it will deny permission are too open .

file is a secret file so always keep the permission closed/

: chmod 600 /Users/vishaldwivedi/Downloads/demoKey.pem

```
ssh -i /Users/vishaldwivedi/Downloads/demokeypart2.pem  
ubuntu@54.206.40.171
```

```
(base) vishaldwivedi@vishals-MacBook-Air-2 ~ % which aws  
/usr/local/bin/aws
```

This does not have my account information on aws .

So I need to connect to aws account and aws cli .

Aws account go to security credential ->

cfT => <https://github.com/aws-cloudformation/aws-cloudformation-templates>

<https://gist.github.com/mda590/679aba60ca03699d5b12a32314debd0>

LINUX OPERATION SYSTEM AND BASIC SHELL SCRIPTING :

Hard ware vs a software :

There has to be a medium btw your software and hard ware it is OS .

Why linux :

Free operating system , where as window is not free

No antivirus to install in linux very secure .

Lot of distribution => Debian , red-hat , alpine , centos .

Fast running os (linux)

Kernel _> device , process, memory , handling system calls (heart of os)

System library : if user if trying to perform a task it first goes to SL then to kernel .

Eg:libC

Compilers : u have to compile the code .

Shell scripting :

No gui , in linux the way to talk via command line to do any operation is called shell scripting these shell command are common btw different os . Eg: Debian , centos , fedora ,ubuntu .

Checking cpu memory disk size :

: free -g // u can see the memory of your laptop .

: nproc // how many cpu u are using

: df -h // what is the disk size .

: top // see all these things in one place .

Eg: create 100 files : -> touch command there for u need automation shell scripting

Ls -ltr // when the file was created what permission it had which user and group they belong too.

If u forgot what that specific command does : suffix **man any command**

Vim vs touch :

Touch if for the automation and vim is to write inside the file .

Vim first-shell-script.sh to start writing the shell script :

`#!/bin(shebang)`

Why we write a shebang it start of every shell script :

`#!/bin/bash` , `dash` , `sh` , `ksh` ?

These are the different executables of your shell script .

So u have to inform your linux or kernel this is the executable u way to use , one of the widely use is `bash` .

Difference btw `#!/bin/sh` vs `#!/bin/bash` ?

The request is is done to `sh` but forward to `bash` concept of linking . (Previous written)
(previously both were same)

But these days some of the os like ubuntu -> linking `sh` to `dash` (on a machine where `dash` is default u may not able to run `.sh` -> `bash` .

Open the `.sh` file -> `vim filename.sh` -> press `esc` key they I(insert mode) .

`#!/bin/bash`

Echo "my name is vishal"

To save this file u need to again press `esc` -> `:wq!`

To look the content of the file -> `cat filename`

Any executable file in linux is executed via `./fileName.sh`

Linux is very secure -> when every u crate a file u need to grand permission to your file

- `chmod` command is used to grand permission to the file .

`Chmod` is divided into 3 categories -> user, group , every one

`Chmod 777` all the permission to all . (Read write execute permission to all 3 user , group , everyone.

4 - read

2 - write

1 - execute

`: history` -> it will show u all the commands that u have entered

Using touch command u can only open the file

Using vim command u can create as well as open the file .

`Cat` command print the context of the file

`Ls` to list all the file in the directory .

`Chmod` grand permission to afile

`Man` command details of a. Specific commands

`Esc` => press I , save file : `wq!` Script , :`wq` to cate the normal file

`Cd../..` -> go move 2 step back to the directory

`cd ~/Downloads` -> to jump directly back to specific directory

`Pwd` ->

`Mkdir` -> my first folder .

