

Jenkins

Jenkins is one of the leading open source devops automation tool.

It is written in java

* It provides 100’s of plugins, by installing a plugin we can add new features to Jenkins which is a biggest advantage.
* Initially Jenkins was introduced as a CI tool later on completely evolved as a devops automation tool.
* Sometimes Jenkins is also called as orchestration tool.
* Jenkins supports 2 types of jobs

1. Free style jobs ( today it’s not recommended)
2. Pipeline jobs ( highly recommended option) – demand is more for this

Pipeline jobs are written in groovy DSL. (domain specific language)

* Installing Jenkins on Linux box

1. Jenkins is written in java , java is required on a server to run Jenkins

Sudo yum list | grep java-1.8 -

for running Jenkins JVM enough, in sme machine I am building java code , for that compiler is necessary for that JDK is required

Sudo yum install java-1.8.0-openjdk-dlevel.x86\_64

Java -version

To check compiler javac -version

By default, Jenkins is not available in my Jenkins repo

After running below commands my Linux machine is pointing to new repository

sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo

sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io.key

sudo yum Install Jenkins

Yum install Jenkins – by default Jenkins is not found in linux repository

Sudo service Jenkins start

Enable Jenkins on reboot – when u restart Jenkins will auto restart

[ec2-user@ip-172-31-32-166 ~]$ sudo service jenkins start

Starting jenkins (via systemctl): [ OK ]

[ec2-user@ip-172-31-32-166 ~]$ sudo chkconfig Jenkins on

[ec2-user@ip-172-31-32-166 ~]$

Let’s access Jenkins from web browser – publicip:8080

* We need to unlock it and to configure it

Unlock Jenkins:

[ec2-user@ip-172-31-32-166 ~]$ sudo cat /var/lib/jenkins/secrets/initialAdminPassword

cb0366896fe741efbf6d13c5e0ad2ad2 – give this password in linux cmd

27-01-20

By default where Jenkins is installed on linux?

1. Var/lib/Jenkins

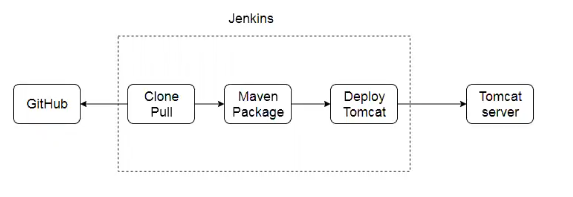
Create Jenkins job which does

1. Clone or pull java code
2. Build java code using MAVEN
3. Deploy war file on to TOMCAT.

Click on new item

Item name -java-maven-tomcat -in real time it is project name (like online – shopping)

Fig refer book

y

install git on linux – sudo yum install git

Repository url - <https://github.com/javahometech/myapp-2020-jan-930>

Go to build

* Goals

Clean package

On Jenkins we don’t have maven

Plugins show just options in UI , but we need to install

* Install maven on linux:

We can install maven directly on Jenkins box.

We also can install maven through Jenkins UI

Jenkins- manag0e Jenkins- global tool configuration- maven installons – maven 3 – version pick latest- save

Configure –

Lets set up tomcat server on linux:

* Aws – launch another server
* Tomcat 8 download – binary distribution – tar is for linux
* It is not good to store in home location

Go to opt – cd /opt

Sudo wget tar file link paste here

I need to untar it

Sudo tar xv apache-tomcat-8.5.50.tar.gz

You can delete (apache-tomcat-8.5.50.tar.gz) this file

We should create a user to tomcat and give access , we wont do in root direcly

Chown -R ec2 user:ec2-user tomcat8/ -- I am recursively changing permissions and giving access to ec2

For tomcat to work java is required

Sudo yum install java1.8.0------

ls-ltr

I can use ssh plugin

(Or)

We want to deploy war file from Jenkins to tomcat using deploy2 container(tomcat container) plugin

Deploy2 container plugin uses tomcat manager application for deployments

By default access is denied to Tomcat manager app from remote host ,, ( i.e from tomcat server we can access and from Jenkins server we can’t)

We have to remove that restriction

Go tomcat8 – web apps – go to manager -meta\_INF

Pwd

/opt/tomacat8/webapps/manager/META - INF

Vi context.xml

Cd /opt/tomcat8/

Go to tomcat manager app – now it won’t give error

We need to configure username-password for tomcat manger app

Cd conf/

We find tomcat-users.xml

Manage Jenkins – manage plugins- available – deploy to container- select and

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop

$ git clone https://github.com/javahometech/myweb

Cloning into 'myweb'...

remote: Enumerating objects: 1866, done.

