

# JENKINS

**CONTINUOUS INTEGRATION:** It is the combination of continuous build and continuous test.

## CONTINUOUS INTEGRATION = CONTINUOUS BUILD + CONTINUOUS TEST

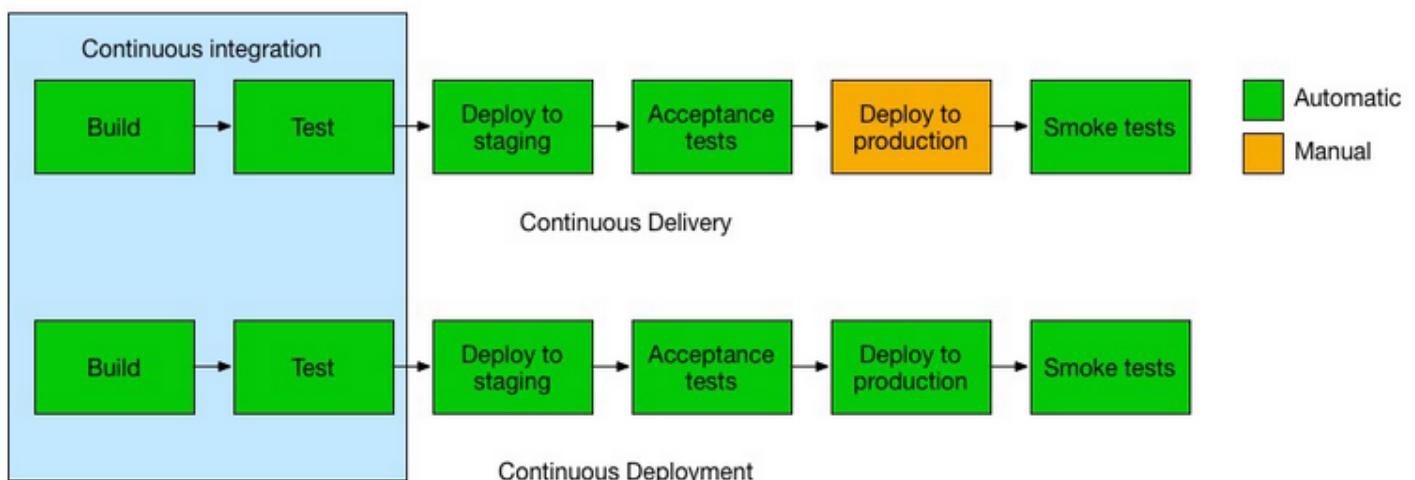
Whenever a developer commits the code using source code management like GIT, then the CI pipeline gets the changes of the code runs automatically build and unit test.

- Due to integrating the new code with old code, we can easily get to know the code is a success or failure.
- It finds the errors more quickly
- Delivery the products to client more frequently
- Developers don't need to manual tasks
- Reduces the developers time 20% to 30%

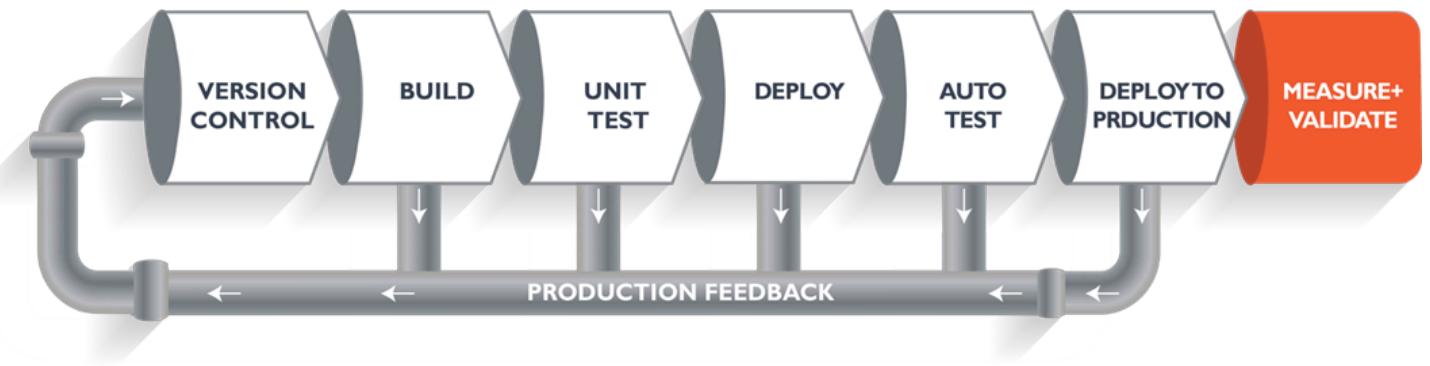
## CD: CONTINUOUS DELIVERY/DEPLOYMENT:

**Continuous Delivery** is making it available for deployment. Anytime a new build artifact is available, the artifact is automatically placed in the desired environment and deployed.

**Continuous Deployment** is when you commit your code then it gets automatically tested, build and deploy on the production server.



**CI/CD PIPELINE:** A CI/CD pipeline is a set of automated steps and tasks that code changes go through, from the initial commit to deployment. These pipelines are typically defined and configured using CI/CD tools and scripts. A pipeline can include actions such as code compilation, testing, packaging, and deployment.



It looks like Software Development Life Cycle, but let's see how it works. Lets consider an example, if you are developing a web application.

**Version Control:** Here developers need to write code for web applications. So it needs to be committed using version control system like GIT or SVN.

**Build:** Lets consider your code is written in java, it needs to be compiled before execution. In this build step code gets compiled.

**Unit Test:** If the build step is completed, then move to testing phase in this step unit step will be done.

**Deploy:** If the test step is completed, then move to Deploy phase in this step you can deploy your code in dev, testing environment. Here you can see your application output.

**Auto Test:** Once our code is working fine in testing servers, then we need to do Automation testing using Selenium or Junit.