`Cd` -> change directly

Simpel shell script example =>

```
vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ cat sample-shell-script.sh
#!/bin/bash
#create a folder
mkdir vishal
# create a file
cd vishal
touch firstfile secondfile
```

Role of shell scripting on develops :

As develops engineer -> U have infrastructure maintenance
Maintain code repo using git
Vm linux
Configuration management
For all these purposes u are using shell scripting
For automation

A dev engineer is working with team with 1000 vm .
Engineer will write one single shell script when very a dev engineer is called to
resolve error -> this shell script will automatically log in to a machine why is vm
running slow -> shell script return the result that the memory is running out of that
shell script .

Email automation in company etc.

:nproc: will list u the no. of cpu in your machine
Free: memory details
Top: what are the process is running on your machine .
Df: available disk space in you machine

Who do u monitor the node health -> using top command .
Using ctrl + c , u can stop the running shell.script

Eg 2 :

```
vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ cat nodeHealth.sh
#!/bin/bash
#####
# Author : vishal
# date : 19-jun-2024
# this script output the node health
#
# version: v1
#####

# meta data info
df -h
free -g
nproc
```

Better way to write shell script ->

```
vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ cat nodeHealth.sh
```

```
#!/bin/bash
#####
# Author : vishal
# date : 19-jun-2024
# this script output the node health
#
# version: v1
# #####
```

```
# meta data info
echo "print the disk space "
```

```
df -h
echo " print the memory "
free -g
echo "print the cpu"
nproc
```

set -x (debug mode) => means = in the out put Its also print the used command in the script

```
vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ cat nodeHealth.sh
```

```
#!/bin/bash
#####
# Author : vishal
# date : 19-jun-2024
# this script output the node health
#
# version: v1
# #####
```

```
# meta data info
set -x # debug mode
echo "print the disk space "
```

```
df -h
echo " print the memory "
free -g
echo "print the cpu"
nproc
```

Good practices : always write the meta data and set -x in your shell script .

How to find out what are the process running on your machine .

-> ps -ef

-> ps -ef | grep "amazon"

Pipe parameter sends the out put of the first command to the second command .

```

vishaldwivedi@ubuntu:~/Documents$ chmod 777 test.sh
vishaldwivedi@ubuntu:~/Documents$ ./test.sh | grep 1
1
11
12
vishaldwivedi@ubuntu:~/Documents$ cat test.sh
echo 1
echo 2
echo 3
echo 4
echo 5
echo 6
echo 55
echo 66
echo 99
echo 11
echo 12

```

Eg: we have printed `ps -ef` to print all the process in your machine
`Ps -ef | grep "amazon"`

INTERVIEW QUESTION ;

:date // will print u the date of today .

Eg : why this don't work ==>

==> Date | echo "today is " -> out put : today is

Date is not shown in the out put ?

Date command will only send the info to stdin not stdout

And pipe | only receives -> stdout

Date sends the out put to std in and pipe will not be able to receive the information to stdin

Eg: 2;

```

vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ ps -ef | grep "amazon"
But given only the id of the process .

```

: awk -> filter out the information in your out put .

: man awk ->

Filter out the id .

```

Ps -ef | grep "amazon"| awk -F" " '{print $2}'

```

Eg:

```
vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ vim test
vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ grep name test
my name is vishal
vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ cat test
my name is vishal
my employee no is 111
```

```
: grep name test | awk -F" " '{print$4}'
```

Important : if **set -e** # is not there -> if first create user , create a file , add the username to the file if the first create a file step get failed it will follow 2 and 3rd . Which is not good.

So there for with set -e it will not execute any step if one failed .

Set -o pipefail :-> 432t235235 | echo it will restrict this .

DEVOPS -> How to find the errors in the remote server log file .

```
vishaldwivedi@ubuntu:~/Documents/myfirstfolder$ cat logfile | grep error
```

Curl vs wget :

If log files are not present in the local machine and are present in google files or s2 or blob storage how we can access these logs from these remote location s.

Using - > curl command u can copy the url of the log file

-> curl URLofLogFile | grep error

Curl command retrieve the information from the internet .

Post man help u create a api calls

Wget will download this log file where as curl command share the out put with u .