Recremote: Total 1866 (delta 0), reused 0 (delta 0), pack-reused 1866

Receiving objects: 100% (1866/1866), 291.24 KiB | 1.03 MiB/s, done.

Resolving deltas: 100% (628/628), done.

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop

$ cd myweb/

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ ls

appspec.yml Jenkins-Declarative-Git src/

azure-pipelines.yml Jenkinsfile start\_tomcat.sh\*

buildspec.yml Jenkinsfile2 stop\_tomcat.sh\*

deployments.yml jenkins-oct-19-pipeline target/

docker-ci-cd kubernetes-ci-cd upload\_docker\_image\_to\_nex

Dockerfile pom.xml war-ci-cd-tomcat

dummy.sh setenv.sh

hello sftp\_tomcat.sh

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ rm \*.yml

ls

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ ls

docker-ci-cd pom.xml

Dockerfile setenv.sh

dummy.sh sftp\_tomcat.sh

hello src/

Jenkins-Declarative-Git start\_tomcat.sh\*

Jenkinsfile stop\_tomcat.sh\*

Jenkinsfile2 target/

jenkins-oct-19-pipeline upload\_docker\_image\_to\_nexus

kubernetes-ci-cd war-ci-cd-tomcat

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ rm jenkins

rm: cannot remove 'jenkins': No such file or directory

ls

ls -ltr

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ ls

docker-ci-cd pom.xml

Dockerfile setenv.sh

dummy.sh sftp\_tomcat.sh

hello src/

Jenkins-Declarative-Git start\_tomcat.sh\*

Jenkinsfile stop\_tomcat.sh\*

Jenkinsfile2 target/

jenkins-oct-19-pipeline upload\_docker\_image\_to\_nexus

kubernetes-ci-cd war-ci-cd-tomcat

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ ls -ltr

total 40

-rw-r--r-- 1 Beere Lokesh 197121 478 Jan 28 09:15 Jenkinsfile2

-rw-r--r-- 1 Beere Lokesh 197121 2382 Jan 28 09:15 Jenkinsfile

-rw-r--r-- 1 Beere Lokesh 197121 1053 Jan 28 09:15 Jenkins-Declarative-Git

-rw-r--r-- 1 Beere Lokesh 197121 108 Jan 28 09:15 Dockerfile

-rw-r--r-- 1 Beere Lokesh 197121 886 Jan 28 09:15 docker-ci-cd

-rw-r--r-- 1 Beere Lokesh 197121 1270 Jan 28 09:15 pom.xml

-rw-r--r-- 1 Beere Lokesh 197121 1372 Jan 28 09:15 kubernetes-ci-cd

-rw-r--r-- 1 Beere Lokesh 197121 1809 Jan 28 09:15 jenkins-oct-19-pipeline

-rw-r--r-- 1 Beere Lokesh 197121 386 Jan 28 09:15 hello

-rw-r--r-- 1 Beere Lokesh 197121 42 Jan 28 09:15 dummy.sh

-rw-r--r-- 1 Beere Lokesh 197121 334 Jan 28 09:15 sftp\_tomcat.sh

-rw-r--r-- 1 Beere Lokesh 197121 130 Jan 28 09:15 setenv.sh

drwxr-xr-x 1 Beere Lokesh 197121 0 Jan 28 09:15 src/

drwxr-xr-x 1 Beere Lokesh 197121 0 Jan 28 09:15 target/

-rwxr-xr-x 1 Beere Lokesh 197121 52 Jan 28 09:15 stop\_tomcat.sh\*

-rwxr-xr-x 1 Beere Lokesh 197121 47 Jan 28 09:15 start\_tomcat.sh\*

-rw-r--r-- 1 Beere Lokesh 197121 699 Jan 28 09:15 war-ci-cd-tomcat

-rw-r--r-- 1 Beere Lokesh 197121 699 Jan 28 09:15 upload\_docker\_image\_to\_nexus