**Deploy to Production:** If everything is fine then you can directly deploy your code in production server.

**NOTE:** If we have error in Code then it will give feedback and it will be corrected, if we have error in Build then it will give feedback and it will be corrected, Pipeline will work like this until it reaches Deploy.

Because of this pipeline, Bugs will be reported fast and get rectified so entire development is fast.

## JENKINS:

- Jenkins is an **open source** project written in **java** by Kohsuke Kawaguchi it runs on the **Window, Linux and Mac OS**.

- Jenkins is a widely used open-source automation tool that helps developers and teams automate and streamline various tasks related to building, testing, and deploying the applications
- It is community-supported, Free to use, and the First choice for Continuous Integration.
- Consist of Plugins
- Automates the Entire Software Development Life Cycle (SDLC).
- It was originally developed by Sun Microsystem in 2004 as HUDSON.
- Hudson was an enterprise Edition we need to pay for it.
- The project was renamed Jenkins when Oracle brought the Microsystems. It can run on any major platform without Compatibility issues.
- Whenever developers write code, we integrate all the code of all developers at any point in time and we build, test, and deliver/deploy it to the client. This is called CI/CD.

## **Advantages:**

- Jenkins follows Master-Slave Architecture.
- You can write your own plugin, can use the community plugin also.
- Jenkins master is going to assign a job to the slave..
- If Slaves are not available Jenkins itself does the job.
- By using the labels we can specify the jobs to the nodes.
- Jenkins automates repetitive and manual tasks in the software development process, reducing human error and saving time.
- Jenkins enables teams to continuously integrate code changes, making it easier to detect and fix integration issues early in the development cycle.
- Jenkins can be configured for high availability, ensuring continuous operation and minimal downtime.
- It integrates seamlessly with popular version control systems like Git, enabling efficient code management.

## **JENKINS ALTERNATIVES:**

- BAMBOO
- HUSON
- TEAM CITY
- CIRCLE CI
- AWS CODE PIPELINE
- BUDDY
- SEMAPHORE
- GITLAB

## **JENKINS SETUP:**

STEP-1: LAUNCH AN EC2 INSTANCE WITH SEPARATE SECURITY GROUP

STEP-2: GO TO JENKINS.IO AND COPY PASTE THOSE 2 LINKS

STEP-3: INSTALL JAVA

STEP-4: INSTALL JENKINS

STEP-5: START THE JENKINS

**links-1:** `sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo`

**link-2 :** `sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key`

**To install java11 :** `amazon-linux-extras install java-openjdk11 -y`

**To install jenkins :** `yum install jenkins -y`

**To start jenkins :** `systemctl start jenkins`

**To check jenkins status :** `systemctl status jenkins`

**To stop jenkins :** `systemctl stop jenkins`

**Connect to dashboard:** copy the public IP address of the server and make a paste on the new tab with Jenkins port number (8080)

`public_ip:8080`

**To unlock the jenkins:**

`cat /var/lib/jenkins/secrets/initialAdminPassword`

- Install suggested plugins
- Add user name, Password and mail id
- connect to dashboard



New Item

People

Build History

Manage Jenkins

My Views

Credentials

New View

## Welcome to Jenkins!

Please [create new jobs](#) to get started.

**JOB:** To perform some set of tasks we use a job in jenkins.

- A Jenkins job is like a task or set of instructions that you create and configure in Jenkins to automate a specific action in your software development process.
- These actions can include things like compiling code, running tests, or deploying software.
- Jenkins jobs are used to define and manage the automation of these tasks, making it easier for developers to consistently and reliably execute them.



### Freestyle project

This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.



### Maven project

Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.



### Pipeline

Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.



### Multi-configuration project

Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.



### Folder

Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.



### GitHub Organization

Scans a GitHub organization (or user account) for all repositories matching some defined markers.



### Multibranch Pipeline

Creates a set of Pipeline projects according to detected branches in one SCM repository.

## PARAMETER TYPES:

- String: any combination of characters and numbers
- Choice: a pre-defined set of strings from which a user can pick a value
- Credentials: a pre-defined Jenkins credential
- File: the full path to a file on the filesystem
- Multi-line String: same as String, but allows newline characters
- Password: similar to the Credentials type, but allows us to pass a plain text parameter specific to the job or pipeline
- Run: an absolute URL to a single run of another job

## FILE PARAMETER:

This is used when we want to build our local files.

General → This Project is Parameterized → File Parameter

## CHOICE PARAMETER:

This parameter is used when we have multiple options to generate a build but need to use only one specific one.

General → This Project is Parameterized → Choice Parameter

## **STRING PARAMETER:**

This parameter is used when we need to pass a parameter as input by default.

It can be any combination of characters and numbers.

General → This Project is Parameterized → String Parameter

## **MULTI STRING PARAMETER:**

This will work as same as String Parameter but the difference is instead of one single line string we can use multiple strings at a time as Parameters.

General → This Project is Parameterized → Multi-String Parameter

## **LINKED JOBS :**

This is used when a job is linked with another job

## **TYPES:**

Up stream and Down stream

Here for job-1 both job-2 & job-3 are Downstream

For job-2 upstream is job-1 and Downstream is job-3

for Job-3 Both Job-2 & job-1 are Upstream



## JENKINS MASTER & SLAVE:

Jenkins Master-Slave architecture is a setup where you have one main Jenkins server (the "Master") that manages and controls multiple additional servers (the "Slaves").

- The Master server coordinates and schedules tasks.
- The Slave servers do the actual work, like building, testing, and deploying applications.

This architecture allows you to distribute the workload and run tasks in parallel, making your Jenkins setup more efficient and scalable. It's like having a boss (Master) who delegates tasks to a group of workers (Slaves) to get the job done faster.