Eg: cat .log | grep ERROR

Via wget I can download a file and then use the grep command on that .
Or directly use the curl command curl .logURL | grep ERROR

:find command => search in entire file system

Find /

How to go to root user => sudo su -

Or -> su(switch user) userName

```
vishaldwivedi@ubuntu:~$ sudo find / -name pam
[sudo] password for vishaldwivedi:
/usr/share/pam
/usr/share/locale/pam
/var/lib/pam
```



```
find: \u2018run/user/1000/gvfs\u2019: Permission denied
find: \u2018run/user/1000/doc\u2019: Permission denied
/snap/core22/1383/usr/share/pam
/snap/core22/1383/var/lib/pam
```

If , if else , for loop :

Trap command :

Trap is used for trapping signals

Yes command : infinite run y : to stop Any command in terminal use =>ctrl + C

Eg: trap "dont press ctrl + c " SIGINT

Shell scripting interview question :

**Q1 : list some of the common command u use in day to day life :
Ls , cp , mv , mkdir , touch , vim , grep ,find , top , sar , df**

**Q2. Write a simple shell script to list all process.
Ps -ef | awk -F " " '{print \$2}'**

**Q3. Write a script to print only error from the remote logs
Curl [google.com](https://www.google.com) | grep HREF**

Q4.

```
(base) vishaldwivedi@vishals-MacBook-Air-2 Desktop % cat sampleScript.sh
```

```
#!/bin/bash
```

```
#####
```

```
#divisible by 3 , 5 , not 3*5 =15
```

```
for i in {1..100}; do
```

```
if ( [ $(expr $i % 3) -eq 0 ] || [ $(expr $i % 5) -eq 0 ] ) && [ $(expr $i % 15) -ne 0 ];
```

```
then
```

```
    echo $i
```

```
fi
```

```
done
```

Q5 . Q4.

Write a script to print number of S in #!/bin/bash

```
x=mississippi
```

```
grep -o "s" <<<"$x" | wc -l
```

write grep command to only filter s sending this Mississippi x standard input to this grep command and get the word count

Q6 how will to debug in a shell script .

= in any script add set -x

Q7 what is crontab in linux ? Can u provide an example of usage .?

=> crontab -> as linux admin even day u need to deliver the node health

So instead of login every day and reporting the node health .

So crontab is like a alarm that every day at 6 pm u have to execute this specific script.

Q8 how do u open a file in a read only mode . ?

-> vim -r test.txt

Q9 what is the difference btw soft and a hard link ?

-> in linux there are two links soft and a hard link

Eg: create a file ,save a file (get saved in the memory) or on the disk

Reuse this file (copy) so instead of copy ing this file again and again u can create the hard link to this file .

Eg: u have a python3 installed -> python so here python is having a soft link to your python3

When u execute python -> ./python

If u are deleting any one of python other one also deleted as they are point ting to the same memory location .

Q10: break and continuous statement in the loop :

=> breaking the execution , continuous (skip this and continue the next)

Q11 : what are the disadvantages of shell scripting ?

1.executing script is slow .

Large , complex task aren't well suited for it , every time a shell command execute an new process is formed ,

Q12 is bash dynamically or statically typed .and why ?

Python , shell are dynamically typed eg : x = 5 , x ="string"

= But static is java -> int a = 4 ; Sting name = "visual " ;

Q13 explain about network trouble shooting tools . ?

=> traceroute [google.com](https://www.google.com) -> from your pc how many hops are there and what time each is taking to reach google .com. or using tracepath command , trace path don't require root privileges.

Q14 how will u short the name of file in a list .

=>Sort command

Q15 how will you manage logs of a system that generates huge logs files every day ?

Vvv important question

= > there logs are keep on building and filling your space so efficiently storage of logs there is log rotate , using logrotate u can efficient manage your linux machine or application logs
Eg: every 30 day make tar or zip file of this log file using log rotate .