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ rm Dockerfile \*.sh

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ ls -ltr

total 34

-rw-r--r-- 1 Beere Lokesh 197121 478 Jan 28 09:15 Jenkinsfile2

-rw-r--r-- 1 Beere Lokesh 197121 2382 Jan 28 09:15 Jenkinsfile

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-rw-r--r-- 1 Beere Lokesh 197121 386 Jan 28 09:15 hello

drwxr-xr-x 1 Beere Lokesh 197121 0 Jan 28 09:15 src/

drwxr-xr-x 1 Beere Lokesh 197121 0 Jan 28 09:15 target/

-rw-r--r-- 1 Beere Lokesh 197121 699 Jan 28 09:15 war-ci-cd-tomcat

-rw-r--r-- 1 Beere Lokesh 197121 699 Jan 28 09:15 upload\_docker\_image\_to\_nexus

Beere Lokesh@DESKTOP-9NR6SN3 MINGW64 ~/Desktop/myweb (master)

$ rm docker-ci-cd kuberneted-ci-cd

**Note: 29=8-01-20**

If tomcat manager app is not configured in production we cant use deploy to container plugin then we need to figure out some other approach.

Jenkins ssh plugin

* We can run scripts on remote host.
* We can copy files from remote host.

Google and find how to configure tomcat as a service such that we can enable tomcat on system rebot.

**Jenkins Build Triggers:**

**There are different ways to trigger Jenkins jobs**

* Build periodically: it allows us to schedule Jenkins jobs, for ex we wan to trigger Jenkins job every 30 min .

Drawback :

* It executes the job even if there are no new changes in the code which is an overhead

Jenkins- build triggers- \*\*\*\*\*\*- save

IQ) POLL SCM:

This option also takes a schedule whch is used to check new commits on SCM periodically

If new comit presents it triggers the job otherwise it wont

This option uses git polling log file

This file contains last build revison

IQ) Git hub hook trigger : this has o overhead on jekins -

We need to configure web hook in SCM which invokes Jenkins when there is a new commit

Go to github setting ----

**Securing Jenkins:**

* **We can manage users in Jenkins by deault**
* **In Jenkins any user by deault you add is admin**
* **Jenkins - create user – add newuser**

**Where Jenkins stores username & password?**

**Jenkins by default stores users &passwords on Jenkins hardisk.**

**We can integrate Jenkins with AD or LDAP such that we don’t need to create user.**

IQ) what is matrix based security

* Its an option where we can configure granular permissions to each & every Jenkins user

Granular means – specific permissions

Jenkins – manage Jenkins – authorization – matrix based security

IQ) we want to configure an user to build only specific jobs not all jobs.

Jenkins – configure gobal security- projet based matrix authorisation strategy-oVERall View

To which ever The job u want TO GRanT peRMissions in THaT job enable Project based security by adding user

IQ) how do u mange project based security

To which ever The job u want TO Grant permissions in That job enable Project based security by adding user \*\* D

What is matrix based

What is project based security

**Jenkins Folder structure**

Config.xml which contains security settings of Jenkins

If u forgot password , go to config.xml (<use security>false)

Users folder: this folder contains user credentials.

Plugins folder: the Jenkins plugins we installed is actually stored in this folder.

What is Jenkins plugin extension: JPI

there is no internet on Jenkins, how do you install a plugin?

If Download it on a machine which has a internet and do a remote copy to a Jenkins plugin folder

Tools: the folder which contains tools installed through Jenkins (ls /tools)

Workspace: for every job we create there will be a workspace folder in that if u r cloning source code those files are present

Jobs: how is diff from work space?

* This folder contains

– job config files

the build history (with logs)

Nodes:- if we configure master slave we will have multiple nodes along with master those details are displayed in this code.

