**Profile:**

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My self Charan.

Having overall 5+ years of experiences as a Dev Op’s and AWS Solution Architect and Automation Engineer.

Currently working as a Senior Software Engineer for R Systems International Pvt Ltd in Noida.

Was started my carrier as a Unix/**Linux Administrator**.

Then slowly moved to Build and Release engineer.

While working as a Build and Release engineer, Used to work with different automation tools like

**Git, Maven, Jenkins, Shell Script, Nexus, Tomcat, Vagrant** for successfully accomplishing the CI/CD processes and implementations.

Later on got a luck to explore and hands on experience on AWS, Cloud Automation and CI/CD implementations.

From the last 3 years supposed to work with different technology stack as follows.

**AWS, Terraform, Cloud Formation, Ansible, BOTO,**

**AWS IOT, AWS Developer Tools, AWS Analytics, AWS Lambda, AWS Gateway, AWS EKS, ECS**

**Python, Packer, Atlantis, GitLabCI, Jenkins, Docker, Compose, Kubernetes,**

**GitHub, GitLab, Jira,Slack,Confluence,ELK**

**Linux Admin Tasks**

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1. OS  Installations
2. Disk Management
3. Package Management
4. User & Group Management
5. Network Management
6. Remote Access Management
7. Job Automation
8. Shell Script
9. Process Management
10. Back Up & Restore

**Build & Release Engineer Tasks**

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1. Installations of Git,Maven,Jenkins,Nexus,Tomcat,Vagrant
2. Configurations of Git,Maven,Jenkins,Nexus,Tomcat,Vagrant
3. Provisioned Dev/Test/UAX environments using Vagrant
4. Configured Free Style Jobs using CI
5. Performed CI/CD operations

**Cloud Automation**

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1. AWS Infrastructure has been provisioned using with Python Boto3 SDK
2. AWS Infrastructure provision with Ansible. Creation of AWS resources using yaml files.
3. Provisioning Of Development/Testing Environment with Ansible and Vagrant
4. Infrastructure automation using with Cloud Formation stack
5. Cloud Infrastructure provision using with Terraform Modules
6. Configured Jenkins Jobs to provision infrastructure using with Terraform.
7. Configured GitLab CI Jobs to provision infrastructure using with Terraform Modules.

**TIPS:**

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Versions:  
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Jenkins: 2.150.1

Ansible: 2.5

Docker:

Java : 1.8

Tomcat: 8.0

Git : 2.14

**Cloud Formation Templates:**

1. AWSTemplateFormatVersion, Description, Mappings, Outputs, Parameters, Resources
2. dry-run = noop mode : [Change Sets](https://aws.amazon.com/blogs/aws/new-change-sets-for-aws-cloudformation/).
3. Aws cloud formation create stack, create change-set,Create-stack, update-stack ,delete-stack describe-stack list-stacks

K8’s **Architecture**

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**Master:** Managing the k8’s cluster. Entry point for admin tasks

**1. API server:** Admin tasks with in master node. Validates and process requests

**2. Scheduler:** Schedules the work in to different each worker node.

**3. Controller manager:** regulates the state of the k8s state. Current state is same as the desired state.

**4. Etcd:** Distributive key-value store to store the cluster state.

**Node:** Controlled by the master node

**1. pod:** logical collection of one or more container

**2. kubeproxy:** Network proxy runs on each pod

**3. kubelet:** Runs on each containers, and make sure all the containers are in healthy state.

**4. container runtime:** Containers

**Service** 🡪 type of k8s resource is configured to forward requests to a set of pod. Have an ip address and this ip address routes to a healthy pod.

1.**cluster ip** -- default service, reachable with in cluster ip

2.**node port** 🡪 each node ip at static port, outside the clusters

3. **load balancers** 🡪 exposes the services externally it will automatically created

4. **external name** : map services to the contents of the external name field by returning a cname record with its value , No proxy of any kind is set up

**Replication Controller:** Managing the pod life cycle.Supports EQUAITY based selectors**.**it looks only exact names/words

**Replica Sets:** replacement of RC**.** Supports SET based selectors

**Deployment Controllers**

1.Create Deployement2.Update Dep3.Rollback dep4.Scale Depl5.Pause Dep

K8’s used for Auto Scaling,Load Balncing,Healing,Scheduling,horizontal scaling,roll out’s and rollbacks

Kubectl is the platform using which you can pass commands to the cluster.

