CI/CD (Jenkins)

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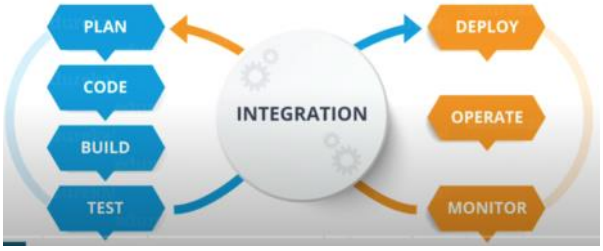
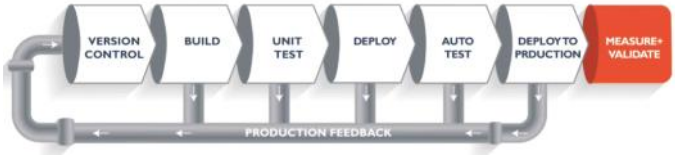
What is DevOps?

DevOps is a software development approach which involves Continuous Development, Continuous testing, Continuous Integration, Continuous Deployment and Continuous Monitoring throughout its development lifecycle.

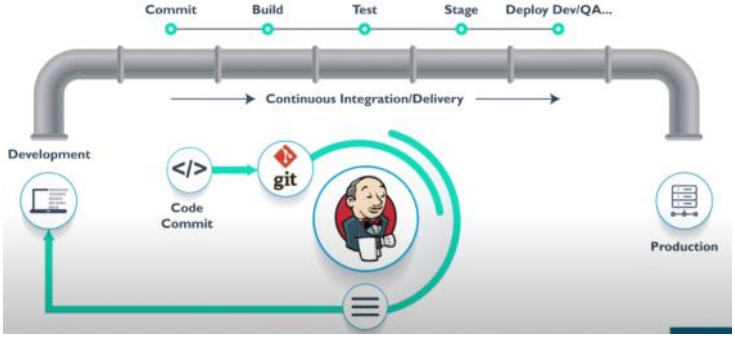


What is CI and CD?
Pipeline is a logical step or a series of steps which define how software development lifecycle occurs



Integration means putting all the code together from all the contributing developers and then merging the code and building it as whole.
We call it **continuous integration** because everything happens in DevOps continuously.

Jenkins - The ultimate CI Tool :
Jenkins is an open source automation tool written in Java with plugins built for Continuous Integration purpose. Plugins allows integration of various DevOps stages.



Jenkins is a tool for continuous integration, Jenkins role is only till the application is packaged, now if it has to be delivered then we need some tools to deliver that product.
Once the product/software moves on to the staging server to deploy it, we need tools like **docker**.

What is Docker :

- Docker file builds a Docker image and that image contains all the project's code
- We can run that image to create as many docker containers as we want
- Then this Image can be uploaded on Docker hub, from Docker hub any one can pull the image and build a container

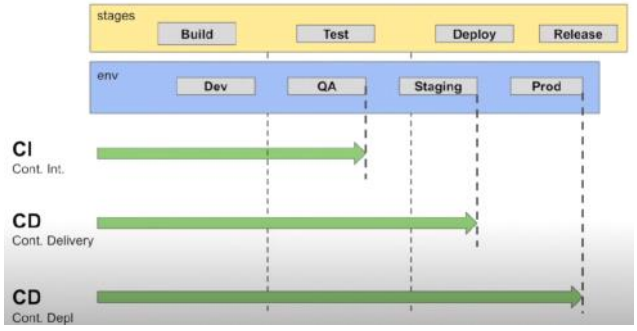
CI/CD, which stands for continuous integration (CI) and continuous delivery (CD)

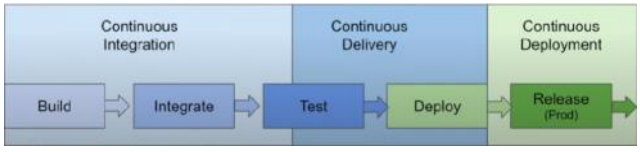
CI - Continuous Integration :
A process where team members integrate their work continuously in a shared repository.
Best achieved using some SCM tools like GIT.
Can be daily or as needed Every integration or check-in in the repo is validated by automated build, automated by unit or integration tests

CD - Continuous Delivery :
After the CI process, Deploying on a Prod like env and running automation tests to ensure the build is ready for release.
Ensure the build is always in a Deployment state.

Pre-prod or staging environment: exactly same as prod env, to make sure anything not crash in prod env, first deploy change in pre-prod/staging env.

CD - Continuous Deployment :
Automated Deployment to Prod. Every change that passes through Automation Tests is deployed to Production





Project or Job :

- A user-configured description of the work that Jenkins will manage
- Job and project used interchangeably

Plugins :

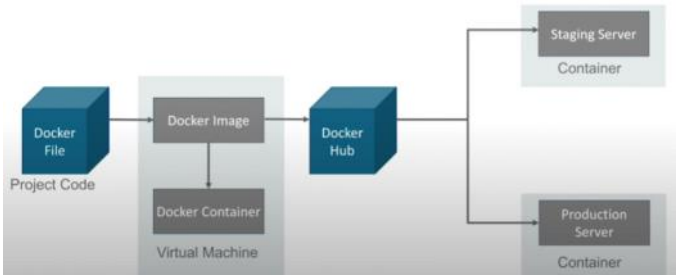
- A software package that extends Jenkins' core functionality

