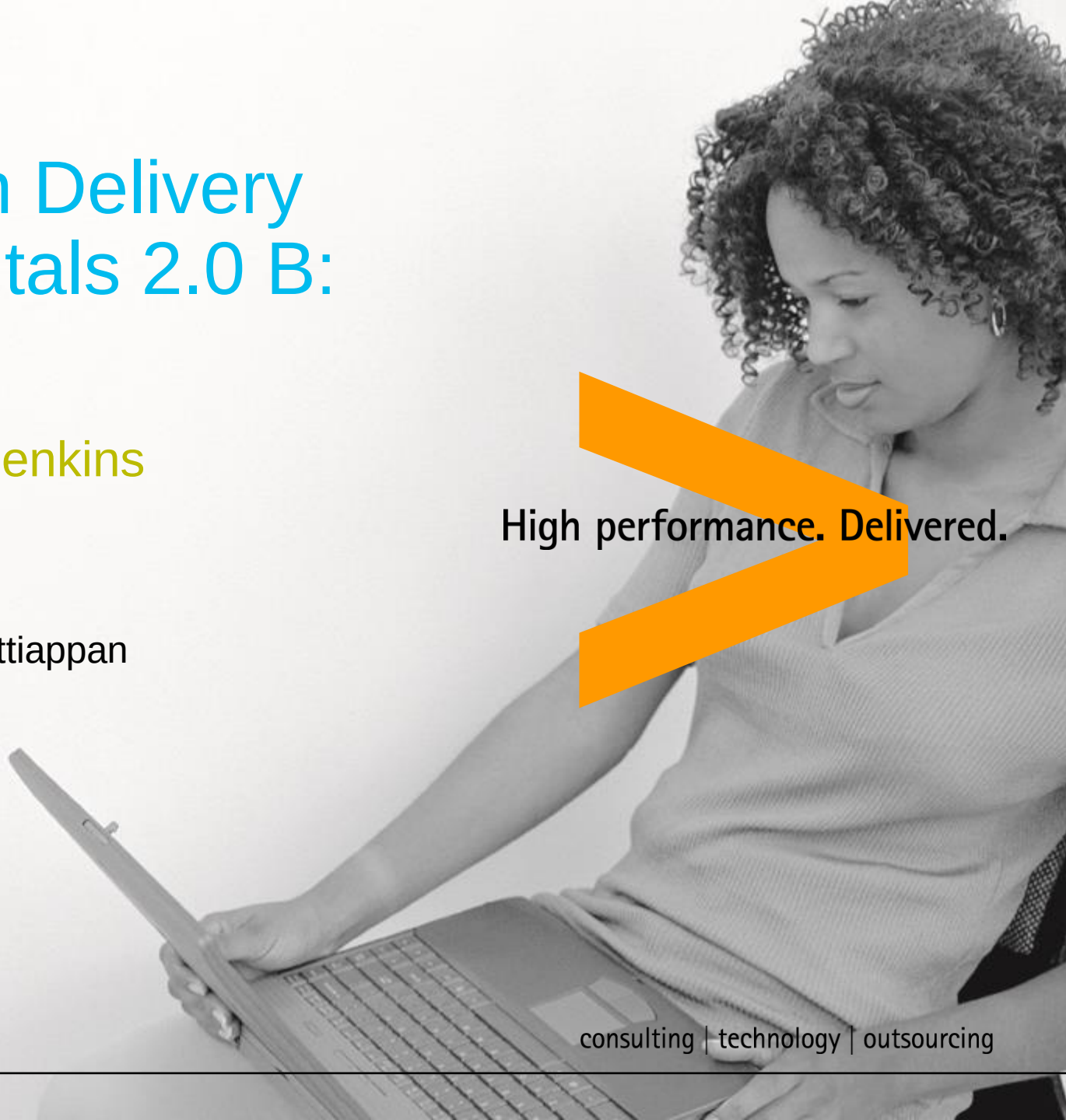
Application Delivery Fundamentals 2.0 B: Java

Introduction to Jenkins



Parameswari Ettiappan

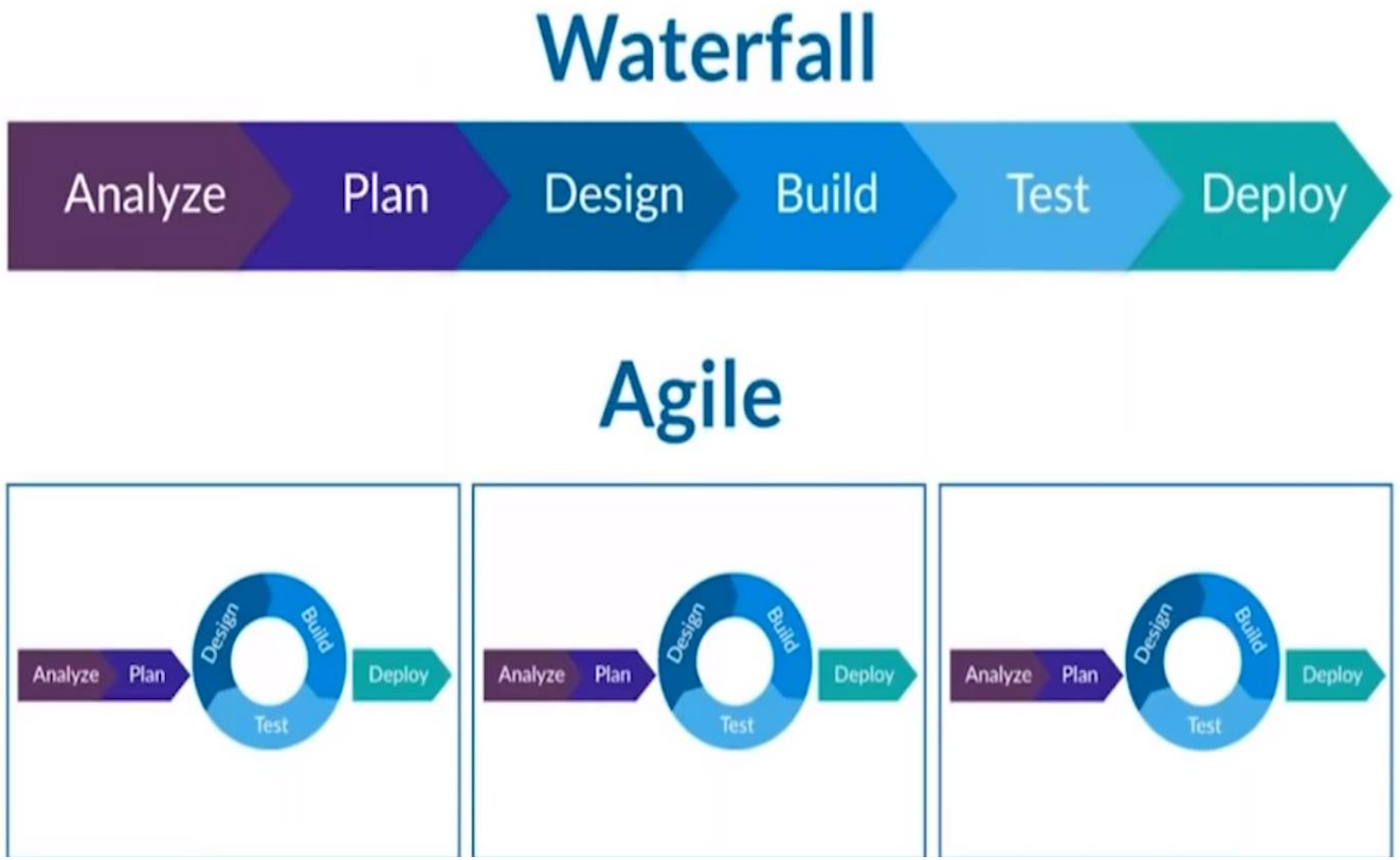
Goals

- Devops
- CI/CD Pipeline
- Maven Build
- Docker Build
- Docker Run
- Jenkins Pipeline
- Sonar Qube

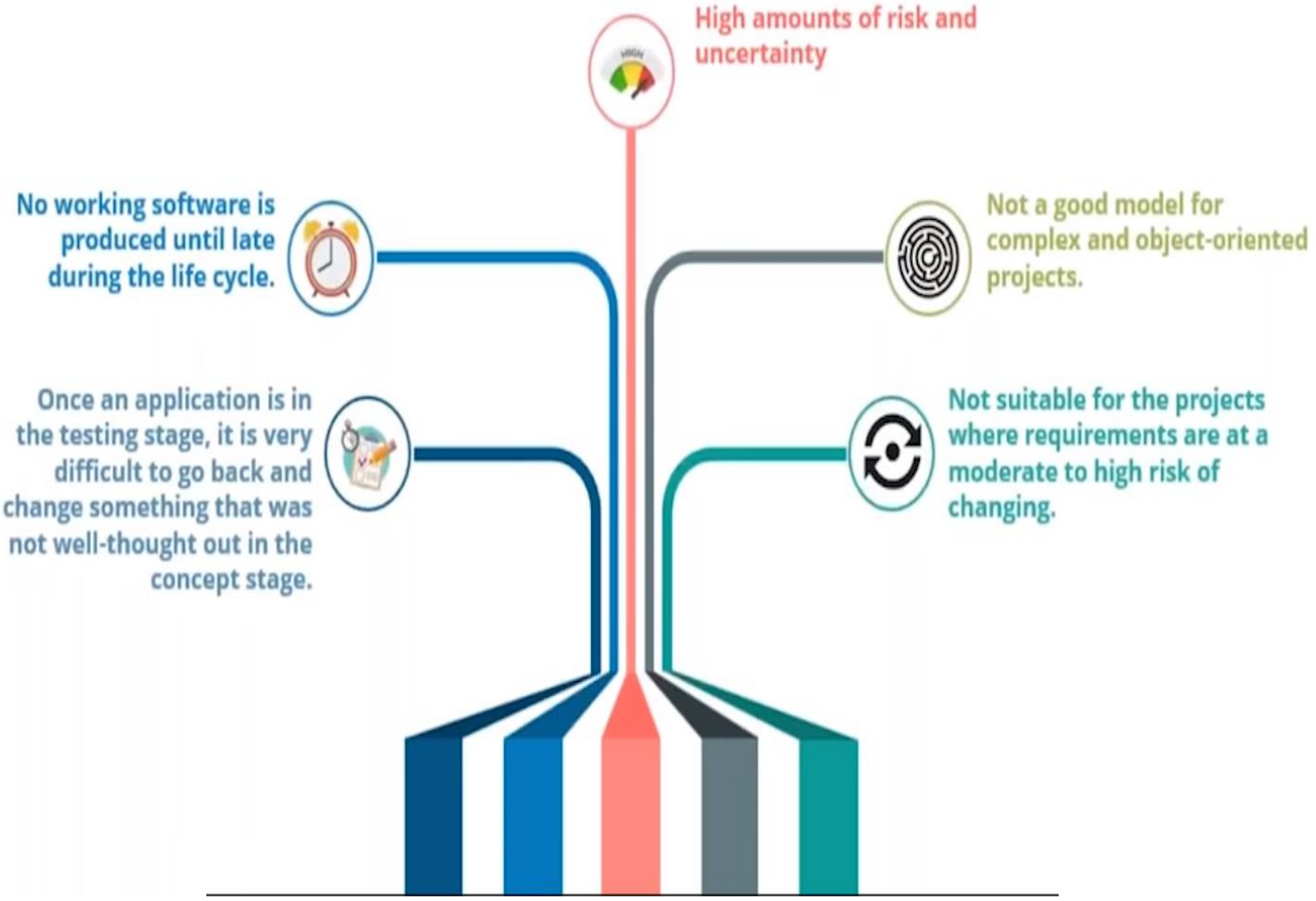
Software Requirements

- Minimum java 8
- STS 4
- maven 3.6
- jenkins 2 or more
- sonar qube 6.6
- github/gitlab
- Docker desktop wsl2

