Jenkins

1. What is Jenkins?

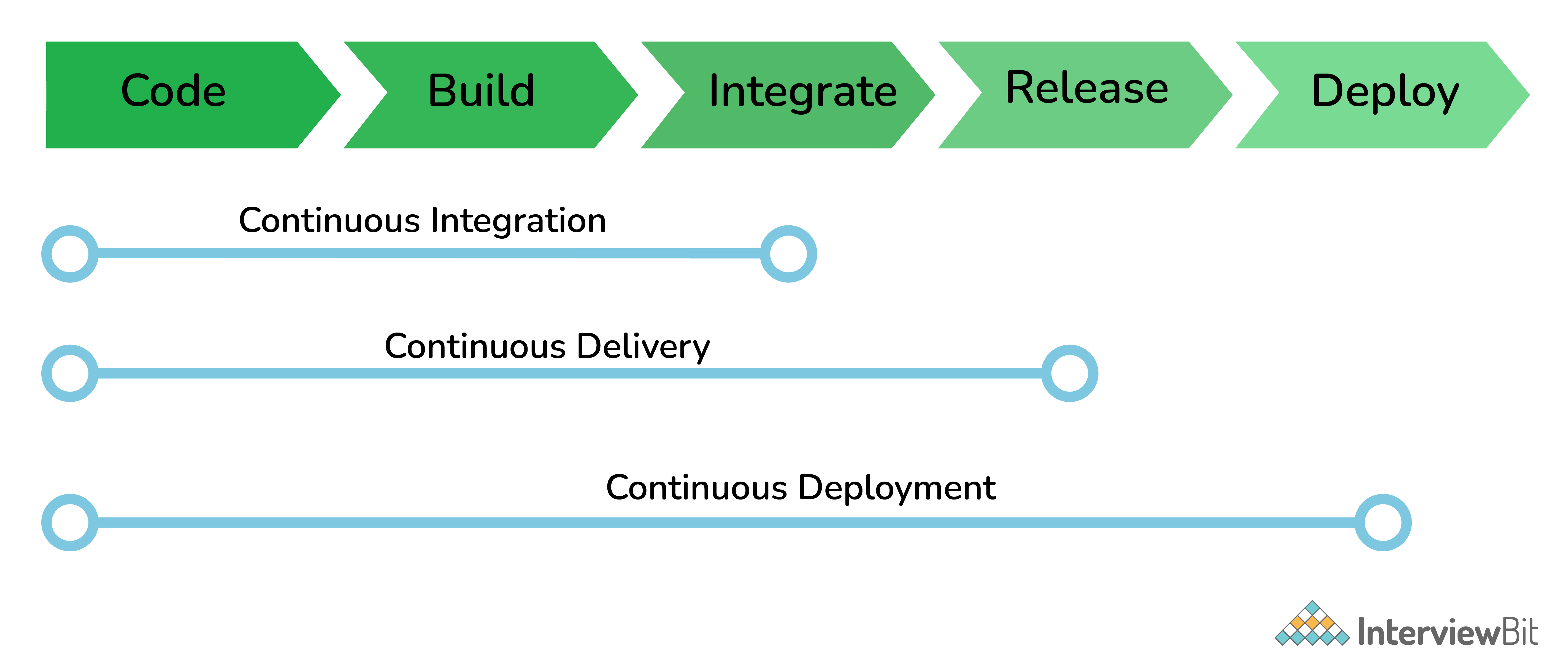
* Jenkins is a self contained, open source automation server which can be used to automate all tasks related to building , testing and delivery activities. Jenkins can be installed even on standalone by any machine with a java runtime environment ( JRE ) installed. Jenkins is a tool for implementing CI-CD ( continuous integration – continuous delivery ) .

1. Tell me something about Continuous Integration, Continuous Delivery, and Continuous Deployment?

* Continuous integration – continuous integration is a process where developer write the code and commit it into github repository. This may be on daily or weekly basis. Whenever there is a change in the git hub repository, Jenkins fetches the update code and it prepares a build of that code which executable file in form of war or jar. This build software forwaded to the test server or the production server.