## STEPS TO IMPLEMENT JENKINS MASTER-SLAVE:

1. LAUNCH **3 INSTANCES WITH KEYPAIR (PEM FILE)**
  - a. MASTER
  - b. SLAVE-1
  - c. SLAVE-3
2. SETUP JENKINS IN MASTER
3. install **JAVA11** on slaves (amazon-linux-extras install java-openjdk11 -y)
4. go to manage jenkins >> manage nodes and clouds >> new node --> give node name & select permanent agent

Dashboard > Manage Jenkins > Nodes >

+ New Node

Name ? slave-1

Configure Clouds

Node Monitoring

Build Queue

No builds in the queue.

Build Executor Status

1 Idle  
2 Idle

Description ? this is for slave-1

Number of executors ? 3

Remote root directory ? /home/ec2-user/jenkins/

Labels ? dev

Usage ? Only build jobs with label expressions matching this node

Launch method ? Launch agents via SSH

Host ? 172.31.44.108

Credentials

slavekeypair.pem

Show all X

## ADD CREDENTIALS:

Dashboard > Manage Jenkins > Nodes >

Only build jobs with label expressions matching this node

Jenkins Credentials Provider: Jenkins

Add Credentials

Domain Global credentials (unrestricted)

Kind SSH Username with private key

Scope ? Global (Jenkins, nodes, items, all child items, etc)

ID ?

Description ? this is for slave-2

Username ec2-user

Show all X

Dashboard > Manage Jenkins > Nodes >

Only build jobs with label expressions matching this node

Description ?  
this is for slave-2

Username  
ec2-user

Treat username as secret ?

Private Key  
 Enter directly  
Key  
-----  
yEGXGUKBqDUKSCFZLKLHnRUiQBzItwL/IUfdPQGNzSPREiULNRR1U0Q1mannhDzUD  
0378OPTlulgH2zqUfTmXt2S7cFay4n39gcadffVHFqYKroxwDlyv05Y5Uc5vF80  
U17aDYW0h46Nh0Pfr+iJ04rSbdKTDX4blePzsy6ywog+9z7n0lx0  
-----END RSA PRIVATE KEY-----

Passphrase

Add Cancel

Disable deferred wipeout on this node ?  
 Environment variables

slavekeypair.pem

Host ?  
172.31.44.108

Credentials ?  
ec2-user (this is for slave-1)  
+ Add

Host Key Verification Strategy ?  
Non verifying Verification Strategy

Advanced...

Availability ?  
Keep this agent online as much as possible

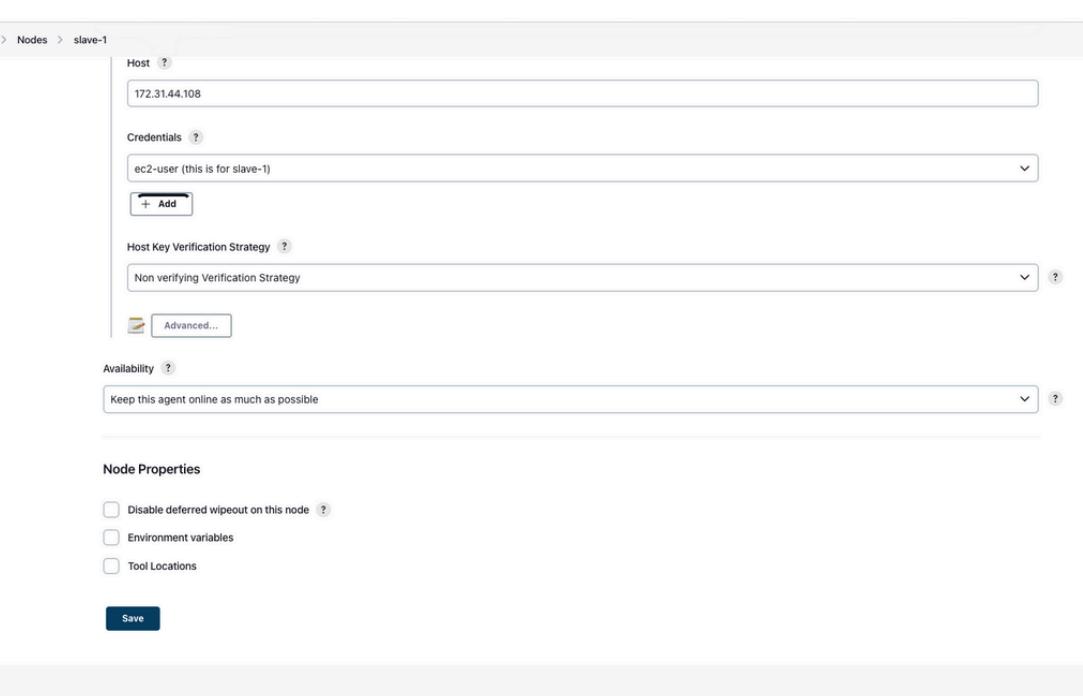
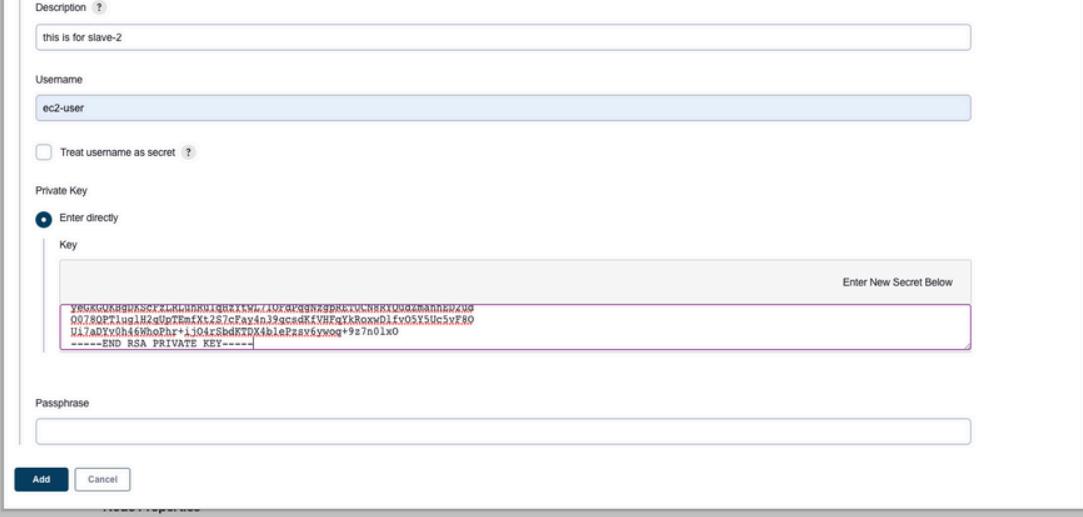
Node Properties

