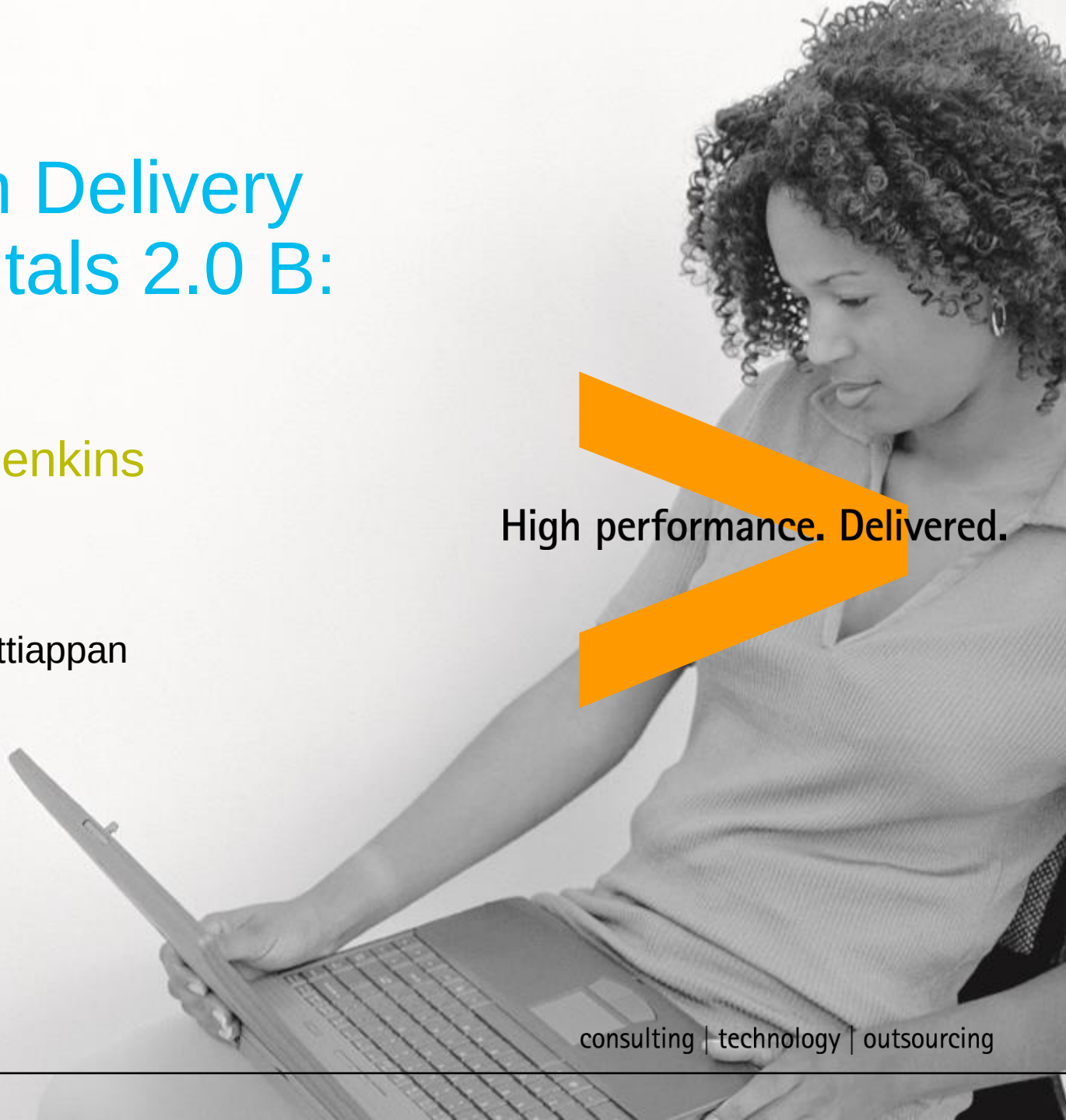
Application Delivery Fundamentals 2.0 B: Java

Introduction to Jenkins



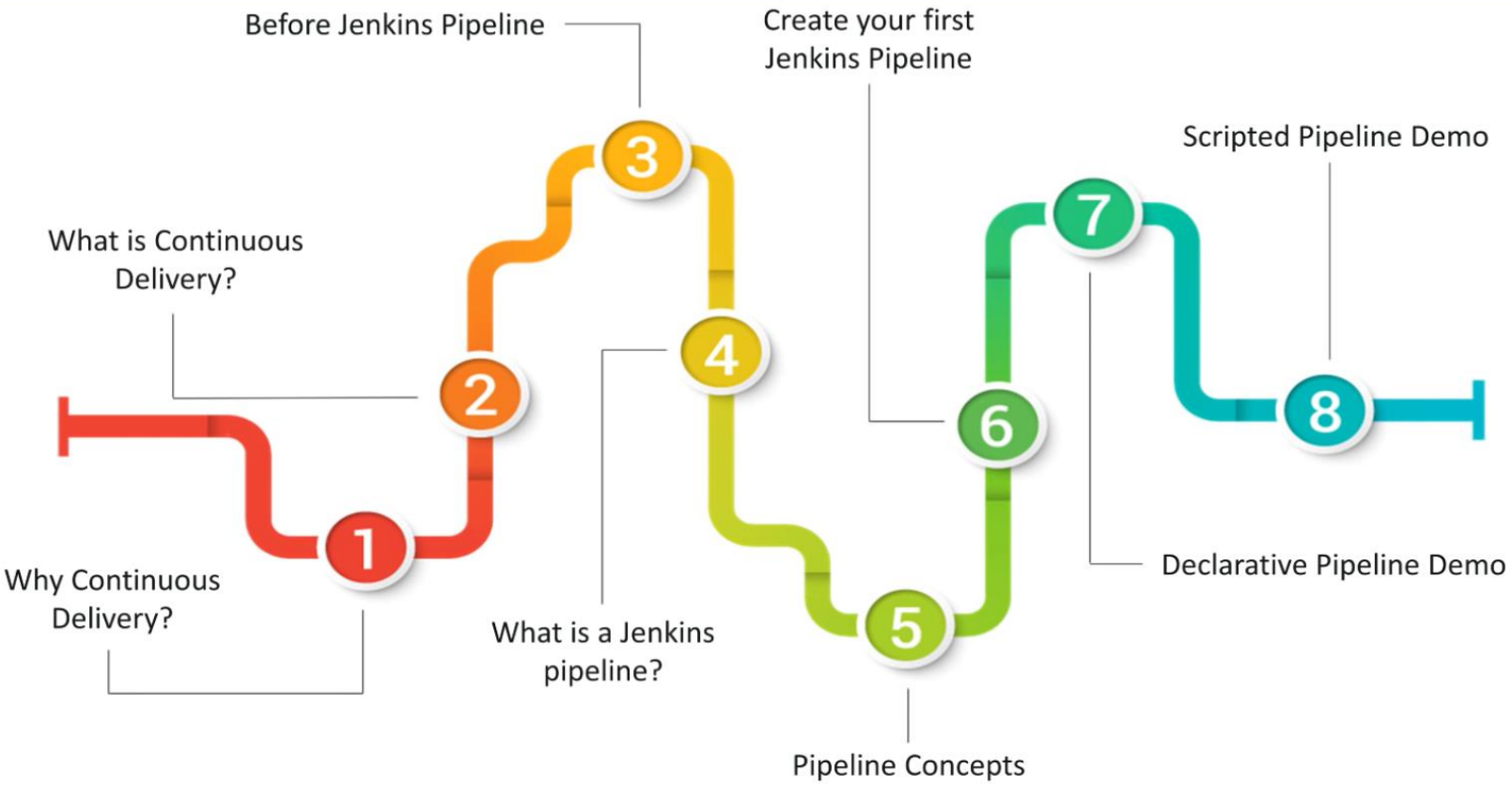
Parameswari Ettiappan

Goals

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

Goals

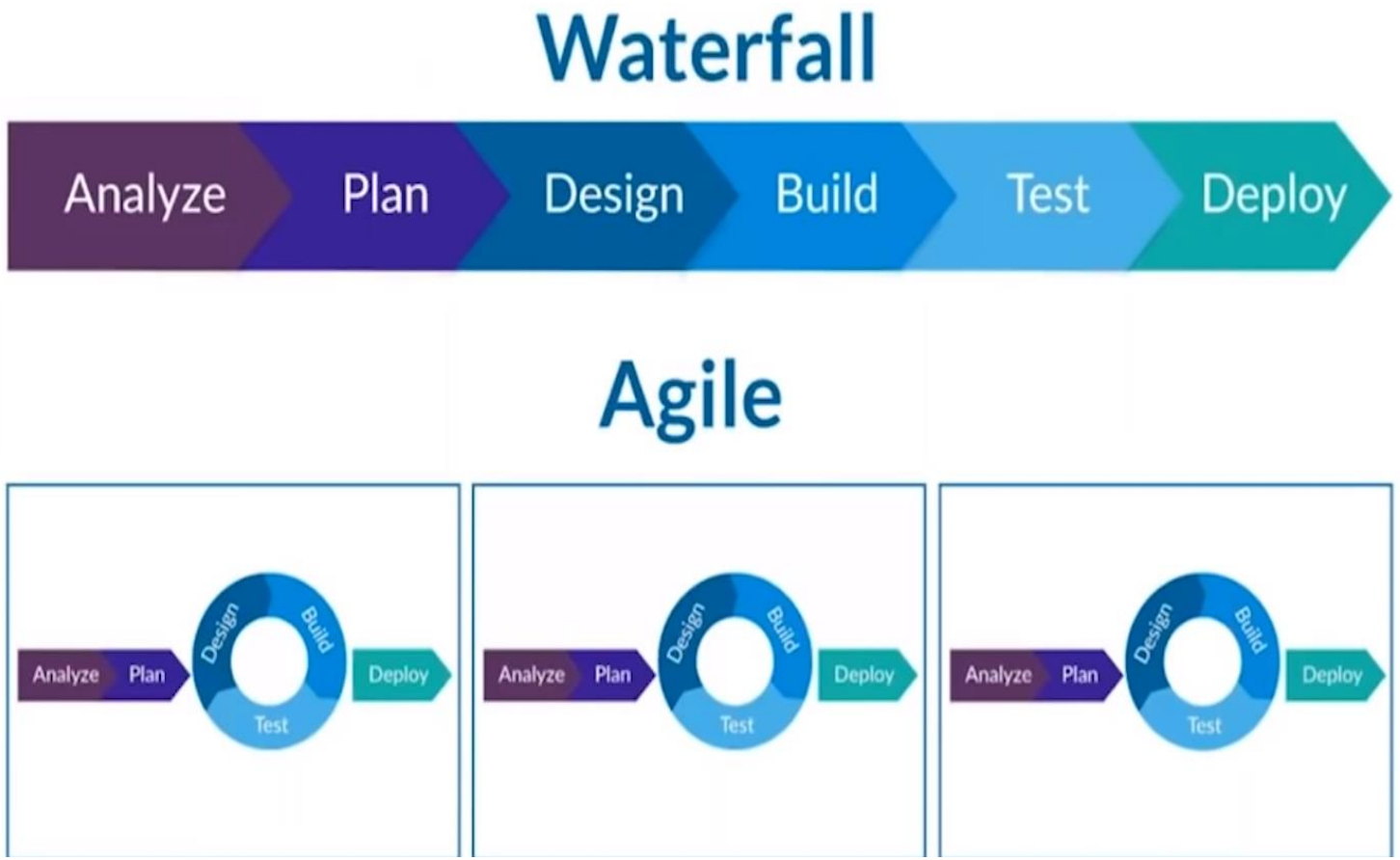
What Will I Learn Today?



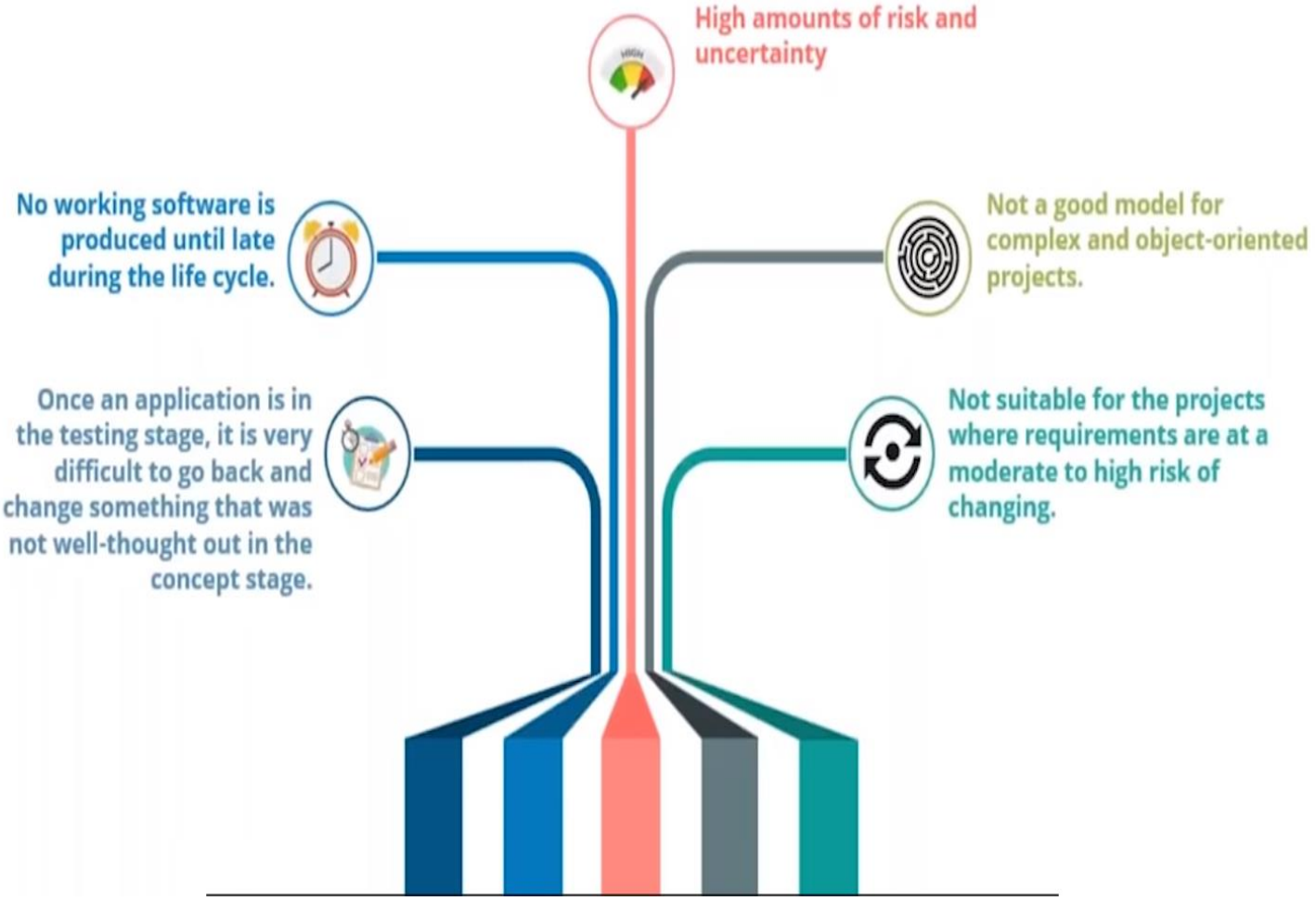
Software Requirements

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

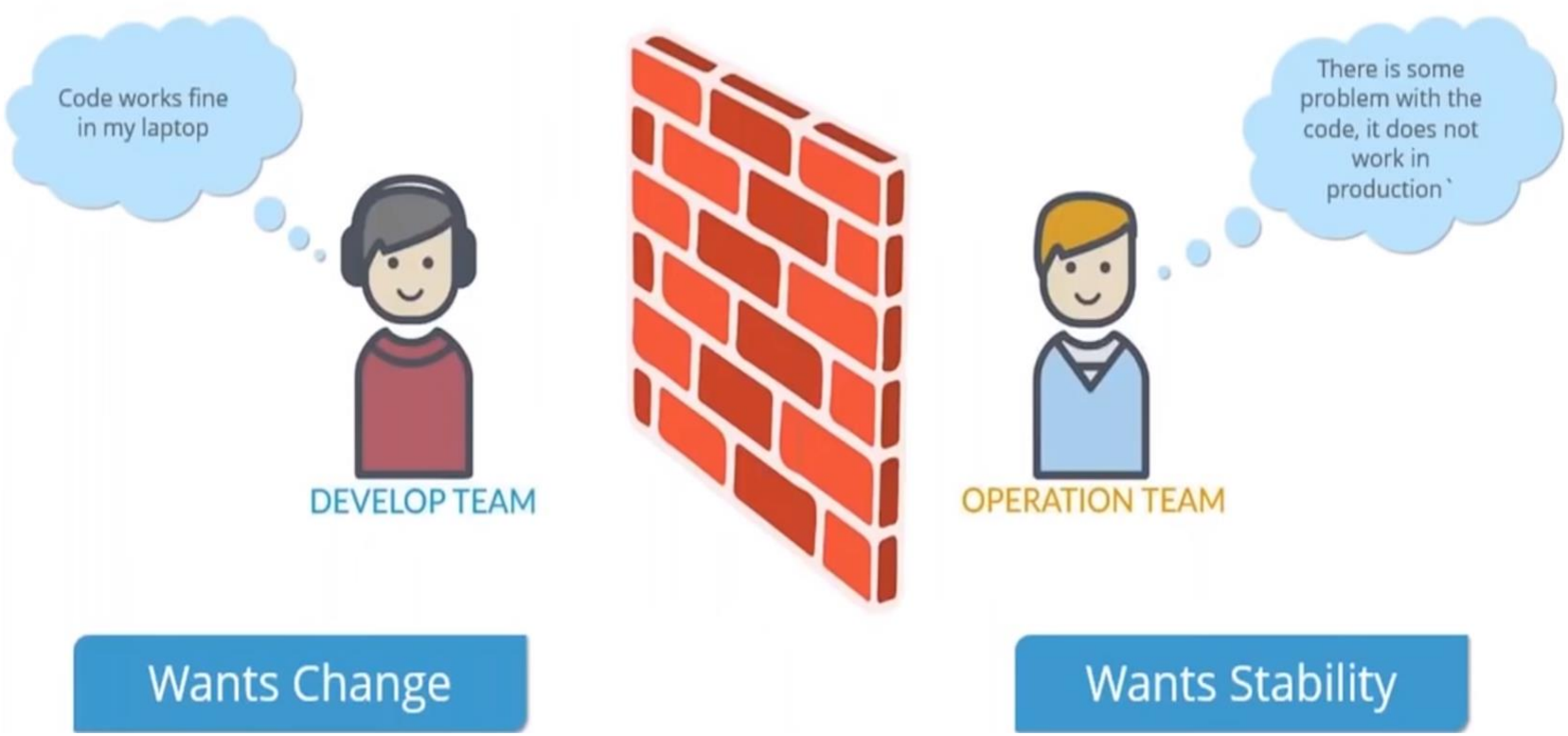
Water Fall Model vs Agile



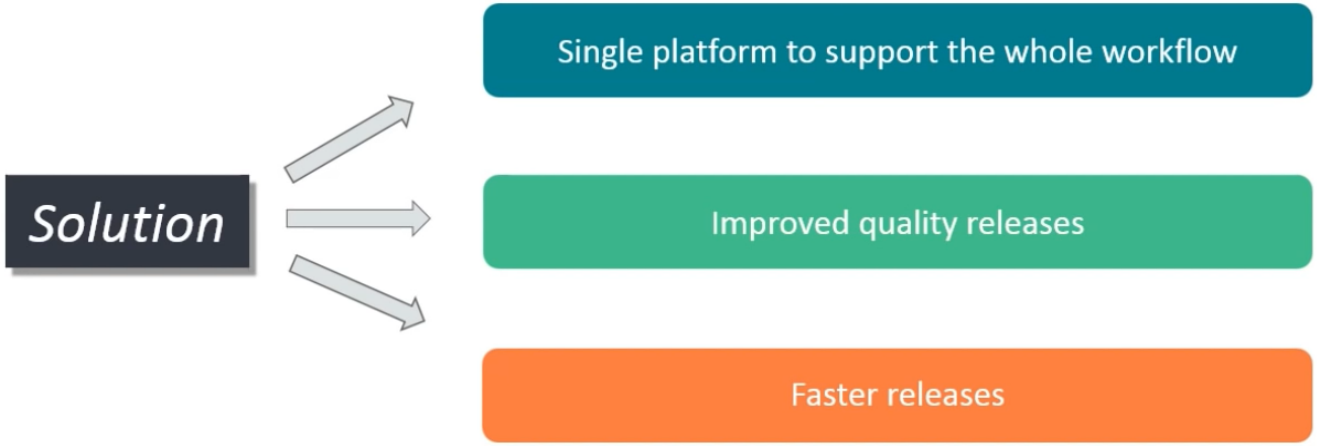
Limitations of Waterfall Model



Limitations of Agile



HP case study

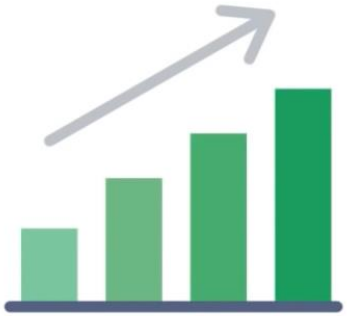


HP case study

How did they achieve this?

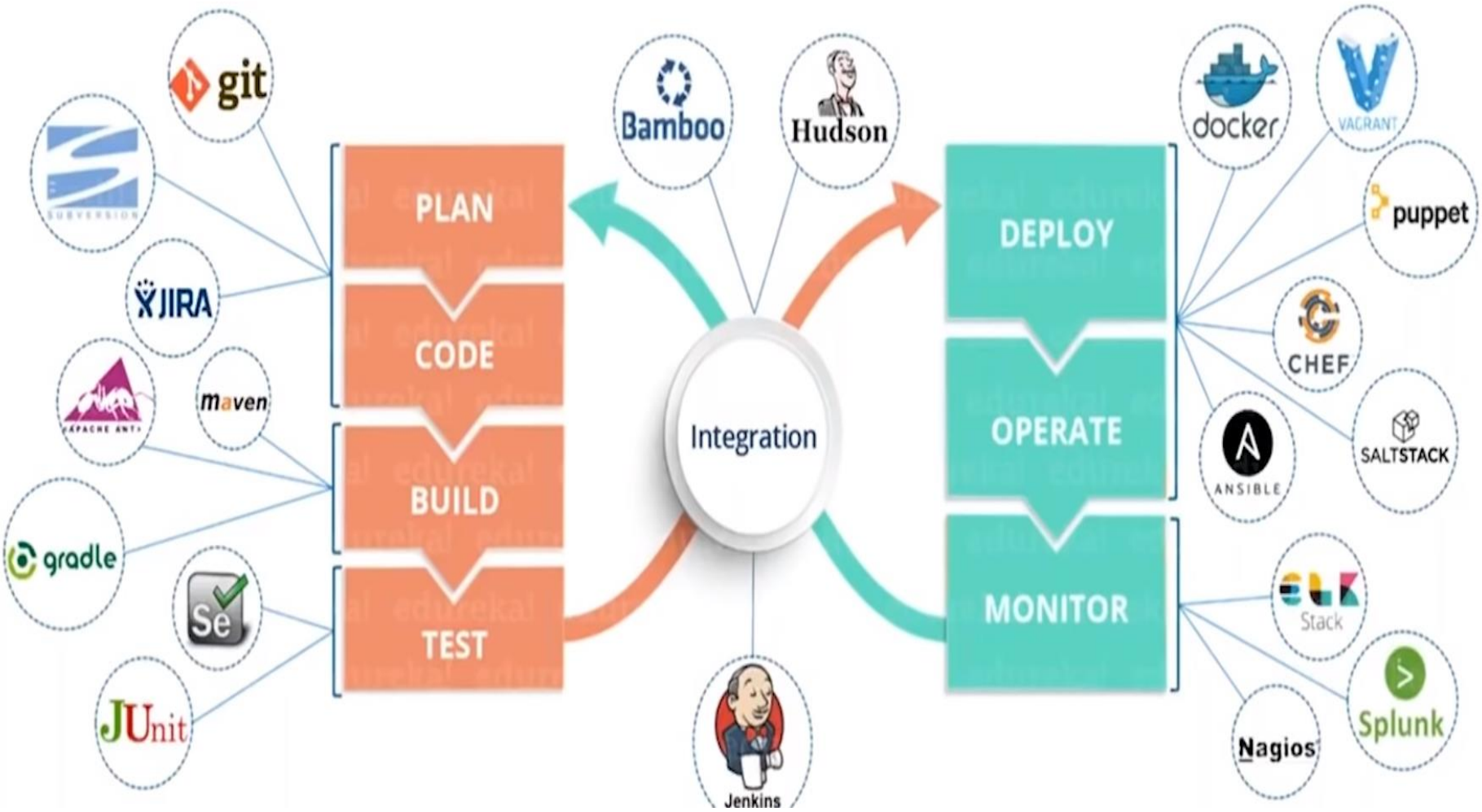
They implemented a CD pipeline with two key features