Deleting unwanted builds:

Build history occupies some space on the disk, eventually Jenkins may run out of space, it’s always good to delete unwanted builds.

Go to job configuration – discard old builds.

IQ) what is master slave configuration in Jenkins?

* We can join multiple nodes/slaves to Jenkins master which mainly helps to distribute the load across multiple servers.
* Master slave is also helpful when we have jobs which runs on specific OS. i.e there might be a job which run only on windows and other job which runs only on linux. But login page will be only 1.

Adding a slave to the master:

Step1: launch a server or vm

1. Login to Jenkins , select manage Jenkins, manage nodes – create new node – select name of node , description (optional)
2. Executers : 1 – if we put 1 it can handle only 1 or remaining will be in queue, if we put 5 , it can run 5 diff jobs
3. Remote root directory: /opt/Jenkins -- if this folder doesn’t exists itcreate automatically.
4. Lables: slave-one, job on the node is happening the link through labels.
5. Usage: only build obs
6. Launch method : launch via ssh

Host: paste ip

Credentials:

Scope : global(………….)

Private key : paste pem file data

1. Availability:

How to schedule Jenkins job on a specific slave?

* In job configuration – under general section – choose restrict where this project can be run

And select label of a slave.- save

30-1-20

Come up with a plan to take a backup of Jenkins server along with its job & its configuration.

**Archving artifacts:**

* Jenkins by default maintains latest artifacts ( JAR/EAR/WAR).
* If u want to maintain artifacts created in previous builds, it have archive option in jenkins.
* In job configuration – under host build actions we have archive the artifacts.

IQ) In Jenkins if deployment fails we want to roll back the deployment to its previous war file

**Notifications:**

**Lets say a code deployed to test server or deployement faild I neeed a notification**

in jenkins job for a failure or a sucss we want to send a notifications we can do email notifications

1. Email
2. Slack
3. Microsoft teams
4. Skype for business etc

Configuring email notifications

Step1: we have to integrate Jenkins with email server we must tell your Jenkins smtp server.

We need to configure smtp server of our company

For our demonstration we are using gmail smtp server

Jenkins home – manage Jenkins - configure system – we see email notification, we also find extended notification

( go to google and serach smtp setting )

Smtp.gmail.com

(For organisation it might be smtp companyname.com)

Use smtp authentication

Put gmail id &pass .

Use ssl

Smtp port

Test configuration by send test email check box

U get 1 alert

Go to manage google a/c ‘s – click on --- security , run on access

Come back to jekins and clist test configuration .

Configure a job to email notifications

31-01-20

* Install & configure nexus on linux.
* Latest one today is nexus3
* There are specific system requirements

For nexus to work java is required , we need 2 cpu 4 gb ram, in aws it wot work on t2 micro.

Launch ec2 instance with t2 medium.

Download nexus , install it & configure it

Copy link address and paste in aws linux.

Cd bin/

Sudo yum list grep | java-1.8.0

./nexus start

Iwant nexus to start on reboot.

Ls

Accessing nexus from webserver

* By default nexus runs on 8081
* Go to brwser Ip:8081
* Sign in :- admin
* Cat of that location
* Type password
* Change password

All artificats are stored in nexus.

If you want to store maven artifacts we need to create maven repository

Click on seetings – repositories- create repository

Maven2(hosted)

Name:- your app name

Fill required info

Creqte repository

* Uploading artifacts to Nexus:

1. Use Jenkins
2. We can confiure maven to uploadd artifacts to nexus.
3. We can use nexus rest API
4. We can use curl command

STEPS TO CONFIGURE MAVEN for uploading artifacts through nexus:

1. Go to pom.xml and add following details. – distribution managment
2. Update maven settings.xml - where is settings.xml - in Jenkins
3. Cd var/lib/Jenkins
4. Cd tools/
5. Cd Hudson.tasks.maven maven installation/

Vi Settings.xml

Cp settings.xml settings.xml.bak -- to backup

Inside the servers

<server>

Id nexus….

,……..

Open Jenkins

Configure

Build

Clean package