Disable deferred wipeout on this node ?  
 Environment variables  
 Tool Locations

Save

REST API Jenkins 2.375.2

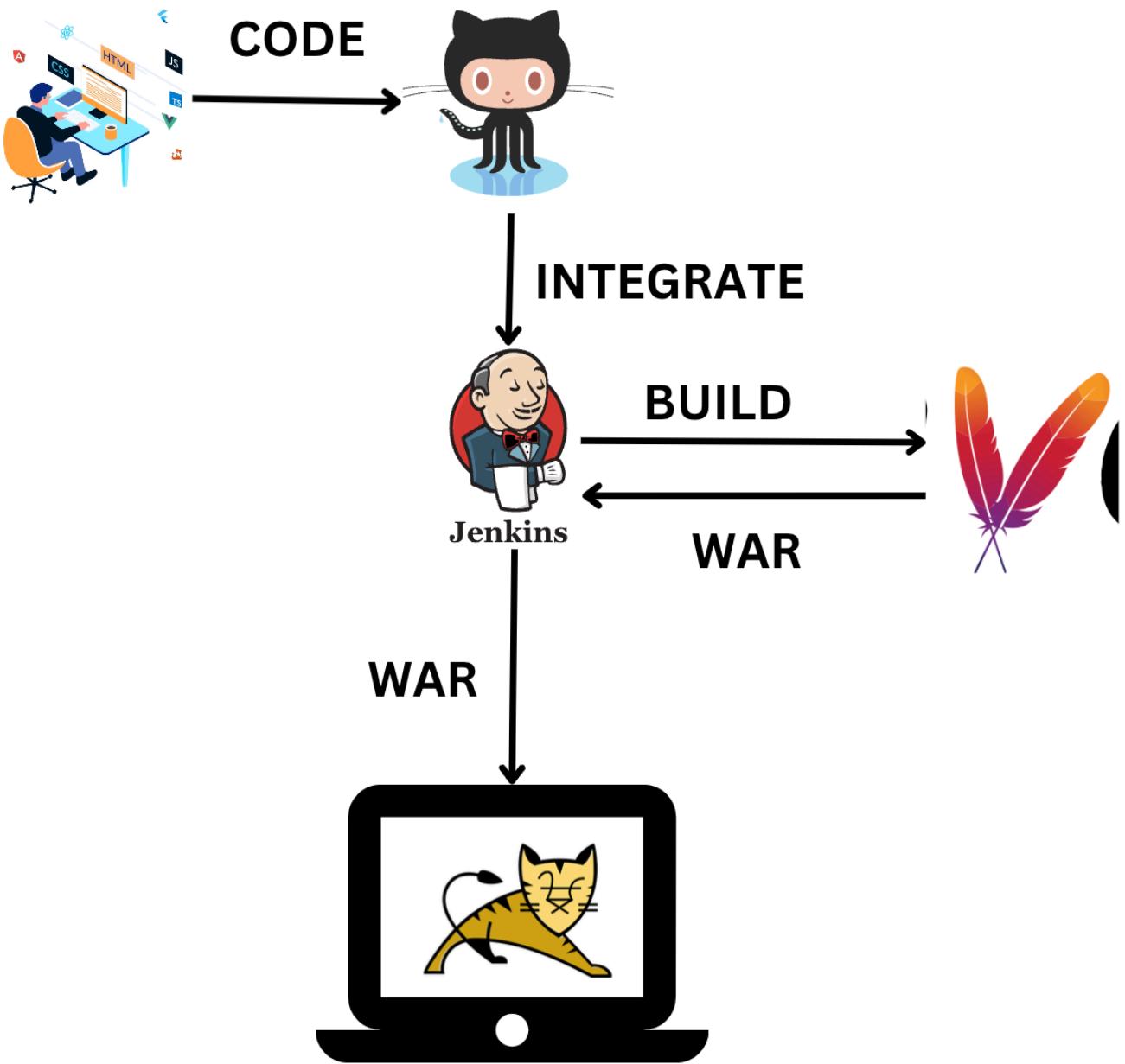
Show all X



**CLICK ON SAVE**

**JENKINS PROJECT:**

**DEPLOY A WAR FILE IN TOMCAT SERVER:**



## REQUIREMENTS:

- LAUNCH 2 SERVER (jenkins, prod)
- GET THE CODE FROM THE DEVELOPERS
- SETUP JENKINS IN JENKINS SERVER
- SETUP TOMCAT IN PROD SERVER

## PROCEDURE:

STEP-1: LAUNCH 2 INSTANCES WITH 8080 PORT

## **STEP-2: SETUP JENKINS IN SERVER**

```
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-2023.key  
amazon-linux-extras install java-openjdk11 -y  
yum install jenkins -y  
systemctl restart jenkins
```

## **STEP-3: FORK THE GITHUB (<https://github.com/devops0014/one.git>)**

## **STEP-4: INSTALL GIT IN OUR SERVER**

```
yum install git -y
```

## **STEP-5:**

CREATE JOB AND INTEGRATE GIT TO JENKINS AND BUILD IT.

ONCE WE BUILD THE JOB, FILES PRESENT IN MASTER BRANCH WILL COMES INTO CI SERVER

## **STEP-6: NEXT STEP IS BUILD THE SOURCE CODE WHICH ARE PRESENT IN CI SERVER. TO BUILD THE WE NEED TO USE MAVEN**

INSTALL JAVA-1.8.0 & MAVEN IN OUR SERVER

```
yum install java-1.8.0-openjdk -y
```

```
yum install maven -y
```

## **STEP-7:**

**CONFIGURE THE SAME JOB AND CLICK ON BUILD STEP AND SELECT ADD BUILD STEP SELECT invoke top level maven target.**

in the goal : **clean package**

SAVE THE JOB AND BUILD.