- Practice CI
- Automation at every step

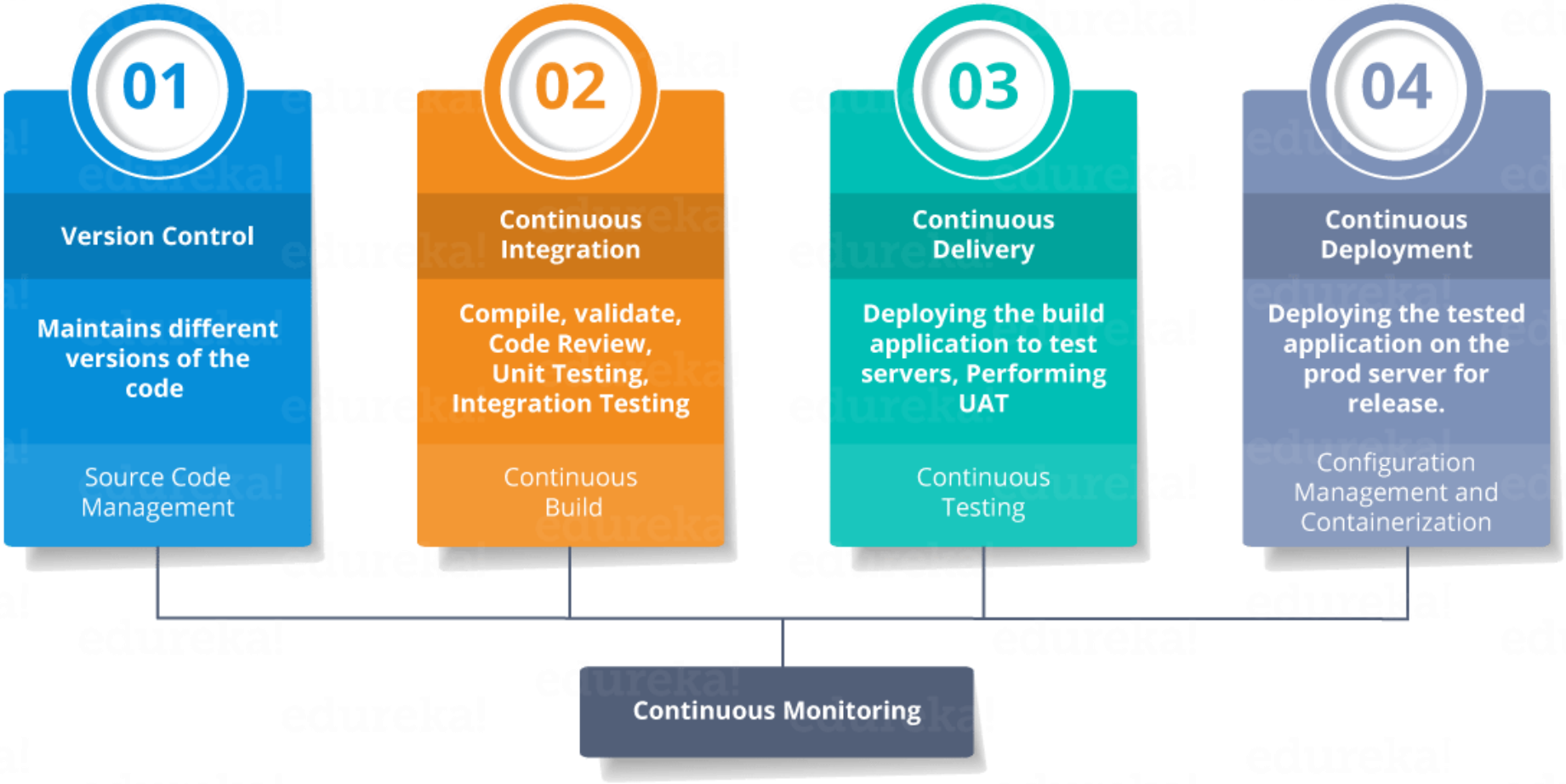


- Overall development cost reduced ~ 40%
- Programs under development increased ~ 140%
- Development cost per program went down ~ 78%

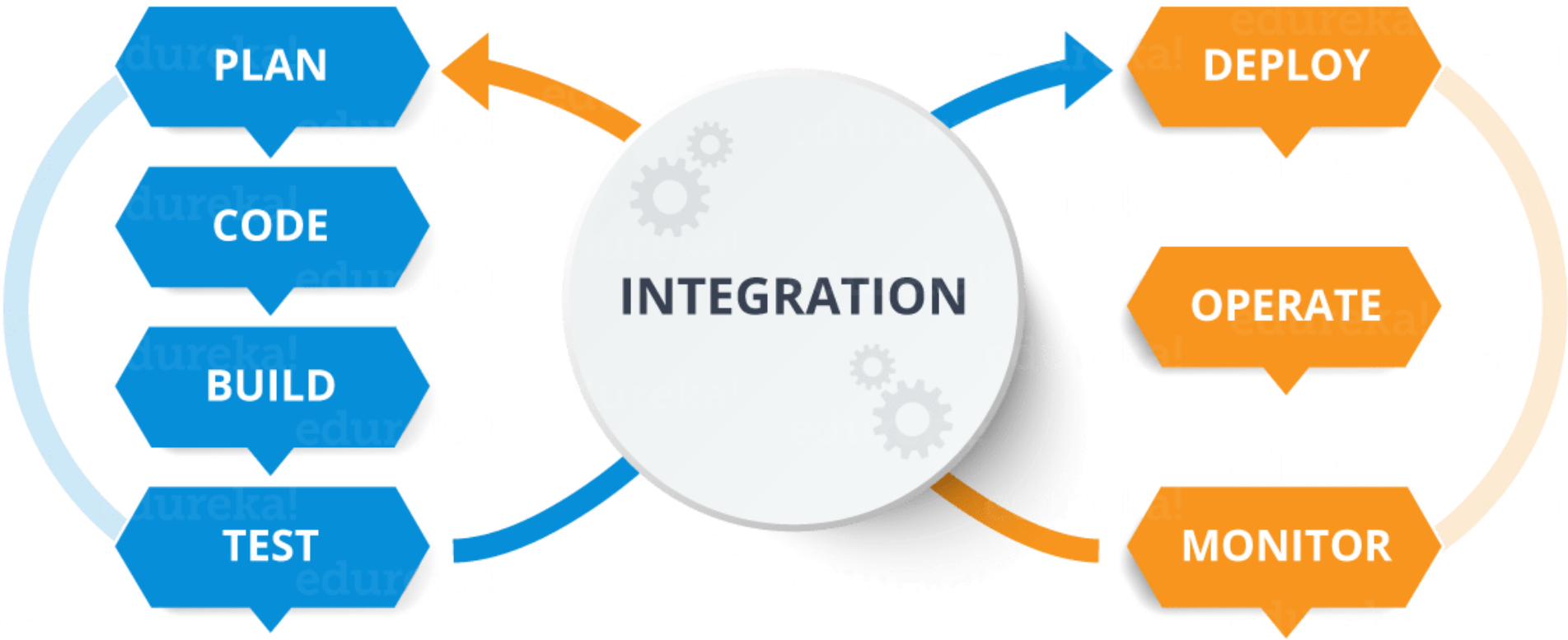
What is Devops



CI/CD Pipeline

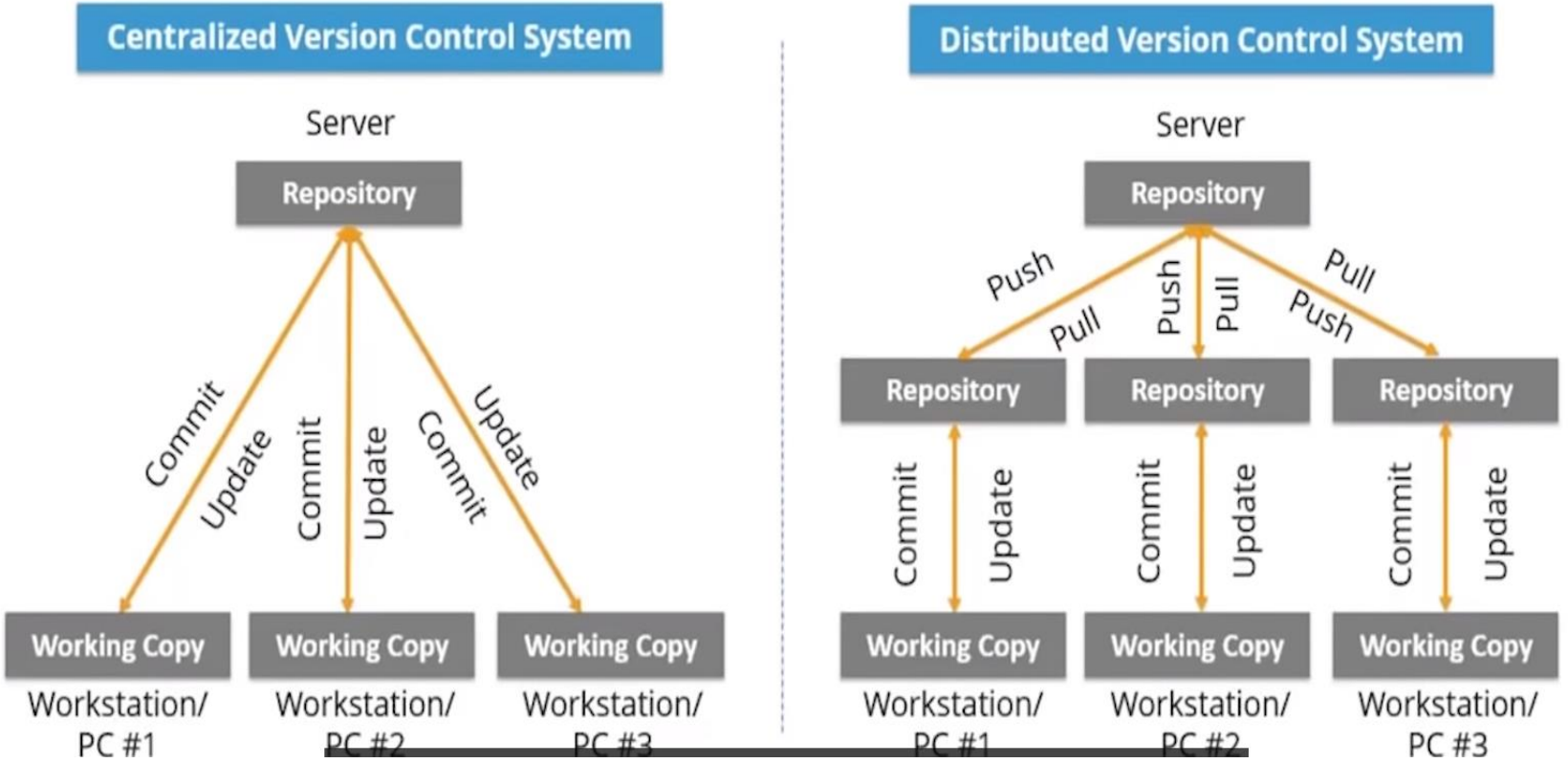


CI/CD Pipeline



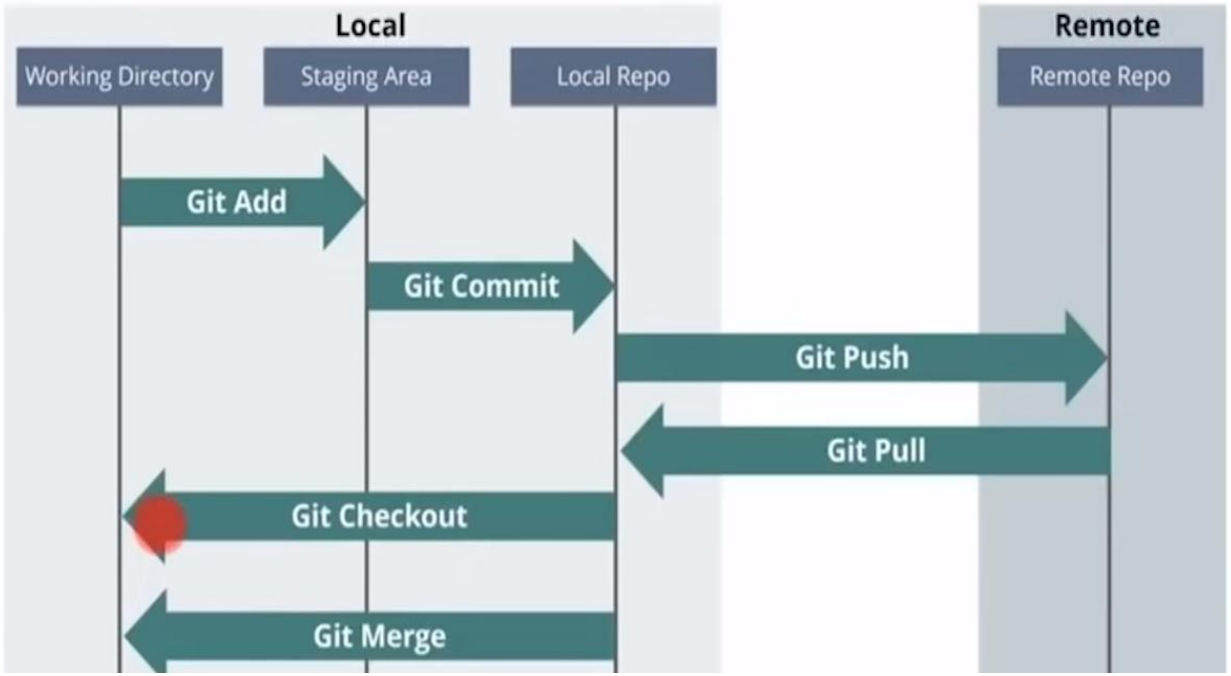
Source Code Management

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

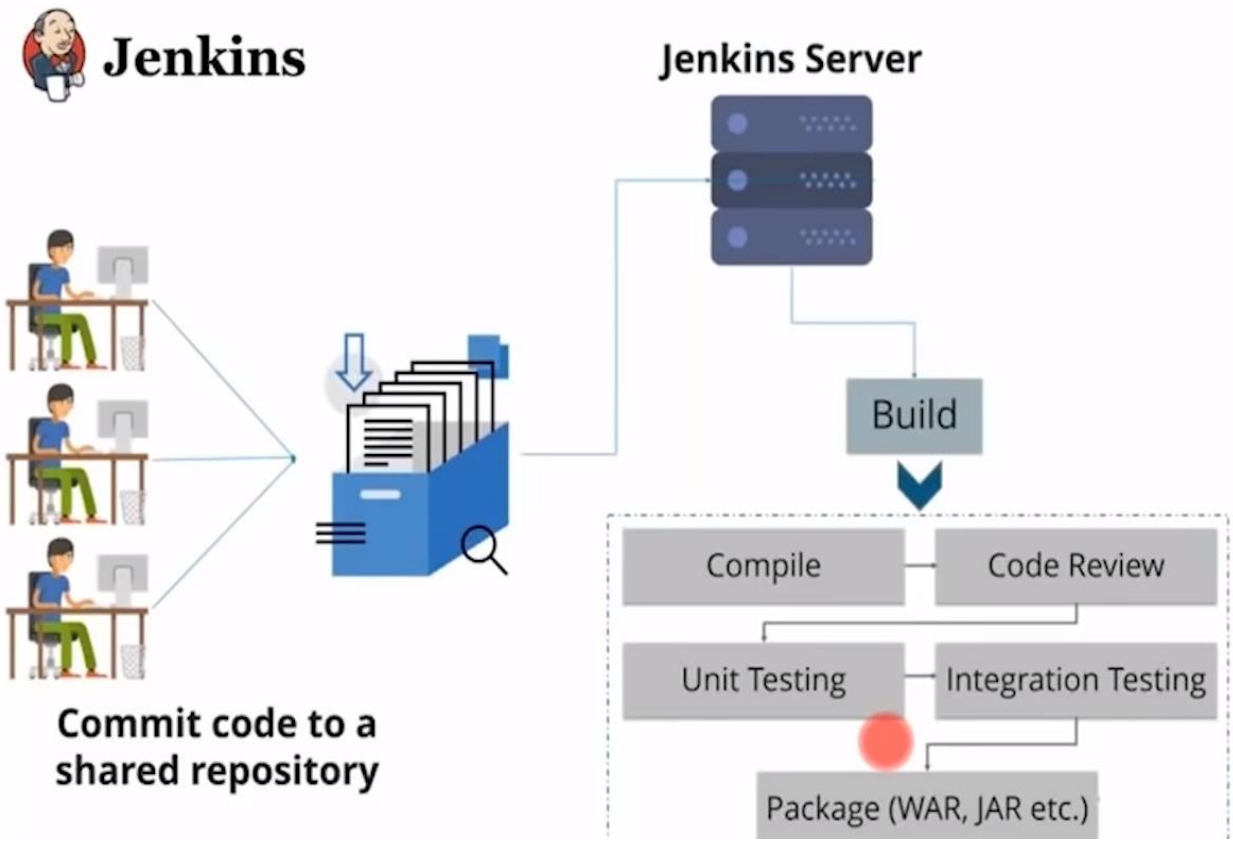


Source Code Management

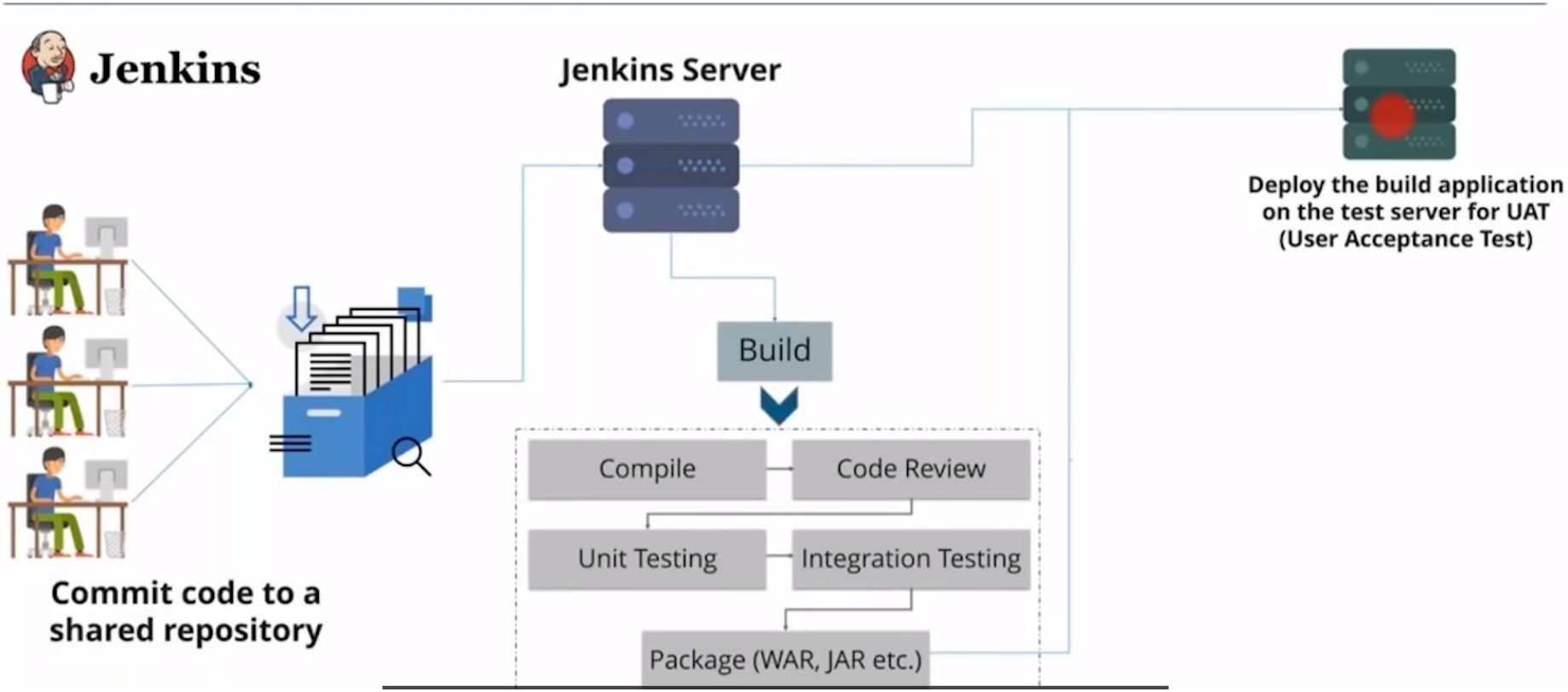
Git is a Distributed Version Control tool that supports distributed non-linear workflows by providing data assurance for developing quality software



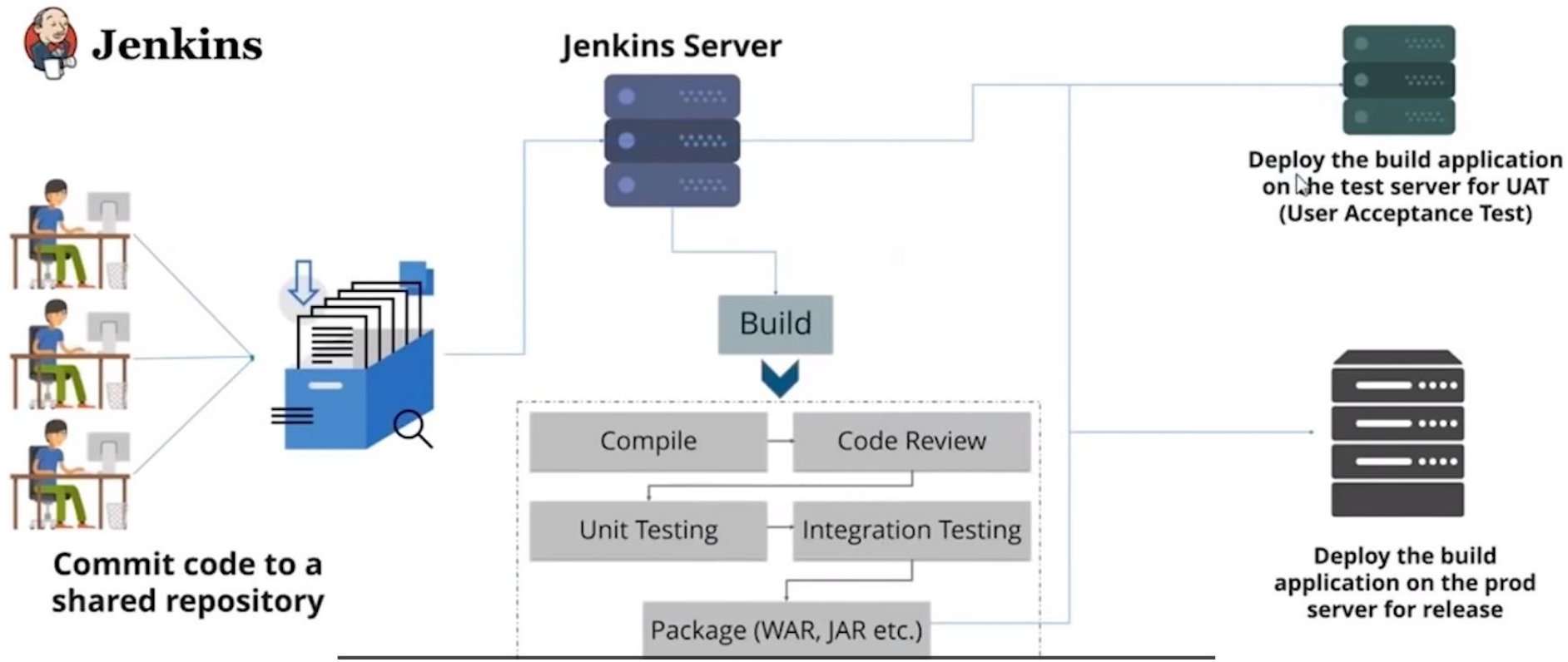
Continuous Integration



Continuous Delivery



Continuous Deployment

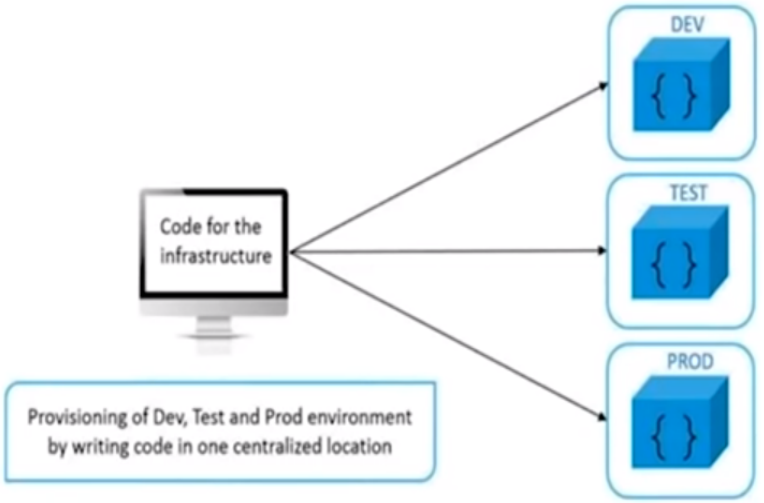


Configuration Management

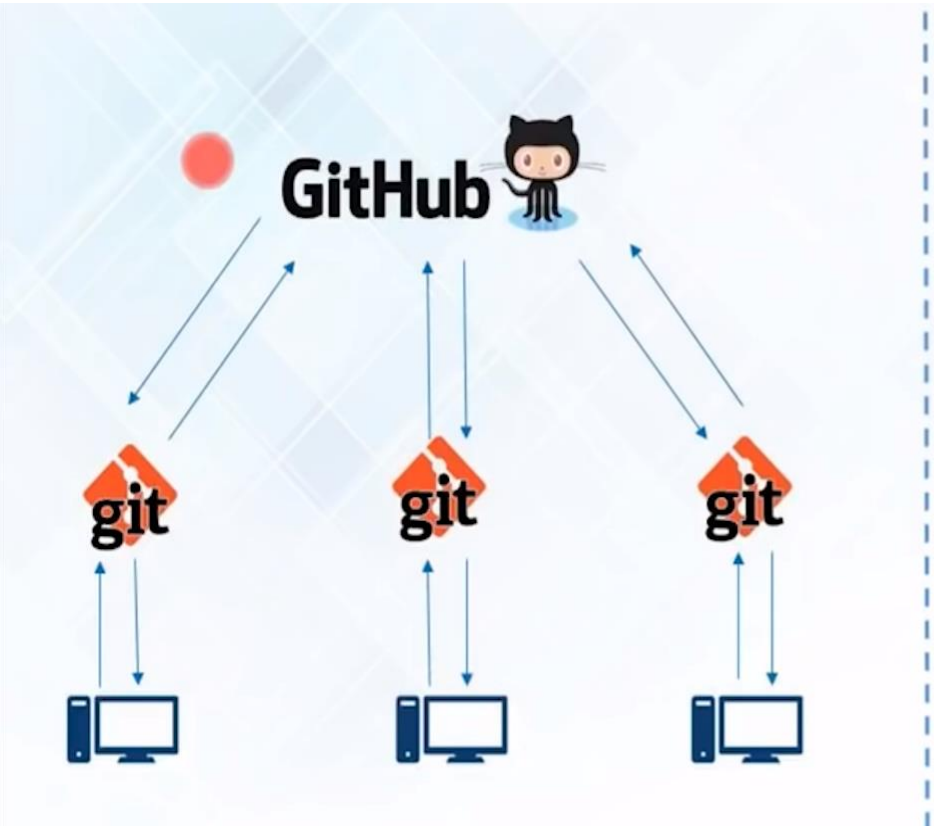
Configuration Management is the practice of handling changes systematically so that a system maintains its integrity over time