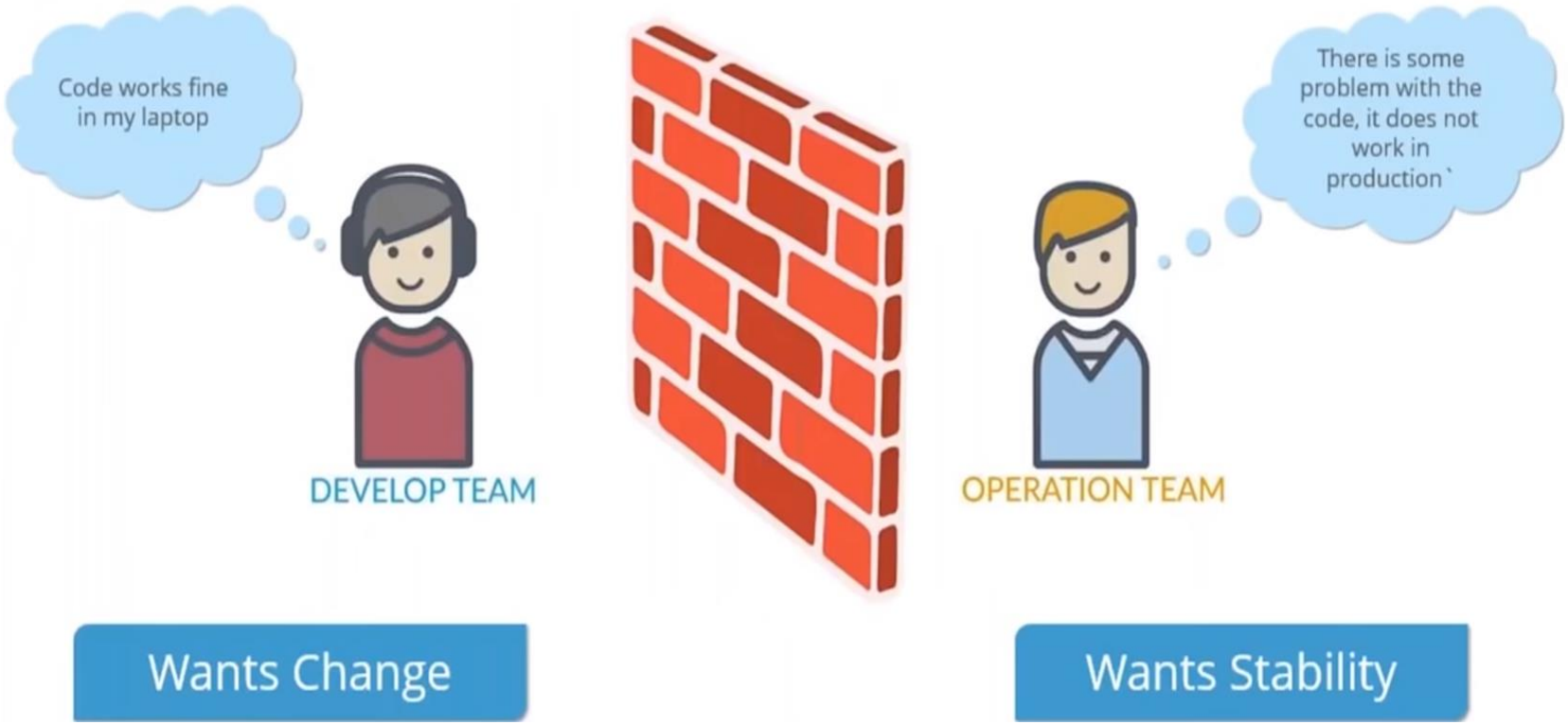
Water Fall Model vs Agile



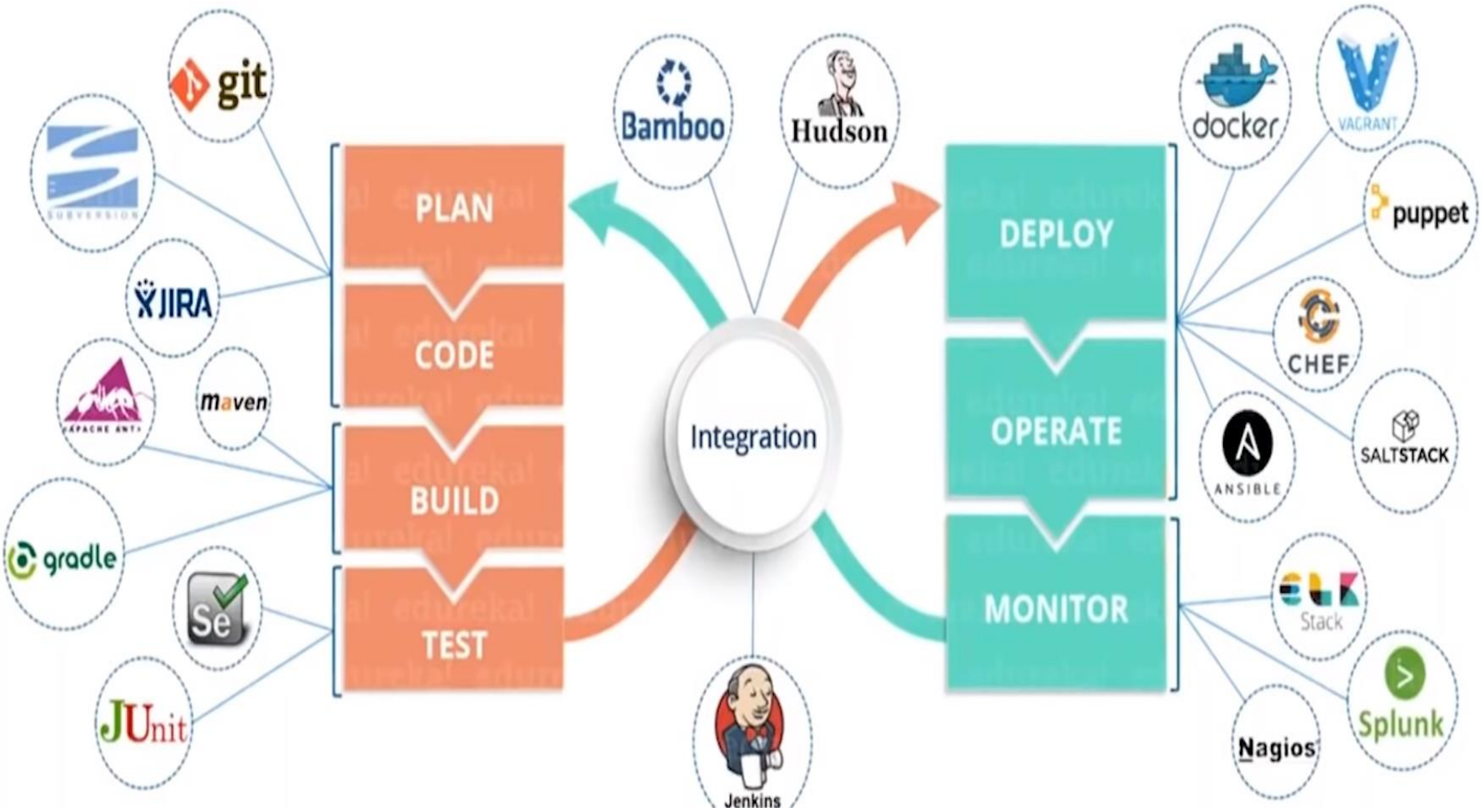
Limitations of Waterfall Model



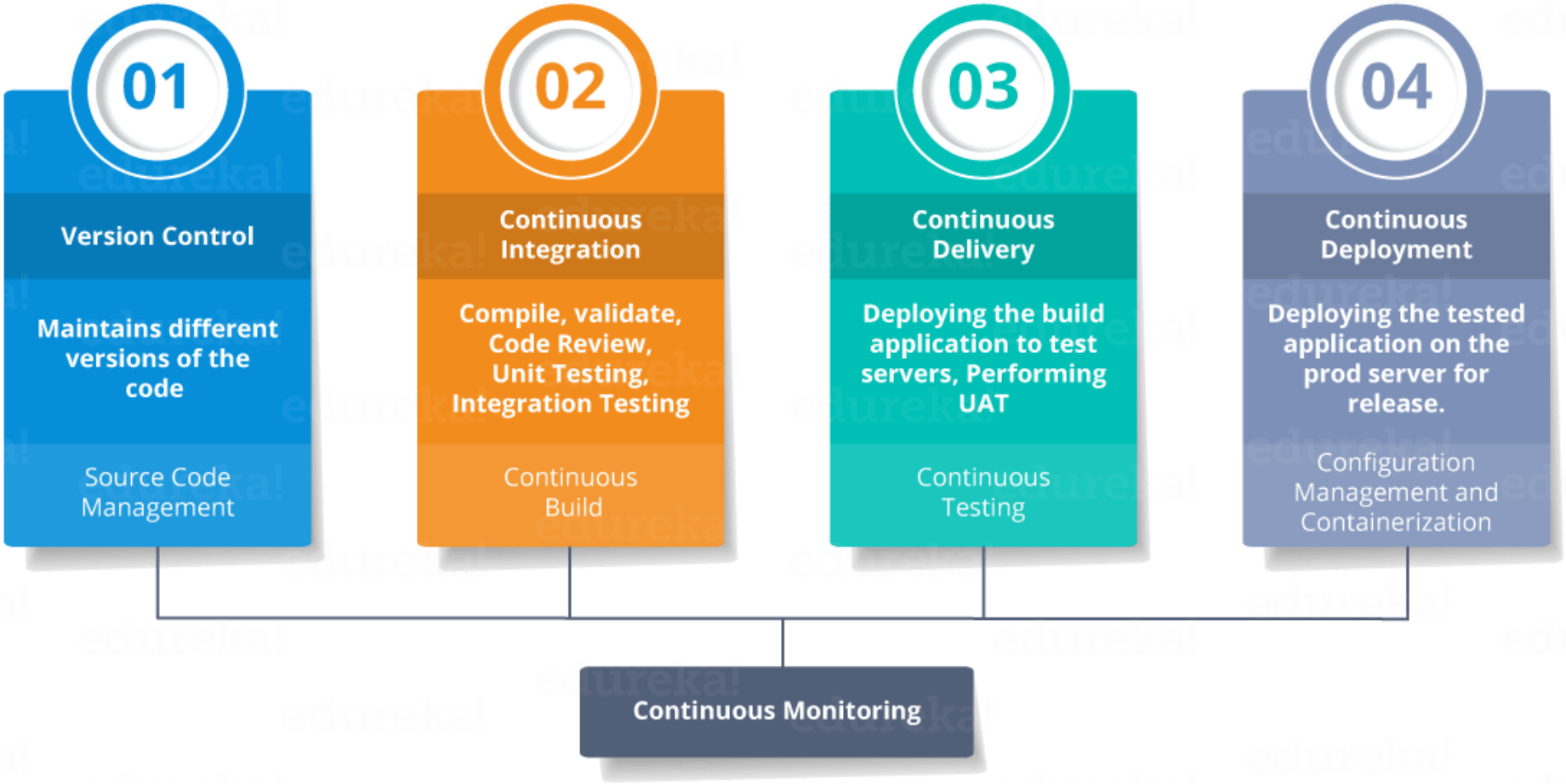
Limitations of Agile



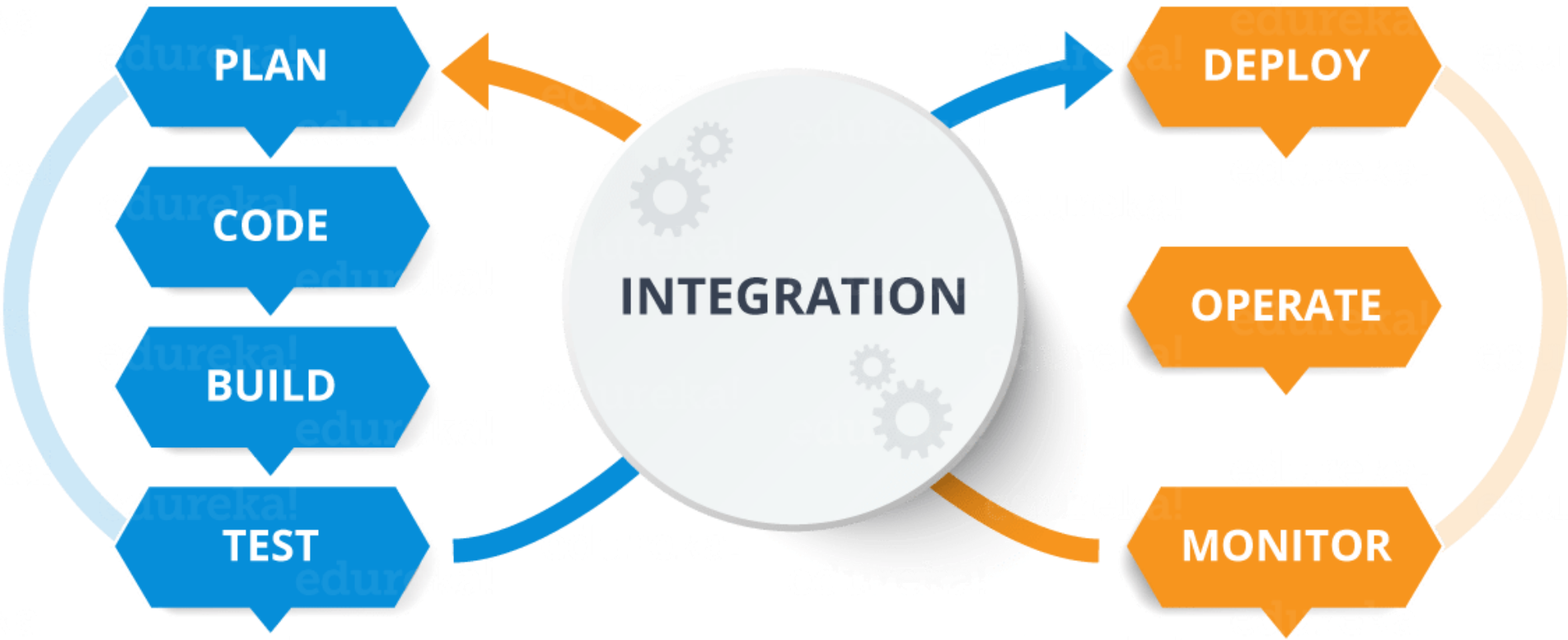
What is Devops



CI/CD Pipeline

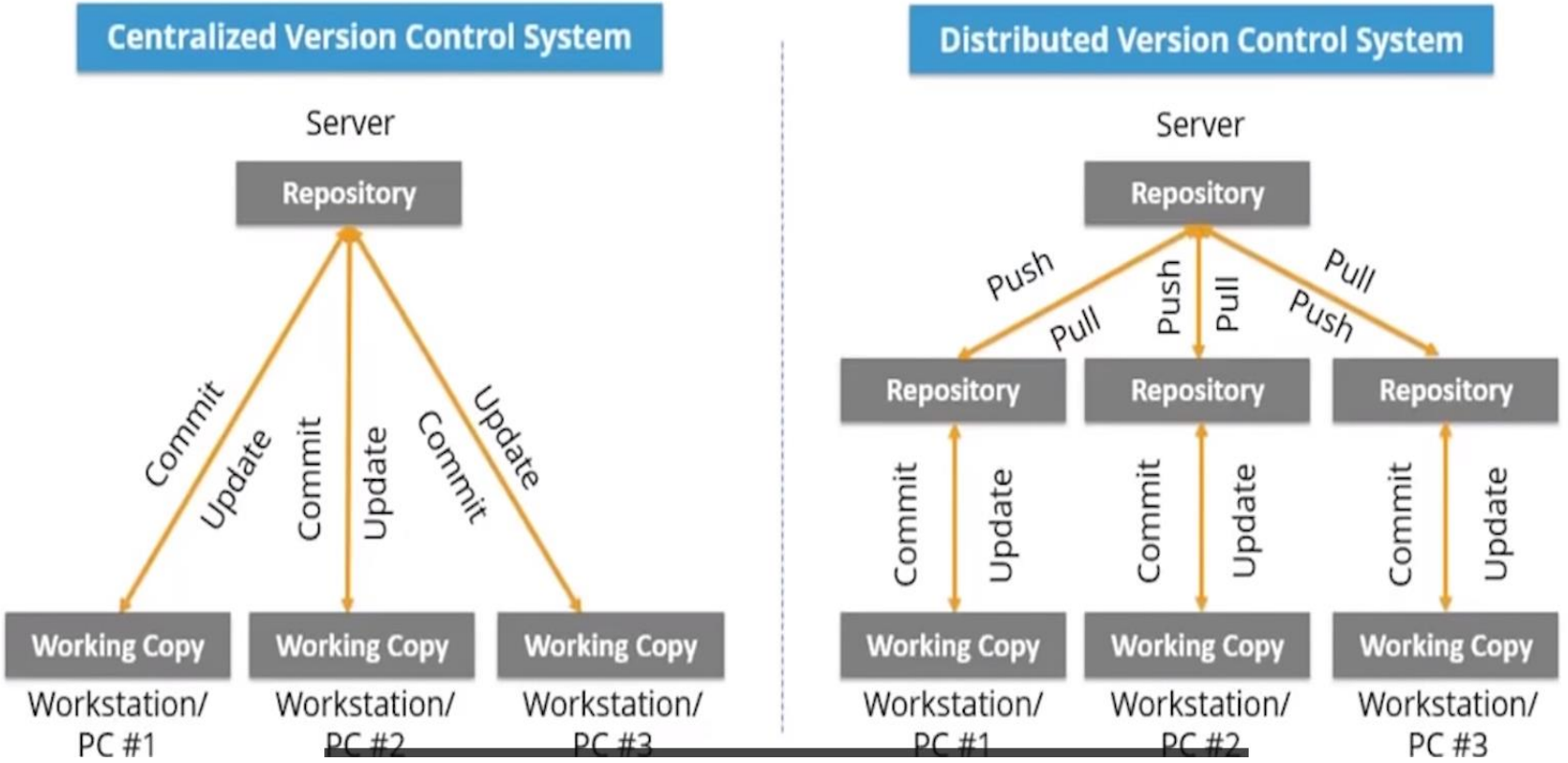


CI/CD Pipeline



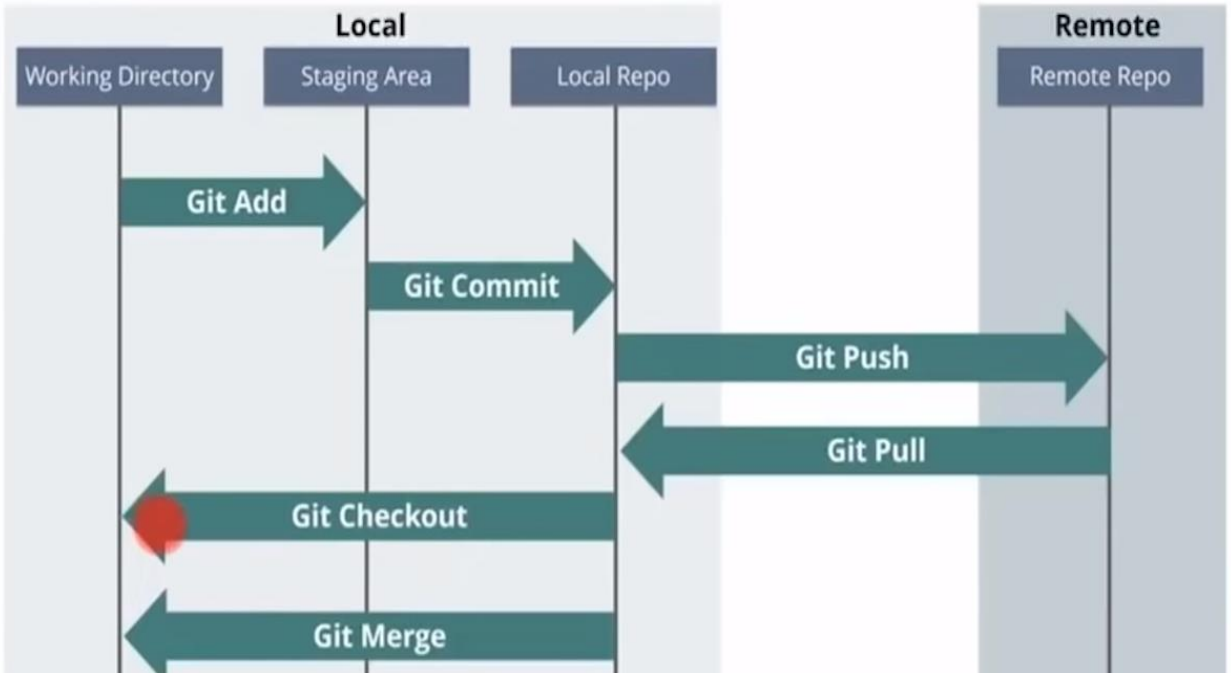
Source Code Management

The management of changes to documents, computer programs, large websites and other collection of information

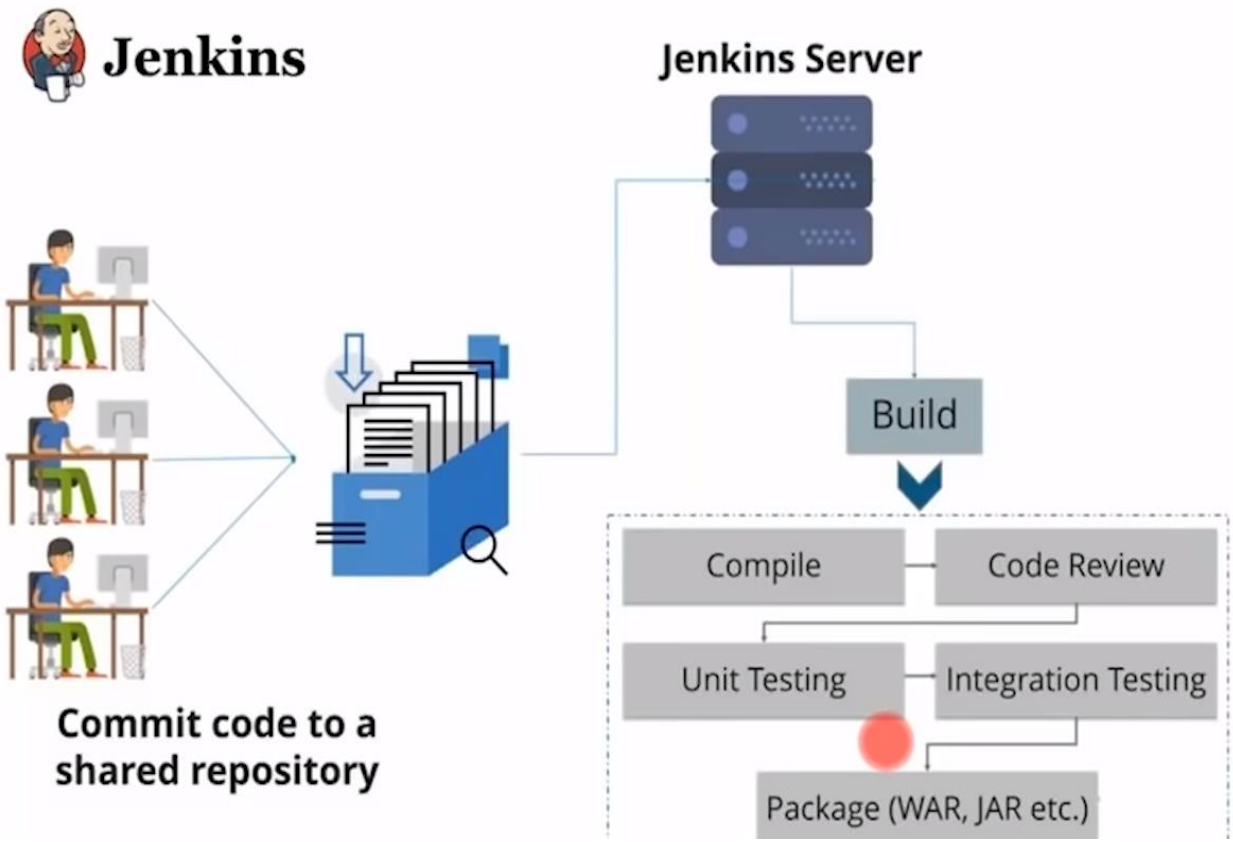


Source Code Management

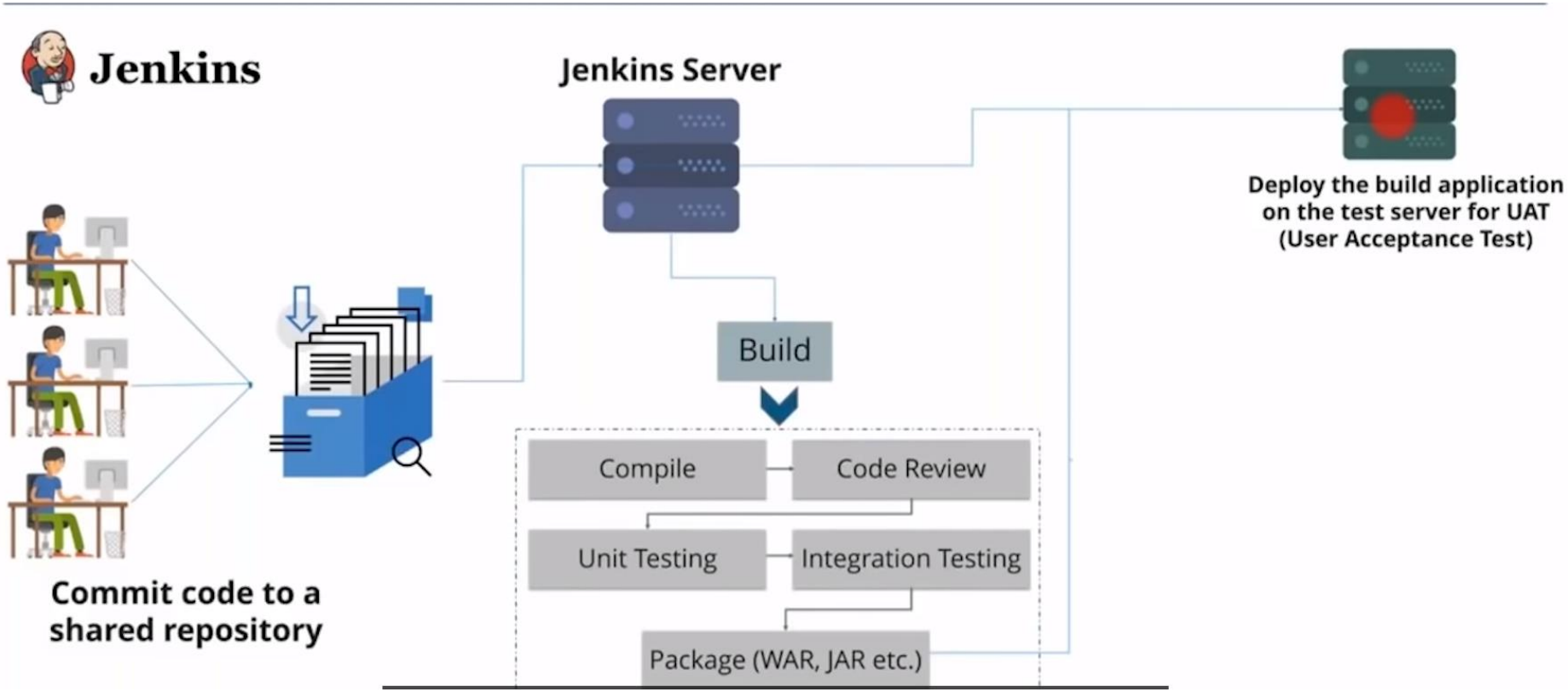
Git is a Distributed Version Control tool that supports distributed non-linear workflows by providing data assurance for developing quality software