SO WE WILL GET A WAR FILE IN TARGET FOLDER.

**STEP-8:** SETUP THE TOMCAT SERVER IN PROD SERVER.

1. download tomcat file from dlcdn: [wget https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.70/bin/apache-tomcat-9.0.70.tar.gz](https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.70/bin/apache-tomcat-9.0.70.tar.gz)
2. untar the file: `tar -zxvf apache-tomcat-9.0.70.tar.gz`
3. go to the folder: `cd apache-tomcat-9.0.70/webapps/manager/META-INF`
4. open the context.xml in vim editor and make some change (delete 2 lines (21 and 22 lines))
5. go to three steps back: `cd ../../..`
6. and go to conf folder and open tomcat-user.xml file in vim editor

```
-->
<role rolename="manager-gui"/>
<role rolename="manager-script"/>
<user username="tomcat" password="123456" roles="manager-gui, manager-script"/>
</tomcat-users>
```

7. go to one step back: `cd ..`
8. go to bin folder and execute startup.sh file
9. `./startup.sh`

**STEP-9:** Go to manager apps and it will ask the user name and password enter it

**STEP-10:** go to jenkins dashboard

- install plugin (manage jenkins --> manage plugin --> available plugin --> **deploy to container**)
- after installing the plugin go to our job and select post build actions --> add post build actions.
- select deploy war/ear to container

#### Post-build Actions

The screenshot shows the Jenkins 'Post-build Actions' configuration page. A specific action, 'Deploy war/ear to a container', is selected. The configuration fields include:

- WAR/EAR files**: target/\*.war
- Context path**: swiggy
- Containers**: Add Container
- Deploy on failure**: Unchecked

At the bottom, there are 'Save' and 'Apply' buttons.

- click on add container(9th version). and add credentials (username & password of tomcat)

The screenshot shows the 'Add Credentials' dialog. The configuration fields are:

- Domain**: Global credentials (unrestricted)
- Kind**: Username with password
- Scope**: Global (Jenkins, nodes, items, all child items, etc)
- Username**: tomcat
- Treat username as secret**: Unchecked
- Password**: ..... (redacted)
- ID**: (empty)

- add tomcat url

The screenshot shows the Jenkins 'Post-build Actions' configuration page. A new action, 'Tomcat URL', is being added. The configuration fields are:

- Tomcat URL**: http://54.241.136.194:8081
- Advanced...** button
- Add Container**: Add Container
- Deploy on failure**: Unchecked

At the bottom, there are 'Save' and 'Apply' buttons.

- save and build the job and go to tomcat

you will see swiggy folder. click on the folder you can access the client application.

## Jenkins User Management:

It is the process of controlling and organizing the individuals who can access and use Jenkins, the automation tool. It involves tasks like creating user accounts, setting permissions, and managing who can do what within Jenkins. User management ensures that the right people have the appropriate level of access and control over Jenkins while maintaining security and organization in the software development process.

- INSTALL PLUGIN (role-based authorization strategy). INSTALL WITHOUT RESTART & RESTART JENKINS
- go to manage jenkins and select manage users.
- create user

The screenshot shows the Jenkins 'Create User' interface. At the top, there's a navigation bar with the Jenkins logo, a search bar, and user information. Below it, the breadcrumb navigation shows 'Dashboard > Jenkins' own user database > Create User'. The main form is titled 'Create User' and contains the following fields:

- Username: akshay
- Password: (redacted)
- Confirm password: (redacted)
- Full name: akshay bhale
- E-mail address: akshay@infosys.com

A blue 'Create User' button is located at the bottom of the form.

- 4. Go to manage jenkins >> config global security and change the authorization to role based strategy and save it

**Configure Global Security**

**Authentication**

Disable remember me

**Security Realm**

Jenkins' own user database

Allow users to sign up [?](#)

**Authorization**

Role-Based Strategy

**Markup Formatter**

Markup Formatter

Plain text

Treats all input as plain text. HTML unsafe characters like < and & are escaped to their respective character entities.

Annotate

**Save** **Apply**

- Go to manage jenkins >> manage and assign roles and select manage roles.

**Manage Roles**

**Global roles**

Role	Overall		Credentials		Agent		Job		Run		View		SCM		
	Administrator	Builder	Owner	Delegated	Manager	Updater	Viewer	Builder	Configure	Connect	Create	Delete	Run	Configure	View
admin	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
dev	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
devops	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
test	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>									

**Role to add**

**Add**

- Go to assign roles

**Assign Roles**

**Global roles**

User/group	admin	dev	devops	test
akshay bhale	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
guru kiran	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
prajwal isane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
shaik mustafa	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anonymous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**User/group to add** [?](#)

**Add**

**JENKINS BACKUP:**

Whatever we execute via Jenkins or perform any setting in Jenkins, it stores in the form of backup in Jenkins home directory. This backup includes data and configuration-related settings like job configurations and plugins, plugin configurations, build logs, etc. So, it's essential to take the backup of this prominent information to use this backup in the future if required.

- INSTALL PLUGIN (THINBACKUP).
- create a folder in opt directory: `mkdir /opt/mybackup`
- change owners of the folder: `chown jenkins:jenkins /opt/mybackup`
- give full permissions to the folder: `chmod 777 /opt/mybackup`
- go to manage jenkins and select thinbackup and click on settings.