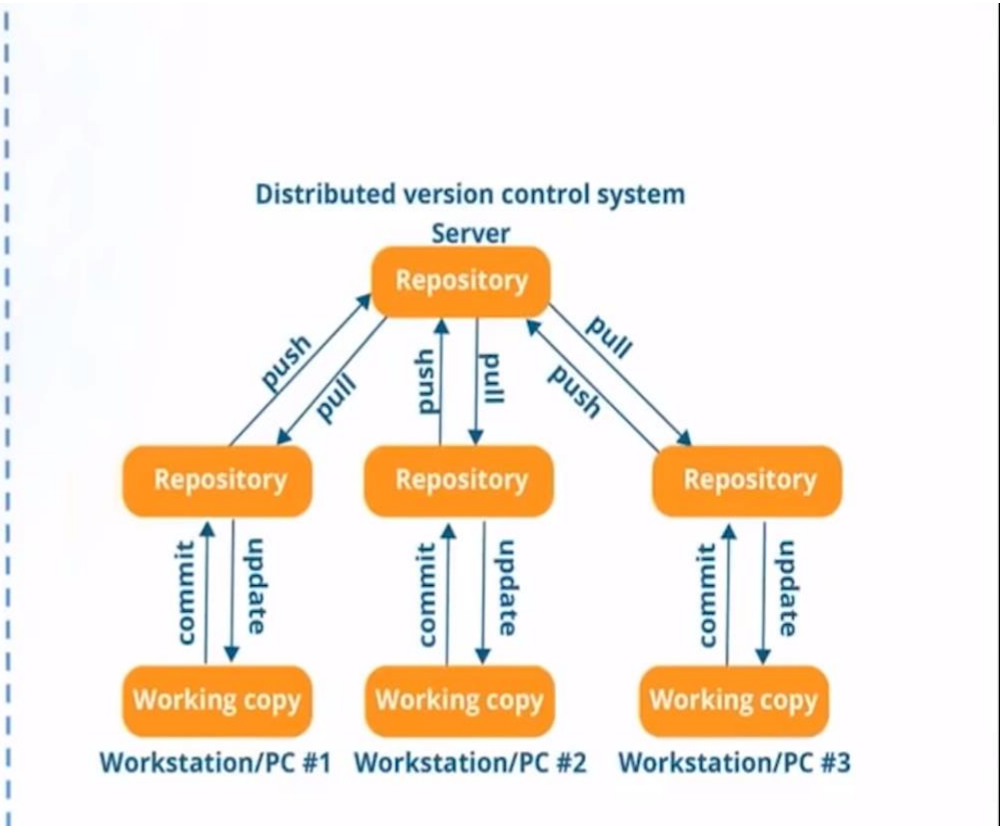
Configuration Management (CM) ensures that the current design and build state of the system is known, good & trusted

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

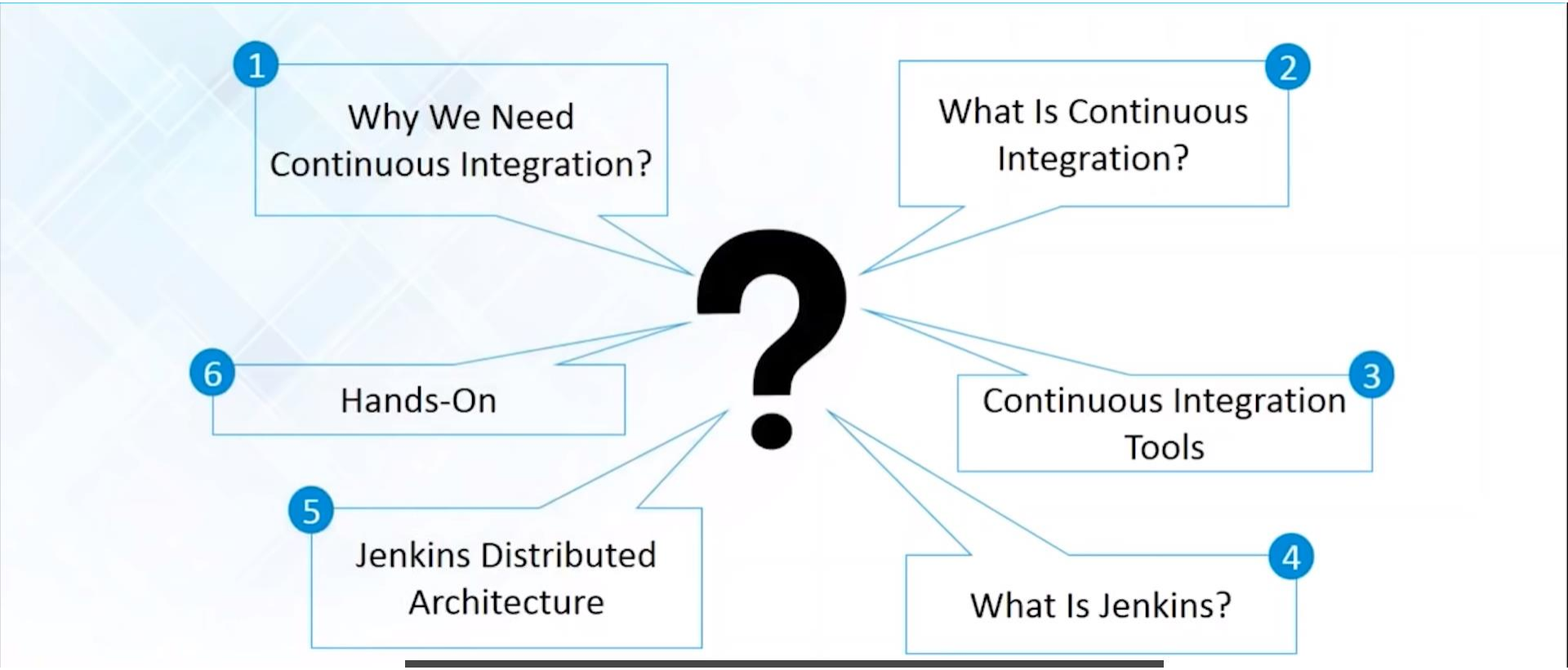


Git vs Github

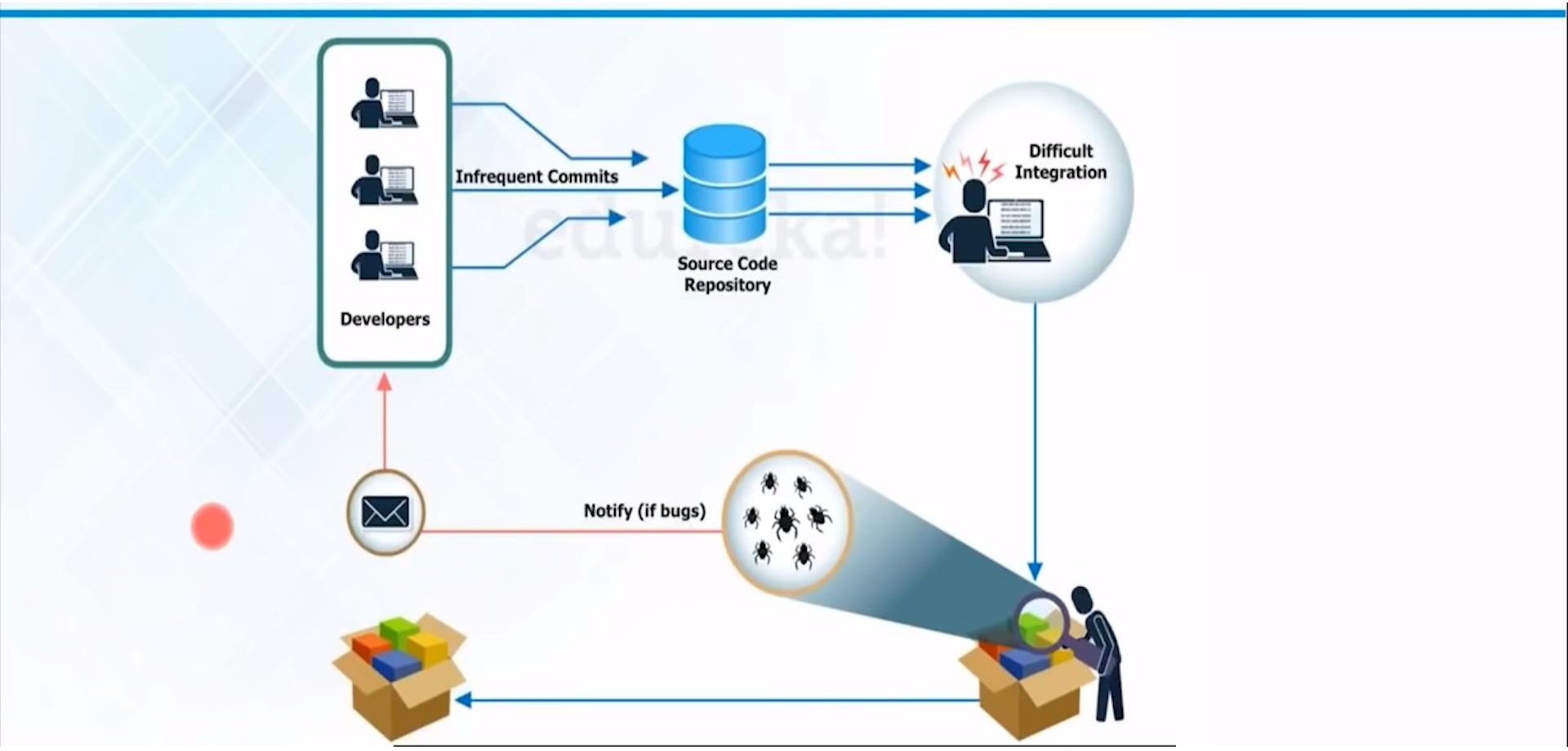




Why Continuous Integration?

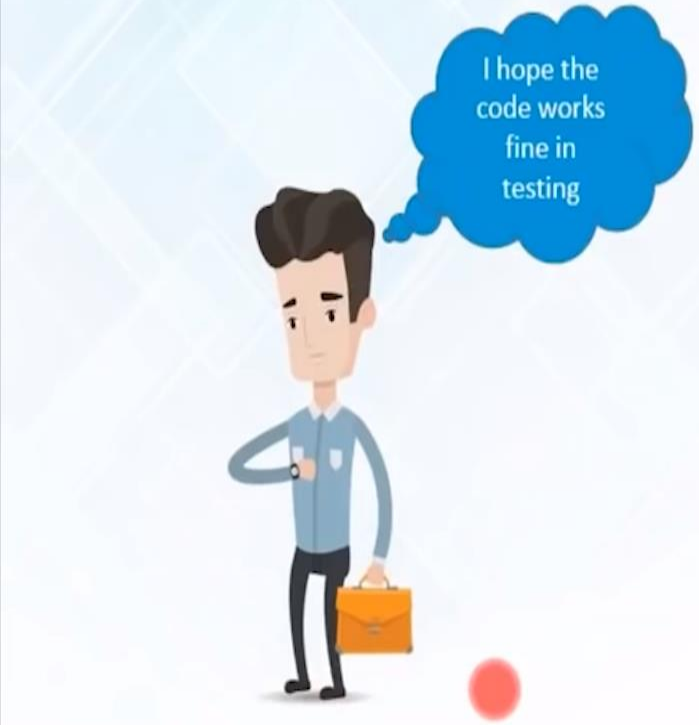


Process Before Continuous Integration?

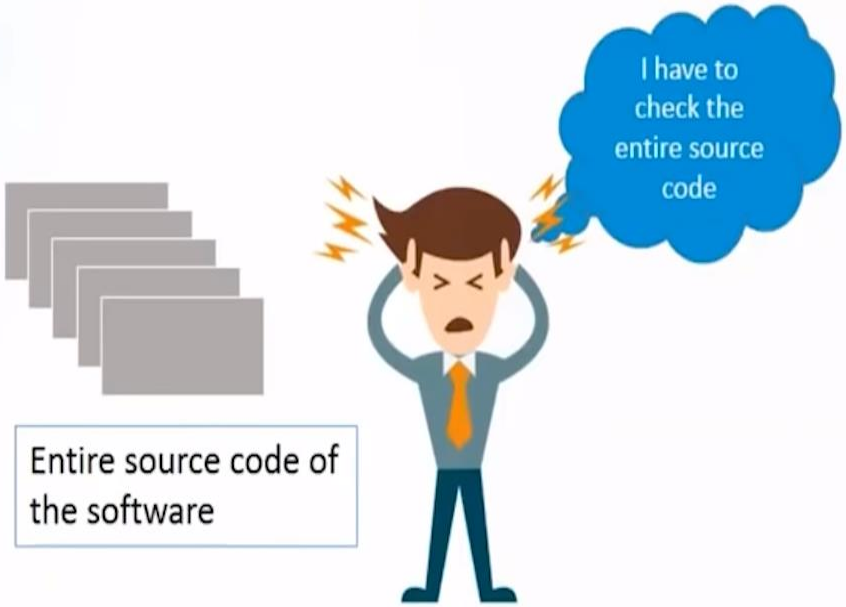


Process Before Continuous Integration?

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

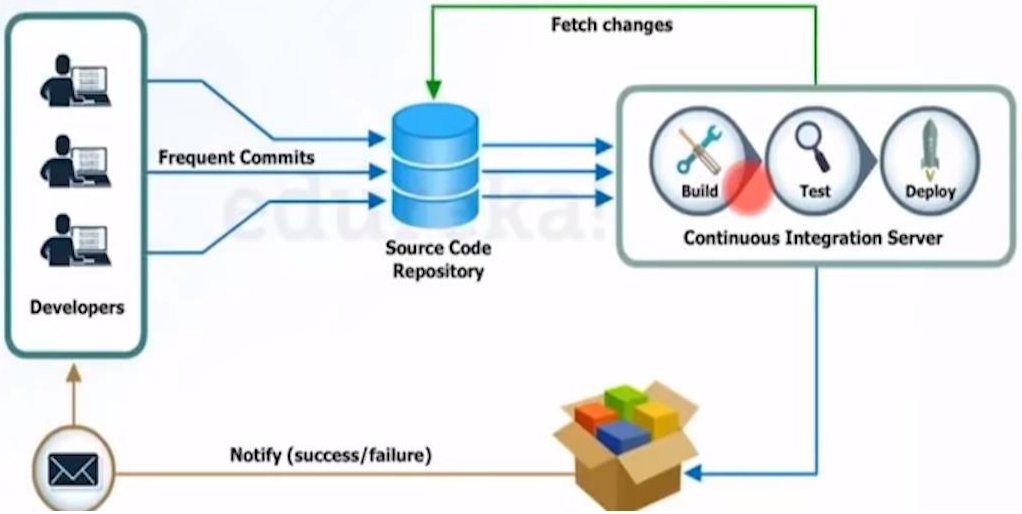


If the test fails then locating and fixing bugs is very difficult. Developers have to check the entire source code of the software.

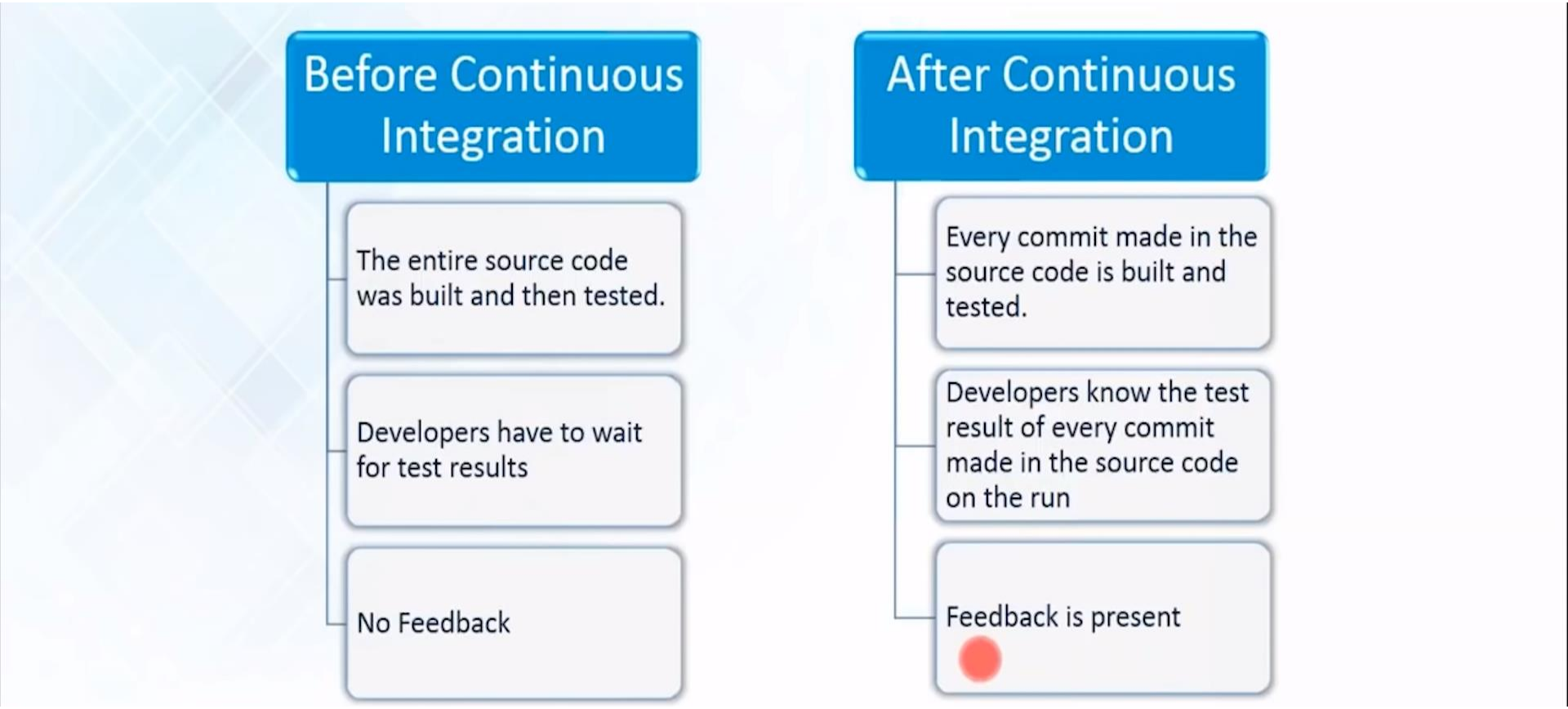


Continuous Integration To the Rescue

- 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

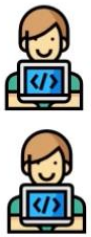


Continuous Integration To the Rescue

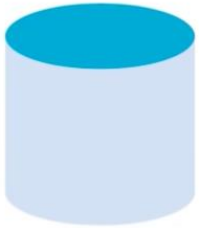


Why do we need Continuous Delivery?

Developers



Application directly deployed to prod



Code repo

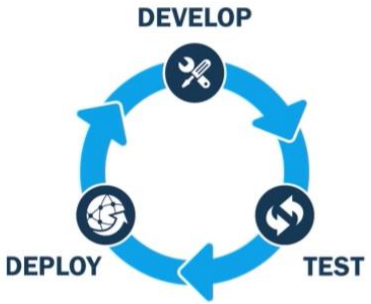
Manual testing (UT, IT)

POSSIBLE REASONS

- Different environments (servers)
- Different libraries & packages (dependencies)
- End user load (traffic)
- App not accessible to intended audience

Why do we need Continuous Delivery?

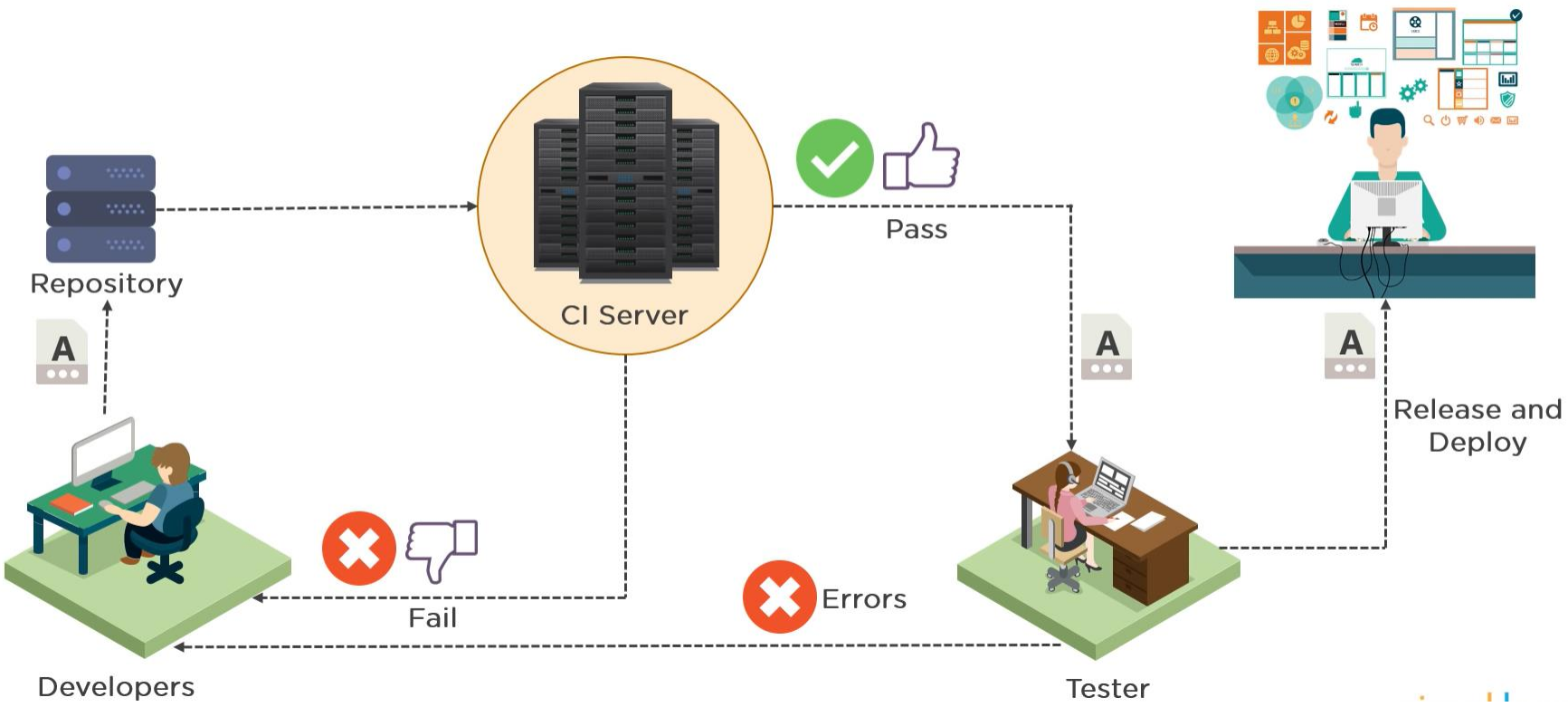
Automates software release



Increases developer productivity

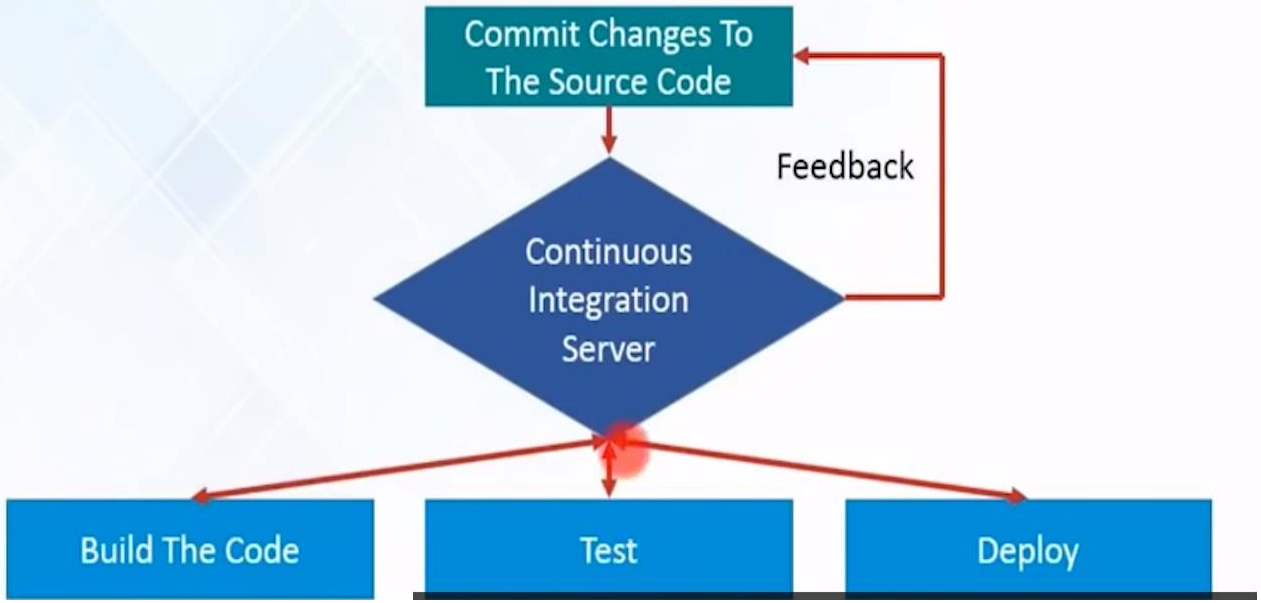
Locates and addresses bugs quicker

What is Continuous Integration



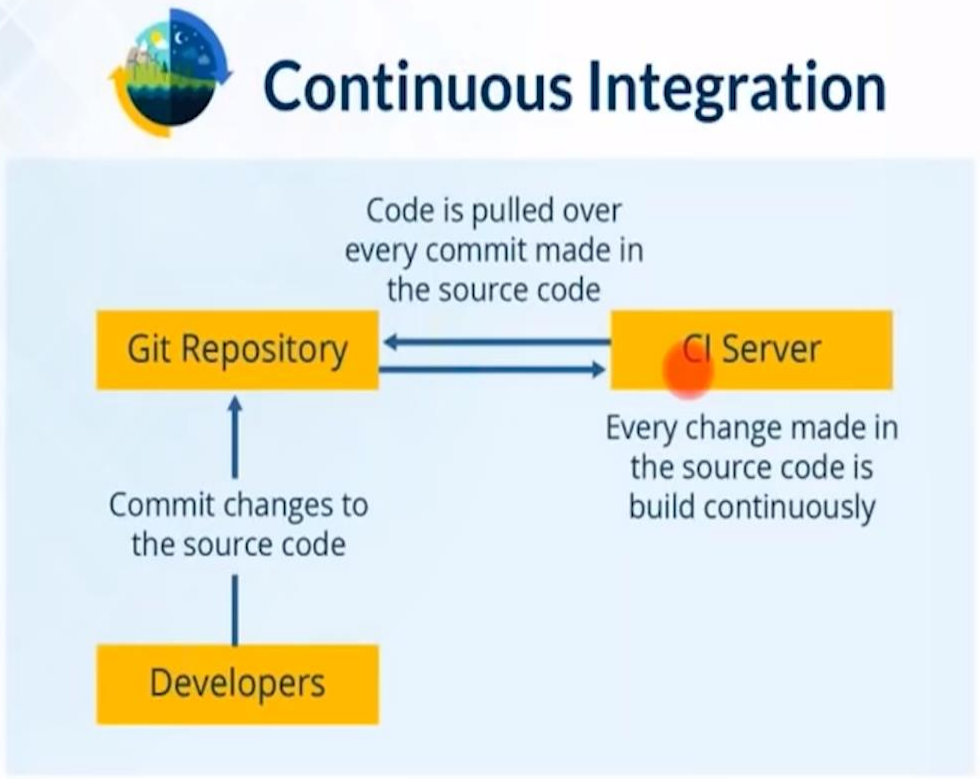
What is Continuous Integration

- 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.