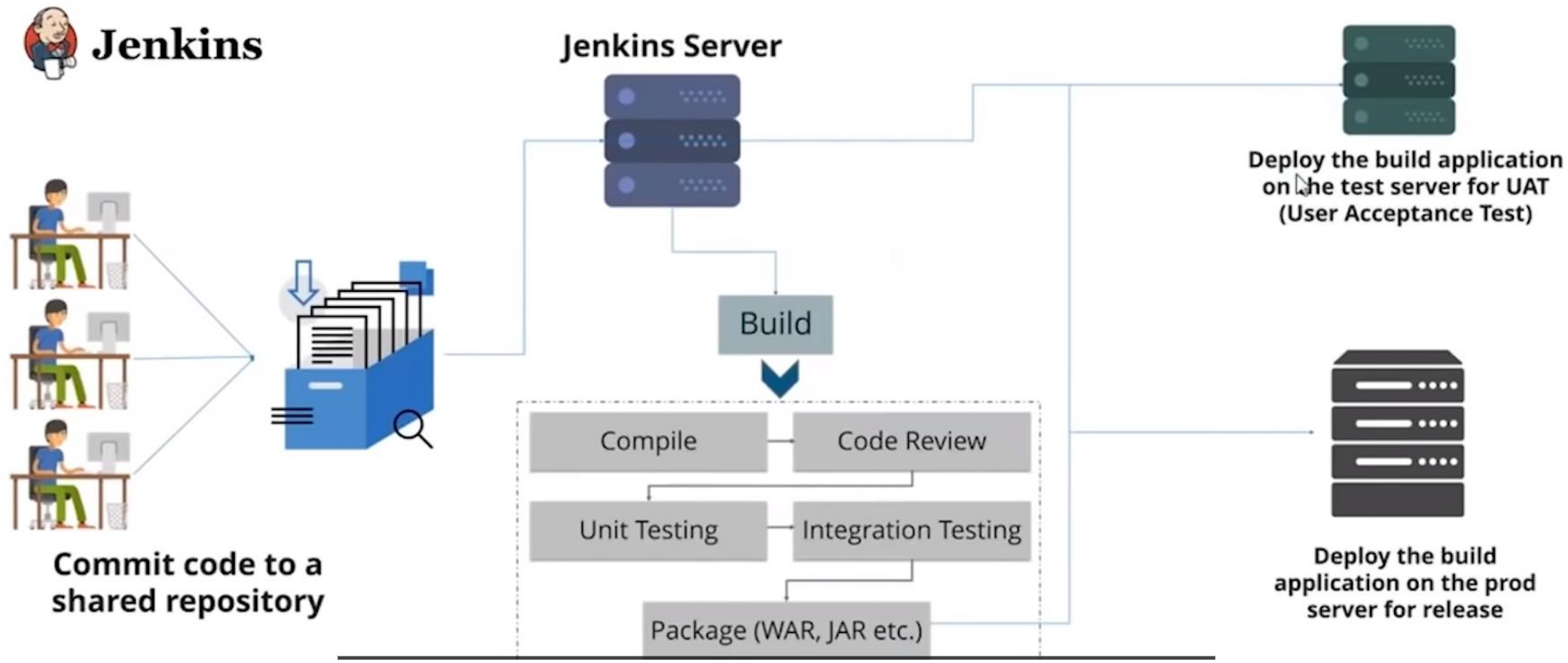
Continuous Integration



Continuous Delivery



Continuous Deployment

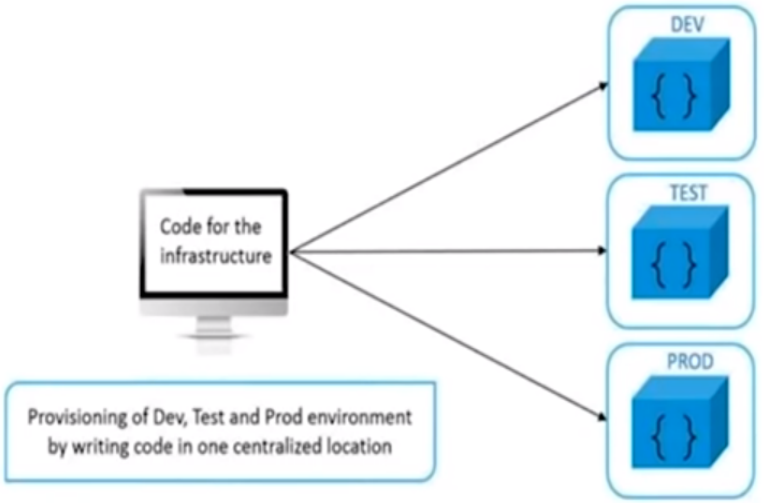


Configuration Management

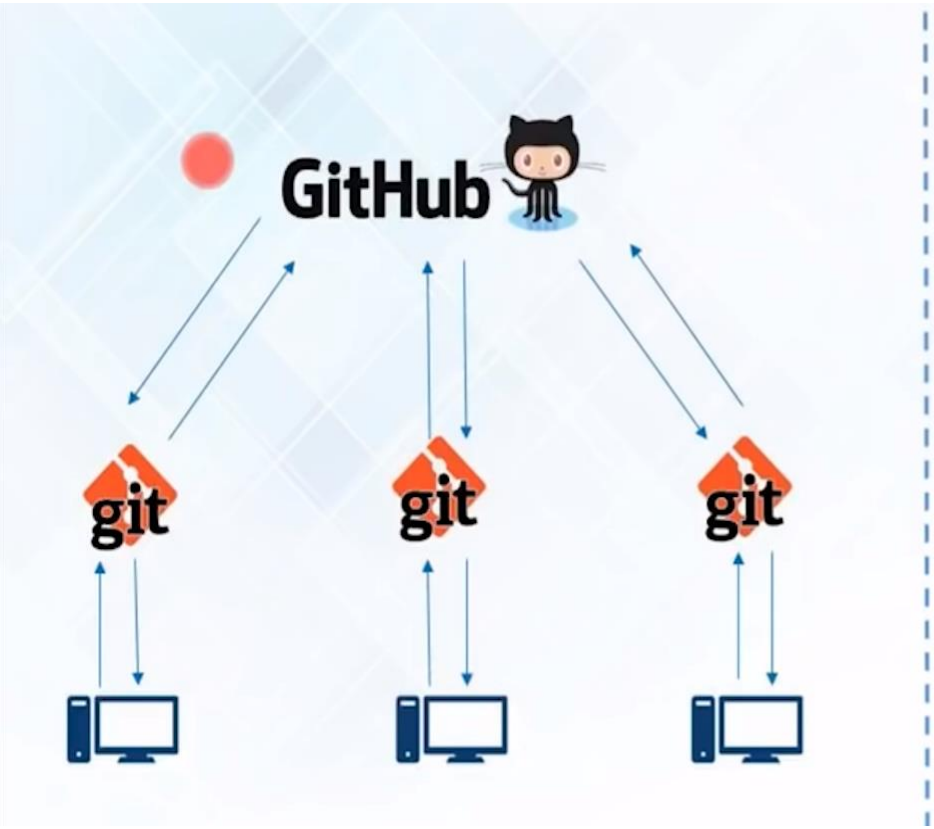
Configuration Management is the practice of handling changes systematically so that a system maintains its integrity over time

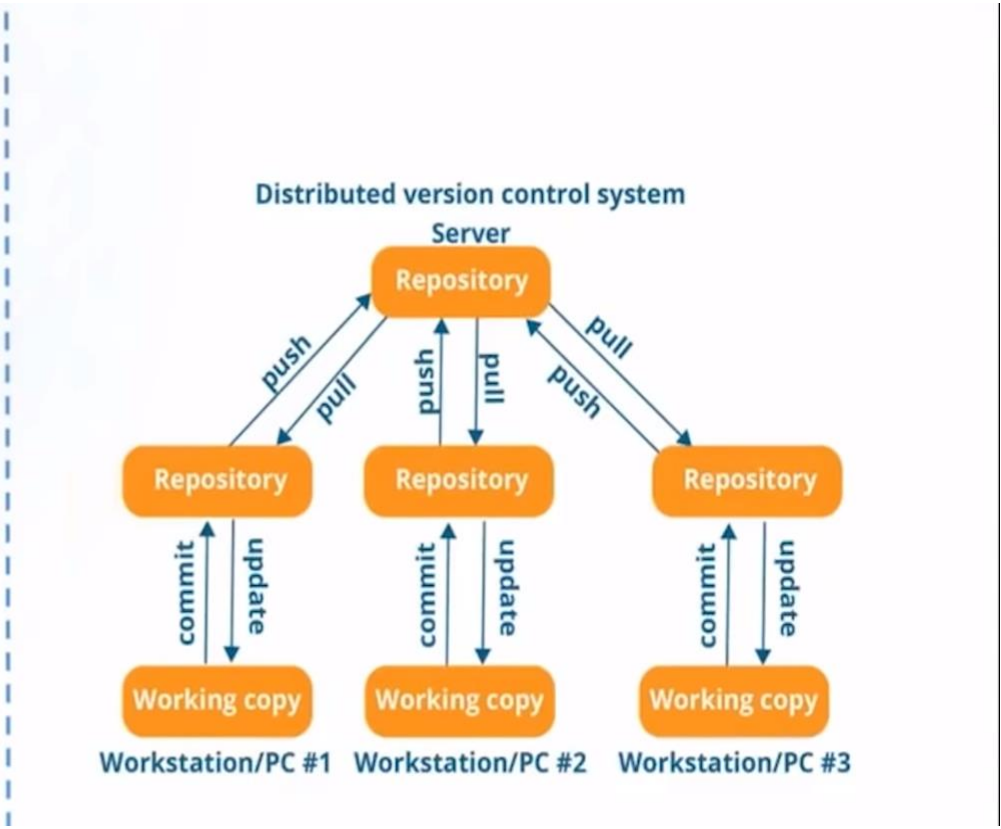
Configuration Management (CM) ensures that the current design and build state of the system is known, good & trusted

It doesn't rely on the tacit knowledge of the development team

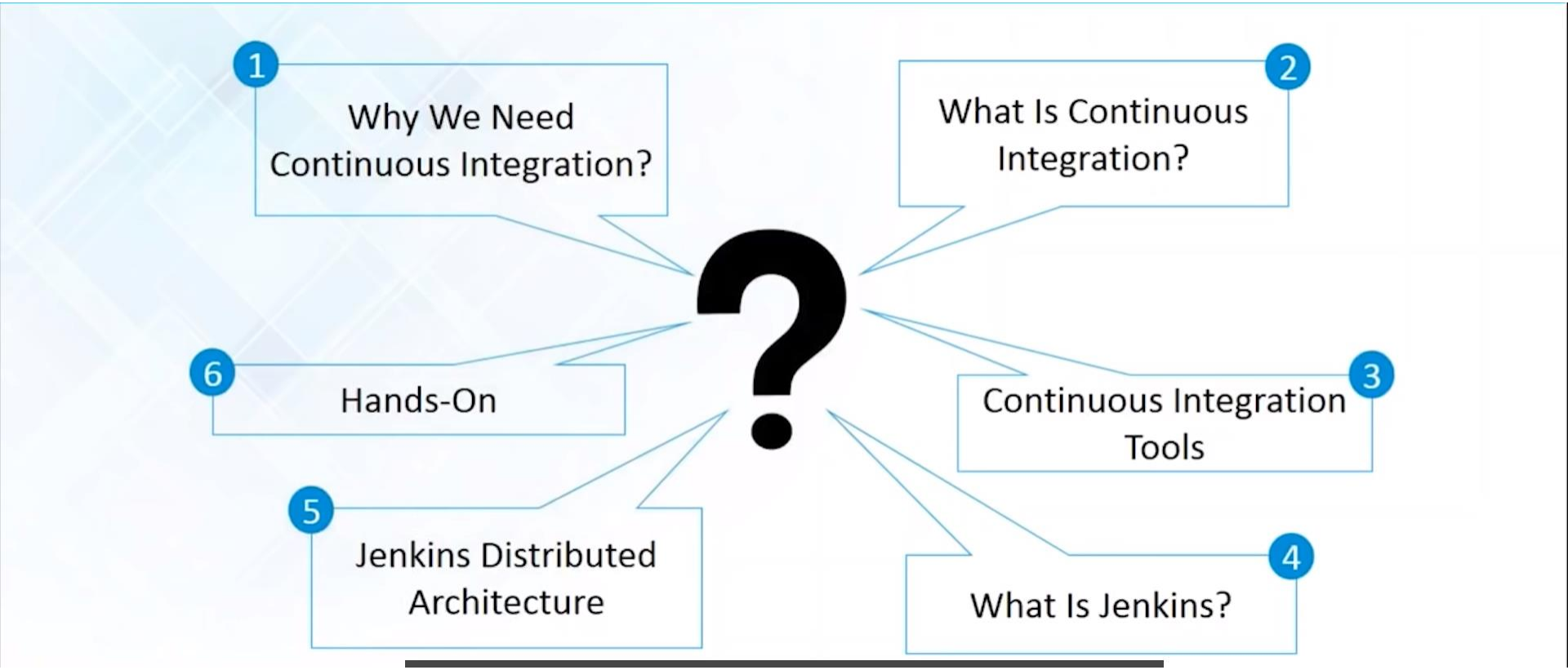


Git vs Github

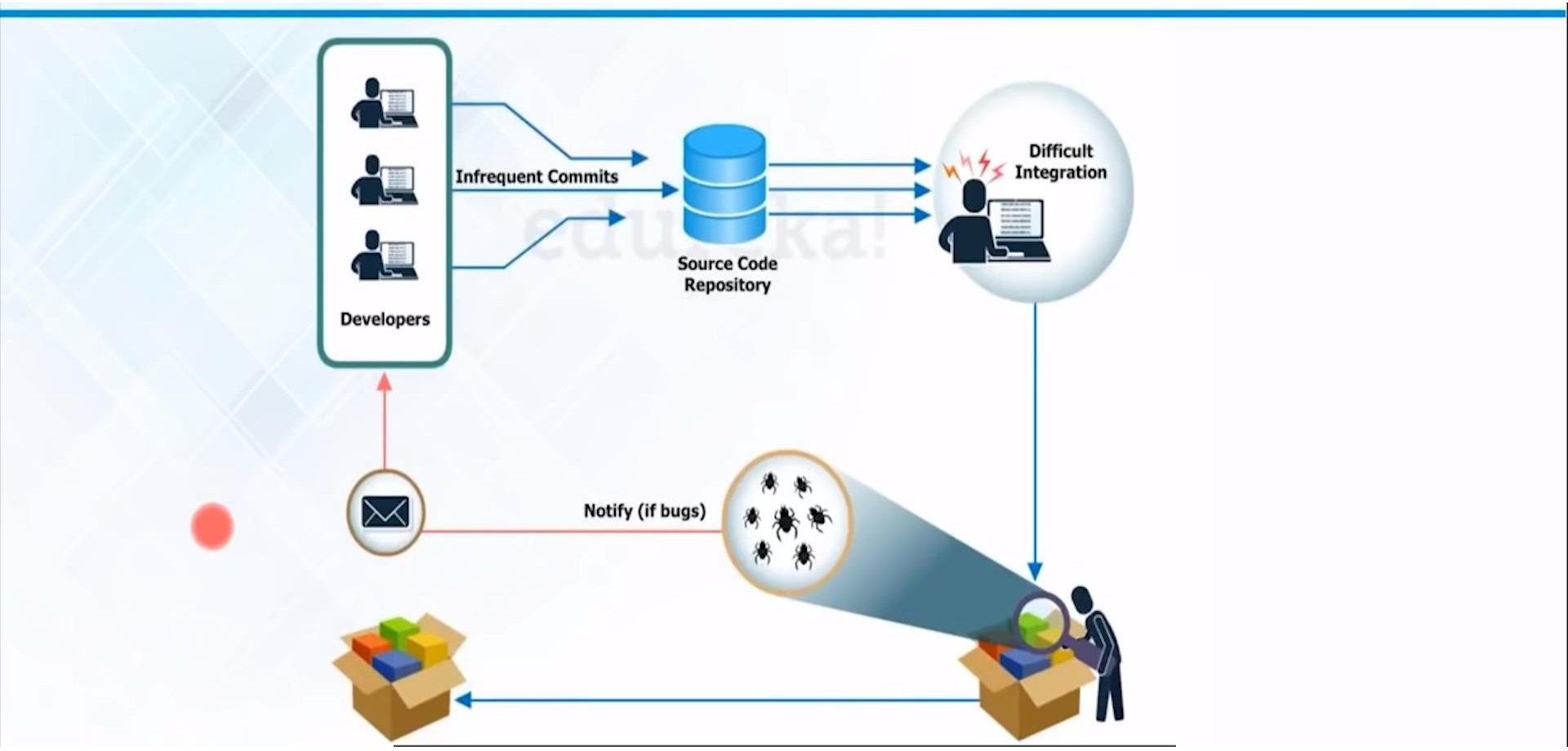




Why Continuous Integration?

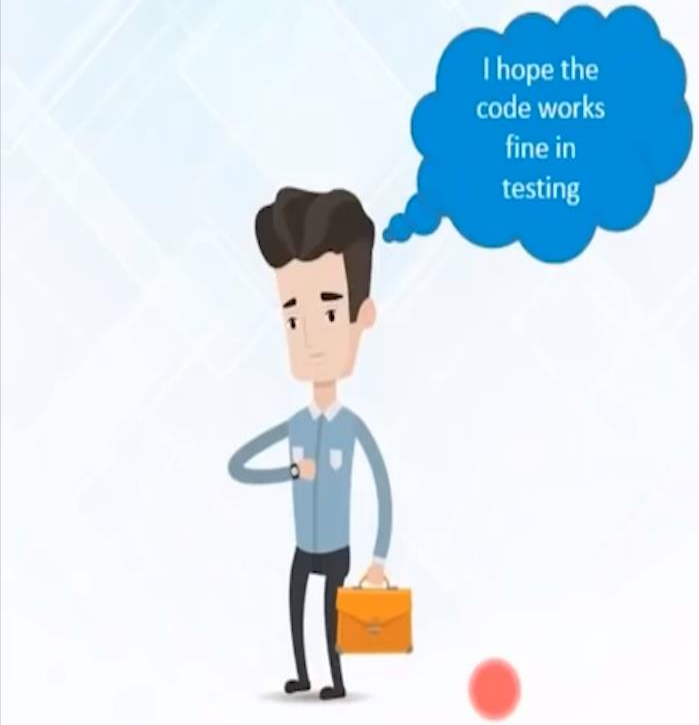


Process Before Continuous Integration?

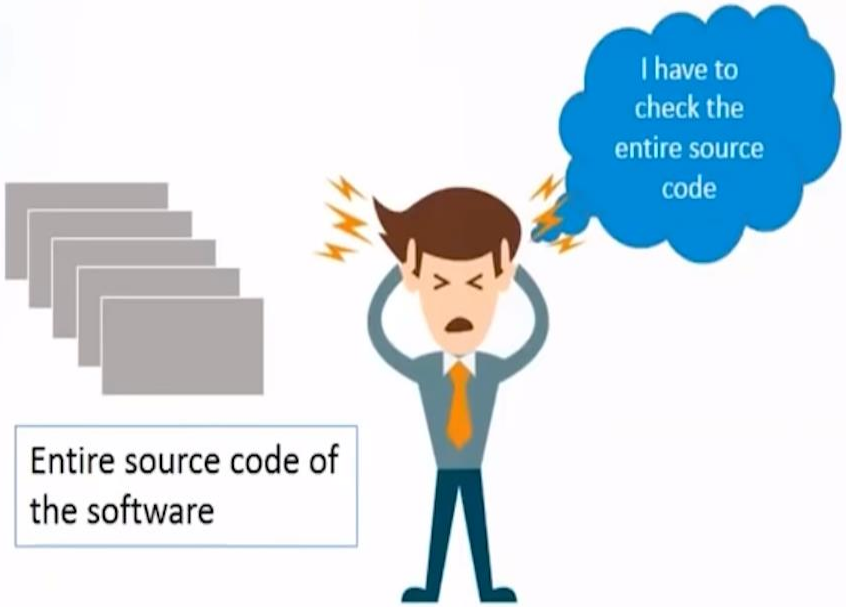


Process Before Continuous Integration?

Developers have to wait till the complete software is developed for the test results.