The screenshot shows the Jenkins 'ThinBackup Configuration' page under 'Manage Jenkins > ThinBackup'. The left sidebar lists various Jenkins management options. The main configuration area includes:

- Thin Backup settings**:
  - Backup directory**: /opt/mybackup/
  - Backup schedule for full backups**: (empty field)
  - Backup schedule for differential backups**: (empty field)
  - Max number of backup sets**: -1
  - Files excluded from backup (regular expression)**: (empty field)
- Build Executor Status** (for slave-1):
  - 1 Idle
  - 2 Idle
  - slave-1** (selected):
    - 1 Idle
    - 2 Idle
    - Wait until Jenkins is idle to perform a backup** (checked)
      - Force Jenkins to quiet mode after specified minutes
      - 120
    - Backup build results** (checked):
      - Backup build archive
      - Backup only builds marked to keep
- Build Executor Status** (for slave-2):
  - 1 Idle
  - 2 Idle
  - slave-2** (selected):
    - 1 Idle
    - 2 Idle
    - Wait until Jenkins is idle to perform a backup** (checked)
      - Force Jenkins to quiet mode after specified minutes
      - 120
    - Backup build results** (checked):
      - Backup build archive
      - Backup only builds marked to keep
    - Backup userContent folder** (checked)
    - Backup next build number file** (checked)
    - Backup plugins archives** (checked)
    - Backup config-history folder** (checked)
    - Backup additional files
    - Clean up differential backups** (checked)
    - Move old backups to ZIP files** (checked)

At the bottom right are 'Save' and 'Show all' buttons. The footer indicates Jenkins version 2.375.2.

- click on **backup now**
- go and check in **/opt/mybackup folder**, you will get all the config files of jenkins in our folder.

if you want to restore those files, click on restore option

## WHAT IS JENKINS FILE?

If we are writing the entire jenkins pipeline in a text format. It contains the steps that are required for running the jenkins pipeline.

It is used to create a pipeline for **build and deploy** the code. This Jenkins file uses **groovy syntax**.

These jenkins file will written in 2 ways

1. Declarative pipeline
2. Scripted Pipeline

**Declarative pipeline:** It is a **recent feature** of the jenkins pipeline which helps us to write the pipeline in a easier way. It will starts with the word **pipeline**

**Scripted pipeline:** It is a **traditional way** of writing a jenkins pipeline as a code. It starts with the word **node**

## SINGLE STAGE PIPELINE:

```
pipeline {
```

```
    agent any
```

```
    stages {
```

```
stage ("stage-1") {  
    steps {  
        echo "hai this is my first stage"  
    }  
}  
}  
}
```

**pipeline** : A Pipeline is a user-defined model of a CD pipeline. A Pipeline's code defines your entire build process, which typically includes stages for building an application, testing it and then delivering it.

**agent** : it defines that, in which server the pipeline will get executed.

**stage** : stage in jenkins file contains of unique tasks such as build, test, Deploy etc..

**step** : It tells the jenkins what exactly needs to be done.

ex: executing a build command or linux command etc..

## MULTI-STAGE PIPELINE:

```
pipeline {  
    agent any  
    stages {  
        stage ("MUSTAGA") {  
            steps {  
                echo "hello Mustafa"  
            }  
        }  
        stage ("devops") {  
            steps {  
                echo "Hello Devops"  
            }  
        }  
    }  
}
```

```
    echo "we are learning devops"  
}  
}  
  
stage ("aws") {  
    steps {  
        echo "we are learning aws also"  
    }  
}  
}  
}
```

## PIPELINE AS A CODE: YOU CAN RUN COMMANDS HERE

```
pipeline {  
    agent any  
    stages {  
        stage('CMD') {  
            steps {  
                sh 'touch file1'  
                sh 'pwd'  
            }  
        }  
    }  
}
```

## MULTIPLE COMMANDS OVER SINGLE LINE:

```
pipeline {  
    agent any
```

```
stages {  
    stage('CMD') {  
        steps {  
            sh ""  
            touch file2  
            pwd  
            date  
            whoami  
            ...  
        }  
    }  
}
```

## ENVIRONMENT VARIABLES:

```
pipeline {  
    agent any  
    environment {  
        name = 'raham'  
    }  
    stages {  
        stage('ENV') {  
            steps {  
                echo "hai my name is $name"  
            }  
        }  
    }  
}
```

```
pipeline {  
    agent any  
    environment {  
        name = 'raham'  
    }  
    stages {  
        stage('ENV1') {  
            steps {  
  
                sh 'echo "${name}"'  
            }  
        }  
        stage('ENV2') {  
            environment {  
                name = 'shaik'  
            }  
            steps {  
  
                sh 'echo "${name}"'  
            }  
        }  
    }  
}
```

## PIPELINE FOR PARALLEL BUILD:

```
pipeline {  
    agent any  
  
    stages {
```

```
stage('Parallel Stages') {  
    parallel {  
        stage('Stage A') {  
            steps {  
                echo 'Running Stage A...'  
                // Your logic for Stage A  
                sh 'echo "Executing tasks in Stage A"'  
            }  
        }  
        stage('Stage B') {  
            steps {  
                echo 'Running Stage B...'  
                // Your logic for Stage B  
                sh 'echo "Executing tasks in Stage B"'  
            }  
        }  
    }  
}
```

## PIPELINE TO GET A SOURCE CODE TO DEV SERVER:

```
pipeline {  
    agent {  
        node {
```

```

label 'dev'

}

}

stages {

stage ("git") {

steps {

git "https://github.com/devops0014/devoprepoforpractice.git"

}

}

}

}

```

## **PIPELINE WITH PARAMETERS:**

### **STRING:**

```

pipeline {

agent any

parameters {

string (name: "aws", defaultValue: "EC2", description: "i am unsing aws cloud")

}

stages {

stage ("stage-1") {

steps {

echo "hai i am using parameters"

}

}

}

}

```

### **BOOLEAN:**

```
pipeline {
    agent any
    parameters {
        booleanParam (name: "jenkins", defaultValue: true, description: "")
    }

    stages {
        stage('Hello') {
            steps {
                echo ' i am using boolean parameter'
            }
        }
    }
}
```