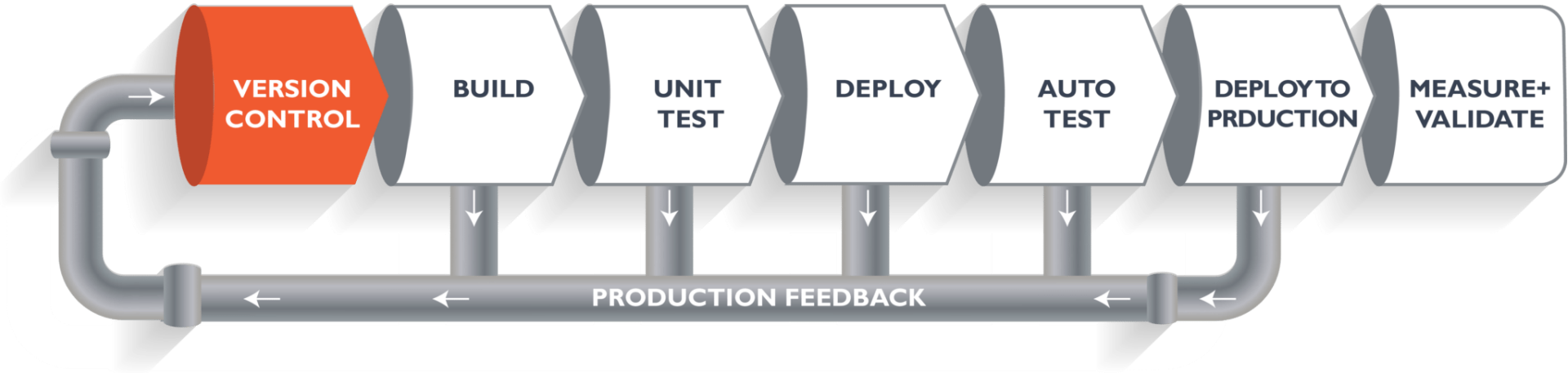


What is Continuous Integration Case Study : Nokia

Solution:



CI/CD Pipeline



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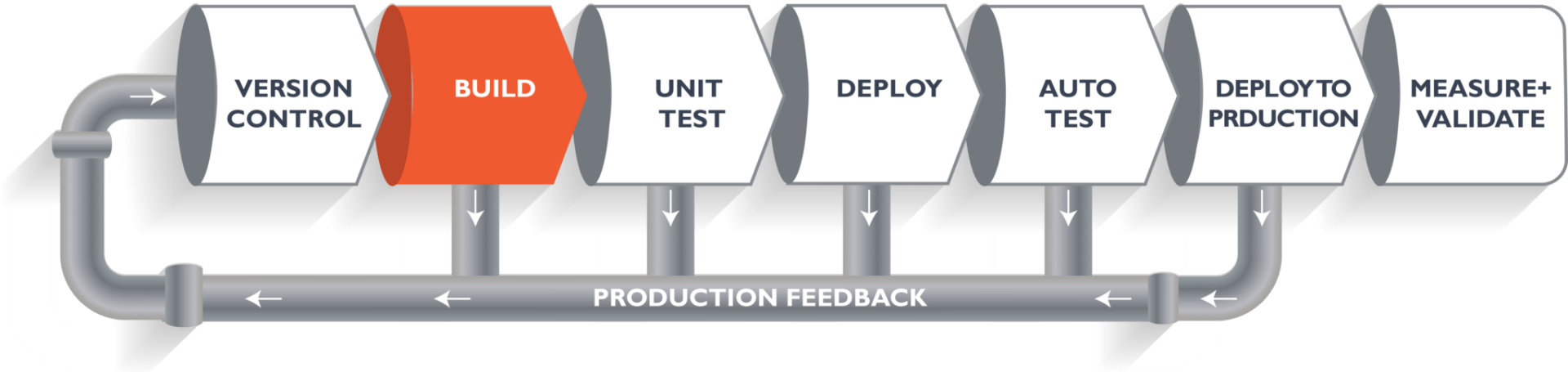

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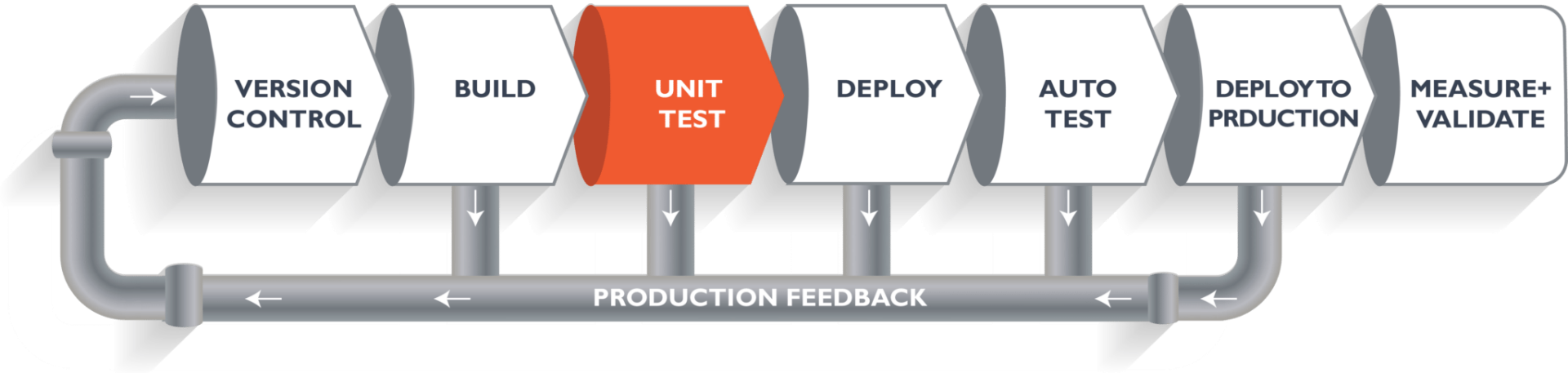

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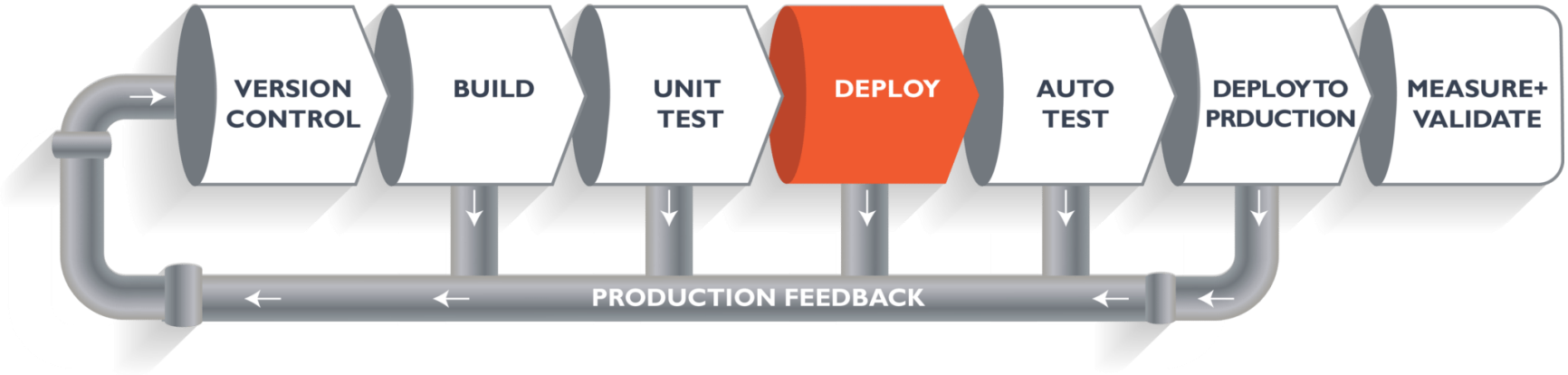
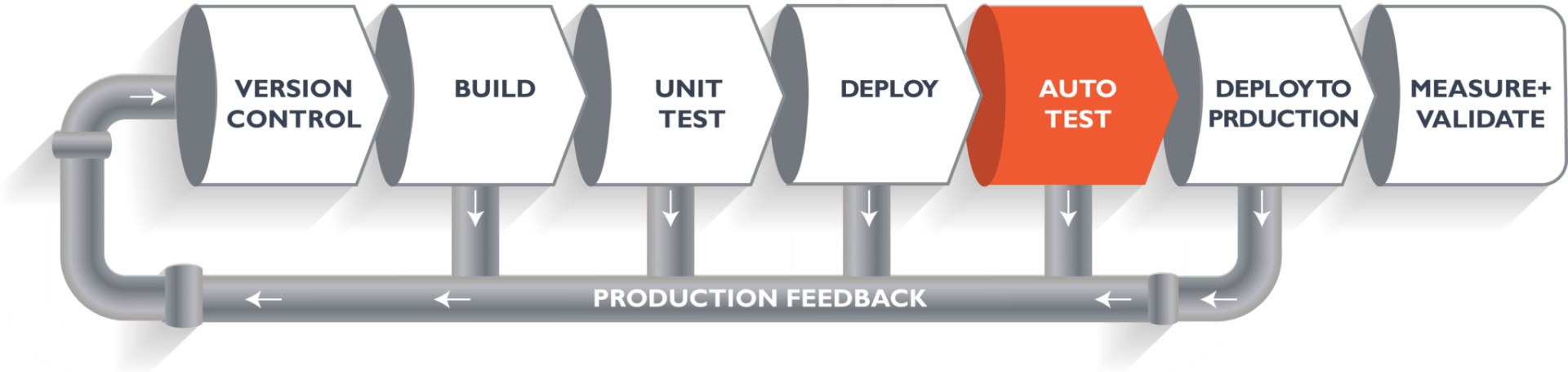


CI/CD Pipeline



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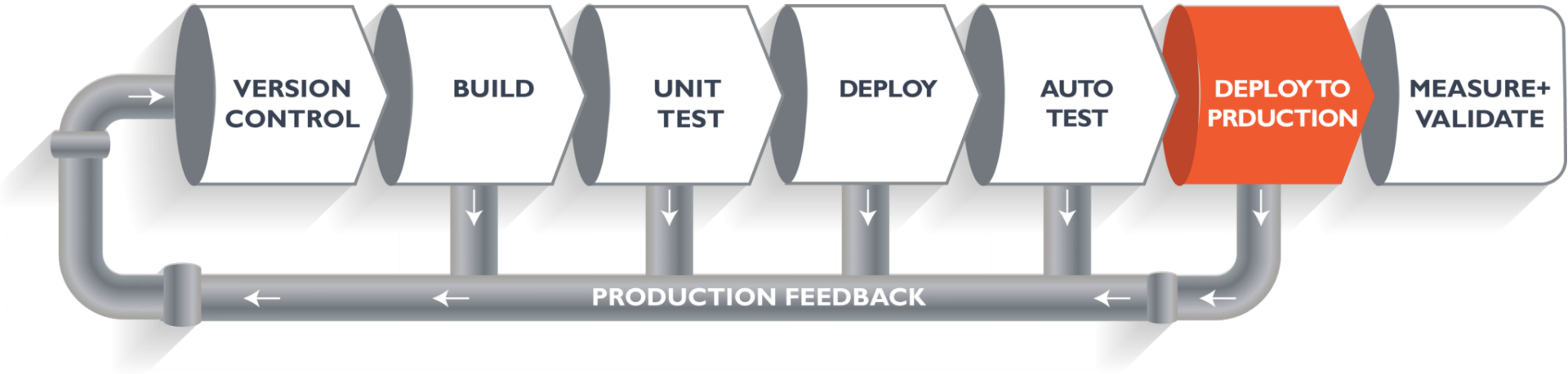
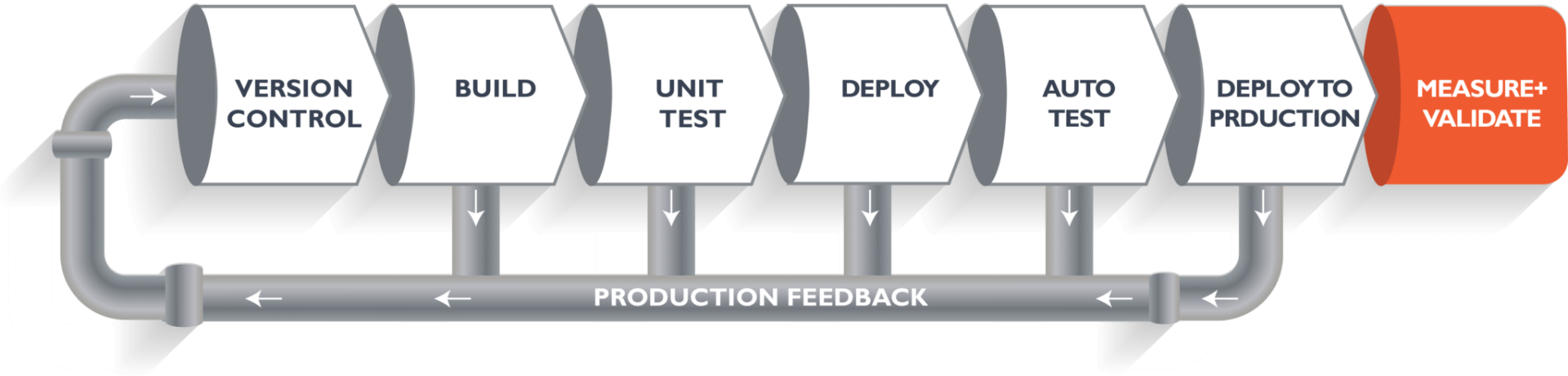


CI/CD Pipeline



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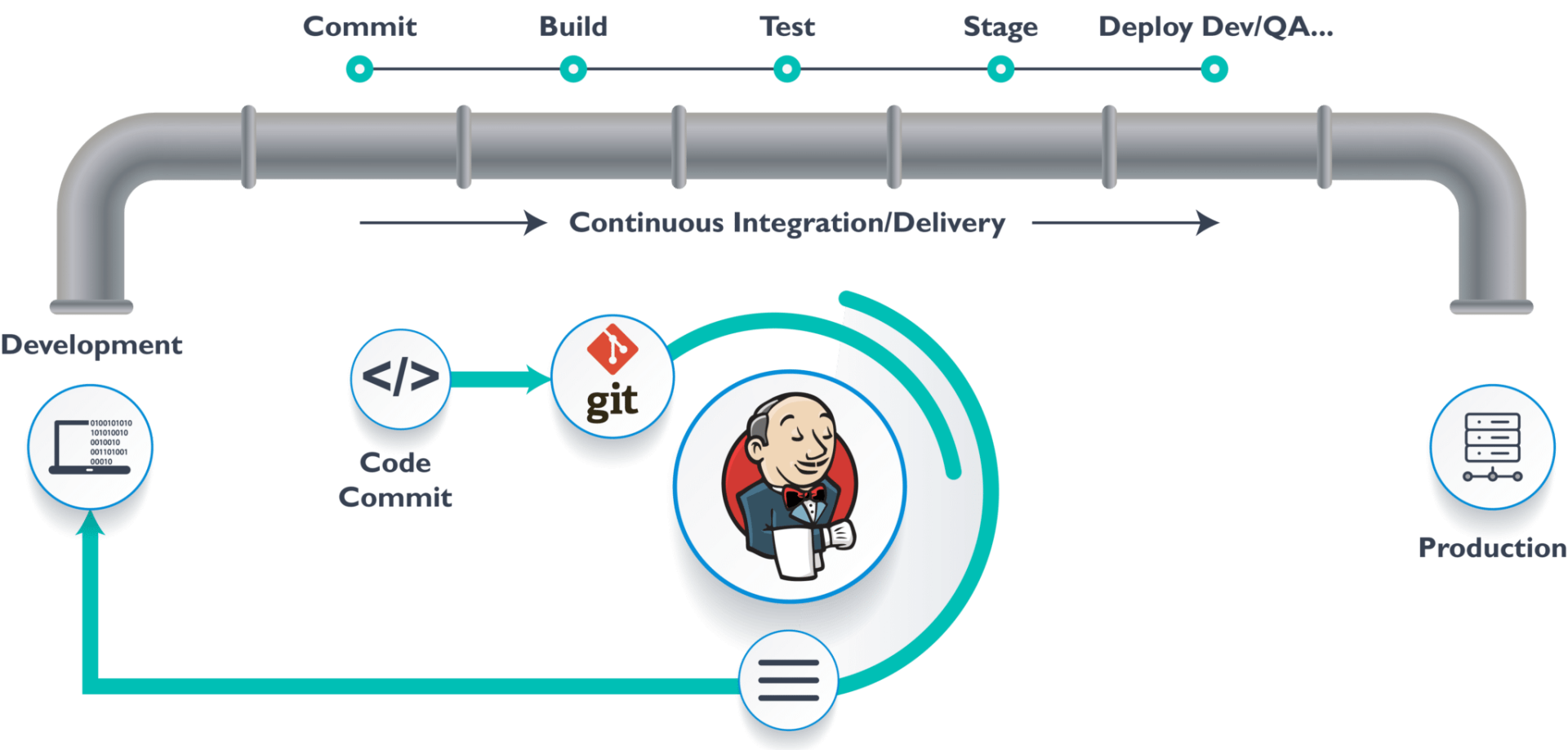

