**JENKINS**

**Why do we need Continuous Integration?**

Continuous Integration (CI) is a development practice that requires developers to integrate code into a shared repository several times a day. Each check-in is then verified by an automated build, allowing teams to detect problems early.

**Continuous Integration(CI):**

Continuous integration is a DevOps software development practice where developers regularly merge their code changes into a central repository, after which automated builds and tests are run.



**Continuous Deployment:**

once the testing of code is completed without errors,then the code is deployed into tomcat servers.

**Jenkins:**

* Continuous Integration and Continuous Deployment tool.
* Plugin based tool.
* Tools like Jenkins are Atlassian Bamboo, GitLab

**Installation Process of Jenkins:**

* Precondition: Java version 8 should be installed.
* Jenkins can be installed on windows in 3 ways:

1)java -jar jenkins.war

2)jenkins.exe

3)Jenkins.war file with application servers

* 1st method is the most efficient way.

1. Download the latest Jenkins.war file through this website <https://updates.jenkins-ci.org/download/war/> .
2. Go to download location from local computer,then open command prompt and run the command "java -jar jenkins.war" (or) "java -jar jenkins.war --httpPort=8080"
3. During the installation process, password will be displayed, copy that password to unblock the Jenkins.
4. After completing the Jenkins installation process, Open <http://localhost:8080/> in a browser and paste that password at initial Administrator password.

To access Jenkins, you need to go to browse the following path in your web browser.

<http://localhost:8080>

If you can access the above URL, then it confirms that Jenkins is successfully installed in your system.

5. After accesing the Jenkins,Customize Jenkins page will be opened.Select "Install suggested plugins" rather than "select plugins to install" option to install the default plugins.Jenkins will start to download and install all the necessary plugins needed to create new Jenkins Jobs.

6. After all suggested plugins were installed,"Create First Admin User" panel will show up. Fill all the fields with desired account details and click the "Save and Finish" button,if you want admin as your preferred user.Otherwise click on the "continue as admin" button.

7. Click on the "start using Jenkins" button,then "Welcome to Jenkins" page will be opened.

**Jenkins server page:**

* At the top right side of Jenkins page,"Enable Auto Refresh" option is available to automatically refresh your Jenkins server for every 15secs.
* Jenkins server can be restarted in 2 ways:

1. restart:

Jenkins server will be restarted immediately and the background jobs will be terminated.To restart the jenkins server, use the following link.

<http://localhost:8080/jenkins/restart>

1. Safe-restart:

Jenkins server wait for the restart process until the jobs will be completed.For safe-restart of the jenkins server, use the following link.

<http://localhost:8080/jenkins/safe-restart>

* At the left side of the Jenkins page,you will see the following options.

**1)New Item:**

To create a sample project which integrates a simple GitHub repository pull and shell command.After the project is created, a new option(Build now) in the left side menu is displayed.If you click "Build Now", Jenkins will schedule and build your project.We can also check the output in console.

**2)People:**

To manage the accounts on the system from the People menu.

**3)Build History:**

To see the results of all builds in the Jenkins.

1. **Manage Jenkins:**

a) Configure system:

* *System message*=> message displays on home directory
* *# of executors*=>(by default 2)no. of build jobs to execute
* *Labels*=> used to run the jobs of main server in sub server with label name which is done in node configurations
* *Usage*=>explains the usage of nodes(I.e., working of sub servers)
* *Quiet period*=> time gap between the builds
* *SCM checkout retry count*=> (by default 0)it is the no. of times jenkins has to check for the code within the poll SCM timeperiod
* *Environment variables*=>global values like username and all
* *SMTP server*=> details of administaration mail details

b) configure Global security:

* *Enable security*=>(by default it is enabled)if it is disabled,then login and logout options will not come.I.e., no security
* *Access Control*=> by default “jenkin’s own user database” is selected

*Allow users to sign up*=>if it is enabled,we can get signup option on home page,it is used to create users for the jenkin server

* *Authorization*=> for giving permissions to created users

*logged in users can do anything*=>By default it is selected

*Allow Anonymous read access* => read permissions given to non-users

*Anyone can do anything*=>it it is selected,then non users can also access jenkins server

*Matrix-based security*=> giving permisssions for users

All permissions should be given to atleast one Adminuser/other user,if we give build permissions to user1 then he can build all the jobs in that server

*Project based Matrix*

*authorization strategy*=>particular jobs(nothing but projects) are assigned to individual or particular users(I.e.,other users can’t access other jobs assigned to particular users)

c) Configure credentials:

For providing credentials

d) Global Tool Configuration:

Used Tools(like Git,Maven,JDK) have to be configured here(I.e.,giving locations where we have installed those or we can install the tools here by clicking on “install automatically”option

e) Reload Configuration from disk:

Reloading files from jenkins directory(after restoring lost jobs,we have to click on this option to reload all the data from home directory)

f) Manage plugins:

Add,remove and manage plugins

*Updates*=> shows updates for installed plugins

*Available*=>(like playstore)can install new plugins

*Installed*=>shows installed plugins

*Advanced*=>can create own plugins with python script

eg: a) Role based strategy plugin(security related plugin)

Tap on “Configure global security” and enable “Role based strategy”

1. i.e.,it is used to assign permissions to “n” no.of users easily by adding them into specific role(i.e., group)

ii) After this we will get “Manage and Assign Roles”,in this select “Manage Roles” and now we need to create Roles(i.e., groups) and assign permisssions to roles

iii) Select “Assign Roles” and add users to the Roles.(i.e., add users and assign Specific roles to the users)

b) Backup plugin(used to backup the data)

i) We will get “Backup Manager” option under “Manage jenkins” after installing this plugin.

ii) Used to restore the backup data and used to take backup to a particular folder

c) Deploy to a container

Used to deploy the executable file in tomcat server automatically(need to give specific details under post build section in Build settings category)

g) System information:

Jenkins related info,plugin info all the data will present

h) System logs:

“All jenkins logs” it displays overall jenkins log info

Logs info will store here,we can create our own logs(like warning logs..)

1. Load statastics:

Displays jenkins load, data(jobs related info like executed jobs…) as graphs

j) Jenkins CLI:

Through cmd also we can operate jenkins(we can run jobs..)

1st download the jenkins cil.jar file and continue the process that displays when we tap the options(like login and logout)

Commands will be present

k) Manage Nodes:

Add,remove,control and monior various nodes that jenkins runs jobs on.

l) Manage old data:

Old jenkins version data will be stored here,after updating the jenkins version we can downgrade to older versions.

m) Manage users:

User creation,reset user password,listouts users for the server

Can modify or delete created users

n) Prepare for Shutdown:

i) If we choose this,then notification(“Jenkins is going to shutdown”) is displayed on the top of the page in red color to all the users who are using that Jenkins server.so that everyone will save the data before shutdown

ii) Choose”cancel shutdown” to remove that notification.

**5)My views:**

To view all the jobs present in the Jenkins server.

**6)Credentials:**

To store credentials in Jenkins.We can add multiple credentials in one Jenkin server.

**7)New view:**

To contribute a new view implementation that provides a dashboard / portal-like view for Jenkins.On the create new view page, give your view a name and select the Dashboard type and click ok.

**8)Build Queue:**

To display all the pending jobs to build in the Jenkins server.

**9)Build Executor Status:**

To display how many jobs build at a time.By default, we can build 2 jobs at a time.To build more than 2 jobs at a time, we can modify the build executor status number.

**Details/options that comes during job creation:**

1. General:

In “parameterised” option,we can pass parameters to the jobs and after that “Build now” option is changed as “Build with parameters”

We can disable particular job/project.

“Execute concurrent build if necessary” it is used to run the no.of builds parallely in single job

1. Source code management:

Select the tool from which we are getting codes

1. Build triggers:

It will have the options that helps us to know about build triggers in SCM.

1. Build Environment:

Build related details will be present

1. Build:

Contains the diffrent platforms to build

1. Post build Actions:

Options that we will deal after build process completion

**Pipeline**

* It is a work flow with group of events or jobs that are chained and integrated with each other in sequence.
* Every job in a pipeline has some dependency on one or more other jobs.

**Continuous delivery pipeline:**

It consists of 4 major stages. They are:

1)Build

2)Test

3)Deploy

4)Release

* Every stage will have some jobs and these jobs are integrated with each other, work in a sequence and we call it as continuous delivery pipeline.
* For each and every stage, there will be a feedback\notification mechanism.

**Pipeline setup:**

Go to Manage Jenkins -> Manage Plugins, tap on available option, then search and install "Build pipeline" plugins.

**Pipeline creation:**

Go to Jenkins main page, tap on "+" icon on the top of jobs, give name to the pipeline at "view name" box, then select "Build pipeline view" option and click OK.

**Options while creating pipeline:**

1)Name: It specifies the name of the pipeline

2)Description: To describe the created pipeline

3)Filter build queue

4)Filter build executors

5)Build Pipeline View Title: Title for building the created pipeline

6)**Pipeline flow**

* Layout: It describes the upstream and downstream view while building the pipeline.
* select Initial job: To select which job to be build first in the pipeline.

1. **Trigger Options**

* Build Cards
* Restrict triggers to most recent successful builds
* Always allow manual trigger on pipeline steps

1. **Display Options**

* No Of Displayed Builds: To display the number of builds to build at "Build Executor Status" in the Jenkins main page.
* Row Headers
* Column Headers
* Refresh frequency (in seconds)
* URL for custom CSS files
* Console Output Link Style: Select the display of builds in the current window or new window.