## CHOICE:

```
pipeline {
    agent any
    parameters {
        choice (name: "branch", choices : ["one", "two", "three", "four"], description: "this is cp")
    }

    stages {
        stage('Hello') {
            steps {
                echo 'Hello World'
            }
        }
    }
}
```

## PIPELINE WITH POST BUILD ACTIONS:

### ALWAYS:

```
pipeline {  
    agent any  
  
    stages {  
        stage('Hello') {  
            steps {  
                echo 'Hello World  
            }  
        }  
    }  
    post{  
        always {  
            echo 'THIS WILL BE PRINTED ANYWAY'  
        }  
    }  
}
```

### SUCCESS:

```
pipeline {  
    agent any  
  
    stages {  
        stage('Hello') {  
            steps {  
                echo 'Hello World  
            }  
        }  
    }  
}
```

```
    }
}

post{
    success {
        echo 'THIS WILL BE PRINTED IF THE BUILD GETS SUCCESS'
    }
}

}
```

### **FAILURE:**

```
pipeline {
    agent any

    stages {
        stage('Hello') {
            steps {
                echo 'Hello World
            }
        }
    }

    post{
        failure {
            echo 'THIS WILL BE PRINTED EVEN IF THE BUILD GETS FAILURE'
        }
    }
}
```

### **SUCCESS, ALWAYS, FAILURE:**

```
pipeline {
    agent any
```

```

stages {
    stage('Hello') {
        steps {
            echo 'Hello World'
        }
    }
}

post {
    always {
        echo "this will gets printed anyway"
    }
    success {
        echo "this will be printed if the build gets success"
    }
    failure {
        echo "this will be printed even if the build gets failure"
    }
}

```

## **INPUT IN JENKINS FILE:**

```

pipeline {
    agent any

    stages {
        stage('deploy') {
            input {

```

```

        message "can i deploy"
        ok "yes you can"
    }
    steps {
        echo 'our code is deployed'
    }
}
}
}

```

## **JENKINS FILE TO DEPLOY THE CODE IN TOMCAT SERVER:**

```

pipeline {
    agent any
    stages {
        stage ("code") {
            steps {
                git "https://github.com/devops0014/myweb-01.git"
            }
        }
        stage ("build") {
            steps {
                sh 'mvn clean package'
            }
        }
        stage ("deploy") {
            steps {
                sh "cp /var/lib/jenkins/workspace/pipeline-1/target/*.war /opt/apache-tomcat-9.0.71/webapps"
            }
        }
    }
}

```

```
}
```

```
}
```

## CHANGE TOMCAT PORT NUMBER:

- To stop the tomcat: ./shutdown.sh
- Go to conf folder and open server.xml file in vim editor
- Change the port number in 69 line from 8080 to 8081
- and save & exit from the file
- Go to one step back cd ..
- Go to bin folder again and execute startup.sh file

## JENKINS JOB TO DEPLOY A WEBAPP IN CLIENT SERVER:

1. LAUNCH AN TWO INSTANCES WITH 8080 PORT AND PEM FILE. (JENKINS & PROD SERVER)
2. SETUP JENKINS IN JENKINS SERVER
3. INSTALL JAVA-11 IN PROD SERVER
4. CREATE A NODE : go to manage jenkins >> manage nodes and clouds >> new node --> give node name & select permanent agent.

The screenshot shows the Jenkins Manage Nodes interface. A new node is being configured with the following details:

- Name:** slave-1
- Description:** this is for slave-1
- Number of executors:** 3
- Remote root directory:** /home/ec2-user/jenkins/
- Labels:** dev
- Usage:** Only build Jobs with label expressions matching this node
- Launch method:** Launch agents via SSH
- Host:** 172.31.44.108

At the bottom left, there is a link to "ADD CREDENTIALS".

ADD CREDENTIALS

Dashboard > Manage Jenkins > Nodes >

Only build jobs with label expressions matching this node

### Jenkins Credentials Provider: Jenkins

Add Credentials

Domain: Global credentials (unrestricted)

Kind: SSH Username with private key

Scope: Global (Jenkins, nodes, items, all child items, etc)

ID: (empty)

Description: this is for slave-2

Username: ec2-user

Disable deferred wipeout on this node

Environment variables

slavekeypair.pem

Show all

Host: 172.31.44.108

Credentials: ec2-user (this is for slave-1)

+ Add

Host Key Verification Strategy: Non verifying Verification Strategy

Advanced...

Availability: Keep this agent online as much as possible

Node Properties

Disable deferred wipeout on this node

Environment variables

Tool Locations

Save

REST API Jenkins 2.375.2

Show all

- SETUP THE TOMCAT IN PROD SERVER (dont need to change the port number).
- INSTALL PLUGIN: go to manage jenkins >> manage plugins >> available plugin >> deploy to container.

CREATE A JOB IN FREE STLE:

**Configure****General**

Enabled

- General
- Source Code Management
- Build Triggers
- Build Environment
- Build Steps
- Post-build Actions

**Description**

[Plain text] [Preview](#)

 Discard old builds  GitHub project

Project url

[Advanced...](#) This project is parameterised  Throttle builds  Execute concurrent builds if necessary  Restrict where this project can be run 

Label Expression

Label **prod** matches 1 node. Permissions or other restrictions provided by plugins may further reduce that list.[Advanced...](#)[Save](#)[Apply](#)**Configure****Source Code Management**

- General
- Source Code Management
- Build Triggers
- Build Environment
- Build Steps
- Post-build Actions

 None Git 

Repositories

Repository URL

Credentials

[+ Add](#)[Advanced...](#)[Add Repository](#)

Branches to build

Branch Specifier (blank for 'any')

[Add Branch](#)

Repository browser

[Save](#)[Apply](#)**Configure****Build Steps**

- General
- Source Code Management
- Build Triggers
- Build Environment
- Build Steps
- Post-build Actions

≡ **Invoke top-level Maven targets**

Goals

[Advanced...](#)[Add build step ▾](#)

Dashboard > MyApp > Configuration

**Configure**

**Post-build Actions**

General

Source Code Management

Build Triggers

Build Environment

Build Steps

Post-build Actions

**Deploy war/ear to a container**

WAR/EAR files ?  
target/\*.war

Context path ?  
swiggy

**Containers**

**Tomcat 9.x Remote**

Credentials  
tomcat/\*\*\*\*\*\*

+ Add

Tomcat URL ?  
http://54.219.172.28:8080/

Advanced...