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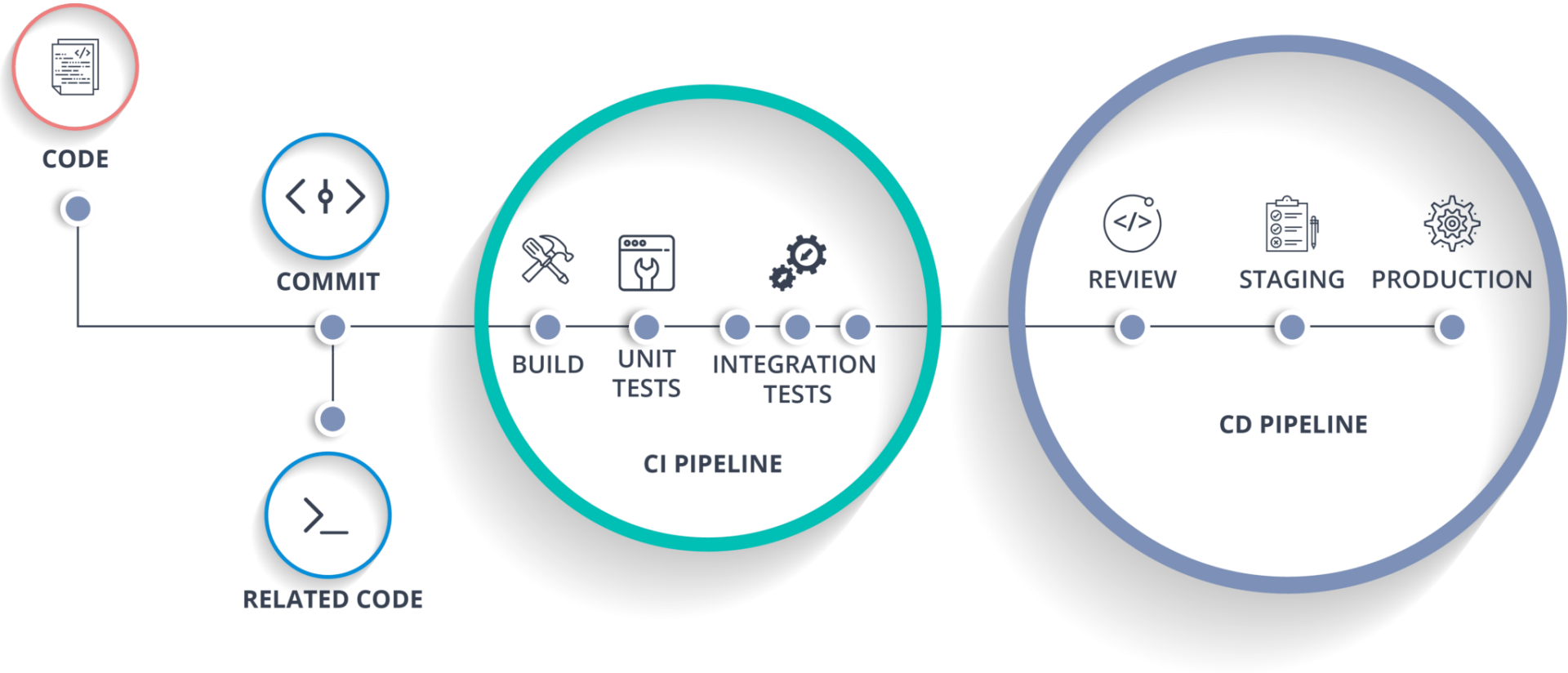
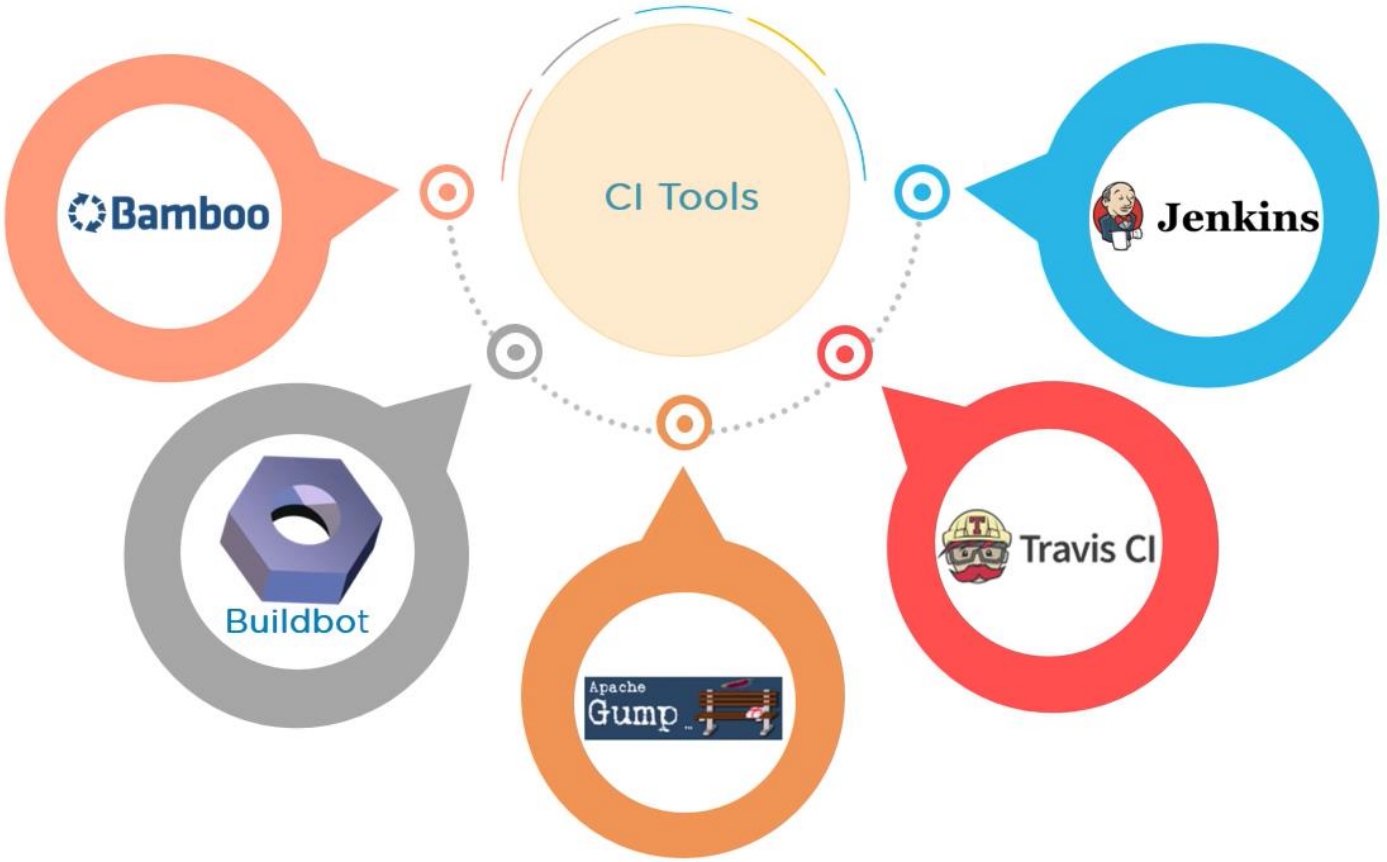
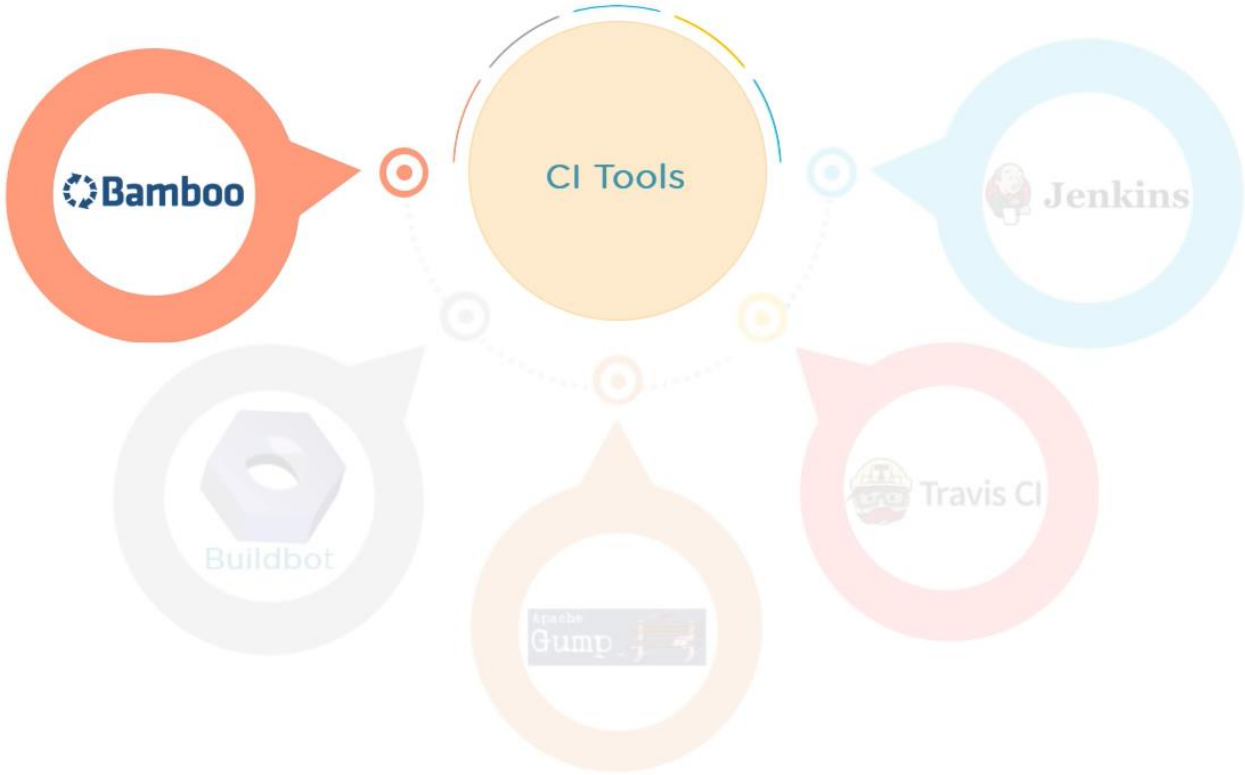


Continuous Integration Tools



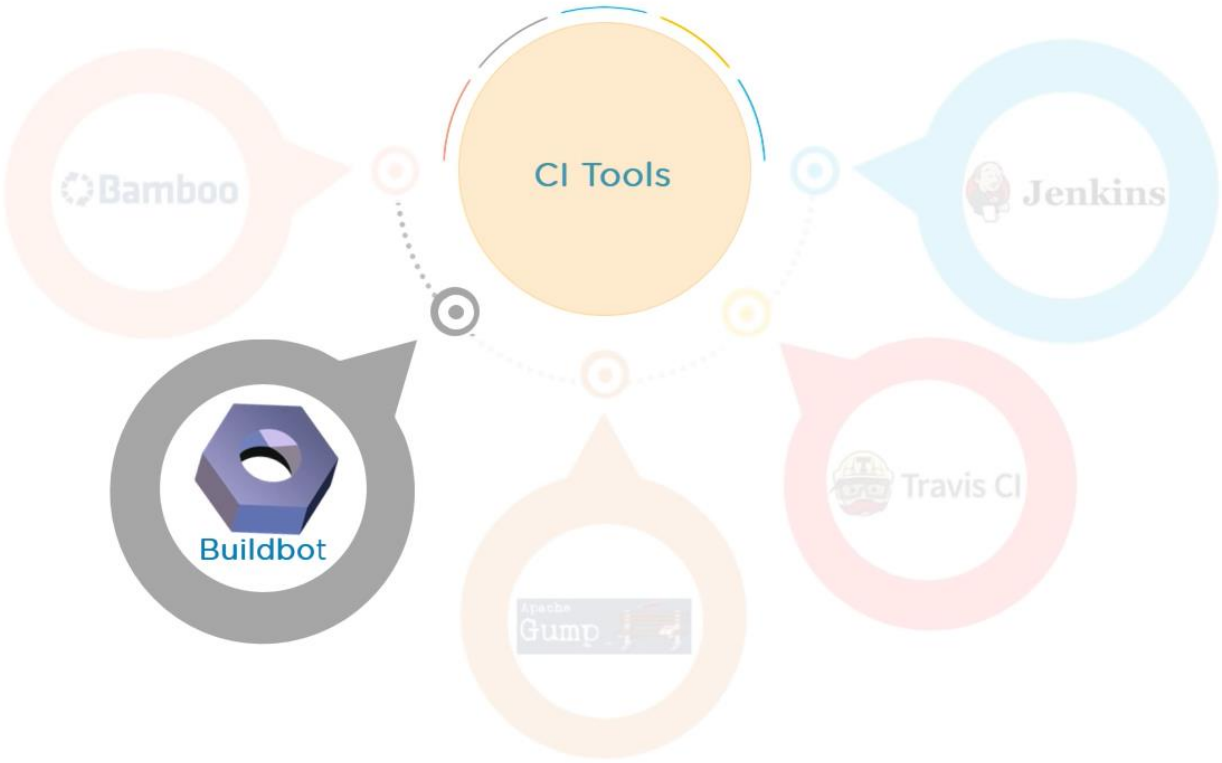
Continuous Integration Tools

Bamboo is a CI tool that can run multiple builds in parallel for faster compilation. It has built in functionality to connect with repositories and has build tasks for Ant, Maven, etc.



Continuous Integration Tools

Buildbot is an open-source framework for automating software build, test and release processes. It is written in Python and supports distributed, parallel execution of jobs across multiple platforms.



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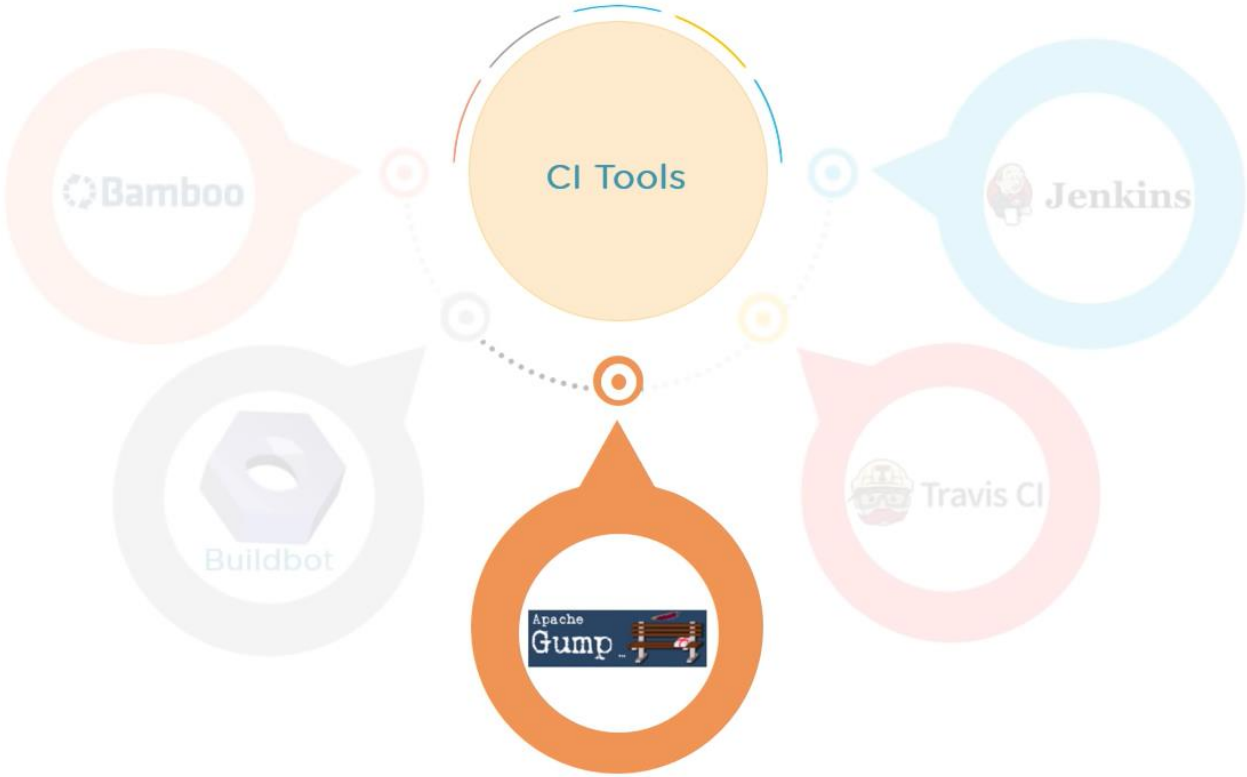
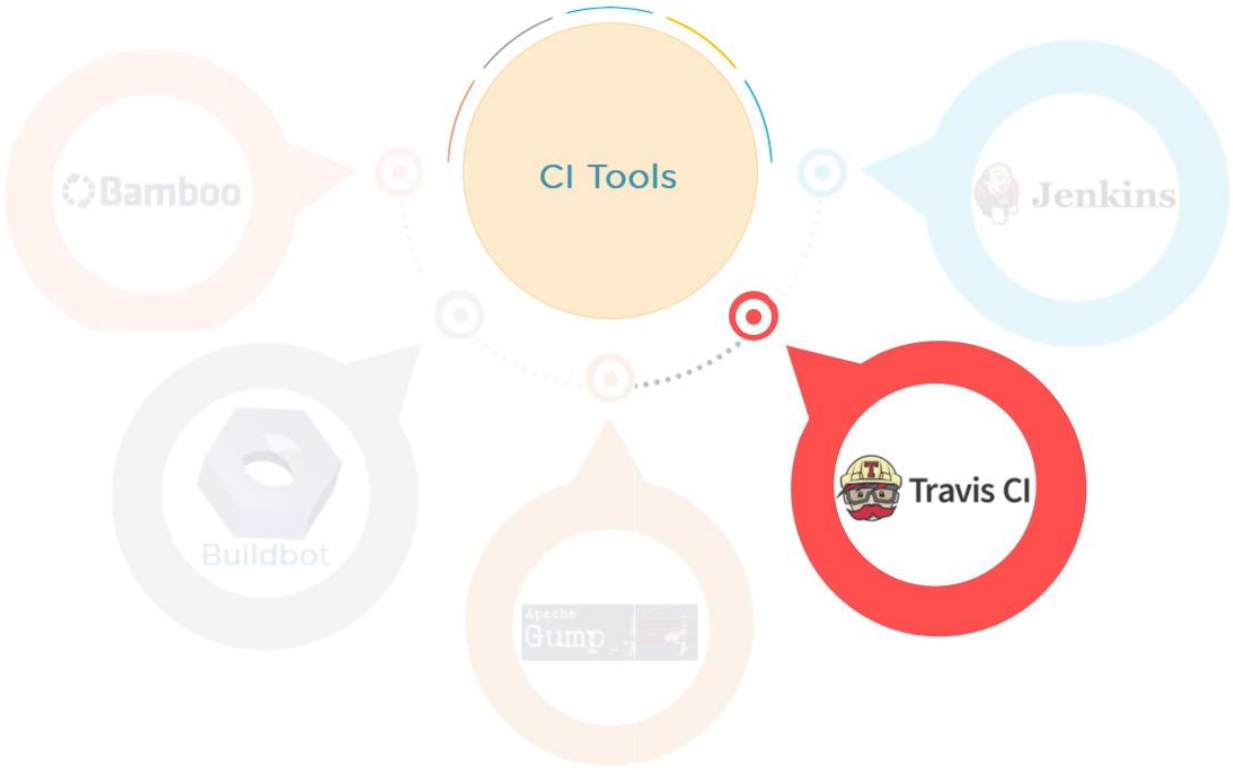
Continuous Integration Tools

Apache Gump is designed with the aim to build and test all the open source Java projects, every night. It makes sure that all the projects are compatible at both API level and functionality level.



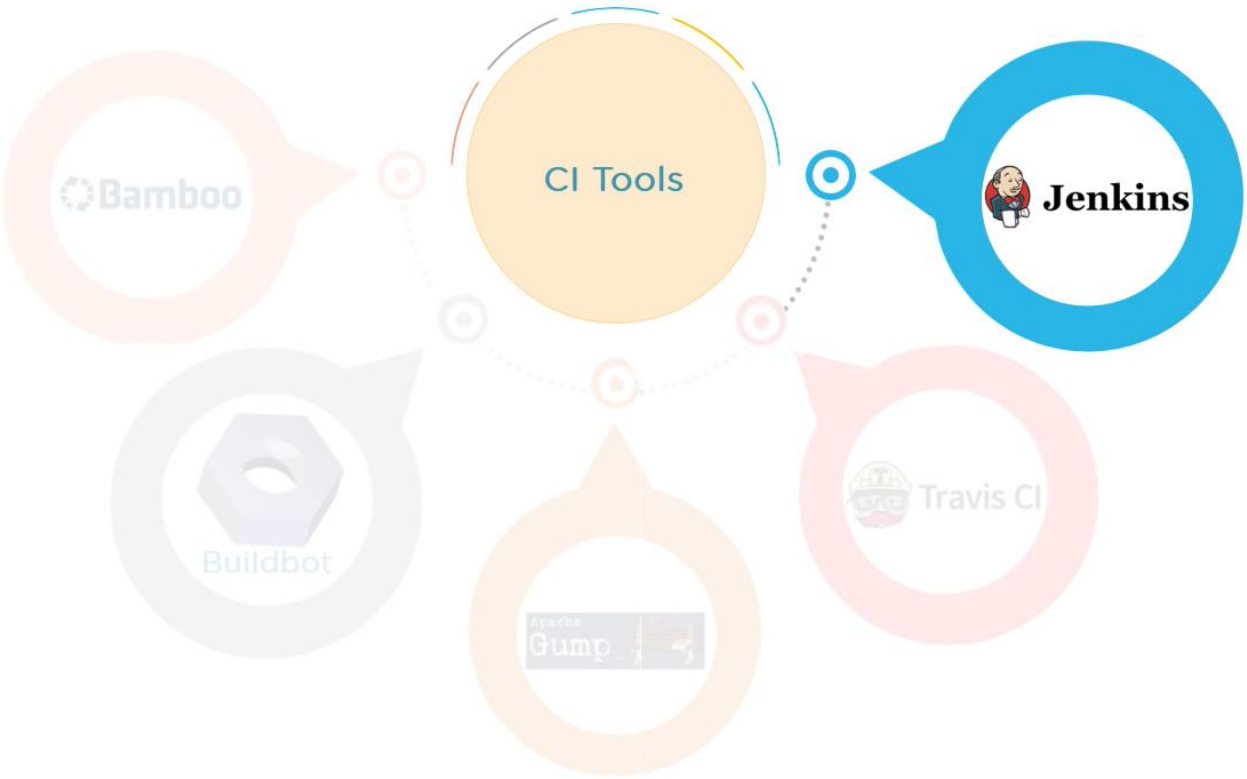
Continuous Integration Tools

Travis CI is a hosted, distributed continuous integration service used to build and test software projects hosted at GitHub. It's built for projects and team of all sizes and supports over 20 different languages.

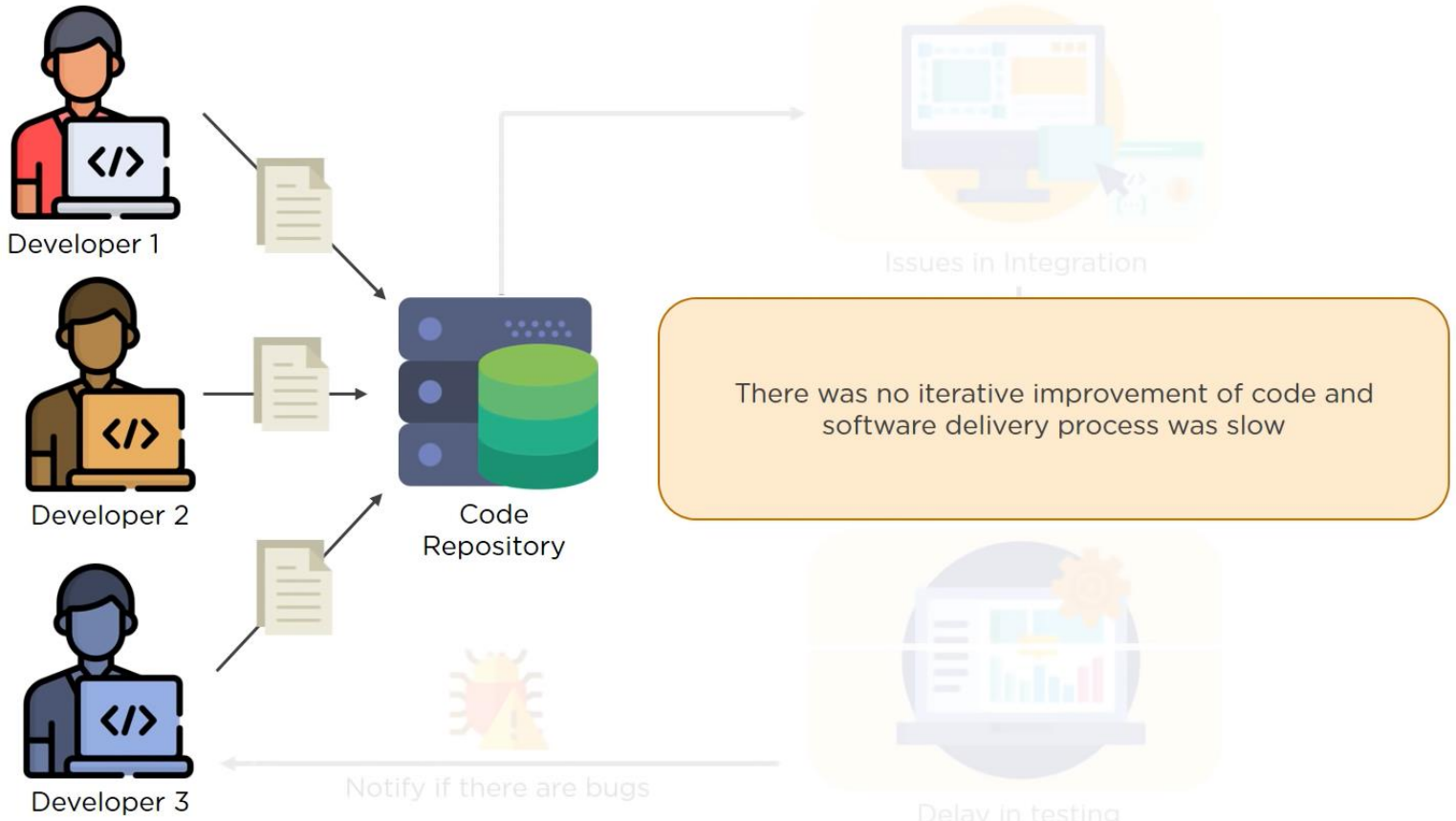


Continuous Integration Tools

Jenkins is an open source automation server written in Java. It is used to automate software development process via continuous integration and facilitates continuous delivery.