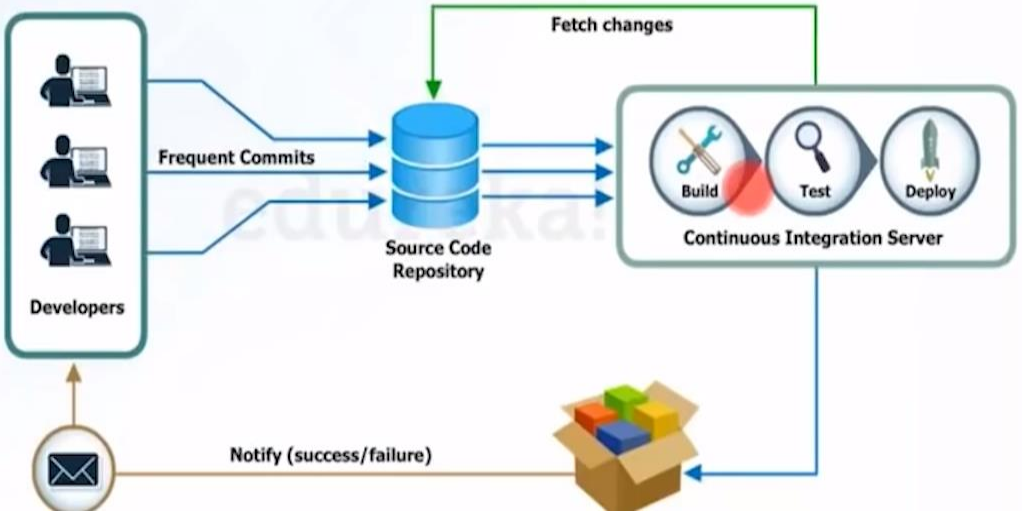


If the test fails then locating and fixing bugs is very difficult. Developers have to check the entire source code of the software.

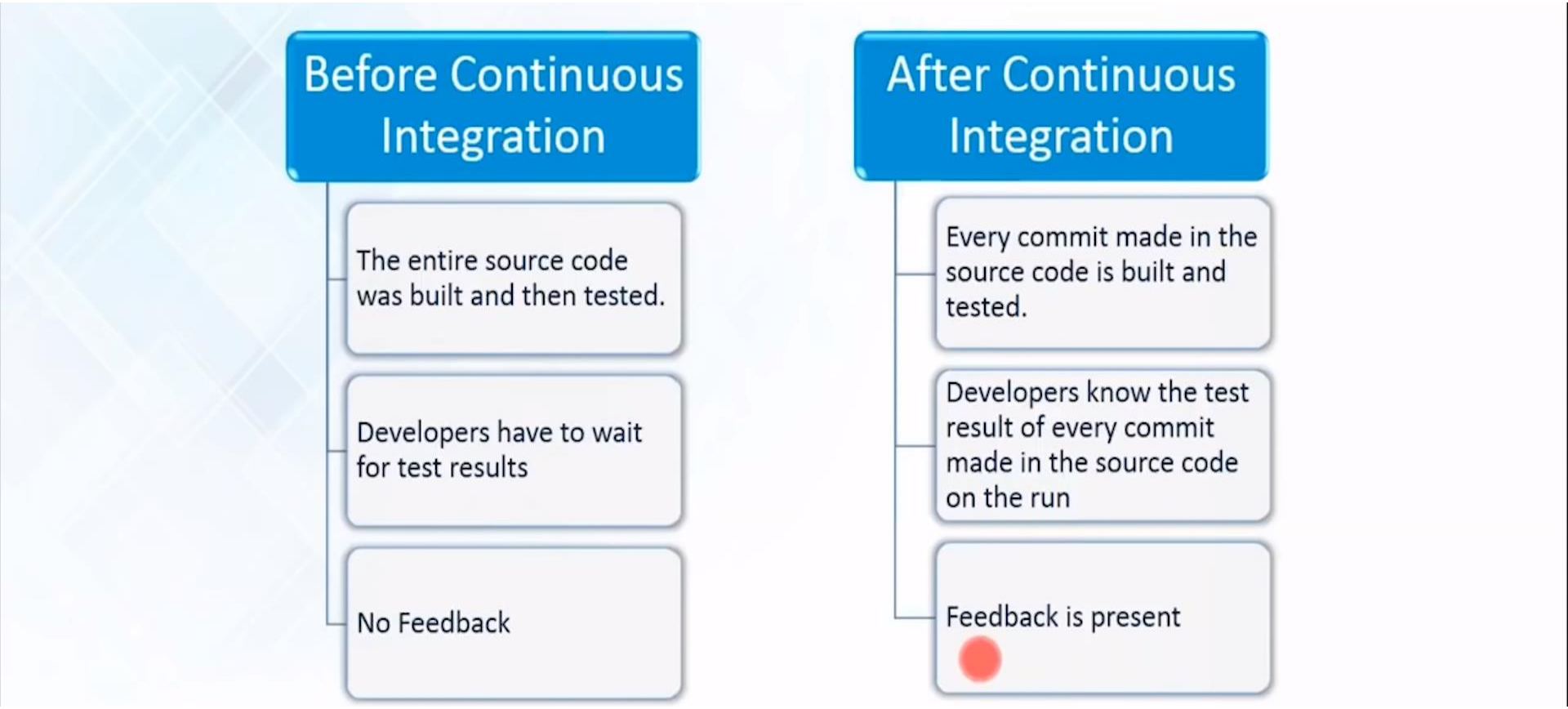


Continuous Integration To the Rescue

- Since after every commit to the source code an auto build is triggered and then it is automatically deployed on the test server
- If the test results shows that there is a bug in the code then the developers only have to check the last commit made to the source code
- This also increases the frequency of new software releases
- The concerned teams are always provided with the relevant feedback

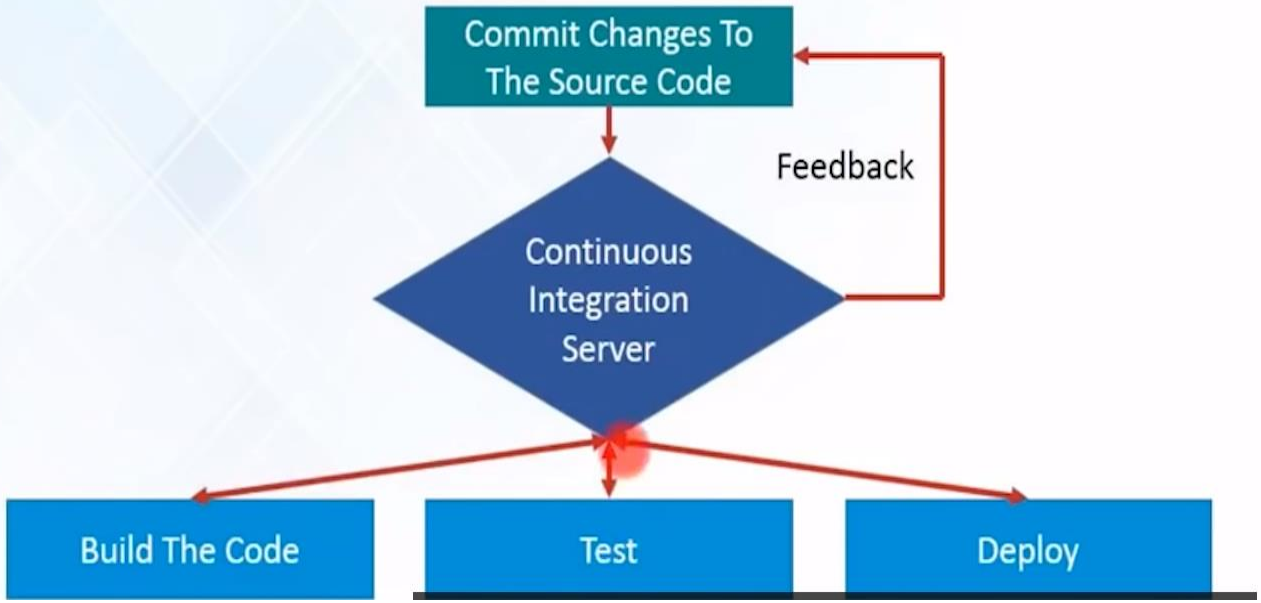


Continuous Integration To the Rescue



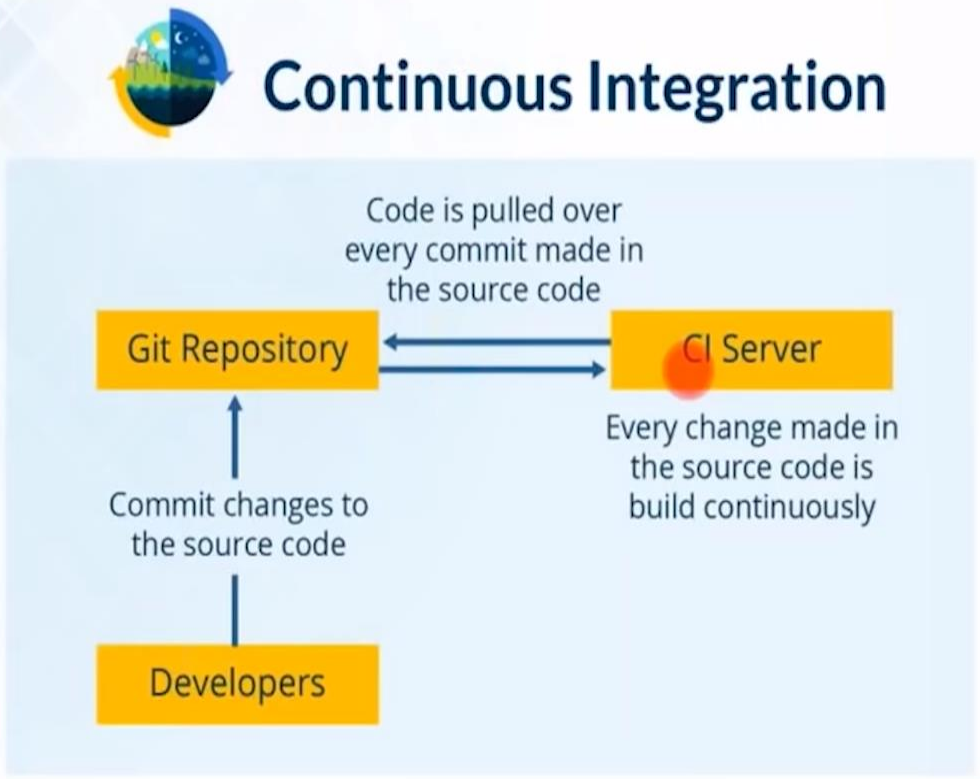
What is Continuous Integration

- Continuous Integration is a development practice in which the developers are required to commit changes to the source code in a shared repository several times a day or more frequently.
- Every commit made in the repository is then built. This allows the teams to detect the problems early.

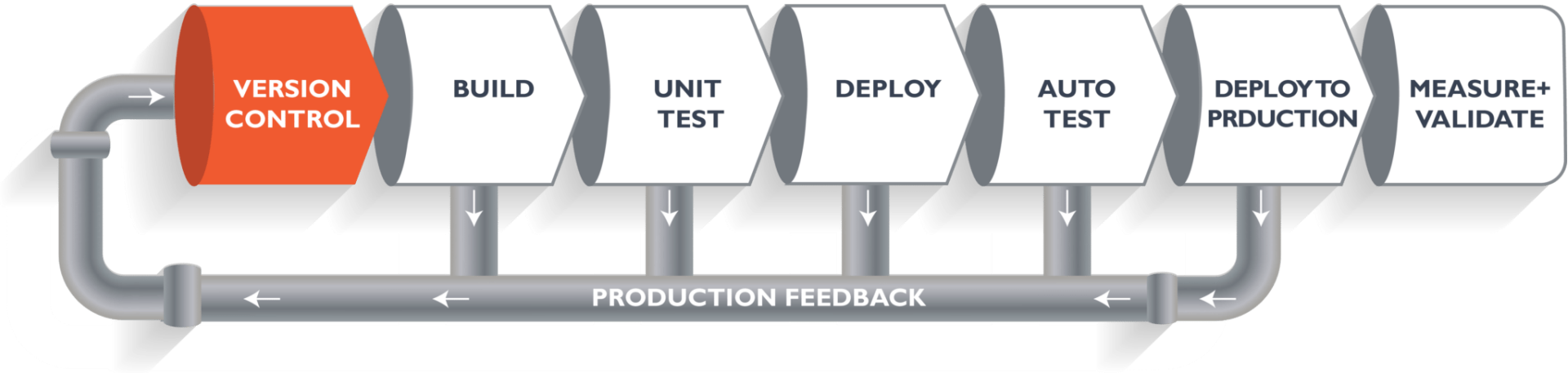


What is Continuous Integration Case Study : Nokia

Solution:



CI/CD Pipeline



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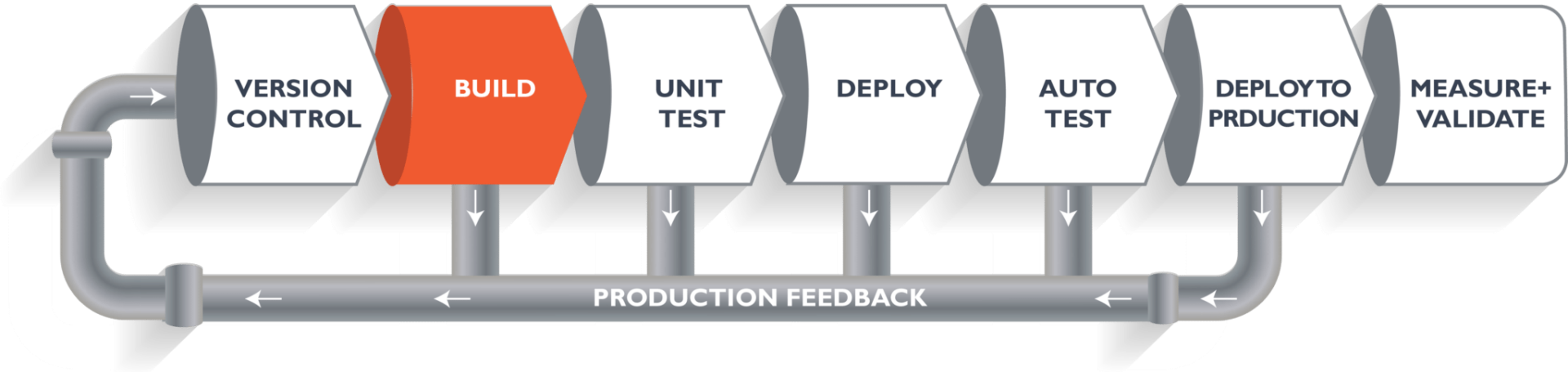

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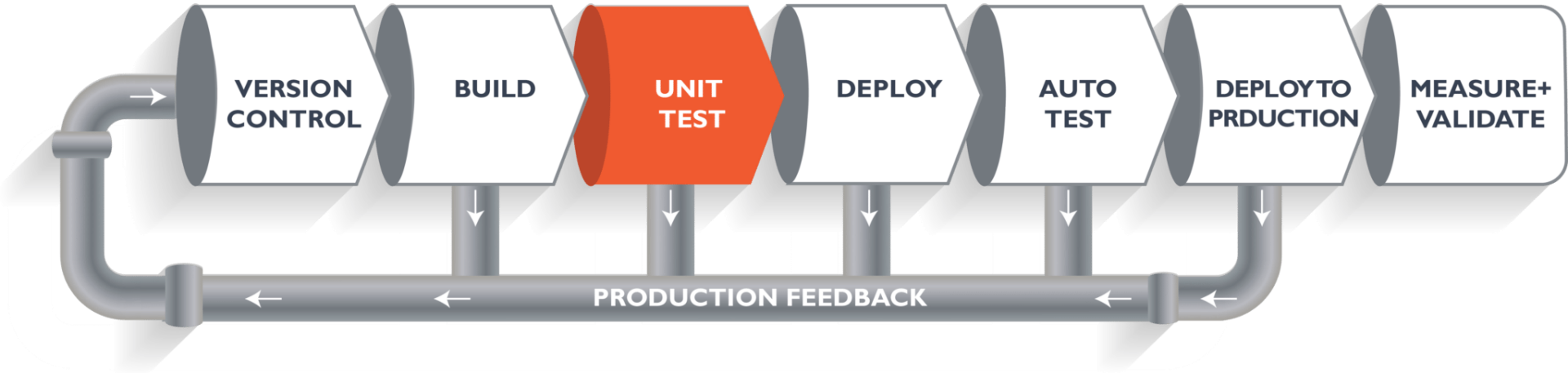

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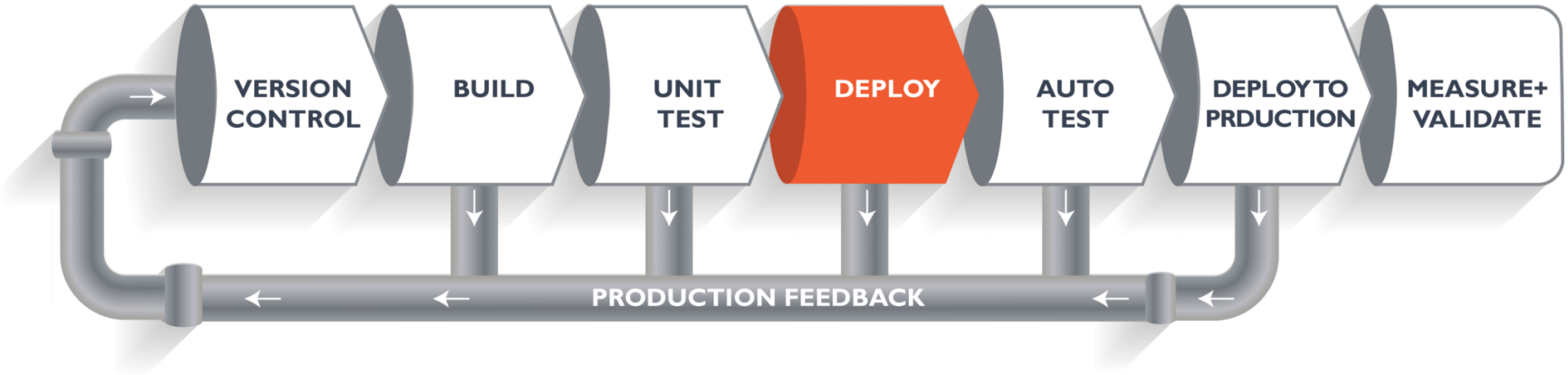

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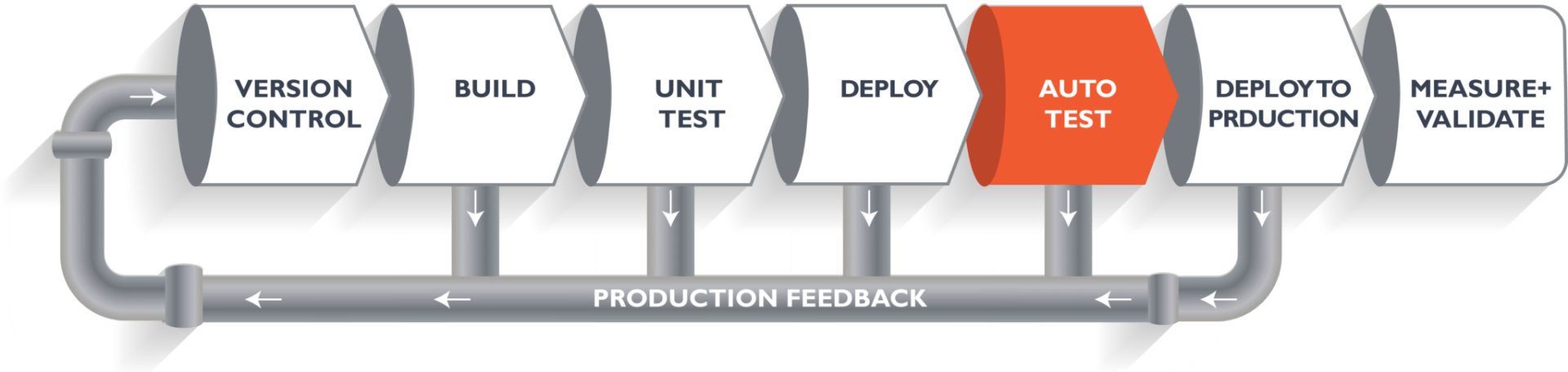