Continuous delivery - This is a Software Development Process where the continuously integrated (CI) changes will be tested & deployed continuously into a specific environment, after all the quality checks are successful.

Continuous deployment - A Software Development practice where the continuously integrated (CI) changes are deployed automatically into the target environment after all the quality checks are successful.



1. What are the common use cases Jenkins is used for?

* Jenkins being open-source automation can be used for any kind of software-based automation. Some of the common use-cases include but not limited to –

Software build jobs

Sanity/Smoke/CI/Regression test jobs

Web/Data Scraping related jobs

Code coverage measurement jobs

General-purpose automation

Reverse Engineering jobs

Key Decoding jobs & many other jobs where software automation will be applicable.

1. What are the ways to install Jenkins?

* Jenkins can be installed using -

Native System Package Manager like - apt (Linux), brew (Mac), etc.

Docker (popular docker images for Jenkins is available for different platforms like Unix/Mac/Windows in the docker registry)

Kubernetes (available as a helm chart and can be installed on our Kubernetes clusters)

Standalone (on any machine with a Java Runtime Environment installed)

1. What is a Jenkins job ?

* A Jenkins job is like a software build, an automation task, test execution etc. using Jenkins automation server and other required plugins, configuration & infrastructures can be done.

1. What is a cicd pipeline ?

* CI/CD Pipeline or Continuous Integration/ Continuous Delivery is considered the DevOps approach's backbone. The pipeline is responsible for building codes, running tests, and deploying new software versions.

1. What are the types of Jenkins pipelines ?

* Jenkins pipelines can be either – a declarative pipeline or a scripted pipelines. Declarative pipelines makes use of numerous , generic , predefined build steps to build our job according to our automation needs. In scripted pipeline the stages can be custom-defined & using a groovy syntax which provides better control in execution level.

1. What is Jenkins pipelines ?

* The pipeline represents the continuous delivery and continuous integration of all the jobs

in the SDLC and DevOps life cycle.

The Jenkins pipeline is a set of plugins that support implementation and integration of continuous delivery pipelines into Jenkins. It connects this pipeline in a particular format by Jenkins.

The Jenkins pipeline solves several problems like the maintenance of thousands of jobs

and maintaining deployment with needing to resort to other powerful methods.

1. What are the requirements for using Jenkins?

* To use Jenkins, you require the following:

A source code repository that can be accessed, for example, a Git repository.

A build script, for example, a Maven script.

1. Name the two components that Jenkins is mostly integrated with ?

* Jenkins is typically integrated with these two components:

Version Control systems like Git and SVN (Apache Subversion)

Build tools like Maven

1. What are the features of Jenkins?

* Some of the crucial features of Jenkins are the following:

It is a free and open-source automation tool

Jenkins provides a vast number of plugins

It is easy to set up and install on multiple operating systems

Provides pipeline support

Fast release cycles

Easy upgrades

1. What is Groovy in Jenkins?

* Apache Groovy is a dynamic object-oriented programming language used as a scripting language for Java platforms.

Groovy is used to orchestrate the Jenkins pipeline and enables different teams to contribute to the work in different languages.

Groovy's syntax is very similar to that of Java, making it more seamless with the Javainterface.

The language has several features like Java compatibility and Development support.

1. How do you install Jenkins?

* Follow the steps mentioned below to install Jenkins:

Install Java

Install Apache Tomcat Server

Download Jenkins war File

Deploy Jenkins war File

1. Which commands can be used to begin Jenkins?

* Here are the commands used to start Jenkins:

Open the command prompt

After the command prompt opens, browse to the directory where Jenkins war is present

Then run the following command:

D:\>Java -jar Jenkins.war

1. How can you set up a Jenkins job?

* To set up a Jenkins job, you may follow these steps:

Select New item from the menu

Next, enter a name for the job and select a free-style job

Click on OK to create a new job

Hence, the next page that appears will allow you to configure your job.