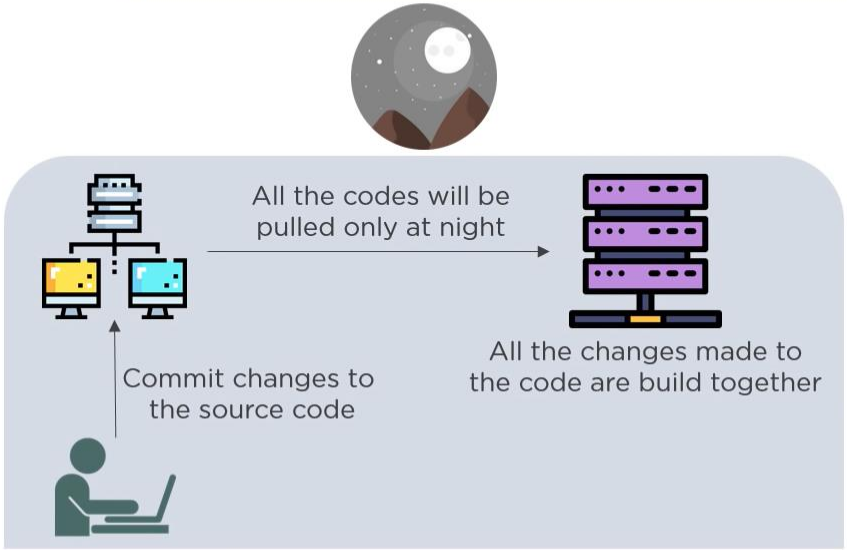


Problems Before jenkins

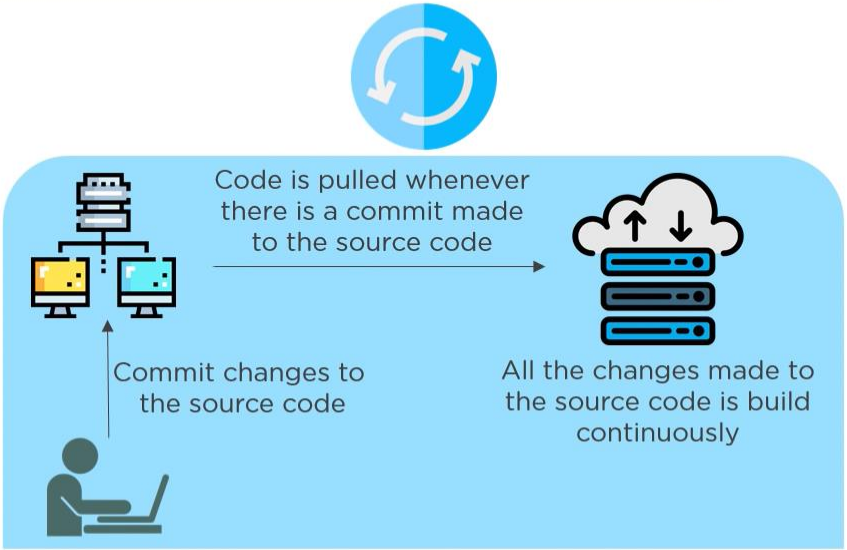


What is Jenkins

Jenkins is a Continuous Integration tool that allows continuous development, test and deployment of newly created codes



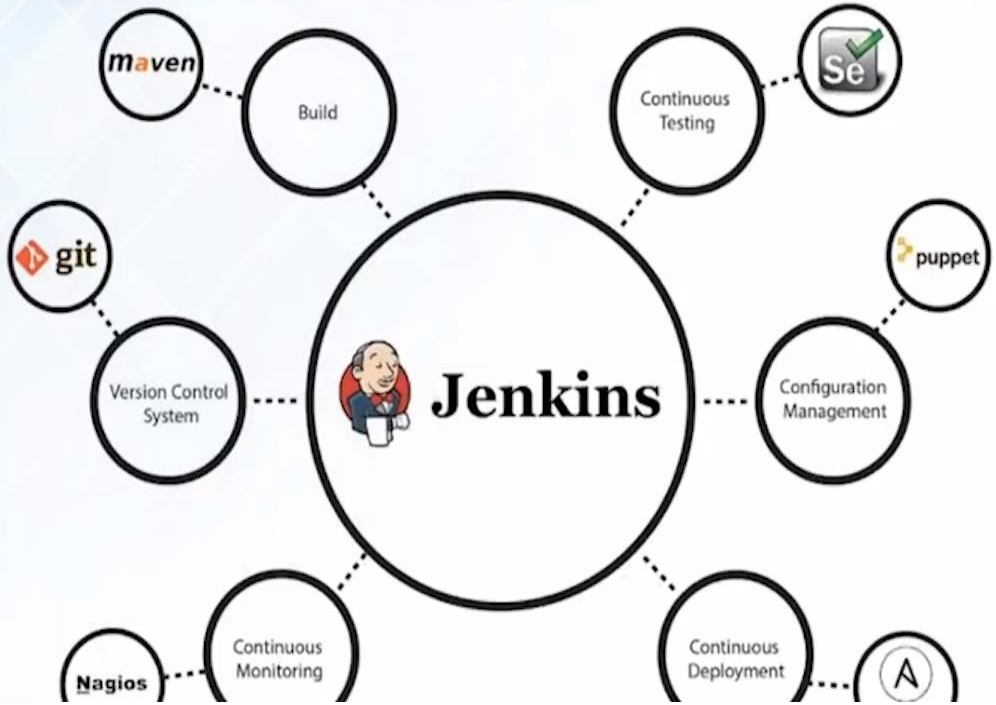
Nightly build and integration



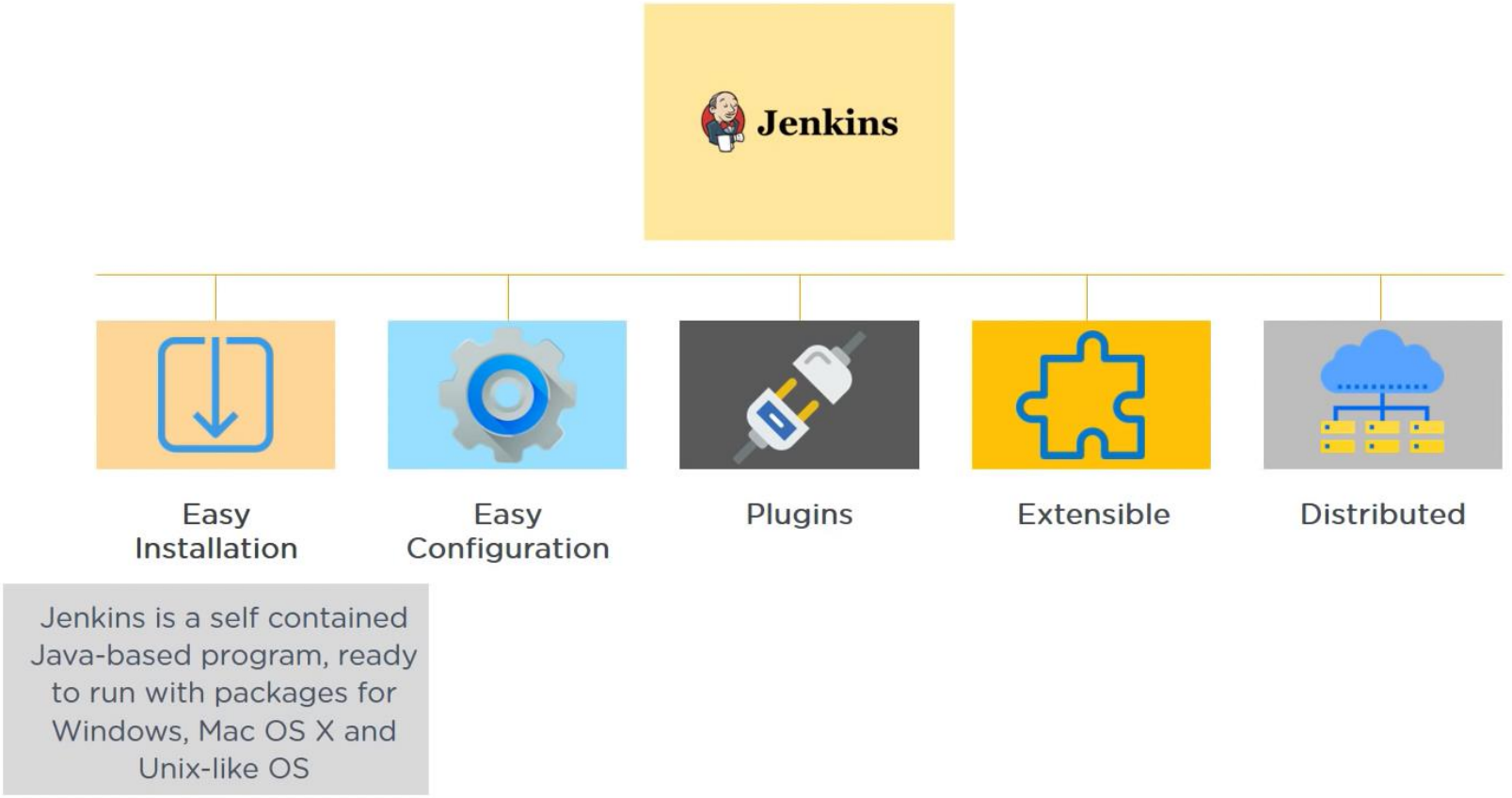
Continuous build and Integration

What is Jenkins

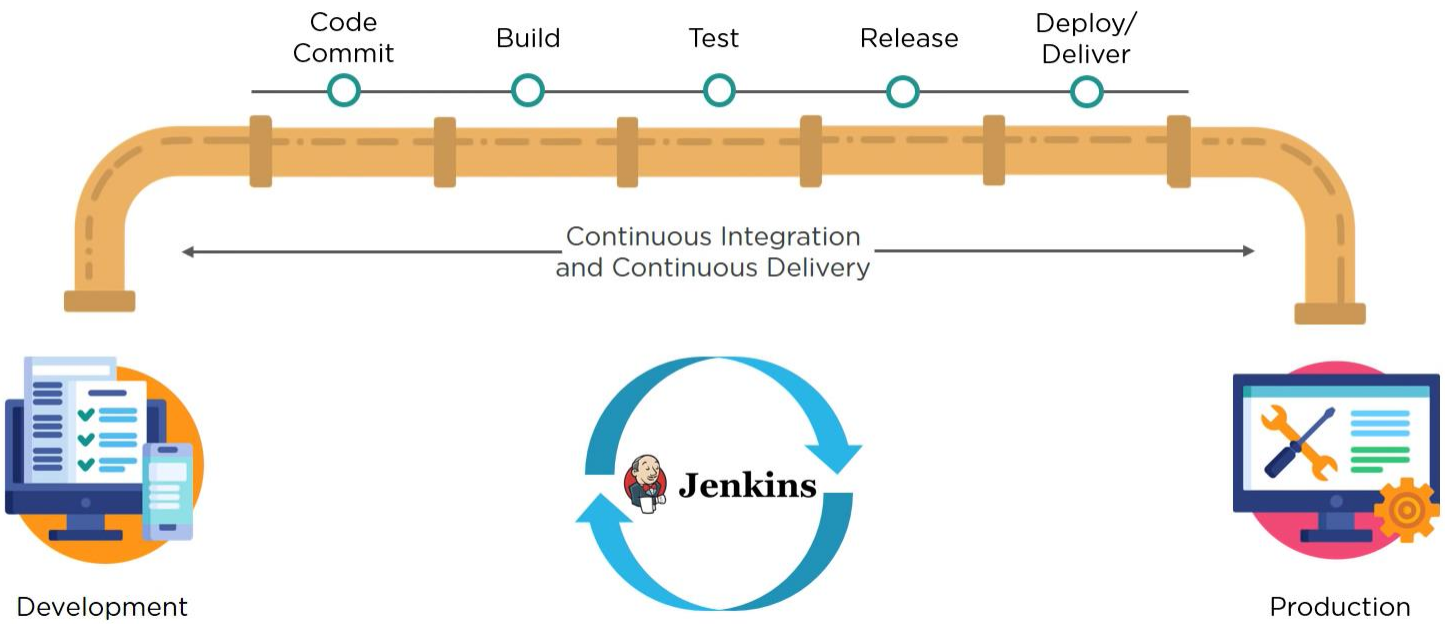
Jenkins is an open source automation tool written in Java with plugins built for Continuous Integration purpose. Plugins allows integration of various DevOps stages.



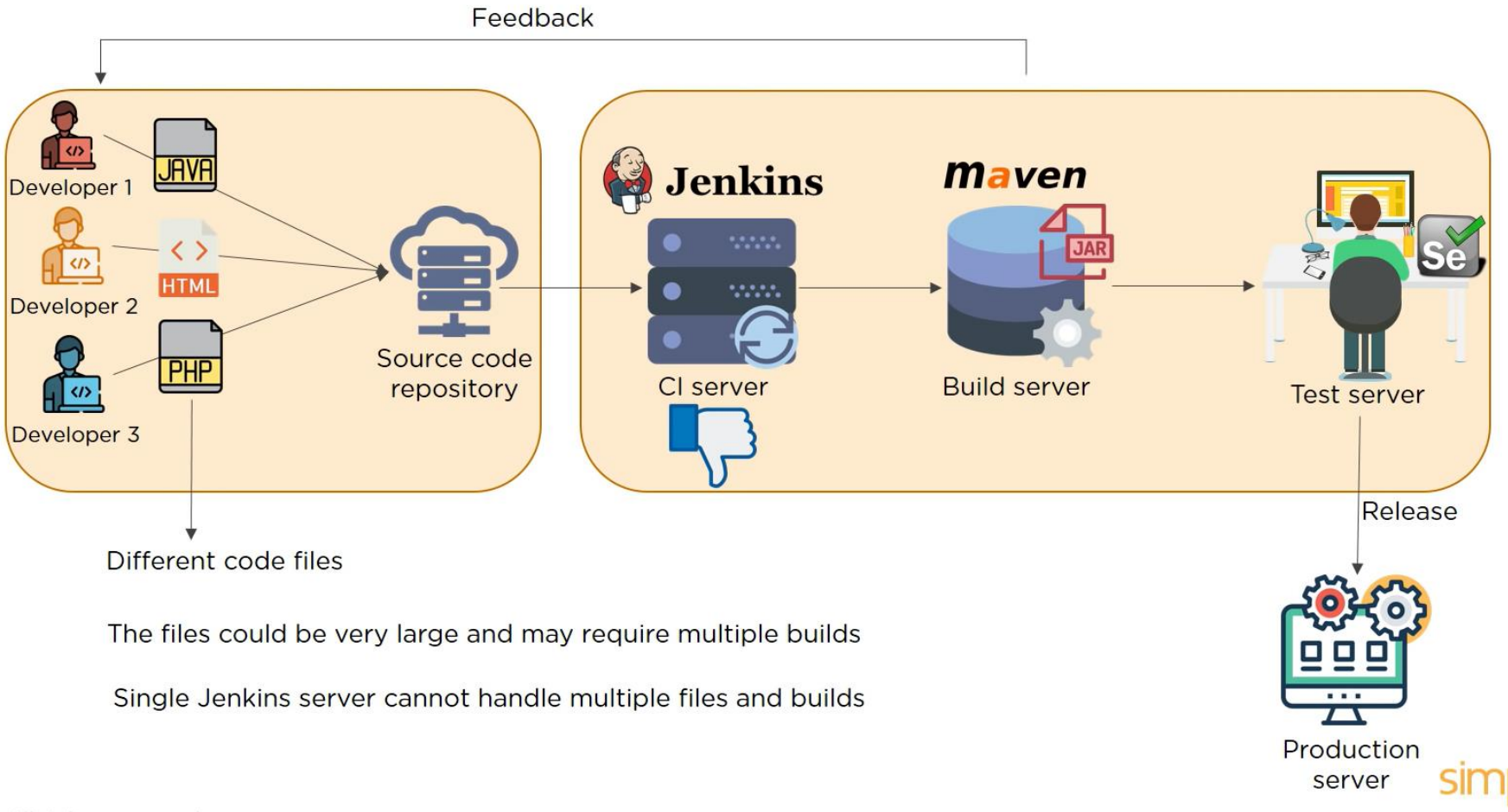
Jenkins Features



Jenkins Pipeline



Jenkins Architecture



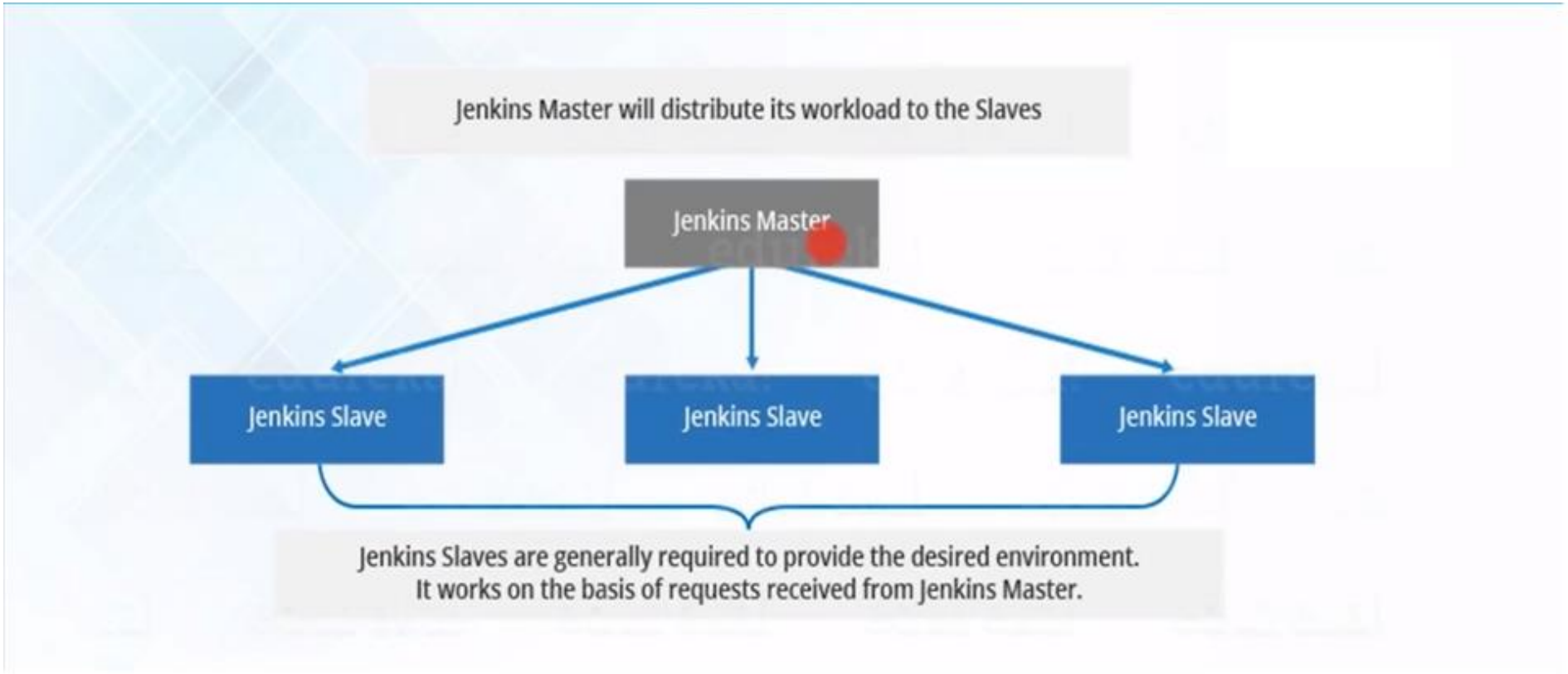
Shortcomings of Single Jenkins Server

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

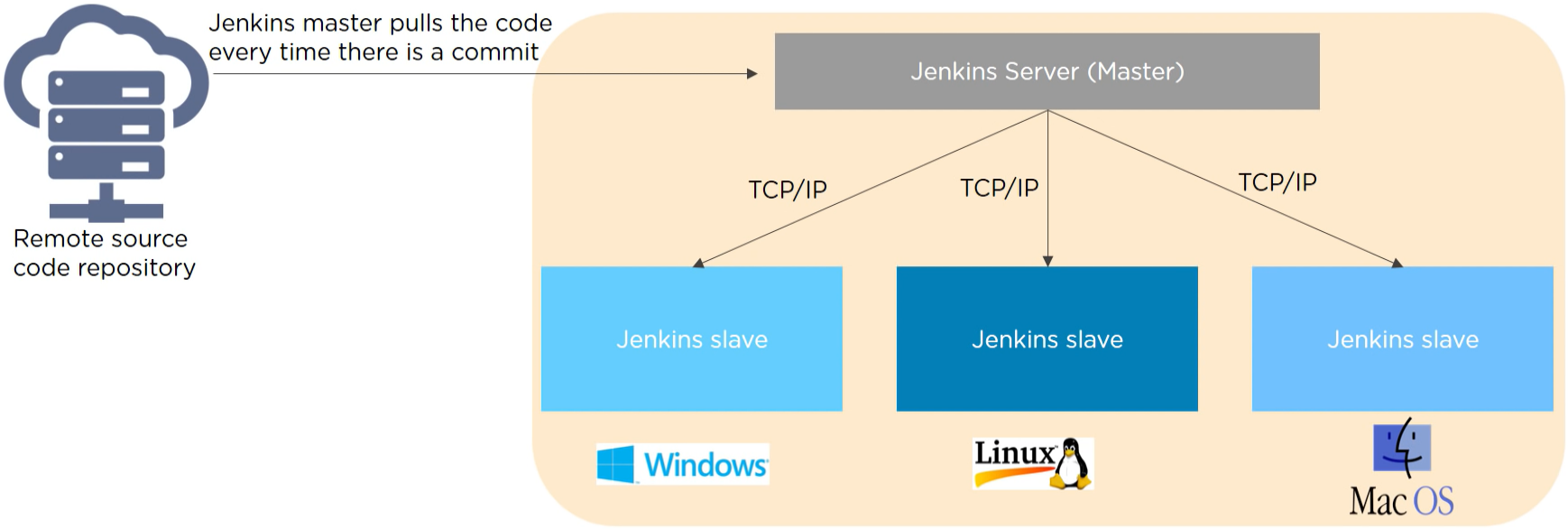
Another build job may require Linux box.

How to manage spikes in build activity

Jenkins Distributed Architecture



Jenkins Master Slave Architecture

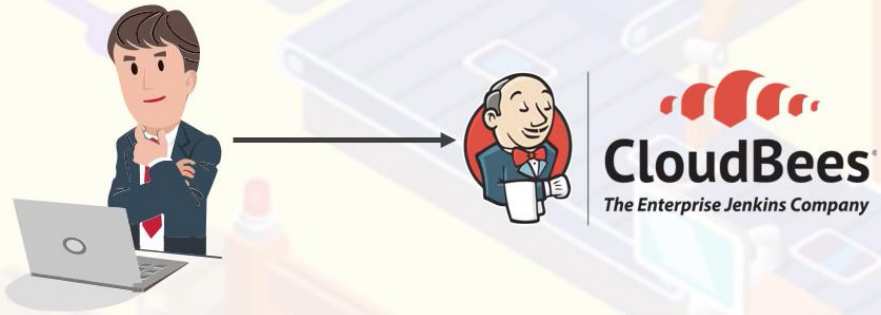


- Jenkins master distributes its workload to all the slaves
- On request from Jenkins master, the slaves carry out builds and tests and produce test reports

Jenkins Case study

Jenkins Case study

BOSCH



CloudBees
The Enterprise Jenkins Company

CloudBees Jenkins platform helped them meet the demands by reducing manual steps and duplication of effort in their build, deploy and test processes

Jenkins Case study

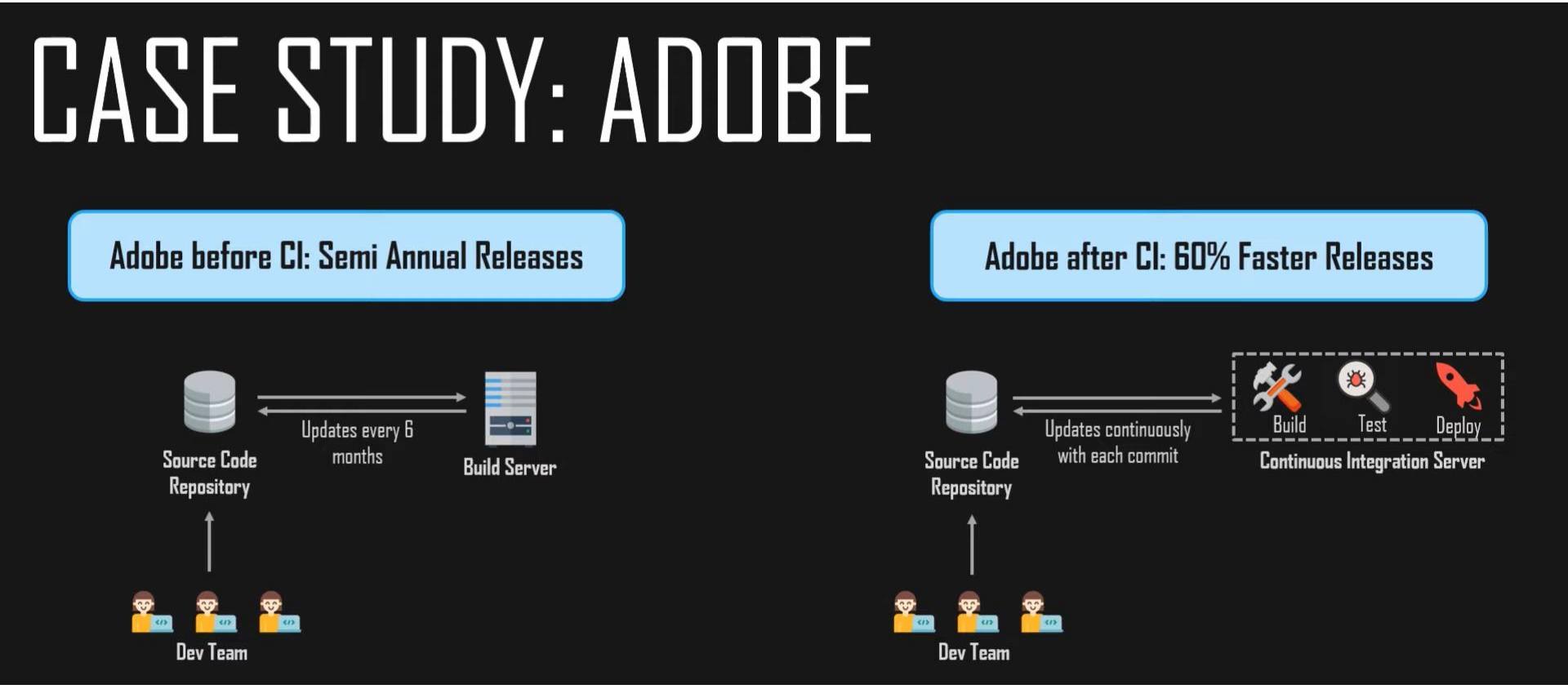
CloudBees
The Enterprise Jenkins Company

BOSCH

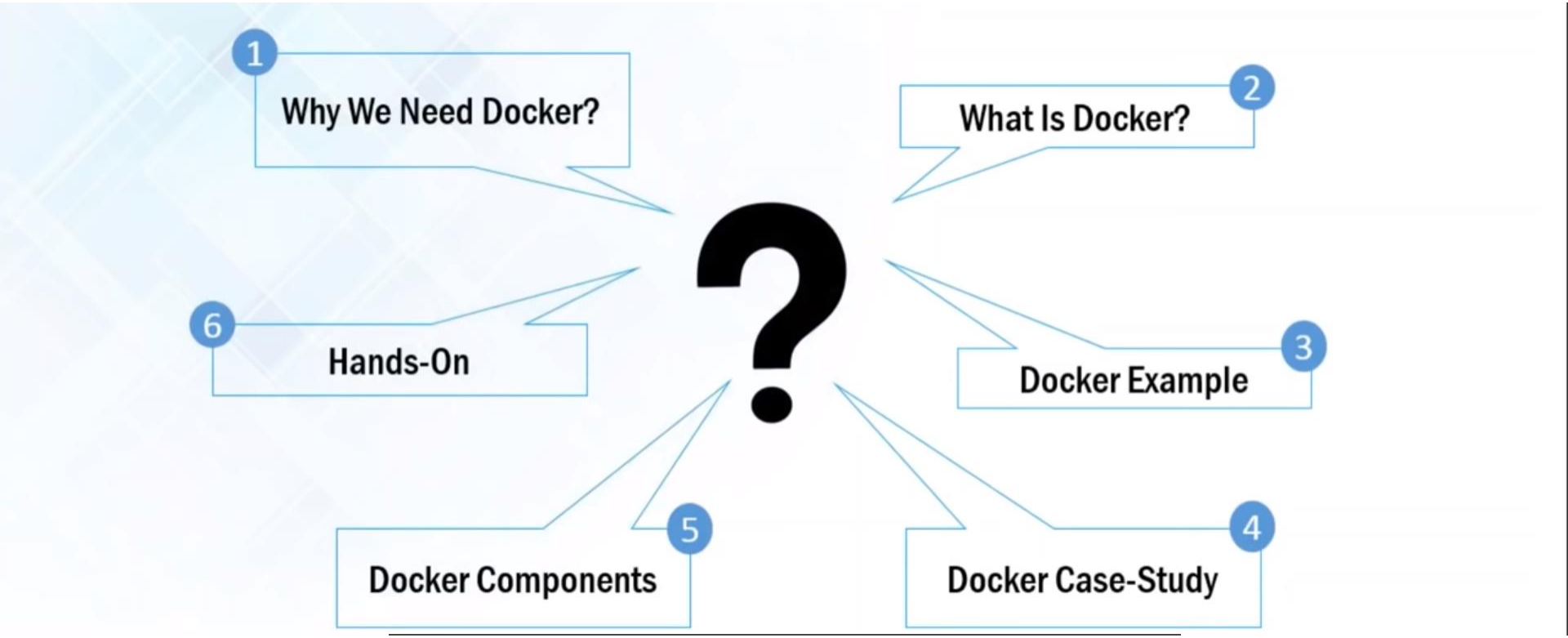
RESULTS

- 3 day build process reduced to less than 3 hours
- Large scale deployment kept on track by expert support
- Visibility and transparency improved with Jenkins Operations support

Jenkins Case study

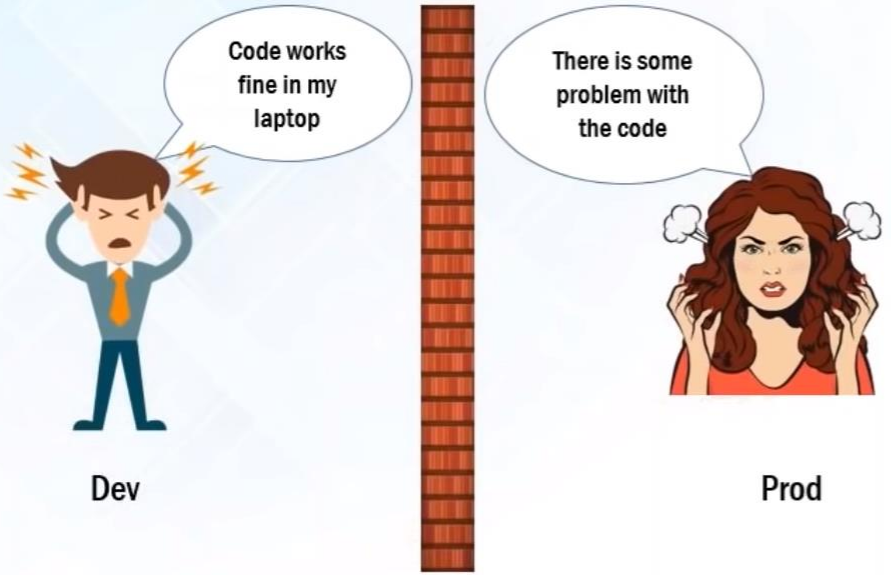


Do you know the following?