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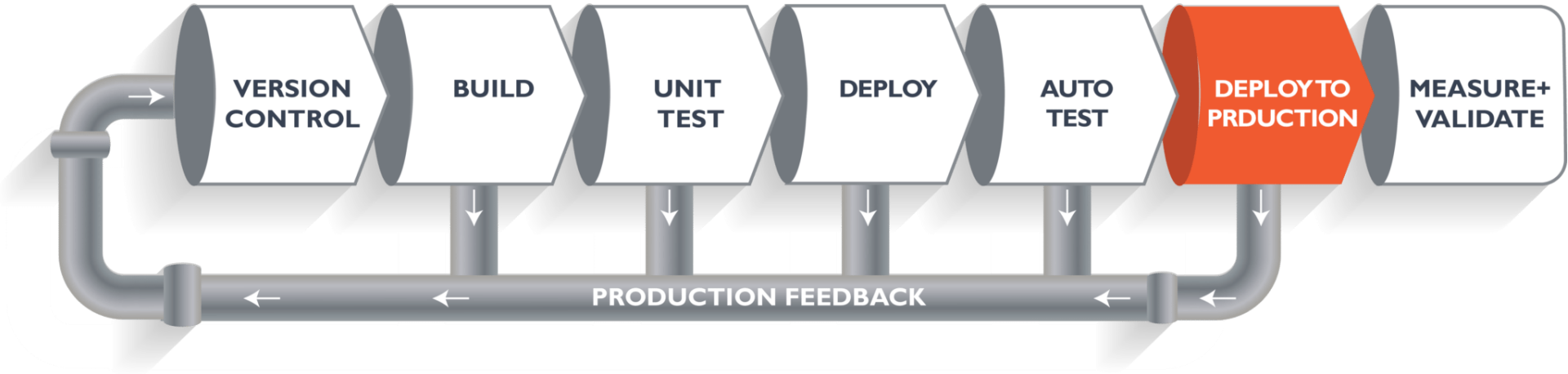

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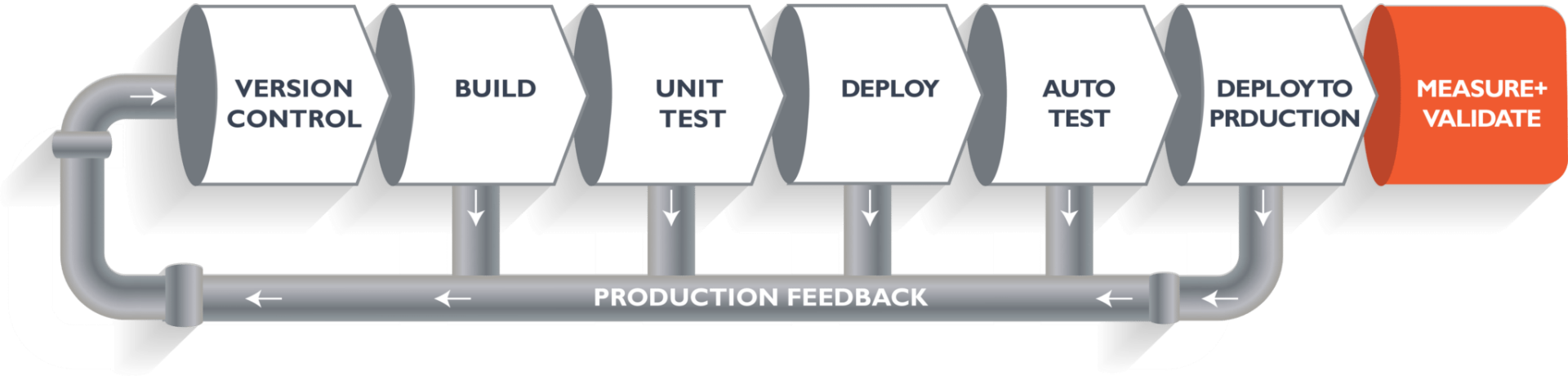

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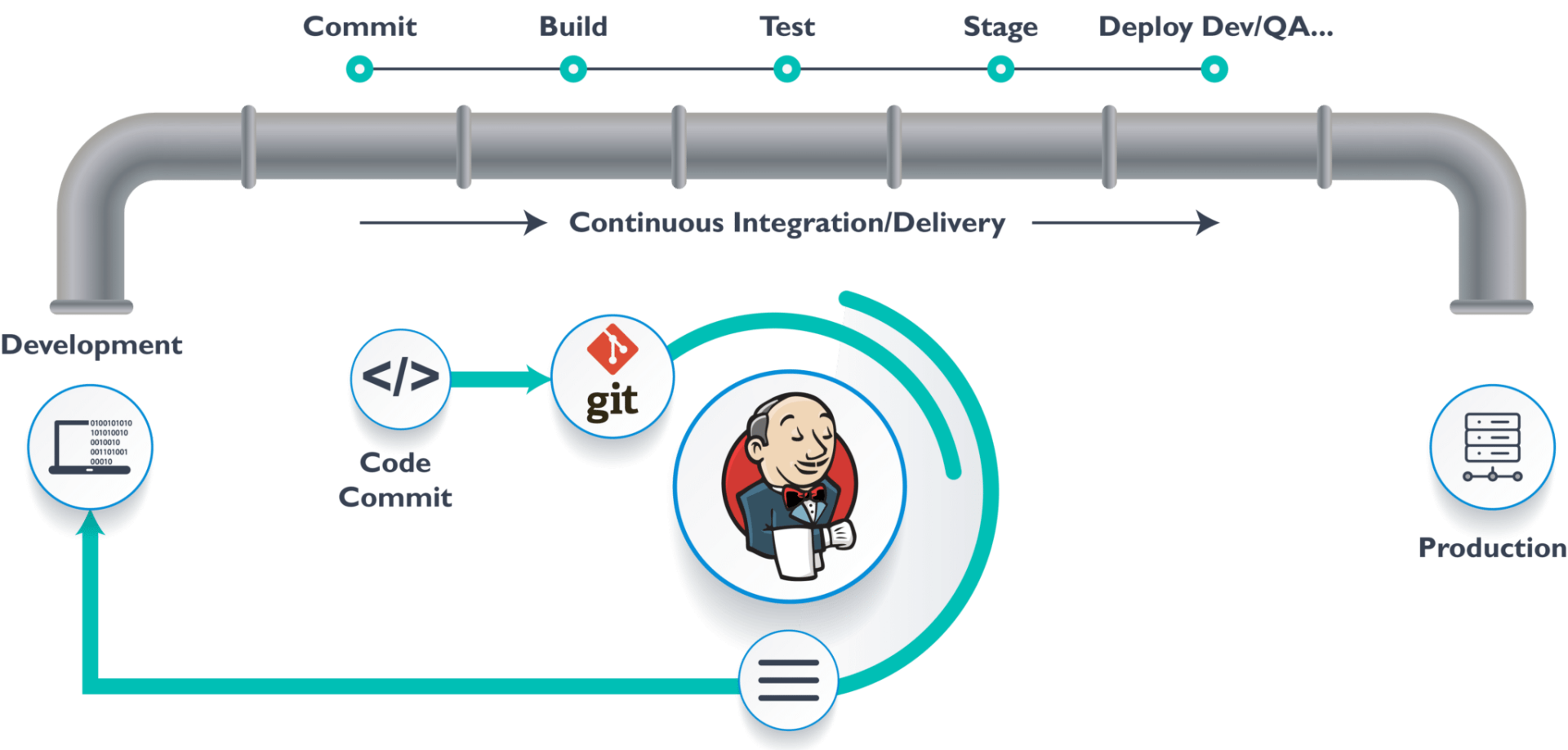

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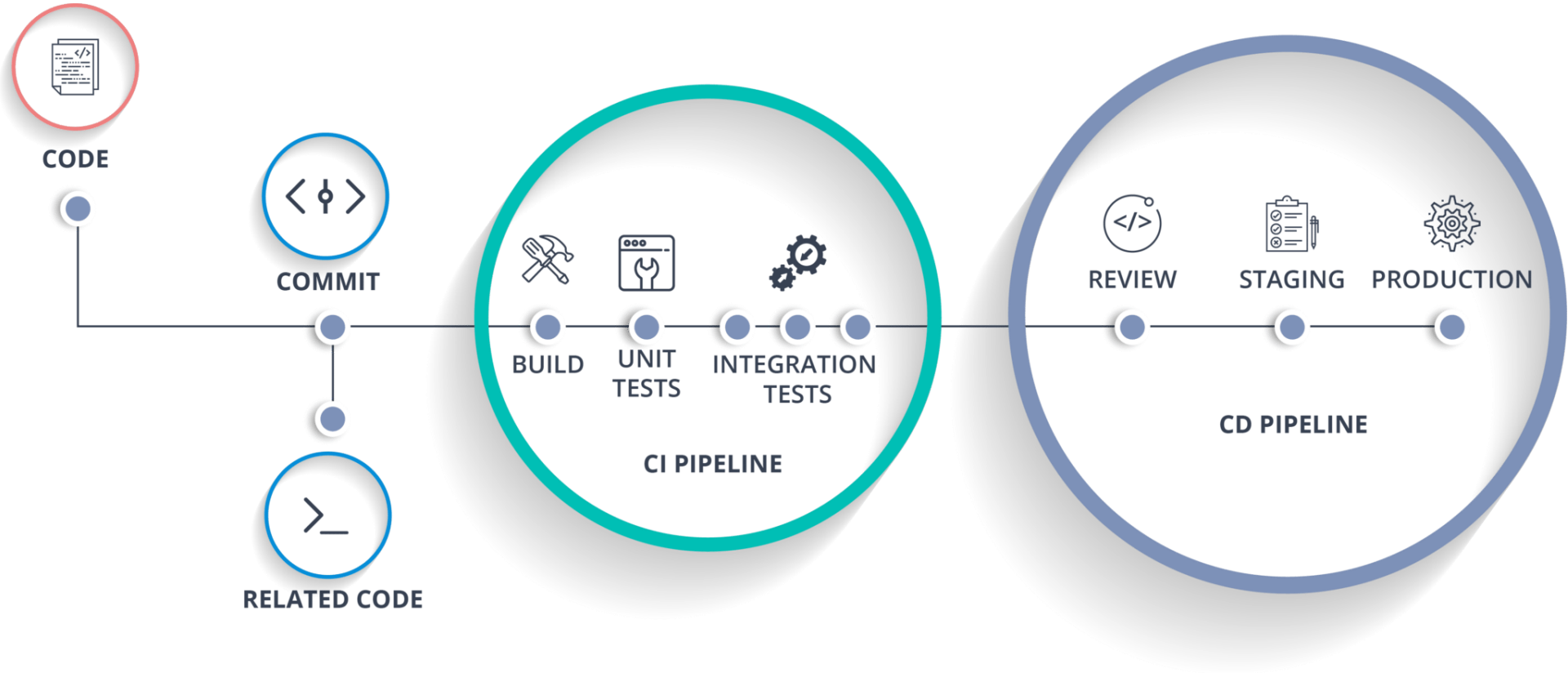
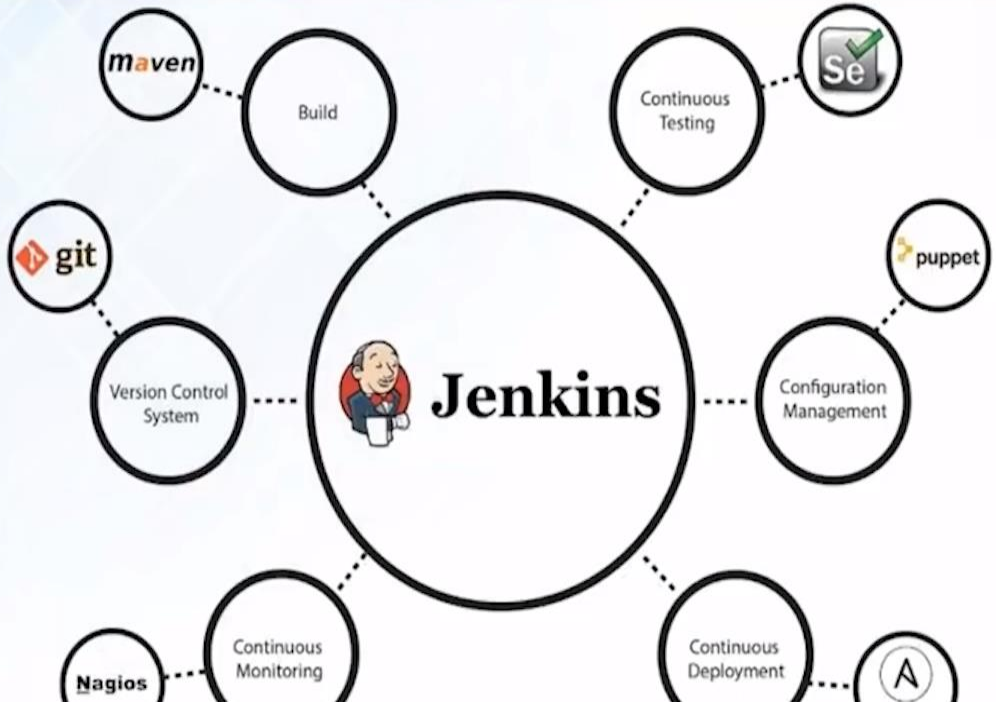


Continuous Integration Tools

What is Jenkins

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



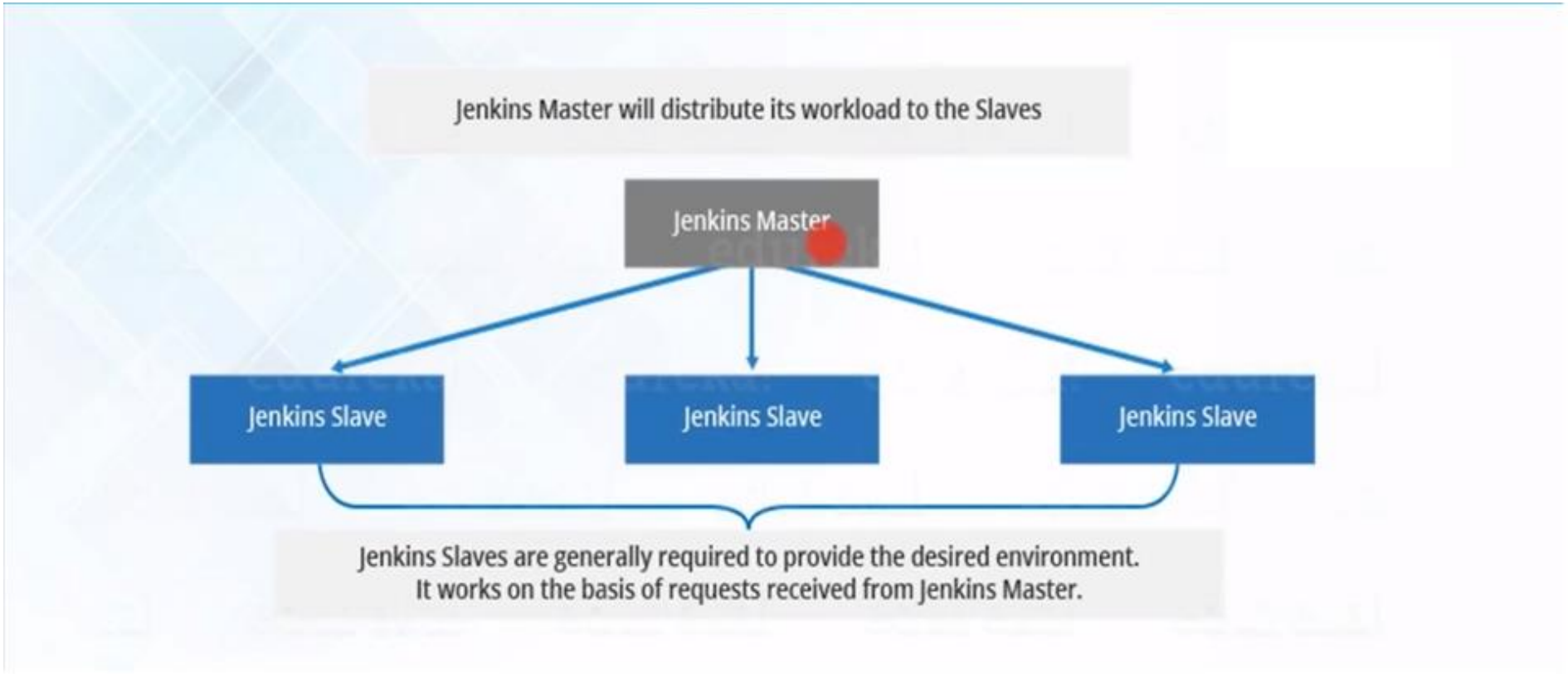
Shortcomings of Single Jenkins Server

If you need to run web tests using Internet Explorer, you need to use a Windows machine.

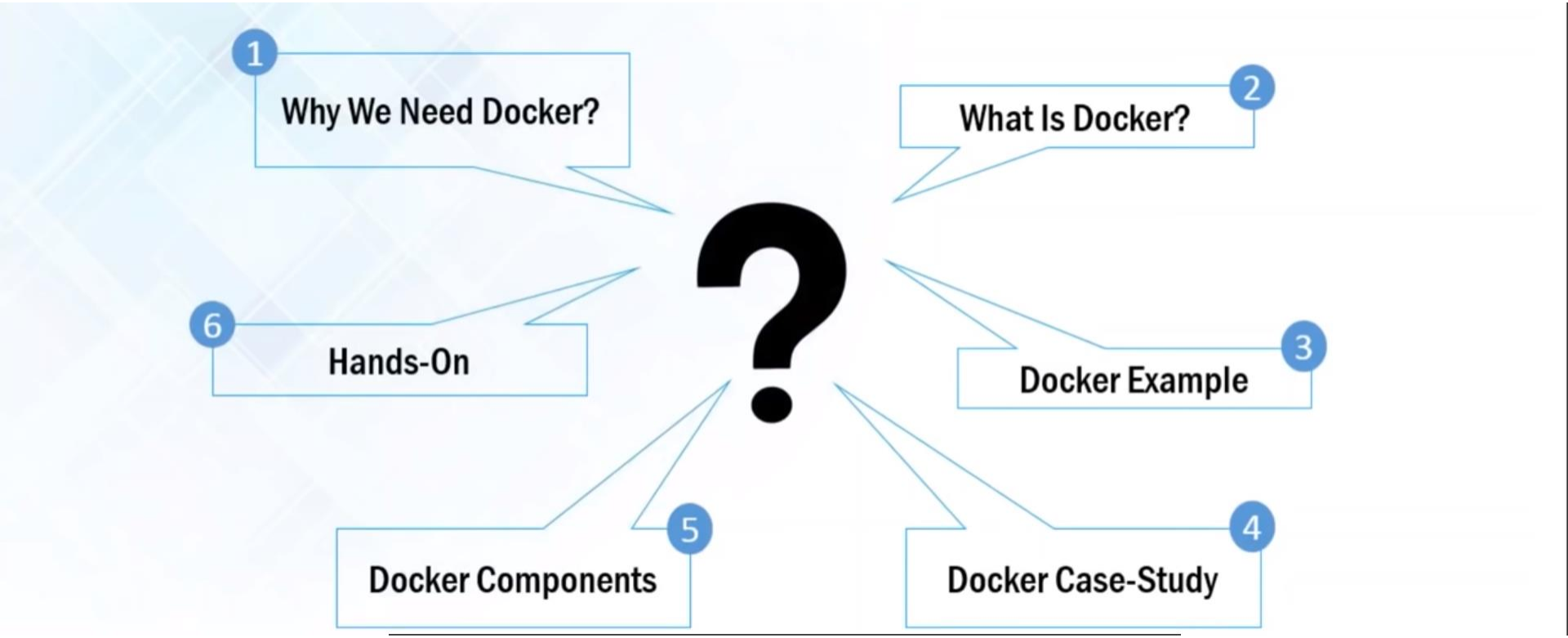
Another build job may require Linux box.