**Controller Manager Types:**

1. Node Controller: Manage status of nodes
2. Replication: Maintains no of pods for every replication object
3. Service account & Token Controller : create default ac & api token controller
4. Endpoint controller: Takes care of end point objects pods, services

Dedicated Host - You pay for the entire physical server

Dedicated Instances - You pay , but they get placed on whatever dedicated hardware Amazon decides.

**Instance Types:** On-demand, Reserved, Spot

Limits : EC2:20,Elastic IP’s :5,VPC:5,Subnets:200,ASG:200,LB:20

**Classic Load Balancer:** when you have an existing application running in the EC2-Classic network.http/s,tcp

**Application Load Balancer:** flexible feature set for your web applications with HTTP and HTTPS traffic.

**Network Load Balancer**: TCP, when you need ultra-high performance, handling millions of requests per second.

A **security group** is a set of firewall rules that control the traffic

**Auto Scaling** to manage Amazon EC2 capacity automatically,

**S3 Permissions :**

**1.Public access settings:** a)Manage public access control listsb) Manage public bucket policies

2. **Access Control List**: Access for u r ac, Access for other aws ac’s, Public Access,S3 log delivery group

3.**Bucket policies**

4.**CORS configuration**(Cross origin resource sharing)

**Storage Life Cycle**

Standard(Frequently access -- Standard-IA(InFrequently access) -- Reduced Redundancy (Frequently access,non critical data) – Glacier( data archiving)

**Storage Gateway** : connecting an on-premises with cloud to provide seamless and secure integration.

**route table** contains a set of rules, called **routes.** network traffic is directed

(**NAT**) **gateway** to enable instances in a private subnet to connect to the internet or other **AWS** services,

**network ACLs** with rules, IN Bound / Out Bound Rules/subnet Associations

**Route 53** to register new domains, transfer existing domains, route traffic for your domains to your AWS and external resources, and monitor the health of your resources

Using volume can able to create snapshot (Volume mandatory).

Using snapshot can able to create volume and Image

**Amazon Cognito** offers user pools and identity pools.

**Amazon Simple Queue Service (SQS)** is a reliable, scalable, fully-managed message queuing service.

A **Lambda function** can be triggered by any of a long list of event sources

**AWS API Gateway**, to invoke a simple Lambda function that handles GET, POST and DELETE requests

**Amazon ECS** to deploy, manage, and scale Docker containers running applications, services, and batch processes.

**Journeling :** It is a dedicated area in the file system where all the changes are tracked(tune2fs

to convert ext2 file system to ext3 file system)

journalctl(all the log files between two different timings and by default **/run/log** location)

auditctl(to see the audit report)

# sar(sar utility is to watch the system activity report like CPU, memory,...etc.,)

Increase the size of the logical volume by **# lvextend or # lvresize** commands.

Then finally update the file system by **# resize2fs or # xfs\_growfs** commands.

# stat <file name/directory name> (to see the statistics of the file or directory)

**How will you lock a user, if he enters wrong password 3 times?**

# vi /etc/pam.d/system-auth

auth required pam\_tally.so no\_magic\_root  
account required pam\_tally.so deny=3 no\_magic\_root lock\_time=180

|  |  |
| --- | --- |
| TCP/IP | UDP |
| Transmission Control Protocol | User Datagram Protocol |
| It is connection oriented | It is connection less |
| Reliable | Non-Reliable |
| TCP Acknowledgement will be sent / received | No Acknowledgement |
| Slow communication | Fast communication |
| Protocol No. for TCP is 6 | Protocol No. for UDP is 17 |
| HTTP, FTP, SMTP, ....etc., uses TCP | DNS, DHCP, ....etc., uses UDP |

A subnet mask allows the users to identify which part of an IP address is reserved

A Gateway is the network point that provides entrance into another network.

# nmap <IP address or hostname of the remote system>

**#**netstat -ntulpRunLevels: 0 Power off-1 Single user-2 Multi user without network-3 Multiuser with network-4Development purpose-5 GUI-6 Restart

**troubleshoot if the network is not reaching?**

# ethtool # ifconfig # uptime # service network # Chkconfig # route

# netstat -r (to check the default gateway and routing table)

# route (to check the default gateway with routing table)

# /etc/rc.local (is the last script to be run when the system is booting)

# netstat -r (to see all routing table information)

In Linux systems the booting is done in 6 stages.