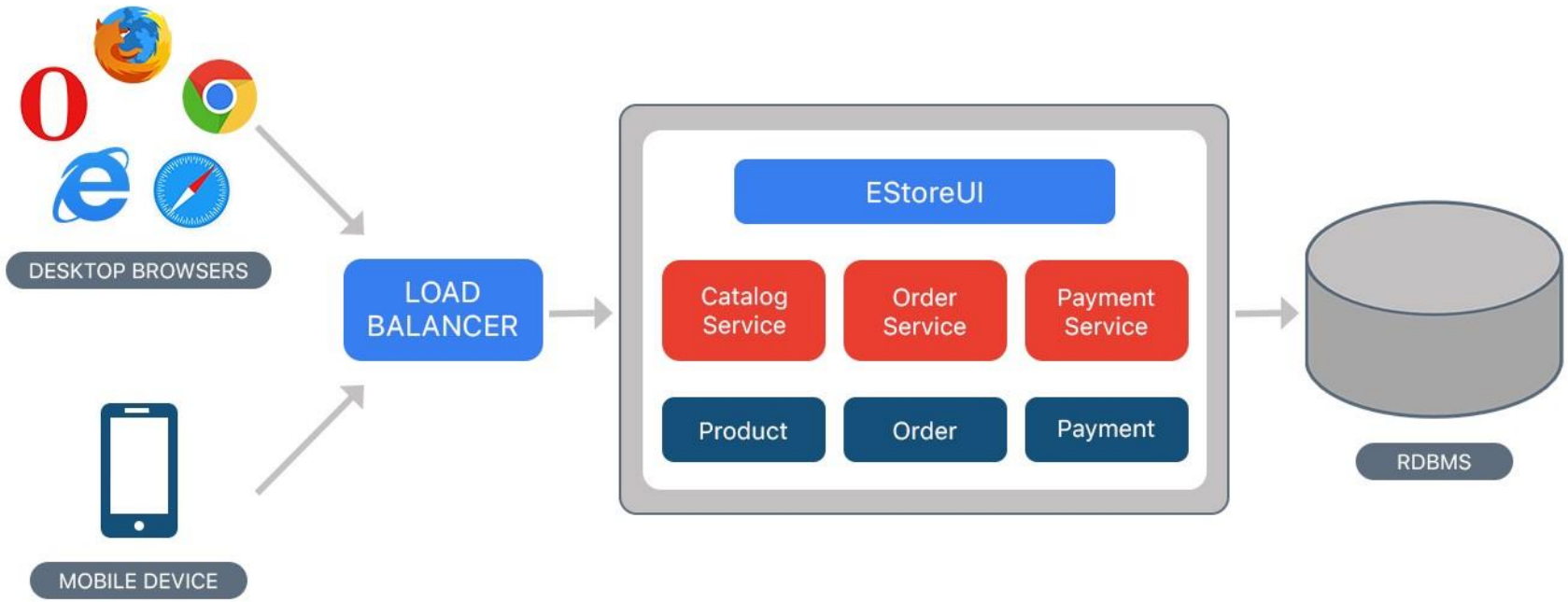
Problems Before Docker

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.

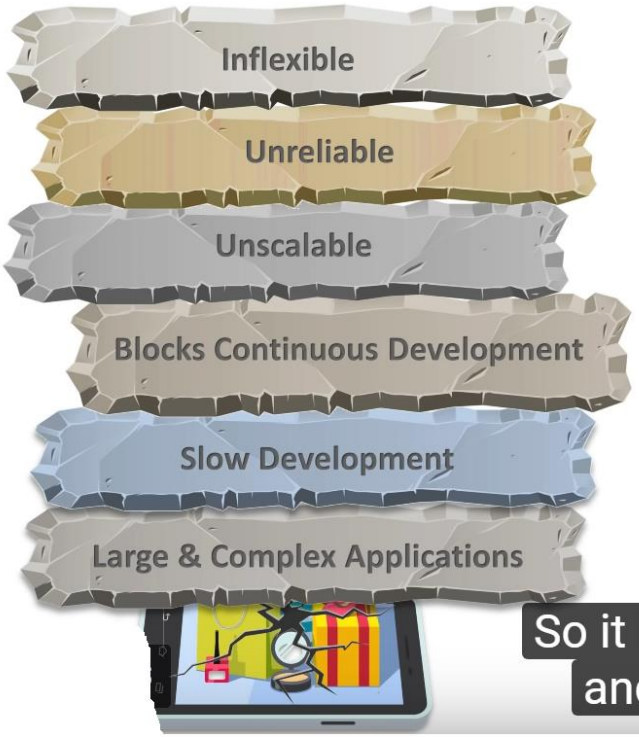


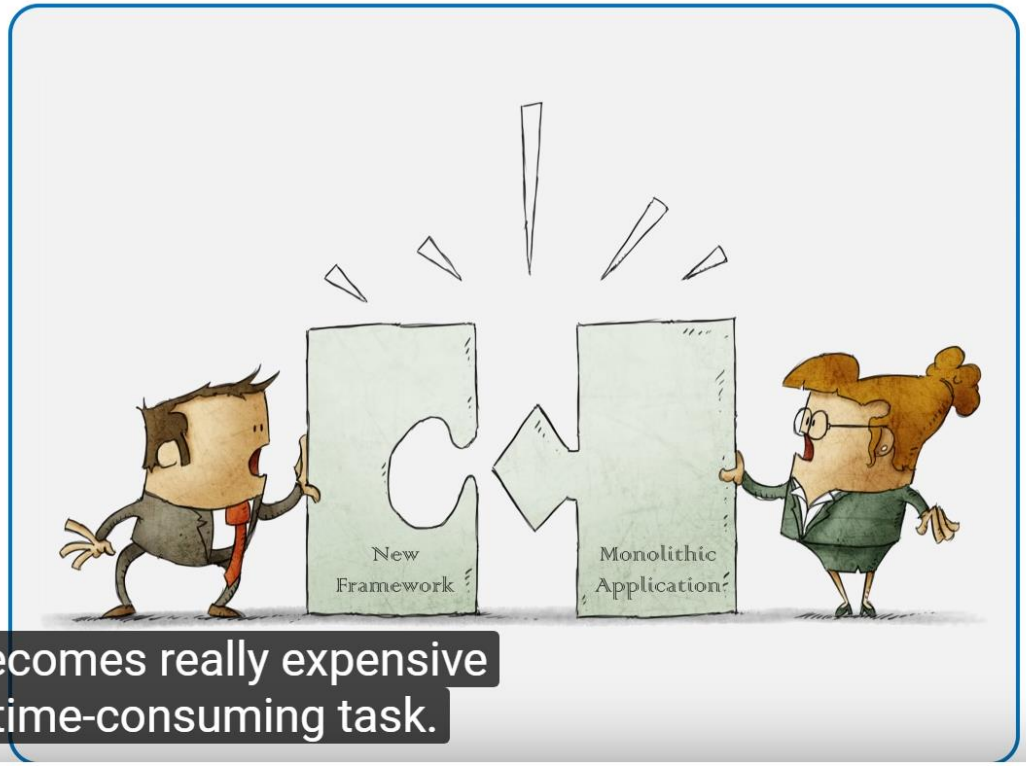
In Dev there can be a software that is upgraded and in Prod the old version of software might be present

Example of Monolithic Approach



Monolithic Architecture





Monolithic vs. Micro Services Example

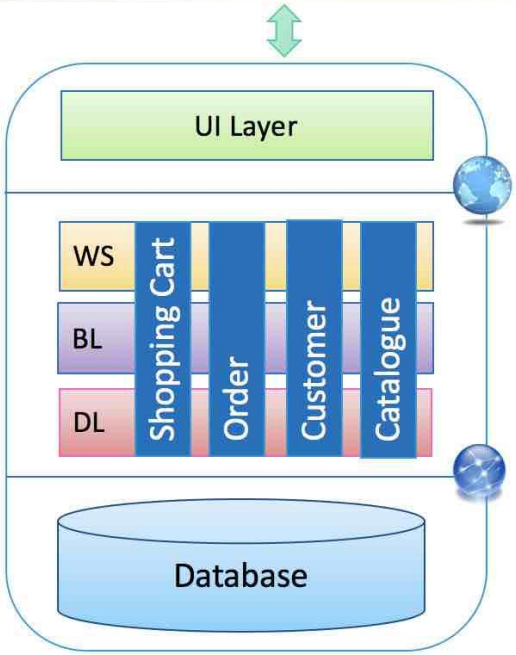




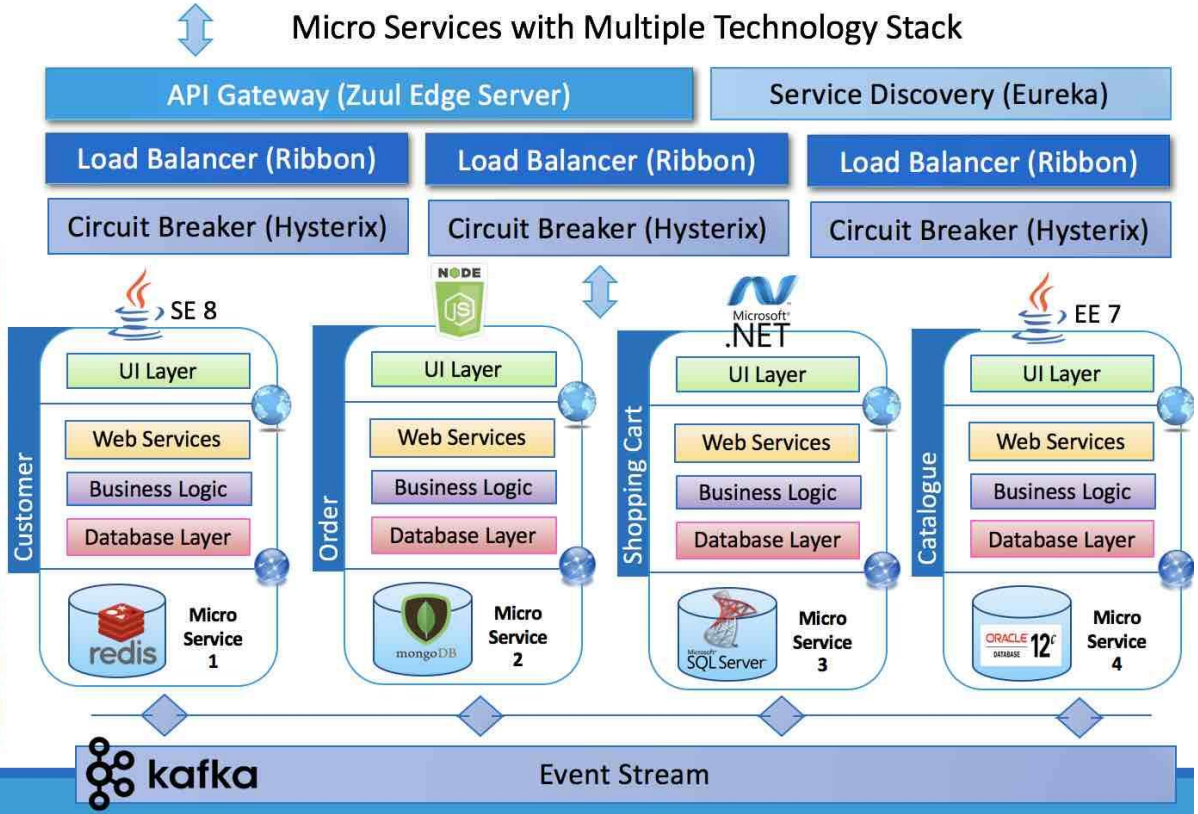
Existing aPaaS vendors creates Monolithic Apps.

This 3 tier model is obsolete now.

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

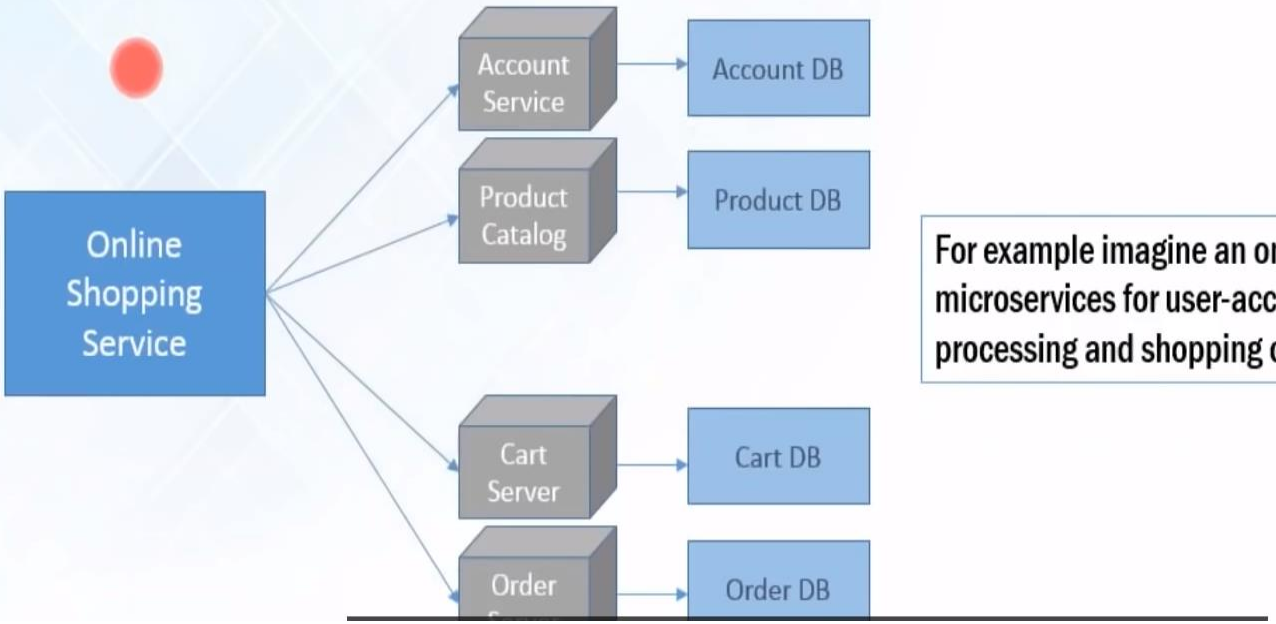


Traditional Monolithic App using Single Technology Stack



Problems Before Docker

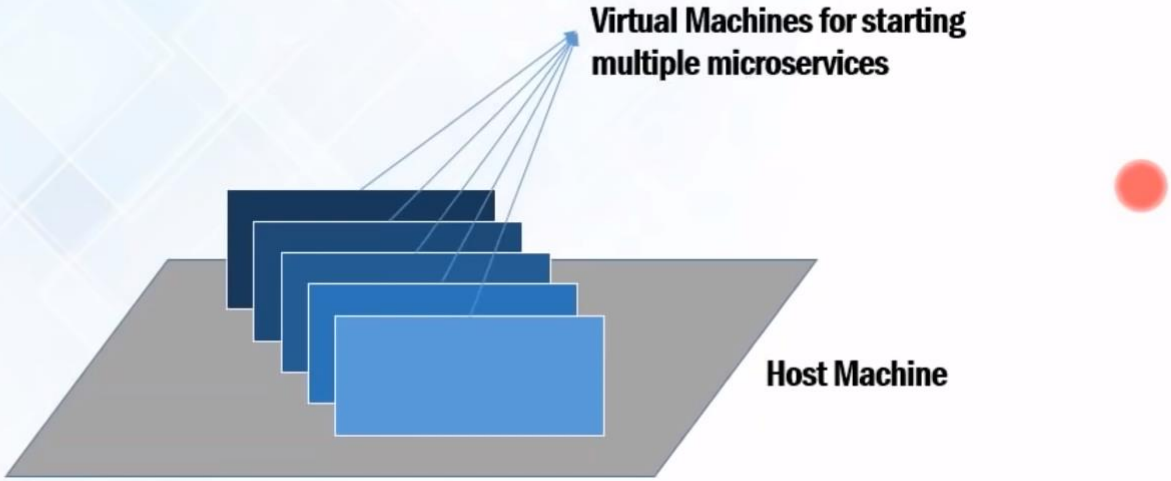
The idea behind microservices is that some types of applications become easier to build and maintain when they are broken down into smaller, composable pieces which work together. Each component is developed separately, and the application is then simply the sum of its constituent components.



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

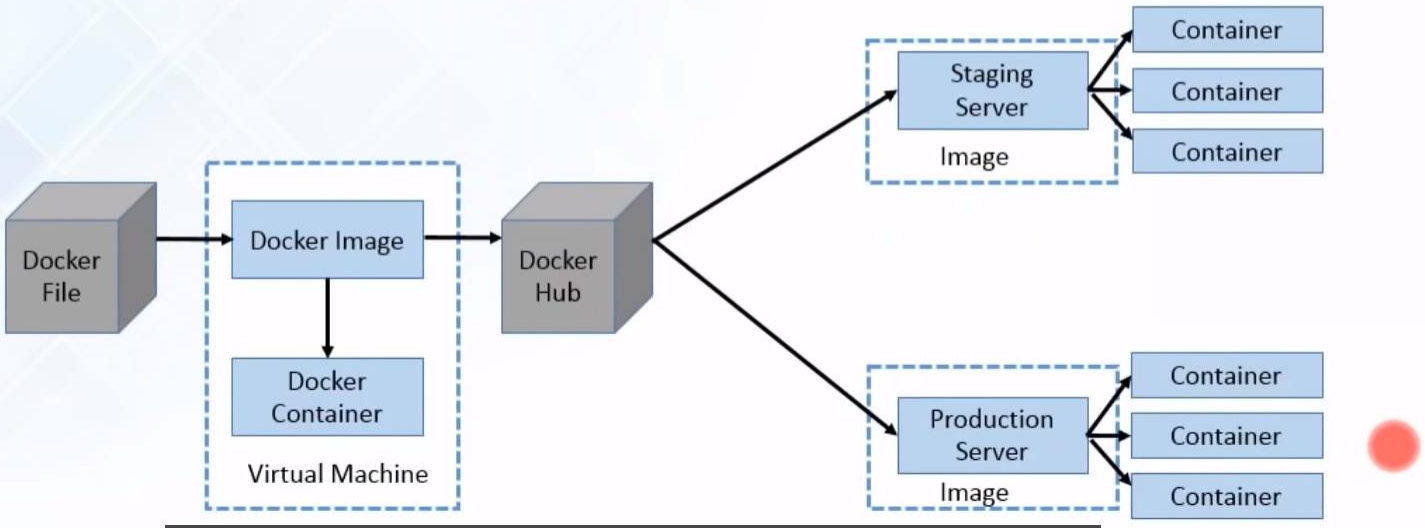
Problems Before Docker

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.

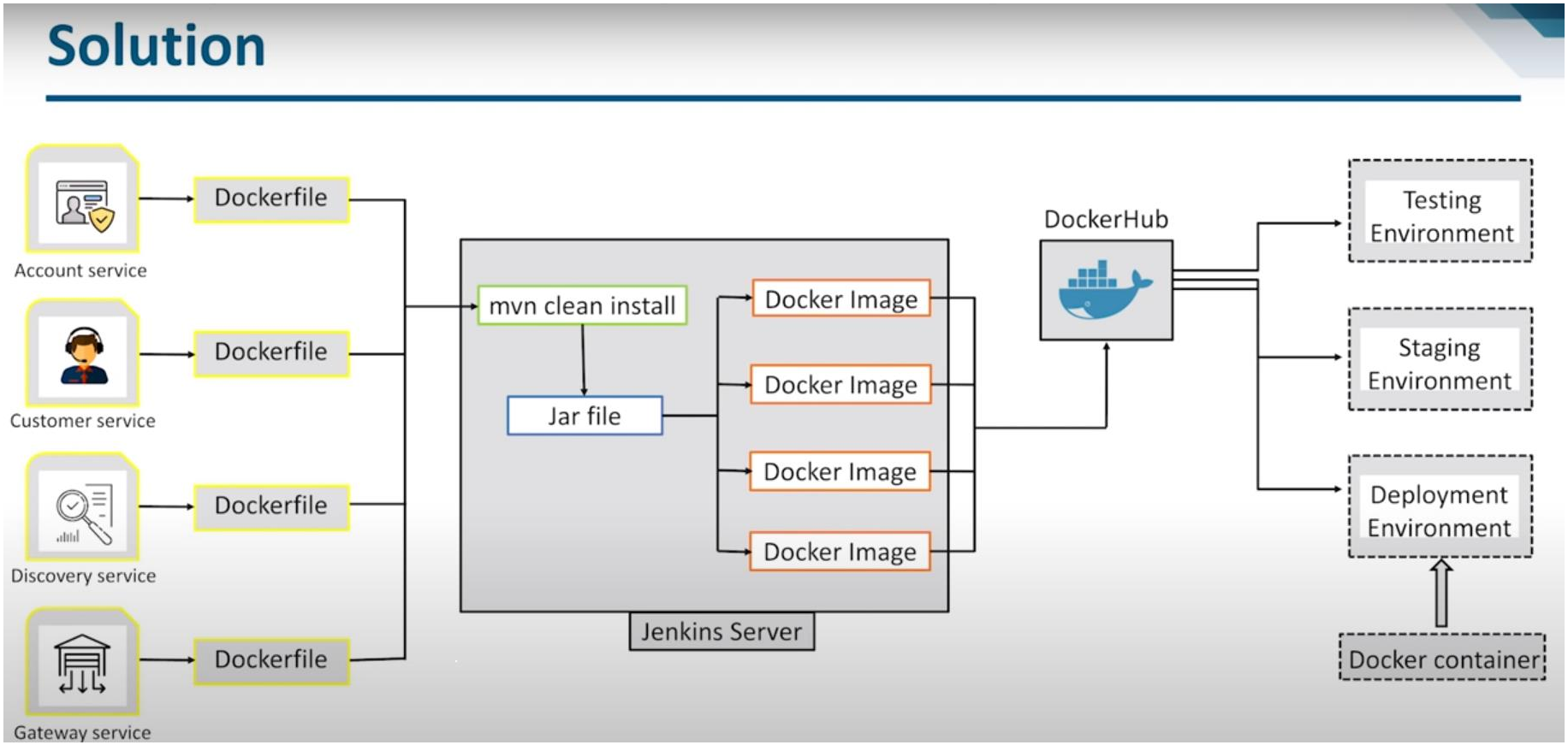


Docker in a Nutshell

- 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

Administrator: Command Prompt

```
C:\WINDOWS\system32>docker run -p 8080:8080 --name=jenkins-master jenkins/jenkins
docker: Error response from daemon: Conflict. The container name "/jenkins-master" is already in use by container "f43c2222247e094a75a6
aca8b1a9a4544baf7145dc299d49ca0d6f2e55361ef5". You have to remove (or rename) that container to be able to reuse that name.
See 'docker run --help'.

C:\WINDOWS\system32>docker container ls -a
CONTAINER ID        IMAGE                                                      COMMAND                  CREATED
 STATUS                     PORTS                                NAMES
f43c2222247e        jenkins/jenkins                                            "/sbin/tini -- /usr/…"   18 minutes ago
 Up 18 minutes              0.0.0.0:8080->8080/tcp, 50000/tcp   jenkins-master
e6f0ed404d77        barathece91/spring-cloud-sidecar-polygot-wstore-node-service:v2.3.0    "docker-entrypoint.s…"   27 hours ago
 Exited (0) 26 hours ago                                        wsstore-service
54dee9e0e76b        barathece91/spring-cloud-sidecar-polygot-zuul-proxy:v2.3.0             "java -jar app.jar"      27 hours ago
 Exited (143) 26 hours ago                                      zuul-proxy
a85871df1cb4        barathece91/spring-cloud-sidecar-polygot-sidecar:v2.3.0                "java -jar app.jar"      27 hours ago
 Exited (143) 26 hours ago                                      sidecar
fa7736867ee7        barathece91/spring-cloud-sidecar-polygot-csstore-microservice:v2.3.0   "java -jar app.jar"      27 hours ago
 Exited (143) 26 hours ago                                      csstore-service
5490e027ce4d        barathece91/spring-cloud-sidecar-polygot-msstore-microservice:v2.3.0   "java -jar app.jar"      27 hours ago
 Exited (143) 26 hours ago                                      msstore-service
cd4d202cdf59        barathece91/spring-cloud-sidecar-polygot-eureka-server:v2.3.0          "java -jar app.jar"      27 hours ago
 Exited (143) 26 hours ago                                      eureka-server
5b129b2c9196        barathece91/spring-cloud-sidecar-polygot-config-server:v2.3.0          "java -jar app.jar"      27 hours ago
 Exited (143) 26 hours ago                                      config-server
e3e7a9df79a4        wurstmeister/zookeeper                                     "/bin/sh -c '/usr/sb…"   9 days ago
 Exited (137) 8 days ago                                        kafka-spring-boot-example-master_zookeeper_1
55265d9dbc70        wurstmeister/kafka                                         "start-kafka.sh"         9 days ago
 Exited (1) 8 days ago                                          kafka-spring-boot-example-master_kafka_1

C:\WINDOWS\system32>docker container start f43c2222247e
f43c2222247e

C:\WINDOWS\system32>
```