1. Name some of the useful plugins in Jenkins ?

* Some of the plugins in Jenkins include:

Maven 2 project

Amazon EC2

Copy artifact

Join

HTML publisher

Green Balls

1. How can you create a backup and copy files in Jenkins?

* Jenkins stores all the settings, builds scripts, and logs in the home directory.

Then, if you want to create a backup of this Jenkins set up all you have to do is copy this

directory.

The job directory may also be copied to clone a job or rename the directory.

INTERMEDIATE QUESTIONS

1. How can you deploy a custom build of a core plugin?

* If you wish to deploy a custom build of a core plugin, you follow the following steps:

Stop Jenkins

Then copy the custom HPI to $Jenkins\_Home/plugins

After that, delete the previously expanded plugin directory

Next, make an empty file called <plugin>.hpi.pinned

Finally, start Jenkins

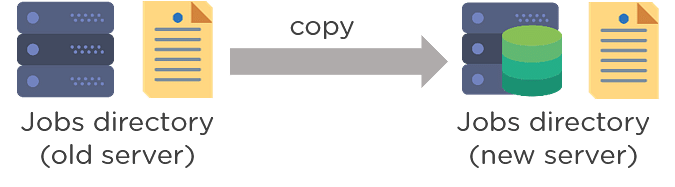
1. What could be the steps to move or copy Jenkins from one server to another?

* There are multiple ways to move or copy Jenkins from one server to another:

You may move a job from one Jenkins installation to another just by copying the corresponding job directory.

You may make a copy of an already existing job by making a clone of the job directory with an uncommon name.

You may also just rename a current job by renaming a directory.



1. Assume that you have a pipeline. The first job that you performed was successful, but the second one failed. What would you do now?

* You don't have to worry, and you just have to restart the pipeline from the point where it failed by doing 'restart from stage.'

1. Explain the process in which Jenkins works?

* Here’s the process in which Jenkins works:

Jenkins checks changes in repositories regularly, and developers must secure their code regularly.

Once the changes are defined, Jenkins detects them and uses them to prepare a new build.

After that, Jenkins will transverse through various stages in its usual pipeline. As one stage completes, the process will move further on to the next stage.

If a stage fails, the Jenkins build will stop there, and the software will email the team using it. When completed successfully, the code implements itself in the proper server so that testing begins.

After the successful testing phase, Jenkins shares the results with the team using it.

1. What is Jenkinsfile?

* Jenkins file is a text file that has a definition of a Jenkins pipeline and is checked into the source control repository. It enables code review and iteration on the pipeline. It also permits an audit trail for the pipeline.

1. Why is Jenkins used with Selenium?

* Using Selenium allows Jenkins’s testing whenever there are any software changes or any changes in the environment. When the Selenium test suite is integrated with Jenkins, the testing part is also automated as part of the build process.

1. What is the process to integrate Git with Jenkins?

* To integrate Git with Jenkins, you can follow the following steps:

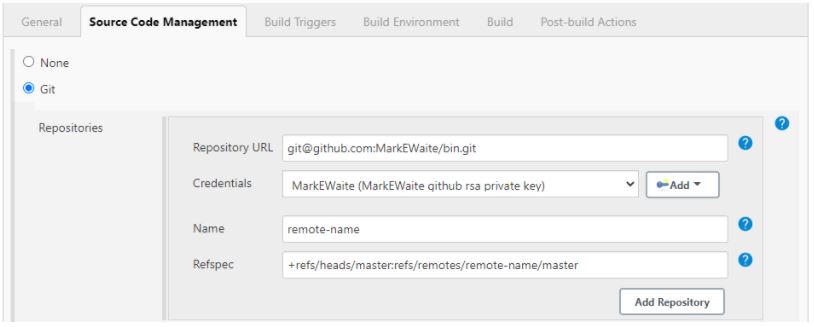
First, create a new Jenkins job and open the Jenkins dashboard.