How to manage spikes in build activity

Jenkins Distributed Architecture

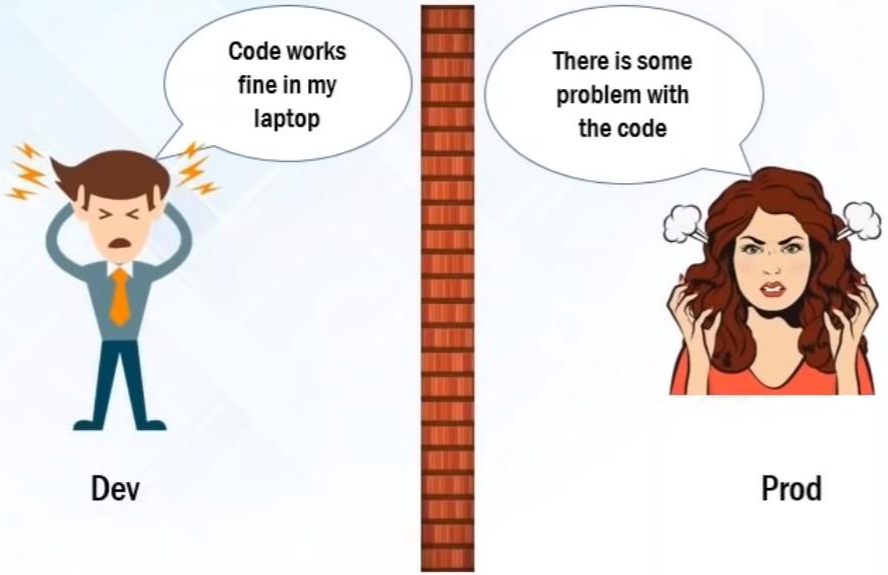


Do you know the following?



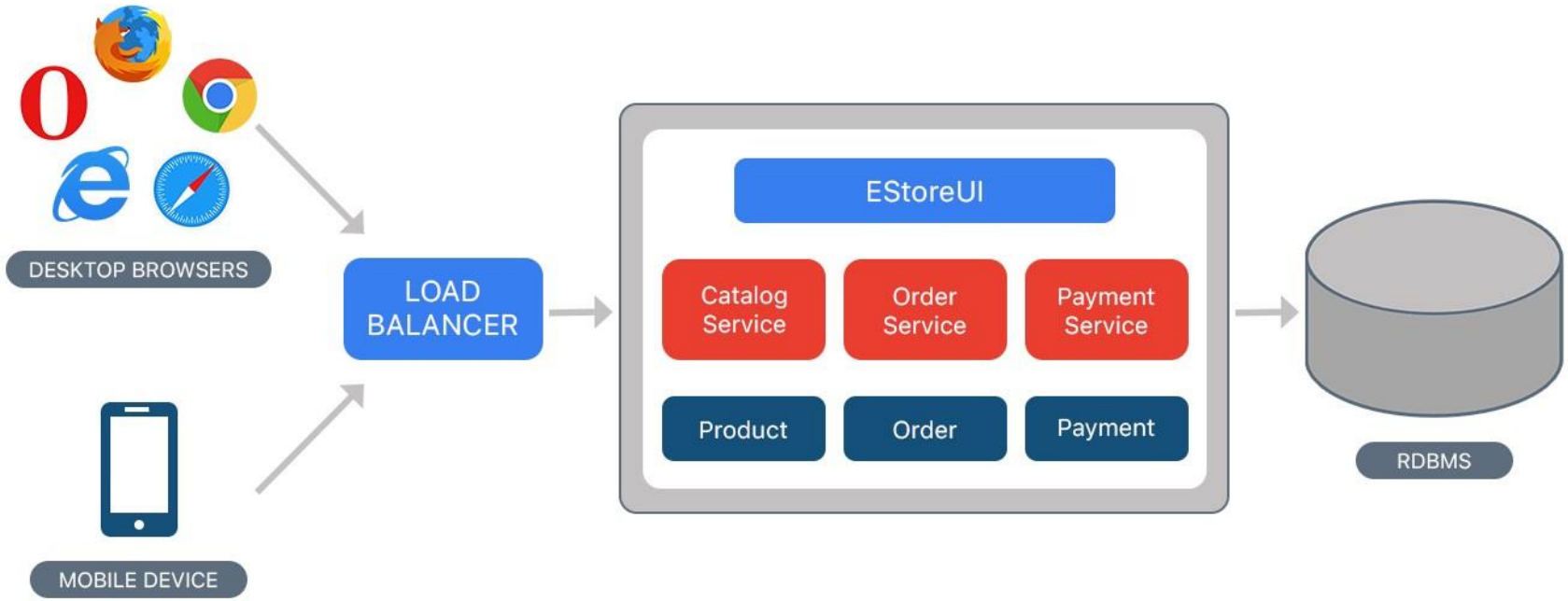
Problems Before Docker

An application works in developer's laptop but not in testing or production. This is due to difference in computing environment between Dev, Test and Prod.

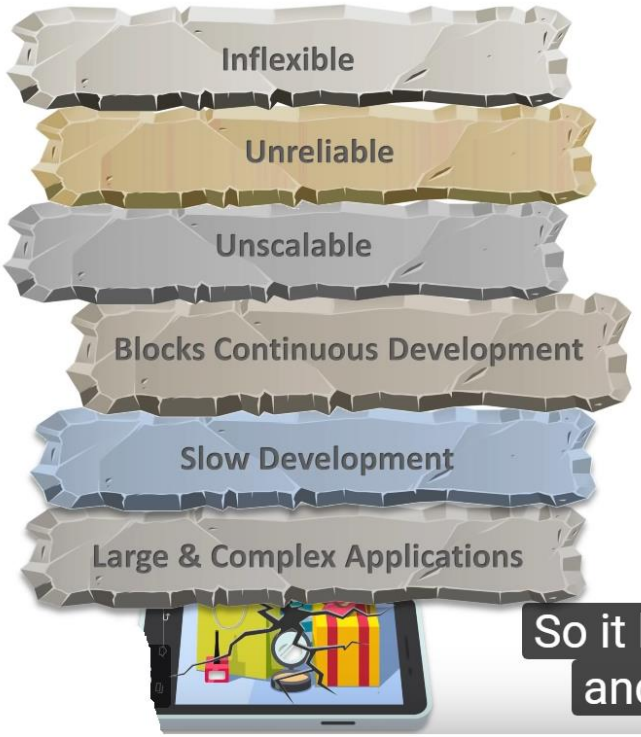


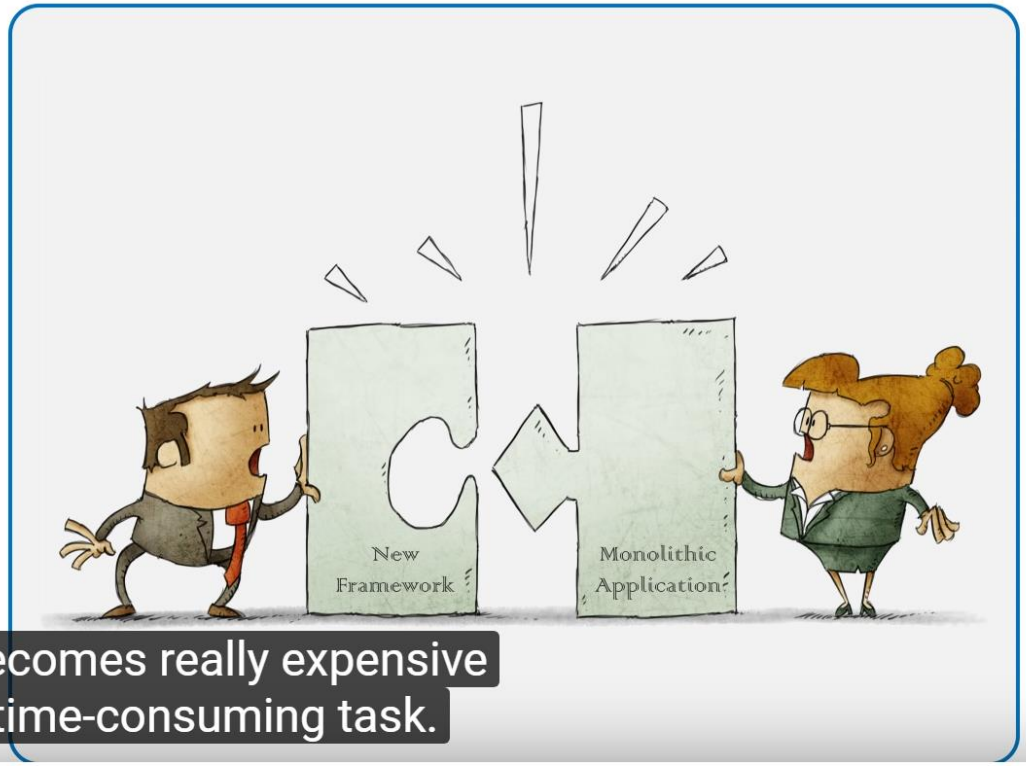
In Dev there can be a software that is upgraded and in Prod the old version of software might be present

Example of Monolithic Approach



Monolithic Architecture





Monolithic vs. Micro Services Example

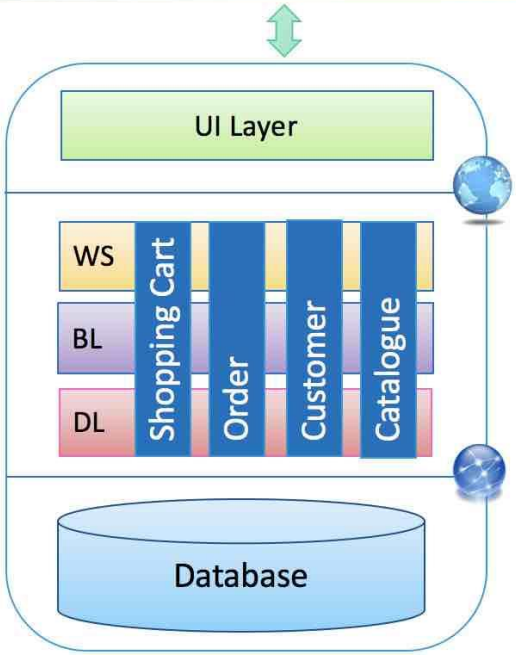




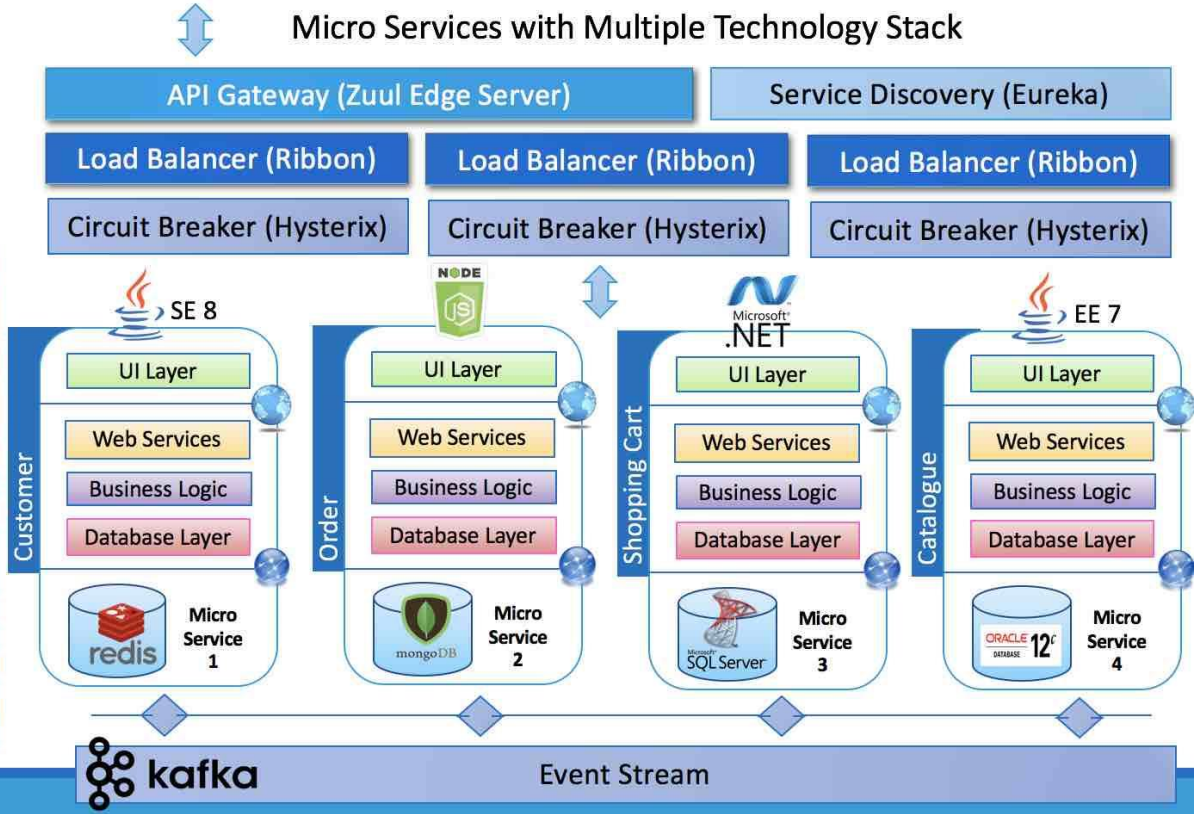
Existing aPaaS vendors creates Monolithic Apps.

This 3 tier model is obsolete now.

Source: Gartner Market Guide for Application Platforms Nov 23, 2016

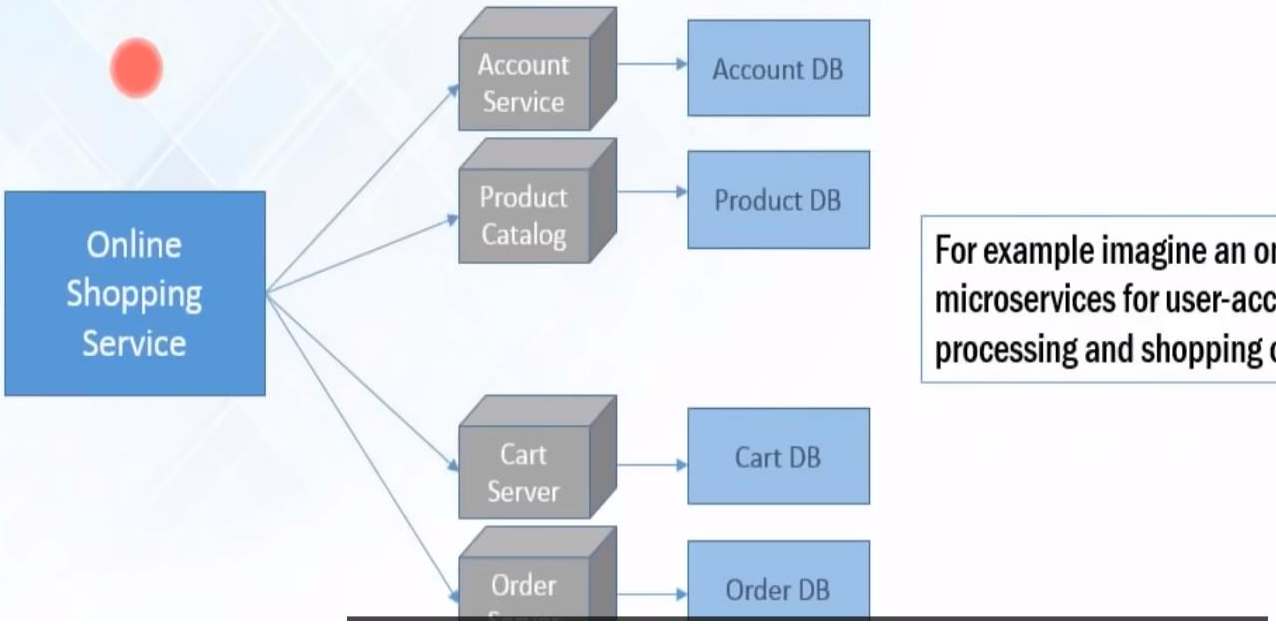


Traditional Monolithic App using Single Technology Stack



Problems Before Docker

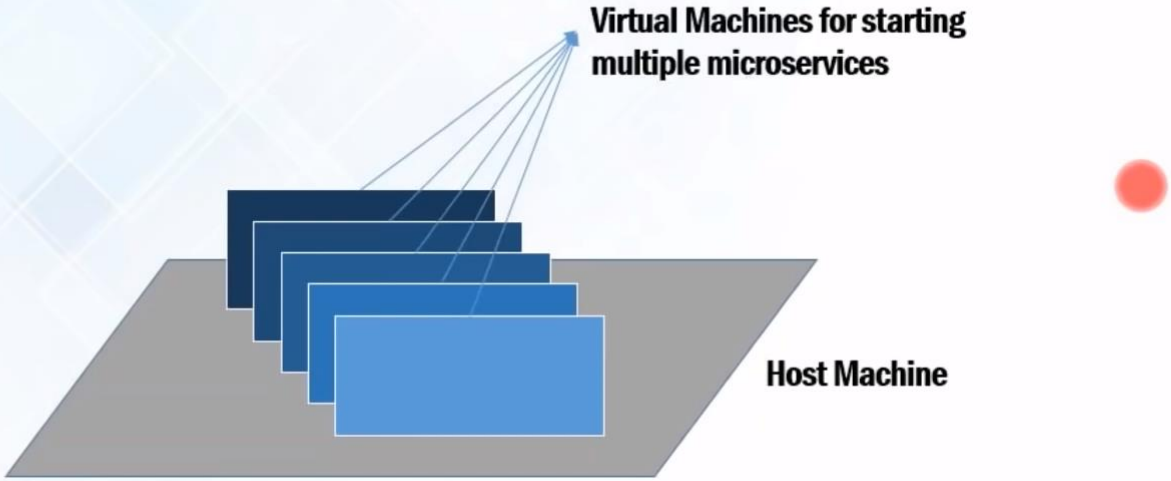
The idea behind microservices is that some types of applications become easier to build and maintain when they are broken down into smaller, composable pieces which work together. Each component is developed separately, and the application is then simply the sum of its constituent components.



For example imagine an online shop with separate microservices for user-accounts, product-catalog order-processing and shopping carts

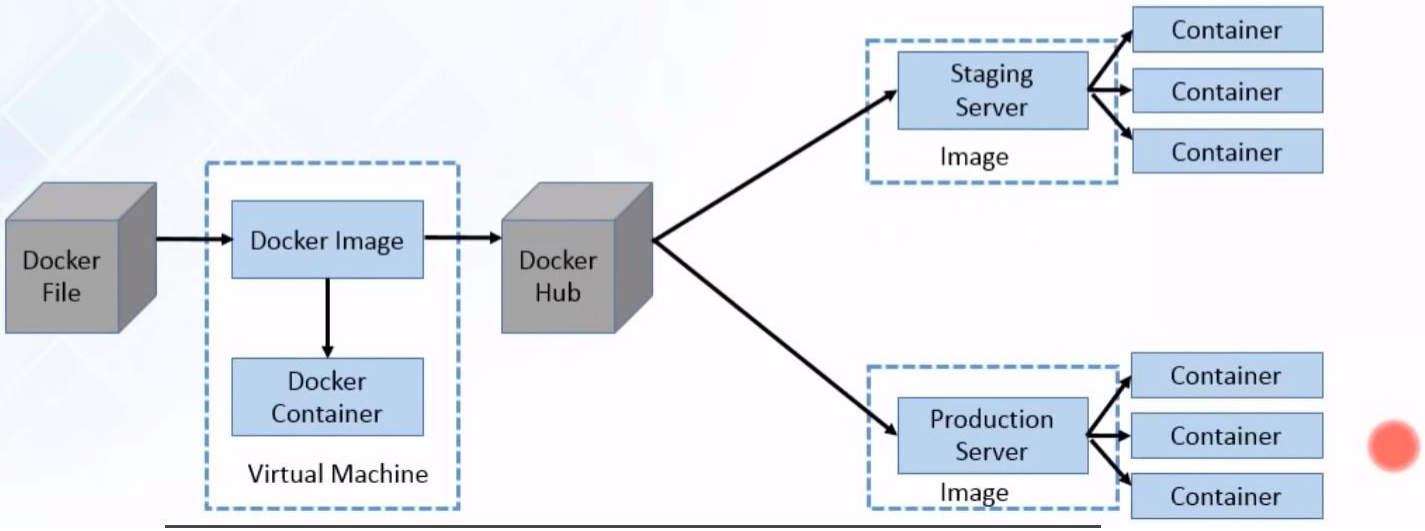
Problems Before Docker

Developing an application requires starting several of microservices in one machine. So if you are starting five of those services you require five VMs on that machine.