* BIOS
* MBR
* GRUB
* Kernel
* Init
* Runlevel

# lsmod (to list all the currently loaded modules)

# modprobe -r <module name> (to remove the specified module)

**# ssh-keygen**

* /home/<user name>/.ssh
* id\_rsa (private key) and id\_rsa.pub (public key).
* # ssh-copy-id -i <user name>@<IP address of the remote system>
* Go to remote system and check whether the above key is copied or not by # cat /home/<user name>/.ssh/authorized\_keys file
* # ssh <user name>@<remote hostname or IP address

(i) Full backup (Entire file system backup)

(ii) Incremental backup (backup from the last full backup or incremental backup)

(iii) Cumulative or differential backup (backup from last full backup or cumulative backup)

# vmstat is the command to the complete information on virtual memory like no of processes, memory usage, paging memory, block I/O (input /output), traps, disk and CPU activity.

Mstat(a,d)

# iostat (to see the Input and Output statistics in the Linux system)

# dmidecode (to see the complete hardware information of the system)

# iptables -A INPUT -i eth0 -p tcp -m tcp --deport 80 -j ACCEPT

# iptables -A OUTPUT -i eth0 -p tcp -m tcp --deport 80 -j ACCEPT

# firewall-cmd --permanent --add-service=http

Take a backup of the database.

**# mysqldump -u root -p <database name>><file name with full path>**

ansible-galaxy [delete|import|info|init|install|list|login|remove|search|setup]

Setup ModuleTo get information about the network or hardware or OS version or memory related information

#### Command Module executes a specific command on the target machine and gives the output.

#### Shell Module To execute any command in the shell of your choice you can use the Shell module.

#### User Module Using this module one can create or delete users.

#### File Module This module is used to create files, directories, set, or change file permissions and ownership etc

Copy Module It is used for copying files to multiple target machines.

Yum

Apt

Service

**replace**module

**archive**module

**debug module**

**get\_url module,**

# lineinfile is used to add additional or append lines to existing files.

**Notify 🡪 Service 🡪 Handlers(Restart)**

**TAGS:** need to execute the tasks with the tag niranjan then the command to run would be:

$ ansible-playbook preposttagseg.yml --tags niranjan

Jinga:Ansible Templates can help us make our configuration files dynamic and re-usable.

Ansible supports running a playbook in dry run mode (also called Check Mode

# ansible-playbook --check playbook.yml

**Build Triggers**

Triggers build remotely -🡪 Authentication Token

Build after another projects are built 🡪 Projects to watch ,Trigger obnly if build is stable,unstable,fails

Build periodically 🡪 schedule

Github hook trigger for git scm poling

Poll scm 🡪 Schedule

**Env Variables :**

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1.Jenkins\_home2. user4.Path5.PWD6.Logname9.WorkSpace directory 10.Build Record Root Directory :

11. Project Name12. BuildNo13. Build Status14. Build URL

Role Based authorization strategy

Jenkins Pipeline (or simply "Pipeline") is a suite of plugins which supports implementing and integrating continuous delivery pipelines into Jenkins.

*Jenkinsfile (Declarative Pipeline)*

pipeline {

agent any/none

stages {

stage('Deploy') {

steps {

options(timeout,retry)

}

}

environment {

DISABLE\_AUTH = 'true'

DB\_ENGINE = 'sqlite'

}

Args

}

Always,success,failure,stable,unstable

**Pipeline steps**

1. **Push the code to source code repo**
2. **Static analysis**
3. Pre deployment testing
4. Packaging and deployment to the test environment
5. **Post deployment testing**

Core concepts:

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Build life cycle(default,clean,site)mvn clean package site

-🡪 build phases

--🡪goals

Generate-sources,Clean,compile,test compile,test,package,integration test,install,deploy

Install 🡪 copy artifact to the local repo

Deploy 🡪 copied to remote repo

Dependencies(external jars files)

build plugins(extra goals to achieve in build phase,add a plugin to the POM file)

common plugins: clean,compiler,surefire,jar,war,Javadoc,

build profiles(build project for diff env’s)

POM file should be located in ROOt directory of project belongs to

Settings.xml : Configure settings for maven across all maven pom files.configure:

1. Location of local repo
2. Active build Profile

Maven Installation dir : $M2\_Home/conf/settings.xml

User’s Home dir : ${User.Home}/.me/settings.xml(It over rides the other file)

Types

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1. Per Project -- > Defined in project pom.xml
2. Per user 🡪 defined maven settings.xml (.m2/)
3. Global 🡪 Defined maven global settings.xml file(/conf/settings.xml)

Profile Activation

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1. Explicitly using command console input
2. Through maven settings(.m2/)

<activeProfile>Test</activeProfile>

1. Based on default variable

<Profile><id>test</id></profile>

<activation>

<activeByDefault>true</activeByDefault>

</activation>

</profile>

1. Os settings

Activation element to include os details.this triggers when the system in windows

<activation>

<os>

<name>Windows</name>

<family>windows

</os>

</activation>

Repo:

====

3 types

1. Local 🡪 User Home Dir
2. Remote 🡪Developers custom repo,project jar’s ,lib’s

POM.xml

<Repositories>

<url>

1. Central 🡪 Maven community

Maven checks new **snapshot** version in remote repo for every build. Automatically fetches latest every time.

If once **version** is downloaded never try to download a newer 1.o.if it need to be downloaded it must be upgraded to 1.1

**Dependency Scope**

1. Compile : Dependency is available in the class path of the project .default scope
2. Provided: Dependency is provided by jdk/web server/container at runtime
3. Runtime: Dependency not required for compilation but needed for execution
4. Test: Dependency need only for test compilation and execution phases
5. System: Provide the system path

[Jenkins Thin Backup](https://wiki.jenkins.io/display/JENKINS/thinBackup) is a popular plugin for backing up Jenkins.

Stash:Stores unstaged changes

Role -- Which is used to provide access to any other aws services.

DB Parameter group to your instance, you are assigned a default Parameter group which has the default values.

backups in two ways: automated backups,DB Snapshots,

**read replicas**i.e. snapshots are created from a source DB and all the read traffic to the source database is distributed among the read replicas, this reduces the overall overhead on the source DB.

An IoT thing is a representation and record of your phyisical device in the cloud.

AWS IoT Greengrass is software that extends cloud capabilities to local devices

Amazon DynamoDB is the latest NoSQL offering from AWS

**Amazon Kinesis:**Easily collect, process, and analyze video and data streams in real time, so you can get timely insights and react quickly to new information

Amazon Elasticsearch Service (makes it easy to set up, operate, and scale an Elasticsearch cluster in the cloud.

Ansible playbook [cd.yml](https://github.com/vfarcic/jenkins-docker-ansible/blob/master/ansible/cd.yml) Role is run.

- hosts: localhost

  remote\_user: vagrant

  sudo: yes

  roles:

    - java

    - docker

    - registry

    - Jenkins

|  |
| --- |
| roles: |
| - etcd |
| - confd |
| - docker |
| - nginx |
| - bdd |

a service on GitHub to call the Jenkins Github webhook because we want to trigger the pipeline. To do this, go to Settings -> Integrations & services. The Jenkins Github plugin should be shown on the list of available services, as below.

**kubeadm join --token <token> <master-ip>:<master-port> --discovery-token-ca-cert-hash sha256:<hash>**

# lsof <device name> (to check the files which are open in that mount point)

# uptime(to see the information from how long the system is running, how many users login and load average)

Zombie Process: parent process will run with out knowing child process

Sar(p-cpu,q-load average,r-memory,s-swap,d-disk,b-i/o stat,

$# = number of arguments.

$@ = what parameters were passed.

$\* holds list of all arguments passed to the script

$? = was last command successful.

"$$" means current PID.

"$!" is the PID of the last program your shell ran in the background

**set command** to **set** or unset values of **shell** options and positional parameters.

The cut command in UNIX is a nice utility program which allows you to cut data from a text file.  
  
**Docker File**

* FROM – Image download from docker hub registry
* MAINTAINER – Specifies about the author
* LABEL – specify metadata about image
* ENV - setting environment variables with key and values.
* ARG - setting environment variables with key and values only applied over build image
* RUN - run commands over image and creates a new layer.
* CMD – to be executed when running a container, only one [ shell and Executable form]
* ENTRY POINT – to configure and run a container as an executable
* VOLUME – create a volume to the container
* USER – set uid,gid
* WORKDIR - set the working directory.
* EXPOSE - get your ports right.
* ADD – for downloading remote resources, extracting TAR files, etc
* COPY - for simply copying files and/or directories into the build context
* ONBUILD – the image in the docker file is used as a base image for another image

CMD is to provide defaults for an executing container.