Now, enter the desired project name and select the job type.

Click on OK.

Then enter the project information.

After that, visit the 'Source Code Management' tab.

If the Git plugin is pre-installed in Jenkins, there will be 'Git'.

If it is not installed, you must reinstall the plugins (GitHub plugin, GitHub Branch Source plugin, GitHub API plugin, Git client plugin, etc.).

After we install the plugins, restart Jenkins.

To check if Git is installed, you can go to Command Prompt and type Git, and you would see various options like usage, version, help, etc.

1. What is DSL Jenkins?

* DSL stands for Domain Specific Language. Jenkins job DSL is a plugin that allows us to define jobs in the programmatic form with minimal effort. You can describe your jobs in Jenkins using a Groovy Based Language. They designed Jenkins job DSL plugin to create versions of the job, manage the records

1. What is the process to configure Third-party tools in Jenkins?

* The process to configure Third-party tools in Jenkins can be seen in four significant steps:

Install the third-party software

Then install a Jenkins plugin supporting the third-party tool

Now, configure the tool from the Manage Jenkins section

Finally, your plugin is ready to be used

1. What are some of the default environmental variables in Jenkins?

* Some of the Jenkins environmental variables are:

$JOB\_NAME - The name that you give your job when it is first set up.

$NODE\_NAME - This is the name of the node on which the current build is running.

$WORKSPACE - Refers to the path of the workspace

$BUILD\_URL - Indicates the URL where the results of the builds can be found.

$JENKINS\_URL - This is set to the URL of the Jenkins master that is responsible for running the build.

ADVANCE QUESTIONS

1. What are some of the critical aspects of the Jenkins pipeline?

* Some of the Jenkins Pipeline key aspects are:

Pipeline: User-defined model of a CD pipeline. Pipeline's code takes the role of defining the entire build process, including building, testing, and delivering an application.

Node: A machine as a part of the Jenkins environment which is capable of executing a pipeline.

Step: An individual task that communicates to Jenkins about what to do at a particular point in time

Stage: This defines distinct subset of tasks that are conceptually unique and performed through the pipeline (build, test, deploy stages)

1. Let's say there is a broken build in the Jenkins project, then what can be done?

* Initially, you will have to open the console output where the broken builds are created and then figure out if there are any file changes that were missed. In case there are no issues found there, then you will need to update your local workspace, replicate the problem, and then try to solve it.

1. How to deploy a custom build of a core plugin?

* The steps to deploy a custom build of a core plugin are:

First, copy the .hpi file to $JENKINS\_HOME/plugins

Then remove the plugin's development directory

Next, create an empty file called <plugin>.hpi.pinned

Finally, restart Jenkins and use your custom build of a core plugin

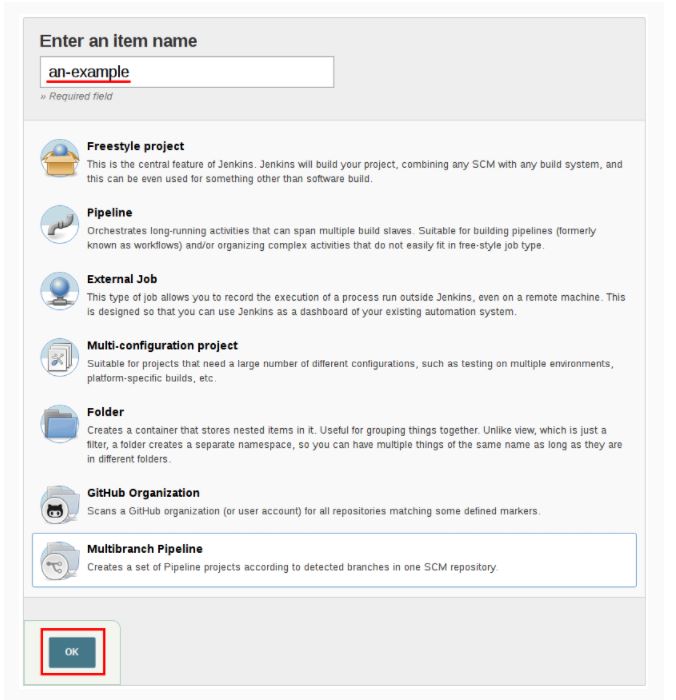
1. What is the process of making a Multibranch Pipeline in Jenkins?