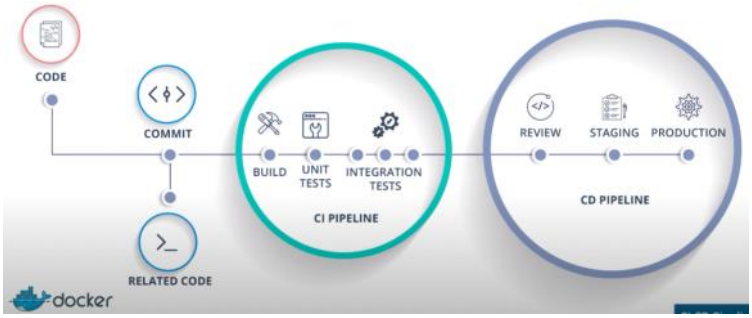
Installing Jenkins on Windows :
https://github.com/LinkedInLearning/learning-jenkins-3003221/tree/01_02
Need to install Java (OpenJDK), Git, before installing Jenkins.

References :
https://www.linkedin.com/learning/learning-jenkins-14423877
https://github.com/LinkedInLearning/learning-jenkins-3003221
https://github.com/managedkaos/apache-maven-hello-world
https://www.jenkins.io

Artifacts :

- Most jenkings jobs will generate some sort of products at the end of each build.
- It can be compiled executable like and .exe, an archive like a jar file or it might even be a report in the text file.





For Creating Pipeline in Jenkins we can have 3 jobs,

- To build the project
- To test the project
- To deploy the project

Reference :
CI CD Pipeline Using Jenkins | Continuous Integration and Deployment | DevOps Tutorial | Edureka

Views and Folder :

Views :

- Views provide a way of associating jobs on the dashboard and displaying them together.
- Views display jobs that meet a criteria
- Views are like a filter
- If we delete a view, all content inside will remain as it is.

Folders :

- Folders allow us to create structures that are very similar to file systems on a disk.
- Folders group things together
- Folders contain jobs, views, and other folders
- Folders provide a namespace that is separate from other folders in jenkins
- If we delete a folder, all content inside will also got deleted.

Pipelines :

Pipeline :

- Jenkins also allows us to configure jobs as code (instead of Jenkins user interface).
- These types of jobs are called pipelines.
- Stored in a file named Jenkinsfile
- Can be versioned in a code repository
- Configure Jenkins jobs
- Contain stages and steps

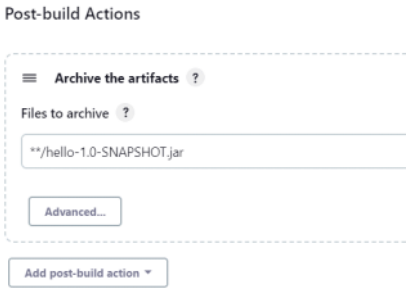
Pipeline stages :

- Stages are sections of the pipeline

```
pipeline {
    stages{
        stage ('Build') {
            Steps {
                Echo "Checking out code..."
            }
            Steps {
                Echo "Compiling code..."
            }
        }
        stage ('Test') {
        }
        stage ('Deploy') {
        }
    }
}
```

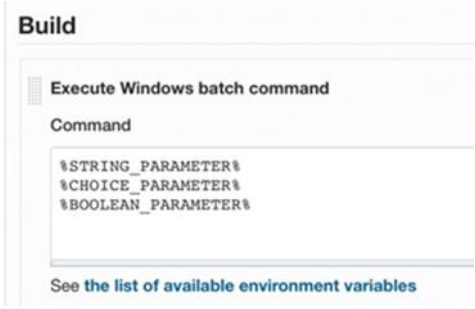
- Each stage must have a step, like build stage can have pull code from git
- Steps are the actions to take

- Most jenkings jobs will generate some sort of products at the end of each build.
- It can be compiled executable like and .exe, an archive like a jar file or it might even be a report in the text file.
- These products are referred to as artifacts.



** - this tells jenkins to search for the file in the workspace without giving the exact path.

Parameters and environment variables :




```
@echo off
@echo ENVIRONMENT = %ENVIRONMENT%
```

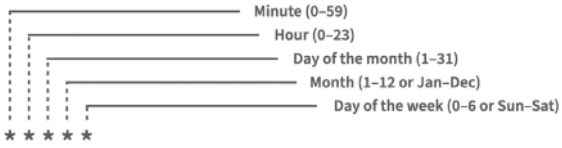
Scheduling Jobs :

- Updating software
- Monitoring system details
- Downloading and processing data

Similar to Cron :

- A time-based job scheduler in Unix-like operating systems
- Jenkins uses a format similar to cron for scheduling jobs
- Execution times are defined by an expression representing the schedule

Jenkins Scheduler Format :



Jenkins Scheduler Aliases :

- Use H for hashed values to spread out jobs around the desired time
- Use simple aliases for general times
  - @hourly
  - @daily
  - @midnight (To run any time after 12AM and before 3AM)
  - @weekly
  - @annualy

Time Zones :

- Time zones are relative to the server
- Many servers use the Universal Time, UTC time zone
  - If our Local time and the server time are different, make sure we account for that in our schedule.
- Plan your schedule accordingly