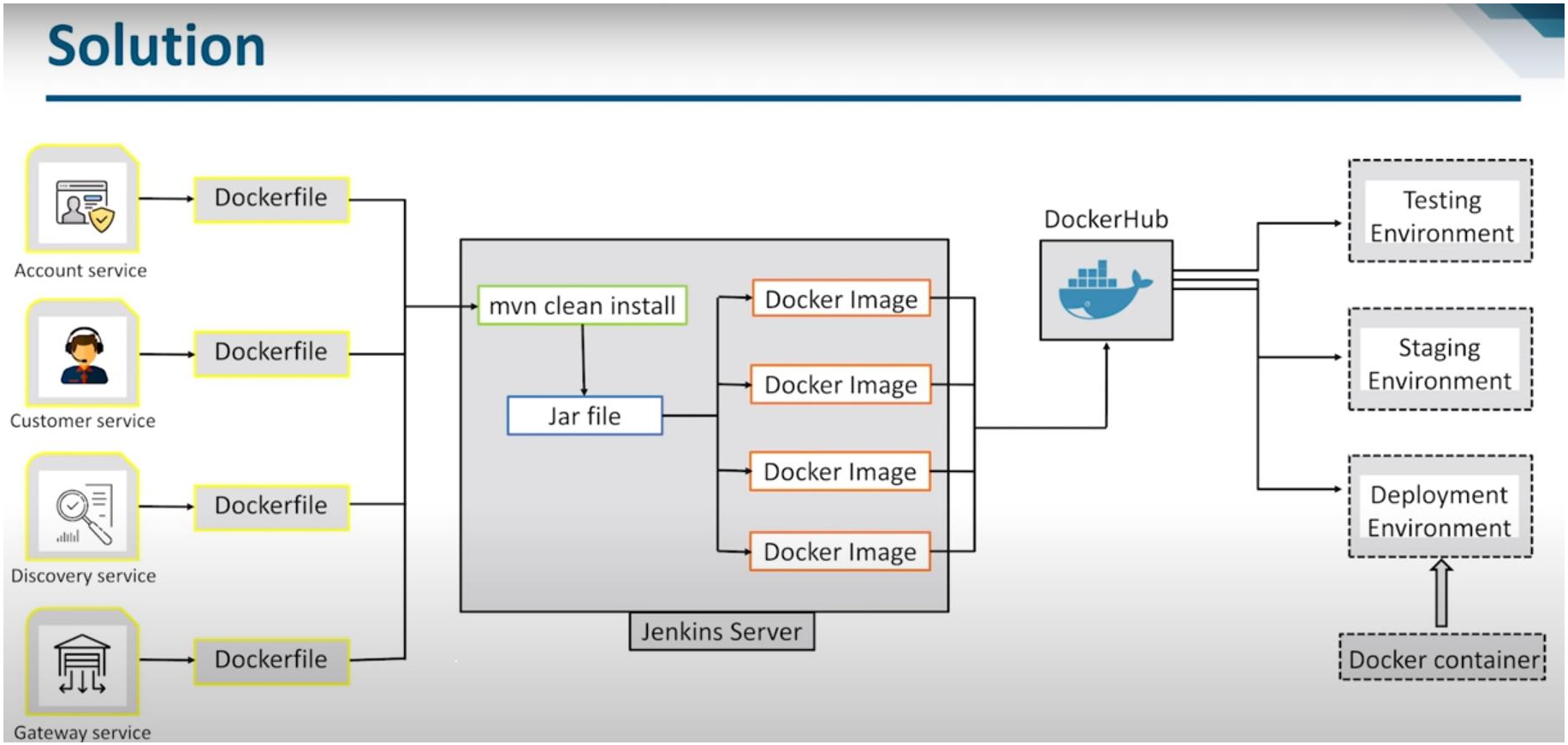


Docker in a Nutshell

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



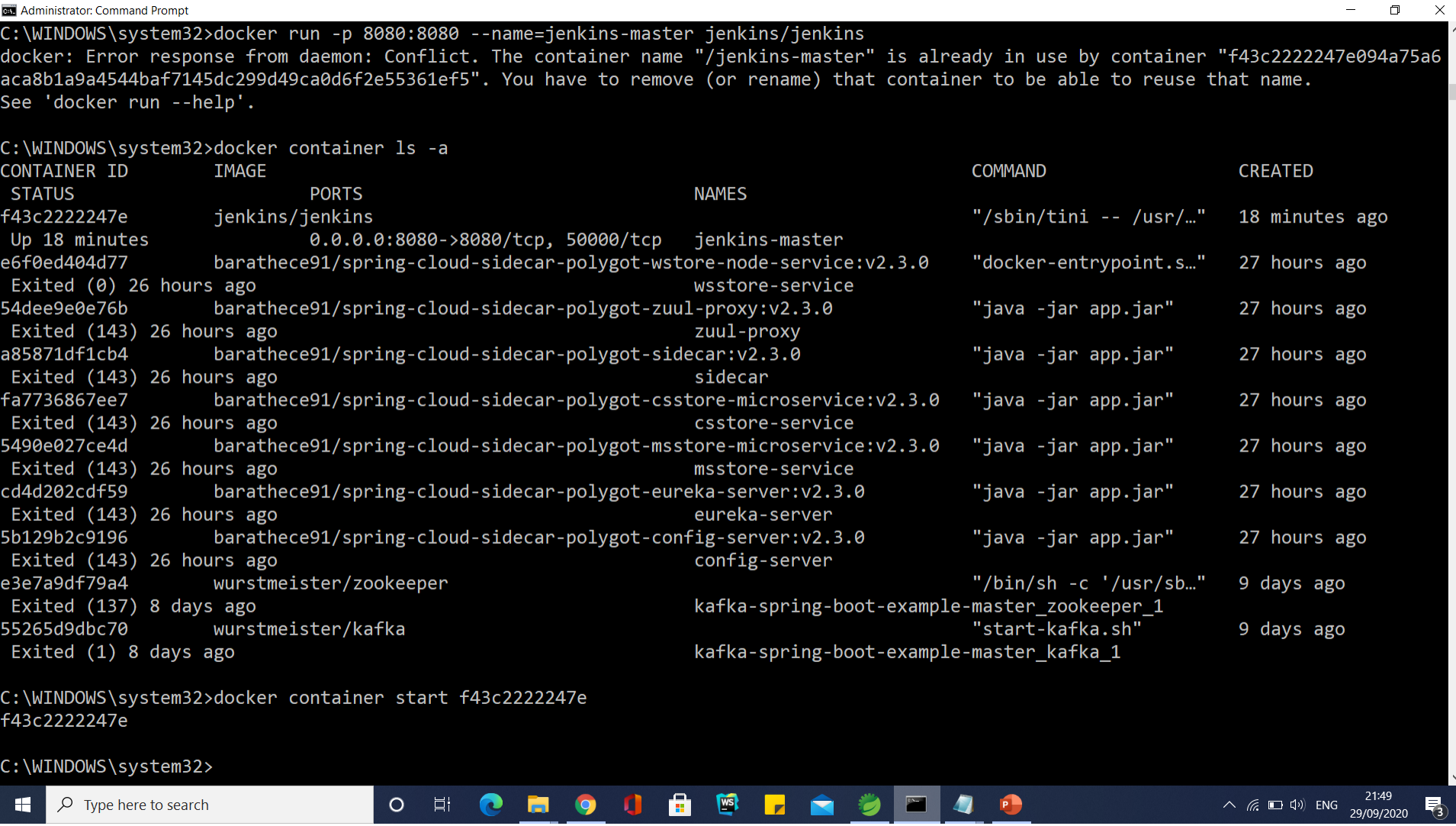
Continuous delivery through DevOps Integration



Docker jenkins

- docker jenkins
- docker pull jenkins/jenkins
- docker run -p 8080:8080 --name=jenkins-master jenkins/jenkins
- docker stop jenkins-master
- docker rm jenkins-master
- docker run -p 8080:8080 --name=jenkins-master -d --env JAVA_OPTS="-Xmx8192m" --env JENKINS_OPTS=" --handlerCountMax=300" jenkins/jenkins

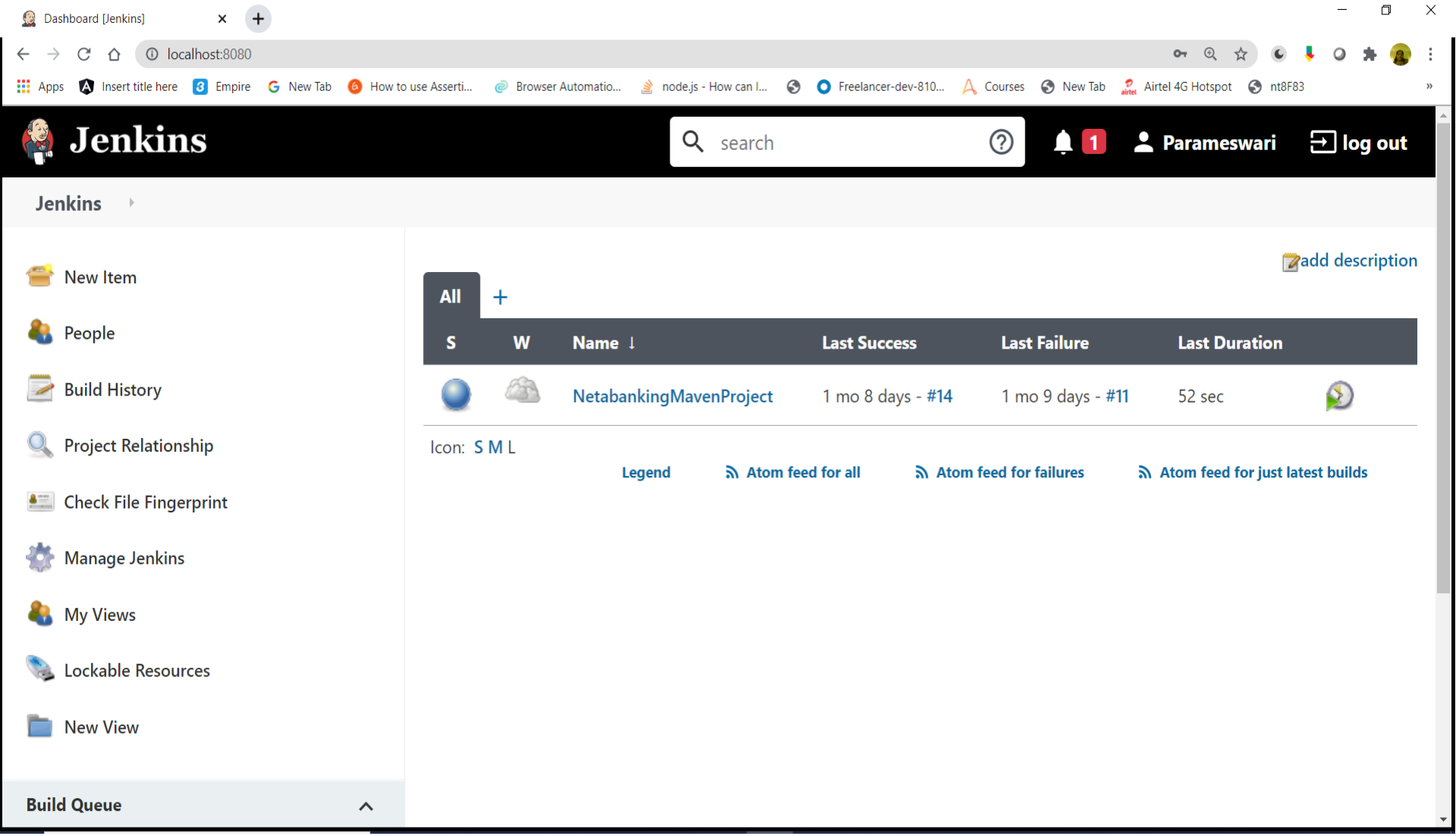
Docker jenkins



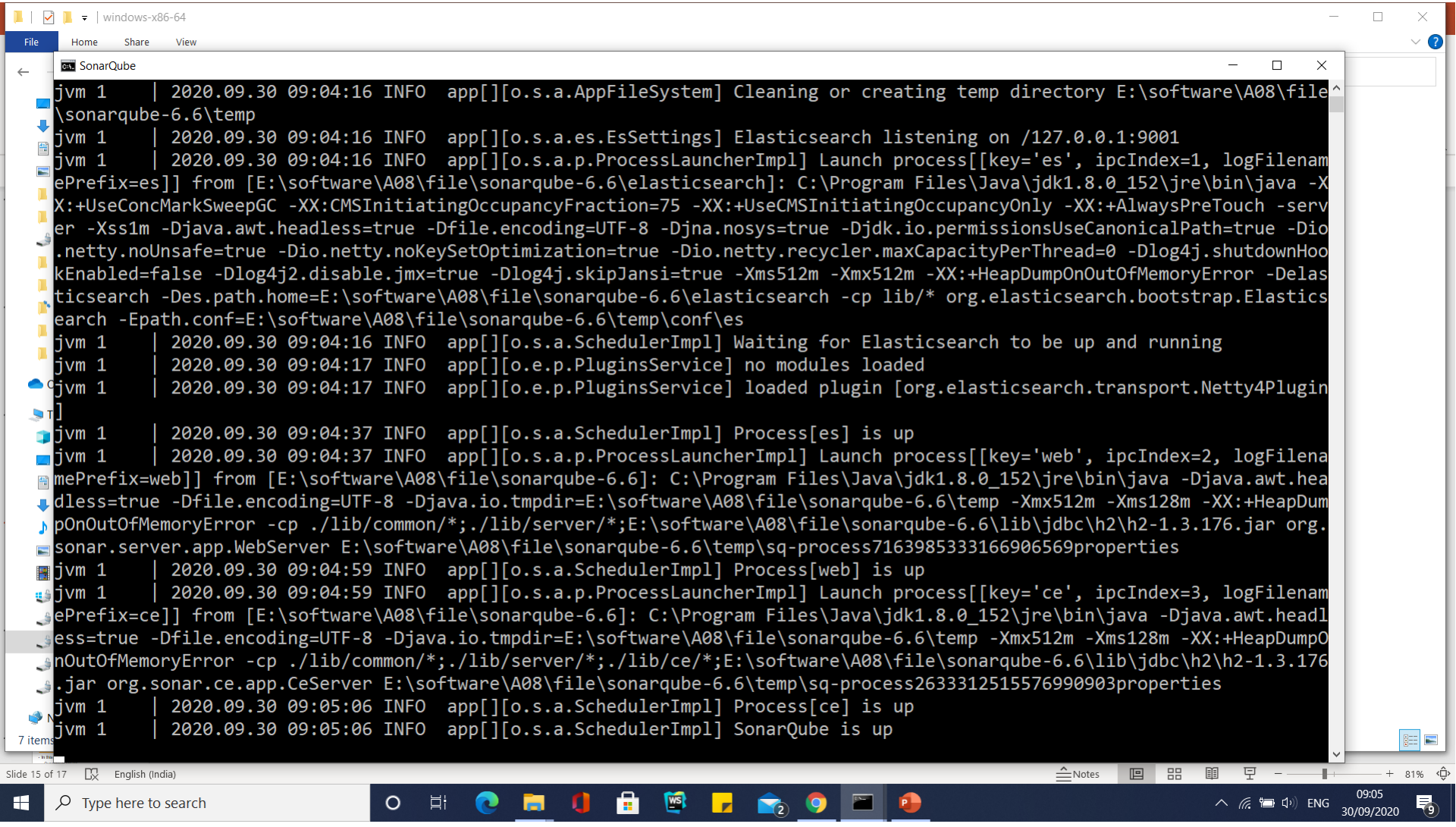
Jenkins using war

```
D:\Program Files\Jenkins>java -jar jenkins.war
Running from: D:\Program Files\Jenkins\Jenkins.war
webroot: $user.home/.jenkins
2020-11-08 13:02:57.113+0000 [id=1]     INFO    org.eclipse.jetty.util.log.Log#initialized: Logging initialized @1481ms to org.eclipse.
jetty.util.log.JavaUtilLog
2020-11-08 13:02:57.419+0000 [id=1]     INFO    winstone.Logger#logInternal: Beginning extraction from war file
2020-11-08 13:03:05.177+0000 [id=1]     WARNING o.e.j.s.handler.ContextHandler#setContextPath: Empty contextPath
2020-11-08 13:03:05.306+0000 [id=1]     INFO    org.eclipse.jetty.server.Server#doStart: jetty-9.4.30.v20200611; built: 2020-06-11T12:3
4:51.929Z; git: 271836e4c1f4612f12b7bb13ef5a92a927634b0d; jvm 1.8.0_261-b12
2020-11-08 13:03:06.749+0000 [id=1]     INFO    o.e.j.w.StandardDescriptorProcessor#visitServlet: NO JSP Support for /, did not find or
g.eclipse.jetty.jsp.JettyJspServlet
2020-11-08 13:03:06.845+0000 [id=1]     INFO    o.e.j.s.s.DefaultSessionIdManager#doStart: DefaultSessionIdManager workerName=node0
2020-11-08 13:03:06.846+0000 [id=1]     INFO    o.e.j.s.s.DefaultSessionIdManager#doStart: No SessionScavenger set, using defaults
2020-11-08 13:03:06.859+0000 [id=1]     INFO    o.e.j.server.session.HouseKeeper#startScavenging: node0 Scavenging every 600000ms
2020-11-08 13:03:07.499+0000 [id=1]     INFO    hudson.WebAppMain#contextInitialized: Jenkins home directory: C:\Users\Balasubramaniam\
.jenkins found at: $user.home/.jenkins
2020-11-08 13:03:07.943+0000 [id=1]     INFO    o.e.j.s.handler.ContextHandler#doStart: Started w.@2c5d601e{Jenkins v2.249.1,/,file:///
C:/Users/Balasubramaniam/.jenkins/war/,AVAILABLE}{C:\Users\Balasubramaniam\.jenkins\war}
2020-11-08 13:03:08.090+0000 [id=1]     INFO    o.e.j.server.AbstractConnector#doStart: Started ServerConnector@3e0e1046{HTTP/1.1, (htt
p/1.1)}{0.0.0.0:8080}
2020-11-08 13:03:08.091+0000 [id=1]     INFO    org.eclipse.jetty.server.Server#doStart: Started @12462ms
2020-11-08 13:03:08.099+0000 [id=23]    INFO    winstone.Logger#logInternal: Winstone Servlet Engine running: controlPort=disabled
2020-11-08 13:03:10.092+0000 [id=29]    INFO    jenkins.InitReactorRunner$1#onAttained: Started initialization
2020-11-08 13:04:02.247+0000 [id=28]    INFO    jenkins.InitReactorRunner$1#onAttained: Listed all plugins
2020-11-08 13:04:15.389+0000 [id=37]    INFO    jenkins.InitReactorRunner$1#onAttained: Prepared all plugins
2020-11-08 13:04:15.404+0000 [id=32]    INFO    jenkins.InitReactorRunner$1#onAttained: Started all plugins
2020-11-08 13:04:19.082+0000 [id=40]    INFO    jenkins.InitReactorRunner$1#onAttained: Augmented all extensions
2020-11-08 13:04:19.155+0000 [id=43]    INFO    jenkins.InitReactorRunner$1#onAttained: System config loaded
2020-11-08 13:04:19.158+0000 [id=43]    INFO    jenkins.InitReactorRunner$1#onAttained: System config adapted
2020-11-08 13:04:19.698+0000 [id=42]    INFO    jenkins.InitReactorRunner$1#onAttained: Loaded all jobs
2020-11-08 13:04:19.699+0000 [id=32]    INFO    jenkins.InitReactorRunner$1#onAttained: Configuration for all jobs updated
2020-11-08 13:04:19.791+0000 [id=62]    INFO    hudson.model.AsyncPeriodicWork#lambda$doRun$0: Started Download metadata
```