Add Container ▾

Deploy on failure

**Save** **Apply**

This screenshot shows the Jenkins configuration interface for a job named 'MyApp'. The 'Post-build Actions' section is selected. It contains two main items: 'Deploy war/ear to a container' and 'Tomcat 9.x Remote'. Under 'Deploy war/ear to a container', the 'WAR/EAR files' field is set to 'target/\*.war' and the 'Context path' is set to 'swiggy'. Under 'Tomcat 9.x Remote', the 'Credentials' dropdown is set to 'tomcat/\*\*\*\*\*\*'. The 'Tomcat URL' is set to 'http://54.219.172.28:8080/'. There are also 'Advanced...' and 'Add Container' buttons. A checkbox for 'Deploy on failure' is present. At the bottom are 'Save' and 'Apply' buttons.

SAVE & BUILD

## SOME ADDITIONAL TOPICS:

### JENKINS POST BUILD ACTIONS:

```
pipeline {
```

```
    agent any
```

```
    stages {
```

```
        stage('Hello') {
```

```
            steps {
```

```
                echo 'Hello World'
```

```
}
```

```
    post {
```

```
        always {
```

```
    echo "this will be printed anyways"
}

}

}

}

post {

always {

    echo "This block always runs."

}

changed {

    echo "This block runs when the current status is different than the previous one."

}

fixed {

    echo "This block runs when the current status is success and the previous one was failed or unstable."

}

regression {

    echo "This block runs when the current status is anything except success but the previous one was successful."

}

unstable {

    echo "This block runs if the current status is marked unstable."

}

aborted {

    echo "This block runs when the build process is aborted."

}
```

```
failure {
    echo "This block runs when the build is failed."
}

success {
    echo "This block runs when the build is succeeded."
}

unsuccessful {
    echo "This block runs when the current status is anything except success."
}

}
```

## JENKINS WHEN CONDITION:

```
pipeline {
    agent any
    stages {
        stage("Test") {
            when {
                equals(actual: currentBuild.number, expected: 5)
            }
            steps {
                echo "Hello World!"
            }
        }
    }
}
```

```
 }  
 }  
 }
```

Note: In the above pipeline, when the build id is 5, then only stage will gets executed.

## WHEN NOT:

```
pipeline {  
    agent any  
    stages {  
        stage("Test") {  
            when {  
                not {  
                    branch "master"  
                }  
            }  
            steps {  
                echo "Test stage."  
            }  
        }  
    }  
}
```

## ALL OF:

```
pipeline {

    agent any

    stages {

        stage("Deploy") {

            when {
                allOf {
                    branch "master"
                    environment(name: "ENV", value: "production")
                    tag "release-*"
                }
            }

            steps {
                echo "Deploy to production."
            }
        }
    }
}
```

## ANY OF:

```
pipeline {

    agent any

    stages {

        stage("NewFeature") {

            when {
                anyOf {

```

```
branch "feature"  
changelog "*new feature.*"  
}  
}  
steps {  
    echo "Test new feature."  
}  
}  
}
```

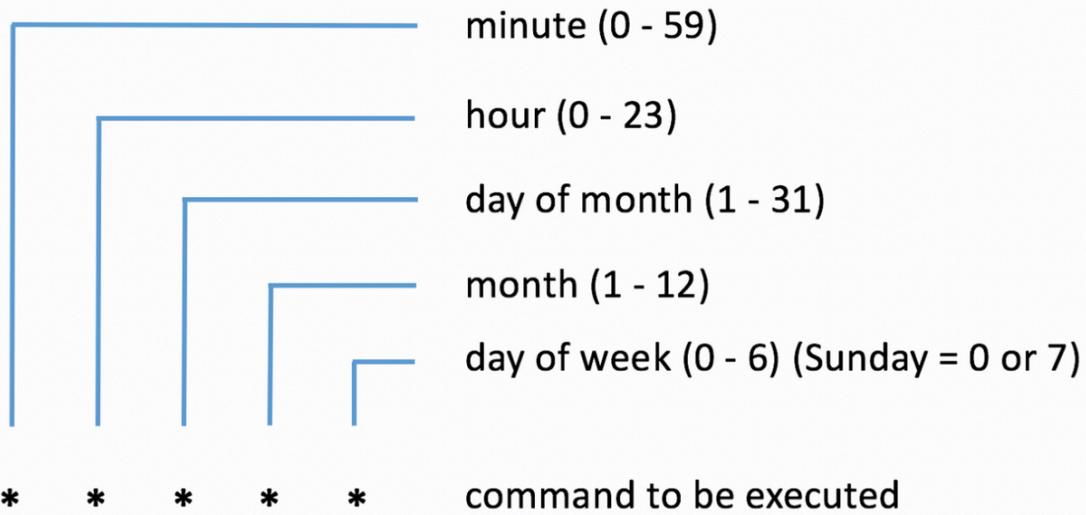
## BUILD PERIODICALLY:

```
pipeline {  
    agent any  
    triggers {  
        cron "* * * * *"  
    }  
    stages {  
        stage("Test") {  
            steps {  
                echo "Hello World!"  
            }  
        }  
    }  
}
```

}

## CRON JOB IN FREE STYLE:

We can schedule the jobs that need to be run at a particular intervals.



Build Triggers --> Build periodically --> \* \* \* \* \* --> save

If you want to make it customize then we can use cron syntax generator.

## JENKINS PORT NUMBER CHANGE:

1. cd /usr/lib/systemd/system
2. vim jenkins.service
3. change port number in line 67
4. systemctl daemon-reload
5. systemctl restart jenkins