* To create a Multibranch Pipeline in Jenkins, follow the following steps:

Open the Jenkins dashboard and create a new item by clicking on 'new item'

Enter the project name and, from the options, select 'Multibranch pipeline'

Click on OK



Then select the repository location, branch source (GitHub/Bitbucket), and add the branch source credentials.

Save the project

Now, Jenkins automatically creates new Multibranch Pipelines for repositories

Then to connect to the GitHub repo, we need the HookURL

To get this URL from the repository settings, add this HookURL to the Webhooks section

Once the jobs are created, Jenkins will automatically trigger the build

1. How can the parameters be defined in Jenkins?

* In Jenkins, a build can take many input parameters to execute.

To define parameters for the job, select the “this project is parameterized” box.

The drop down “Add Parameter” is enabled with the parameter types list. Any number of parameters may be added in the list.

There are several parameter types provided in the list.

1. Explain the ways to configure Jenkins node agent to communicate with Jenkins master?

* There are two ways to configure Jenkins node agent to communicate with Jenkins master:

Browser–If we launch the Jenkins node agent from a browser, a Java Web Start or JNLP file is downloaded. The downloaded file launches a new process on the client machine to run jobs.

Command-line–If you want to start the node agent using the command line, you need the executable agent.jar file. When this file runs, it launches a client's process to communicate with the Jenkins master to run build jobs.

1. What is the use of the JENKINS\_HOME directory?

* JENKINS\_HOME directory is the place where all the settings, logs, and configurations are stored. It stores all this information in XML files.

The directory contains a subdirectory for every Jenkins build job being operated.

Every directory has two subdirectories: builds and workspace., and some other files as well.

These sub directories are important, as the workspace directory is located at the place where Jenkins is building the project, and it contains the source code.

The builds directory stores the history of all the builds performed for this job

1. Explain a backup plugin and its uses.

* It includes job configs, plugins, logs, plugin configuration, etc. Jenkins provides a backup plugin which can be used to get critical backup configuration. This is most important when there is a failure; it prevents the loss of any settings.

1. What do you understand by a trigger concerning a pipeline?

* A trigger is something that defines when and how the pipelines should be executed. There may be several triggers like a pull request trigger that is used to deploy a pull request, or there may be a stage trigger that is used in configuring how each stage in the release will be triggered.

1. What are the three security mechanisms Jenkins uses to authenticate users?

* The three mechanisms are as follows:

Jenkins uses an internal database to store user data and credentials.

Jenkins can use a lightweight Directory Access Protocol (LDAP) server to authenticate users.

We can configure Jenkins to employ the application server's authentication mechanism upon which we deploy it.

1. Tell me the shell scripts used in Jenkins ?

* For shell scripts in job’s configuration build block we need to add step shell execute than we can use shell scripts in that, for example:-

#!/bin/bash

echo "hello, today is $(date)" > /tmp/jenkins\_test

1. What is global credentials and how to makes the passwords?

* Global credentials are manually entered login methods stored in Jenkins. Anyone with access can use the credentials to connect to other services. These can include: Code repos, like GitHub or Bitbucket.

in global credentials we can add specify the credential’s Username and Password in their respective fields.

1. What is SonarQube and how you define the thresholds

* SonarQube is an Open Source tool for continuous inspection of code quality. SonarQube has a collection of rules to analyze your source code at compile time to identify potential vulnerabilities, bugs, anti-patterns, refactoring and poor coding practices.