Jenkins

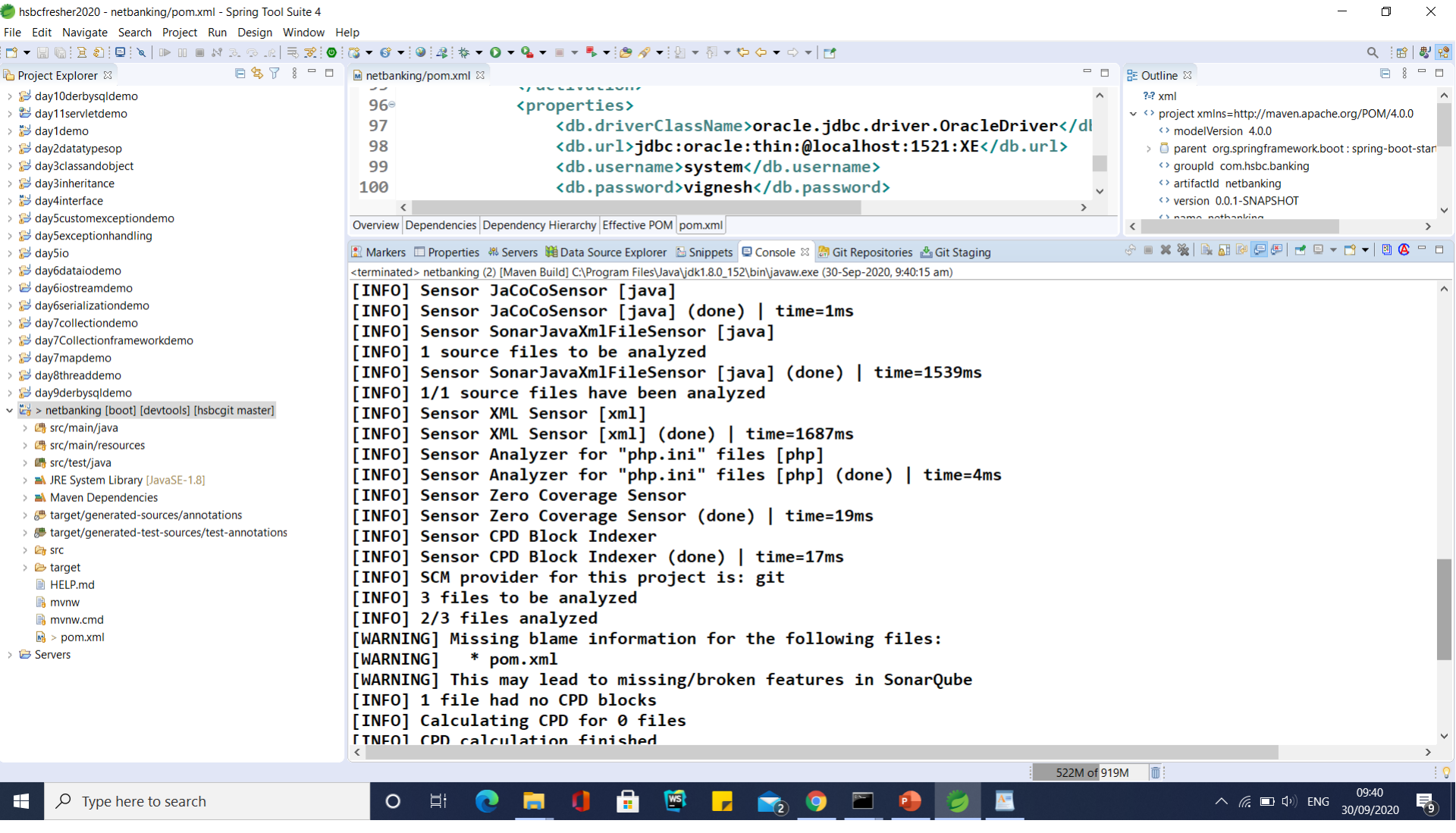

Dashboard [Jenkins]
localhost:8080
Apps
Insert title here
Empire
New Tab
How to use Asserti...
Browser Automatio...
node.js - How can I...
Freelancer-dev-810...
Courses
New Tab
Airtel 4G Hotspot
nt8F83
Jenkins
search
1
Parameswari
log out
Jenkins
New Item
People
Build History
Project Relationship
Check File Fingerprint
Manage Jenkins
My Views
Lockable Resources
New View
Build Queue
add description
All
S
W
Name ↓
Last Success
Last Failure
Last Duration
NetabankingMavenProject
1 mo 8 days - #14
1 mo 9 days - #11
52 sec
Icon: S M L
Legend
Atom feed for all
Atom feed for failures
Atom feed for just latest builds

SonarQube

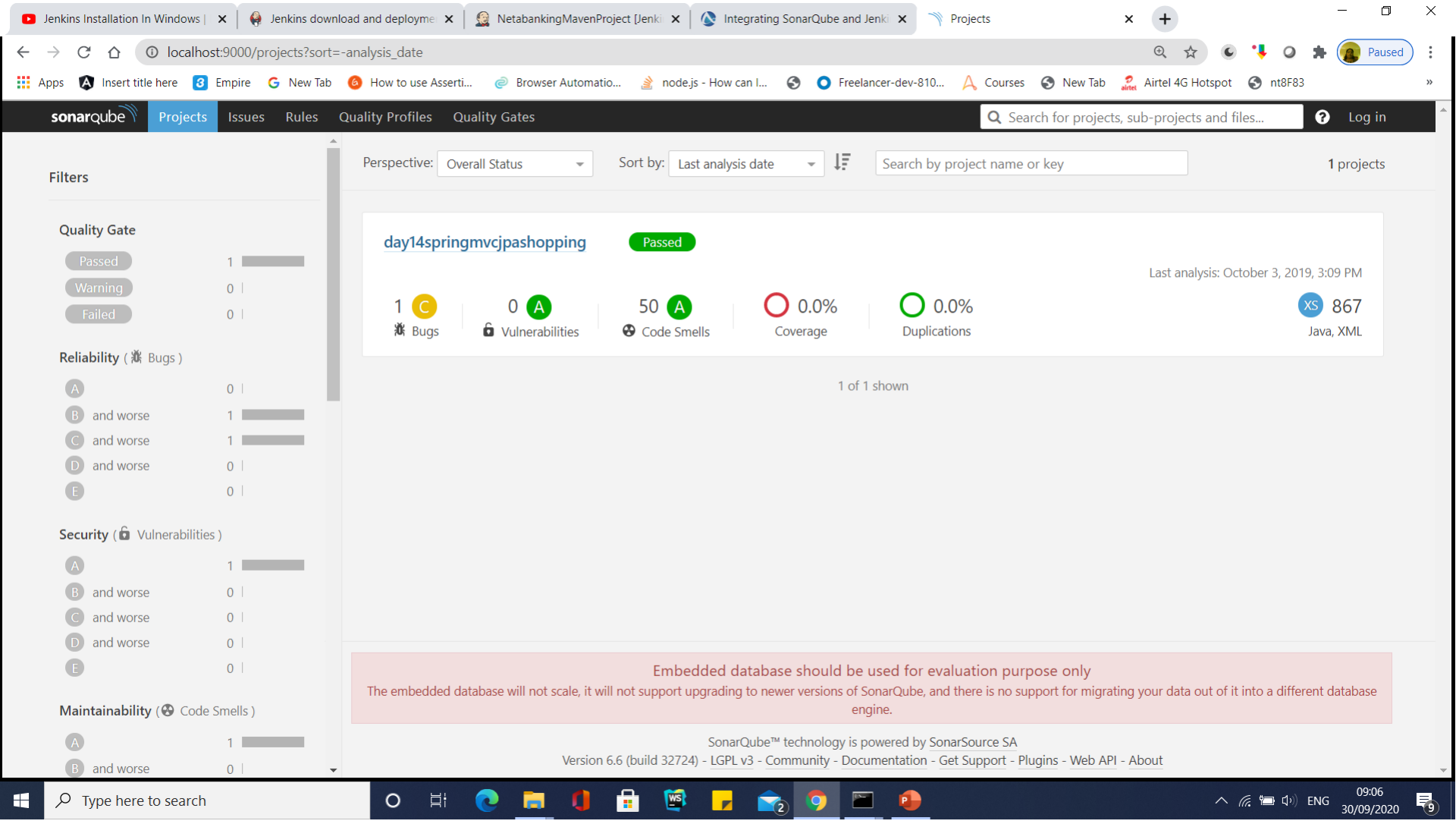

windows-x86-64
File
Home
Share
View
SonarQube
jvm 1 | 2020.09.30 09:04:16 INFO app[][o.s.a.AppFileSystem] Cleaning or creating temp directory E:\software\A08\file\sonarqube-6.6\temp
jvm 1 | 2020.09.30 09:04:16 INFO app[][o.s.a.es.EsSettings] Elasticsearch listening on /127.0.0.1:9001
jvm 1 | 2020.09.30 09:04:16 INFO app[][o.s.a.p.ProcessLauncherImpl] Launch process[[key='es', ipcIndex=1, logFilenamePrefix=es]] from [E:\software\A08\file\sonarqube-6.6\elasticsearch]: C:\Program Files\Java\jdk1.8.0_152\jre\bin\java -XX:+UseConcMarkSweepGC -XX:CMSInitiatingOccupancyFraction=75 -XX:+UseCMSInitiatingOccupancyOnly -XX:+AlwaysPreTouch -server -Xss1m -Djava.awt.headless=true -Dfile.encoding=UTF-8 -Djna.nosys=true -Djdk.io.permissionsUseCanonicalPath=true -Dio.netty.noUnsafe=true -Dio.netty.noKeySetOptimization=true -Dio.netty.recycler.maxCapacityPerThread=0 -Dlog4j.shutdownHookEnabled=false -Dlog4j2.disable.jmx=true -Dlog4j.skipJansi=true -Xms512m -Xmx512m -XX:+HeapDumpOnOutOfMemoryError -Delasticsearch -Des.path.home=E:\software\A08\file\sonarqube-6.6\elasticsearch -cp lib/* org.elasticsearch.bootstrap.Elasticsearch -Epath.conf=E:\software\A08\file\sonarqube-6.6\temp\conf\es
jvm 1 | 2020.09.30 09:04:16 INFO app[][o.s.a.SchedulerImpl] Waiting for Elasticsearch to be up and running
jvm 1 | 2020.09.30 09:04:17 INFO app[][o.e.p.PluginsService] no modules loaded
jvm 1 | 2020.09.30 09:04:17 INFO app[][o.e.p.PluginsService] loaded plugin [org.elasticsearch.transport.Netty4Plugin]
jvm 1 | 2020.09.30 09:04:37 INFO app[][o.s.a.SchedulerImpl] Process[es] is up
jvm 1 | 2020.09.30 09:04:37 INFO app[][o.s.a.p.ProcessLauncherImpl] Launch process[[key='web', ipcIndex=2, logFilenamePrefix=web]] from [E:\software\A08\file\sonarqube-6.6]: C:\Program Files\Java\jdk1.8.0_152\jre\bin\java -Djava.awt.headless=true -Dfile.encoding=UTF-8 -Djava.io.tmpdir=E:\software\A08\file\sonarqube-6.6\temp -Xmx512m -Xms128m -XX:+HeapDumpOnOutOfMemoryError -cp ./lib/common/*;./lib/server/*;E:\software\A08\file\sonarqube-6.6\lib\jdbc\h2\h2-1.3.176.jar org.sonar.server.app.WebServer E:\software\A08\file\sonarqube-6.6\temp\sq-process7163985333166906569properties
jvm 1 | 2020.09.30 09:04:59 INFO app[][o.s.a.SchedulerImpl] Process[web] is up
jvm 1 | 2020.09.30 09:04:59 INFO app[][o.s.a.p.ProcessLauncherImpl] Launch process[[key='ce', ipcIndex=3, logFilenamePrefix=ce]] from [E:\software\A08\file\sonarqube-6.6]: C:\Program Files\Java\jdk1.8.0_152\jre\bin\java -Djava.awt.headless=true -Dfile.encoding=UTF-8 -Djava.io.tmpdir=E:\software\A08\file\sonarqube-6.6\temp -Xmx512m -Xms128m -XX:+HeapDumpOnOutOfMemoryError -cp ./lib/common/*;./lib/server/*;./lib/ce/*;E:\software\A08\file\sonarqube-6.6\lib\jdbc\h2\h2-1.3.176.jar org.sonar.ce.app.CeServer E:\software\A08\file\sonarqube-6.6\temp\sq-process2633312515576990903properties
jvm 1 | 2020.09.30 09:05:06 INFO app[][o.s.a.SchedulerImpl] Process[ce] is up
jvm 1 | 2020.09.30 09:05:06 INFO app[][o.s.a.SchedulerImpl] SonarQube is up
7 items
Slide 15 of 17
English (India)
Notes
81%
Type here to search
ENG
09:05
30/09/2020

SonarQube Maven

sonar:sonar -Dsonar.host.url=http://localhost:9000 -Dsonar.login=b56042da35208eb303feb4b1abafe76f9ae572ac



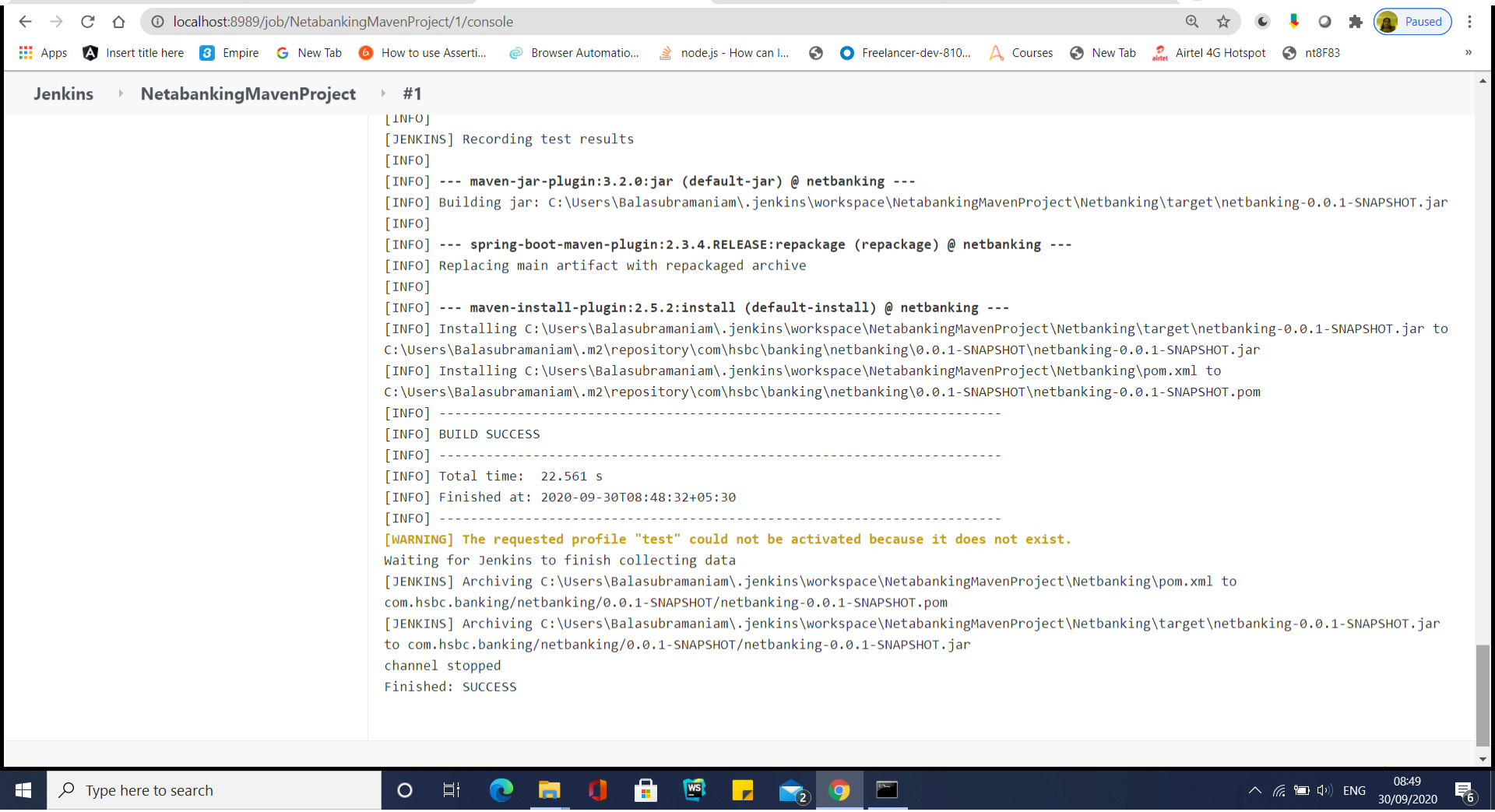
SonarQube


Jenkins Installation In Windows
Jenkins download and deployme
NetabankingMavenProject [Jenki
Integrating SonarQube and Jenki
Projects
localhost:9000/projects?sort=-analysis_date
Paused
Apps
Insert title here
Empire
New Tab
How to use Asserti...
Browser Automatio...
node.js - How can I...
Freelancer-dev-810...
Courses
New Tab
Airtel 4G Hotspot
nt8F83
sonarqube
Projects
Issues
Rules
Quality Profiles
Quality Gates
Search for projects, sub-projects and files...
Log in
Filters
Quality Gate
Passed 1
Warning 0
Failed 0
Reliability (Bugs)
A 0
B and worse 1
C and worse 1
D and worse 0
E 0
Security (Vulnerabilities)
A 1
B and worse 0
C and worse 0
D and worse 0
E 0
Maintainability (Code Smells)
A 1
B and worse 0
Perspective: Overall Status
Sort by: Last analysis date
Search by project name or key
1 projects
day14springmvcjpashopping
Passed
Last analysis: October 3, 2019, 3:09 PM
1 C Bugs
0 A Vulnerabilities
50 A Code Smells
0.0% Coverage
0.0% Duplications
XS 867 Java, XML
1 of 1 shown
Embedded database should be used for evaluation purpose only
The embedded database will not scale, it will not support upgrading to newer versions of SonarQube, and there is no support for migrating your data out of it into a different database engine.
SonarQube™ technology is powered by SonarSource SA
Version 6.6 (build 32724) - LGPL v3 - Community - Documentation - Get Support - Plugins - Web API - About
Type here to search
ENG
09:06
30/09/2020

SonarQube Properties

- sonar.projectKey=netbanking
- sonar.projectName=C:/Users/Balasubramaniam/.jenkins/workspace/NetabankingMavenProject
- sonar.projectVersion=1.0
- sonar.login=admin
- sonar.password=admin
- sonar.exclusions=vendor/**, storage/**, resources/**
- sonar.language=java
- sonar.sources=C:/Users/Balasubramaniam/.jenkins/workspace/$JOB_NAME
- sonar.java.binaries=C:/Users/Balasubramaniam/.jenkins/workspace/$JOB_NAME/netbanking/target/classes
- sonar.sourceEncoding=UTF-8

Jenkins Build



Questions

Module Summary

- In this module we discussed
  - Overview of Maven
  - Maven archetypes
  - Maven life cycle phases
  - The pom.xml file
  - Creation of Java projects using Maven
  - Creation of war files