ENTRYPOINT helps you to configure a container that you can run as an executable.

* CMD sets default command and/or parameters, which can be overwritten from command line when docker container runs.
* ENTRYPOINT command and parameters will not be overwritten from command line. Instead, all command line arguments will be added after ENTRYPOINT parameters.

HA in K8’s

Zero-DownTime-Deployment in K8’s

A list is a sequence of elements in a specific order.

A set has no order, contains an element is much faster, handy operations such as union and intersection.

A tuple is basically an immutable list, meaning you can't add, remove, or replace any elements.

A dictionary is a mapping from keys to values

Docker images are stored in two files as shown by following command

$ docker info

Data file: /var/lib/docker/devicemapper/devicemapper/data

Metadata file: /var/lib/docker/devicemapper/devicemapper/metadata

docker -D info(Debugging Info)

**Playbook:**

Hosts,Tasks,Vars,Handlers,MetaData,remote-user,Roles

propagate: false flag to move to next stage when previous stage fails.

ps –ef LIST ALL PROCESSES THAT ARE CURRENTLY RUNNING IN THE BACKGROUND

**Top/ps command** to display all running process: # ps -aux

**Python namespace** is a simple system to control the names in a program. It ensures that names are unique and won’t lead to any conflict.

**decode()** decodes the string using the codec registered for *encoding*

encode --- encryption format

decode – decryption format

A lambda function can take any number of arguments, but can only have one expression

**Browser Request**

**----------------------**

You type maps.google.com into the address bar of your browser.

The browser checks the cache for a DNS record to find the corresponding IP address of maps.google.com.

If the requested URL is not in the cache, ISP’s DNS server initiates a DNS query to find the IP address of the server that hosts maps.google.com.

Browser initiates a TCP connection with the server.

The browser sends an HTTP request to the web server.

The server handles the request and sends back a response.

The server sends out an HTTP response.

The browser displays the HTML content (for HTML responses which is the most common).

DNS is a list of URLs and their IP addresses just like how a phone book is a list of names and their corresponding phone numbers.

In order to find the DNS record, the browser checks four caches.

* First, it checks the browser cache.
* Second, the browser checks the OS cache.
* Third, it checks the router cache.
* Fourth, it checks the ISP cache.

The purpose of a DNS query is to search multiple DNS servers on the internet until it finds the correct IP address for the website.

ISP’s DNS server a DNS recurs or whose responsibility is to find the proper IP address of the intended domain name of Name Servers.

Root Domain : ., First level Domain : .com, Second-level-domain : google, third –level : www

Searches by .com fitst

Once the browser receives the correct IP address it will build a connection with the server that matches IP address to transfer information.

TCP is the most common protocol used for any type of HTTP request.

Client to Server communication establishment process called **TCP/IP three-way handshake**

1. Client send SYNC(Synchronize)
2. Server ACK(acknowledge server for new connections)
3. Client receive ACK packet and sent ACK packet to server

The browser will send a GET request asking for maps.google.com web page.

Entering credentials or submitting a form this could be a POST request.( as browser identification)

In server,The request handler is a program (written in ASP.NET, PHP, Ruby, etc.) that reads the request, it will assemble a response in a particular format (JSON, XML, HTML).

1xx indicates an informational message only● 2xx indicates success of some kind● 3xx redirects the client to another URL

● 4xx indicates an error on the client’s part● 5xx indicates an error on the server’s part

[mod\_evasive](http://www.zdziarski.com/blog/?page_id=442) is an Apache module for preventing DoS attacks.Essentially, you set some limits for how many times an IP address can make requests to your site over a given interval. It's useful in a variety of contexts, but not well documented.

DOSSiteCount 50

**/trunk** is your standard, bleeding edge development. We use CI so this must always build and pass tests.

## -x option to debug a bash shell script

Run a shell script with -x option.  
$ bash -x script-name  
$ bash -x domains.sh

* **set -x** : Display commands and their arguments as they are executed.(Turn ON) set +x(Turn OFF)
* **set -v** : Display shell input lines as they are read.

**Function :** Set \_DEBUG to ‘on’ when you need to debug a script: \_DEBUG="on"