Type here to search

ENG 21:49 29/09/2020

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
```

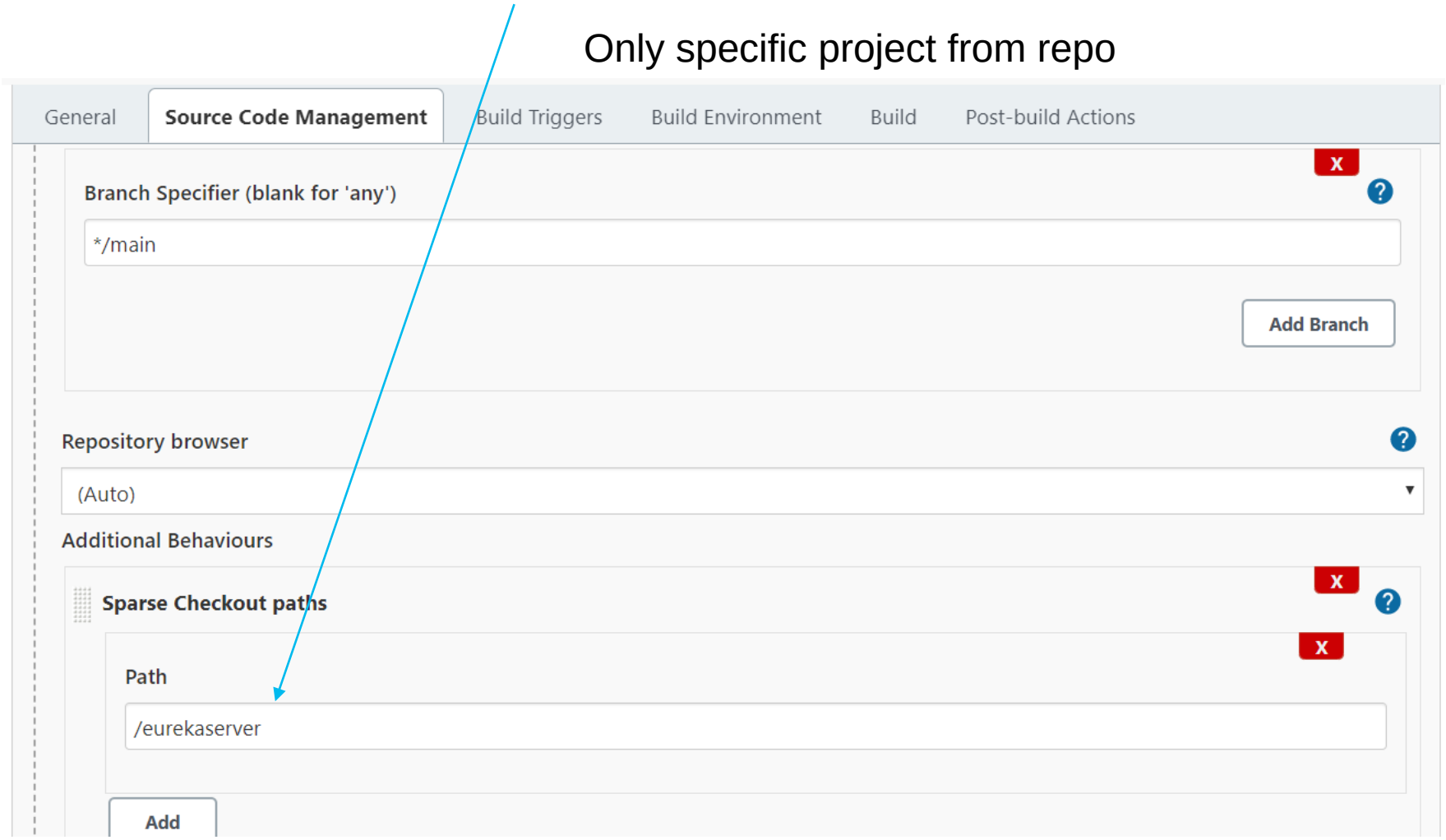
Large Repos are unhealthy

- Large git repos (2 GB+) often are a sign of git misuse (large binaries, etc.)
- Yes, there are cases where a large git repo is not a sign of misuse
  - Linux kernel repo is over 1 GB
  - Linux kernel repo is one of the oldest git repos
- ○ Git is able to handle large repos, some operations are slower on some systems
- Git misuse doesn’t matter - we need to run our Jenkins jobs anyway
  - The 18 GB+ repository at my work isn’t pretty, but it is business critical...

Jenkins tricks for large repos

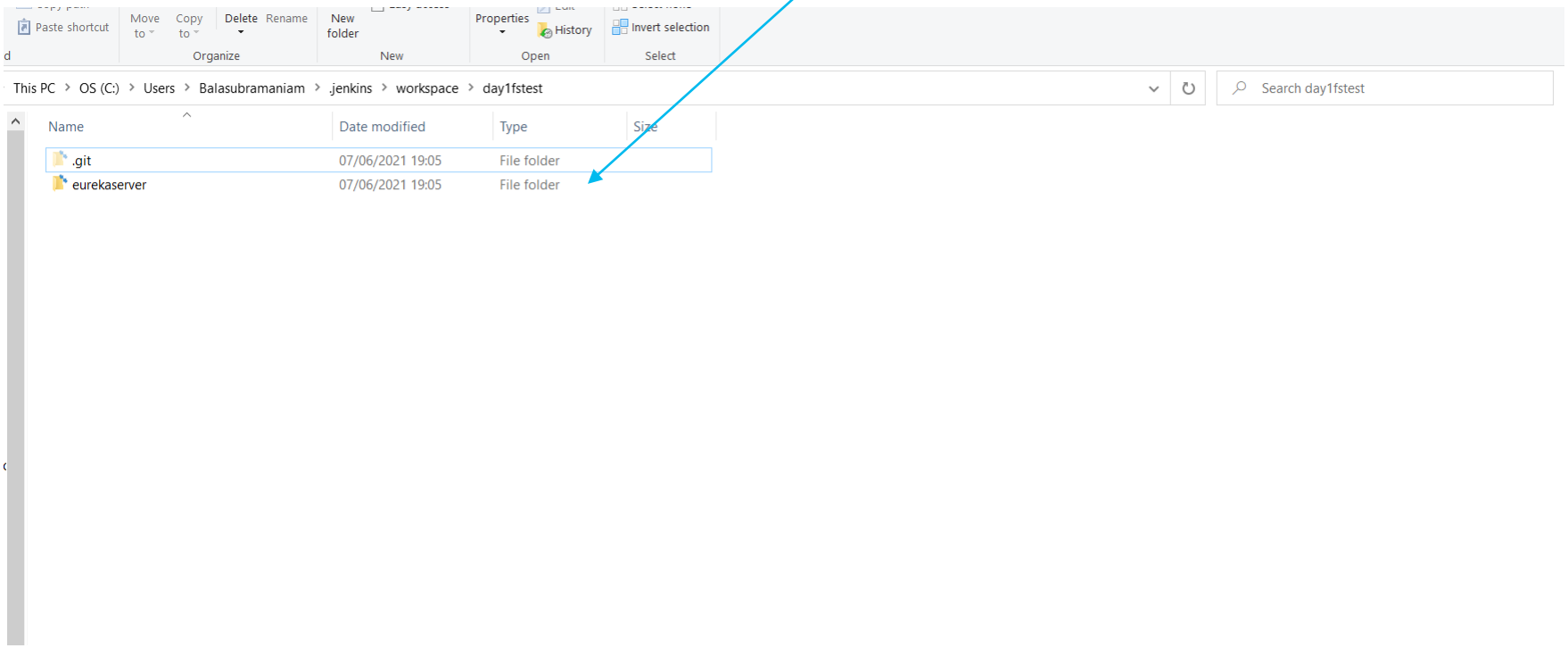
- Use command line git rather than JGit
  - Command line git explicitly manages memory and handles large repos
  - JGit large repo support has improved, will likely always lag behind command line git
- Reduce data transfer & disc space for history
  - ○ Reference repositories - only clone what's new
  - ○ Shallow clone - only clone recent history
  - ○ Don't fetch tags
  - ○ Narrow refspecs - only clone specific branches
- Reduce disc space for working directory
  - ○ Sparse checkout

Jenkins free style project sparse checkout



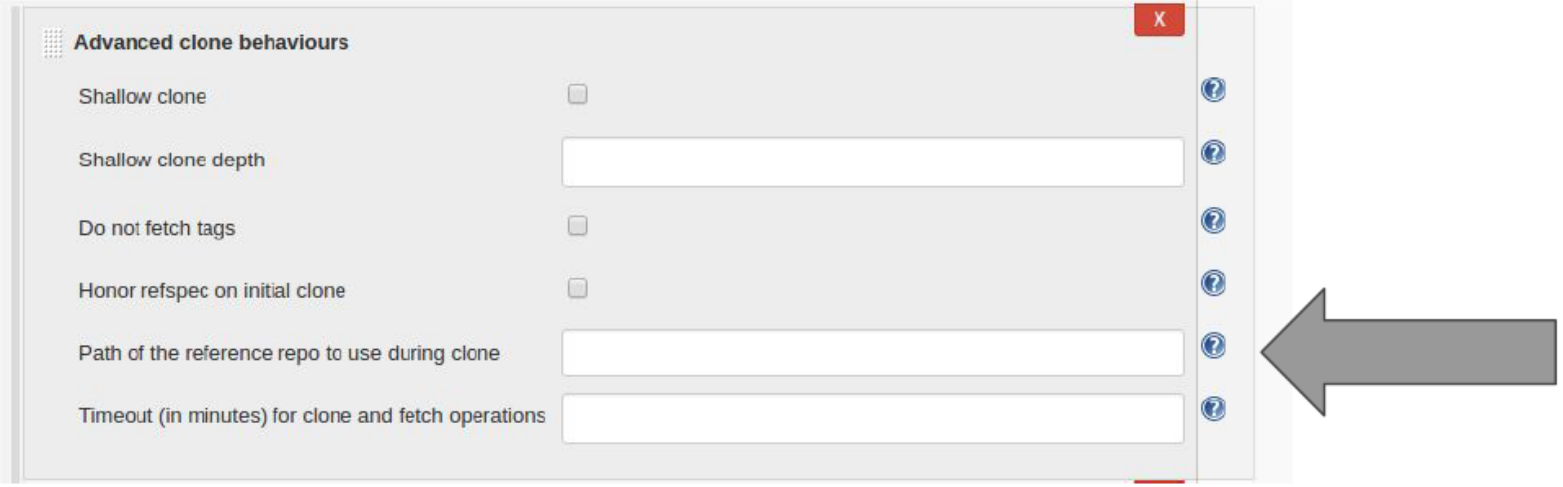
Jenkins free style project sparse checkout

Only specific project from repo



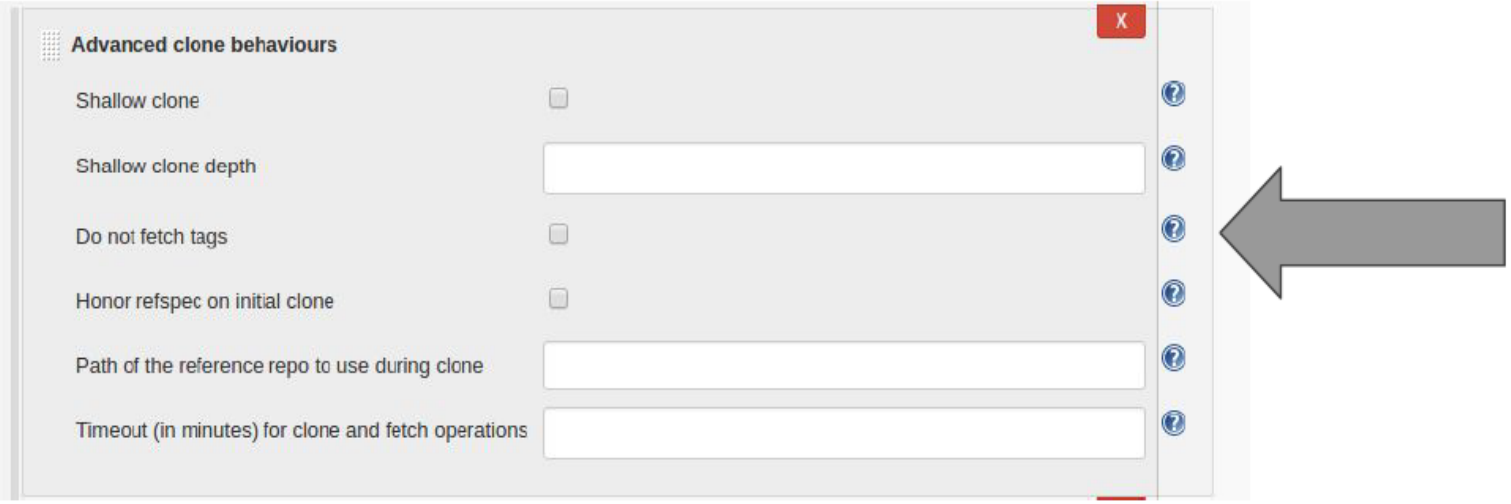
Reference repository - pointers, not copies

- A bare git repository can be used as a “reference repository” for other repositories
- Git creates pointers to the reference repo
  - Saves space by not copying data to disc
  - Saves time by not transferring over the wire



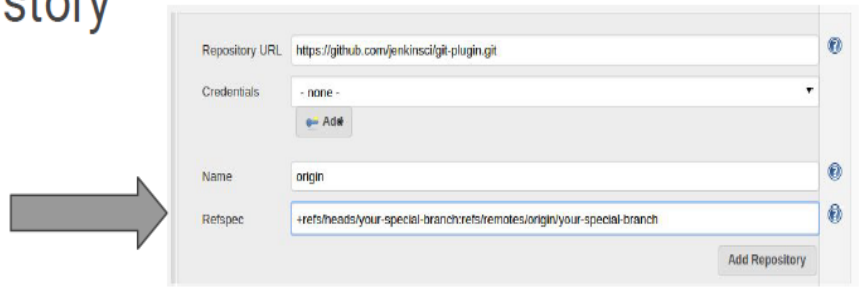
Don’t Fetch Tags

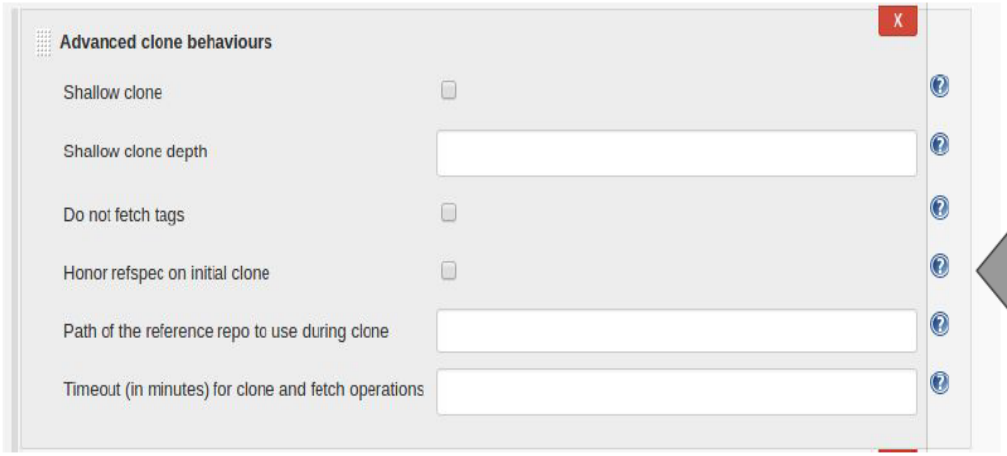
- Most Jenkins jobs don’t need tags
- Skipping tags can reduce data transfer and local disc use



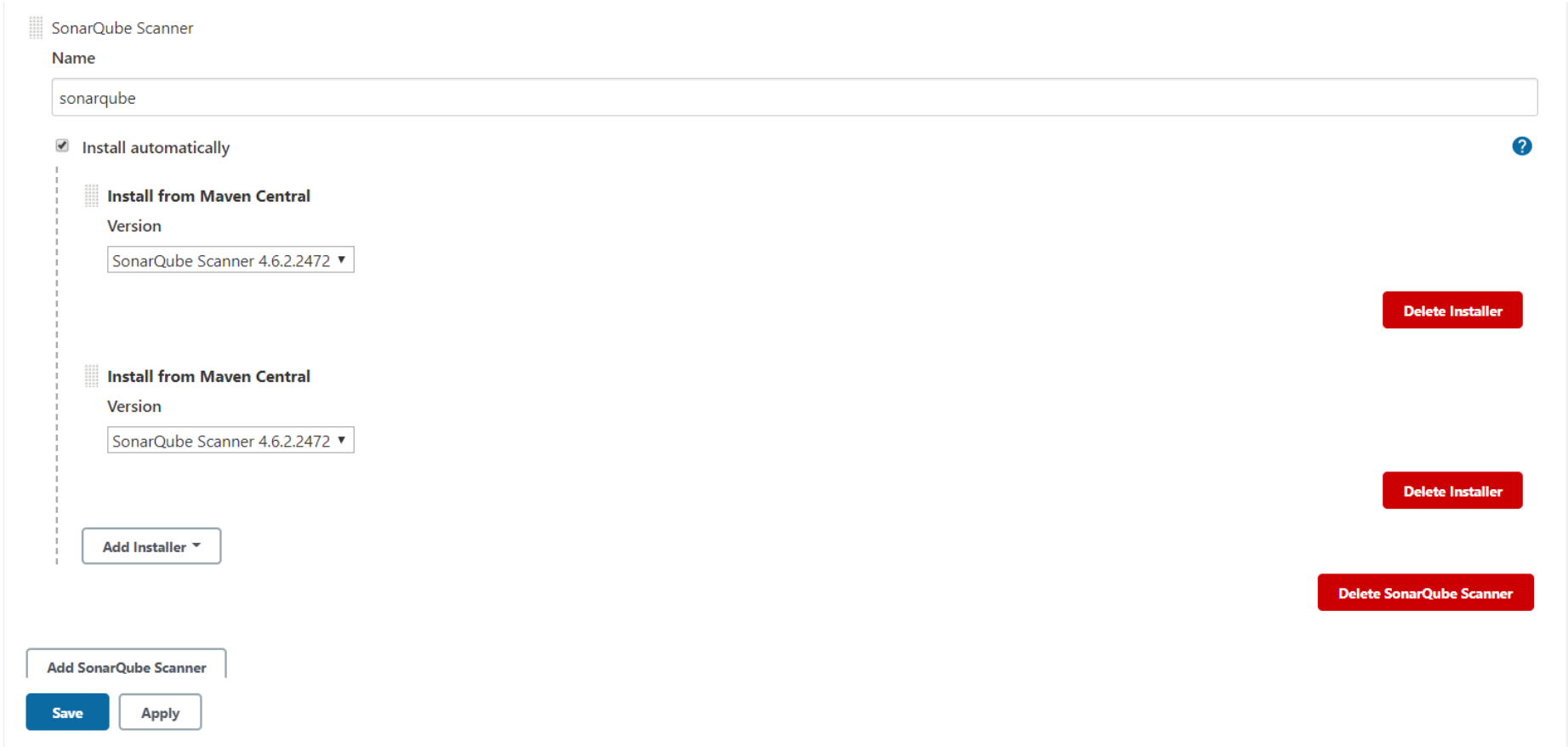
Narrow refspecs - clone only what you need

- Git refspec describes what to copy from remote
- Reducing the refspec can reduce the data transfer and disc use in the local copy of the git history

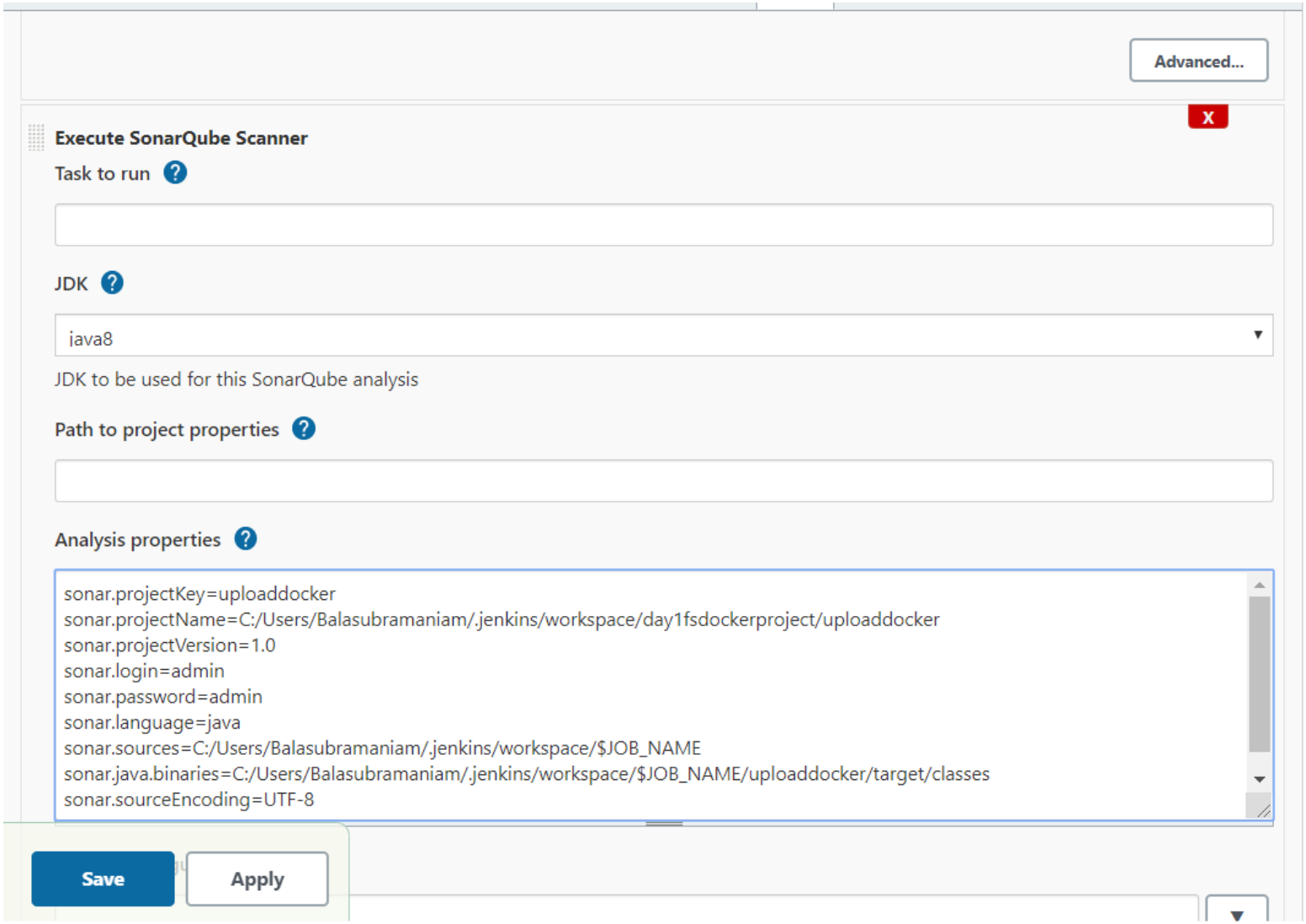




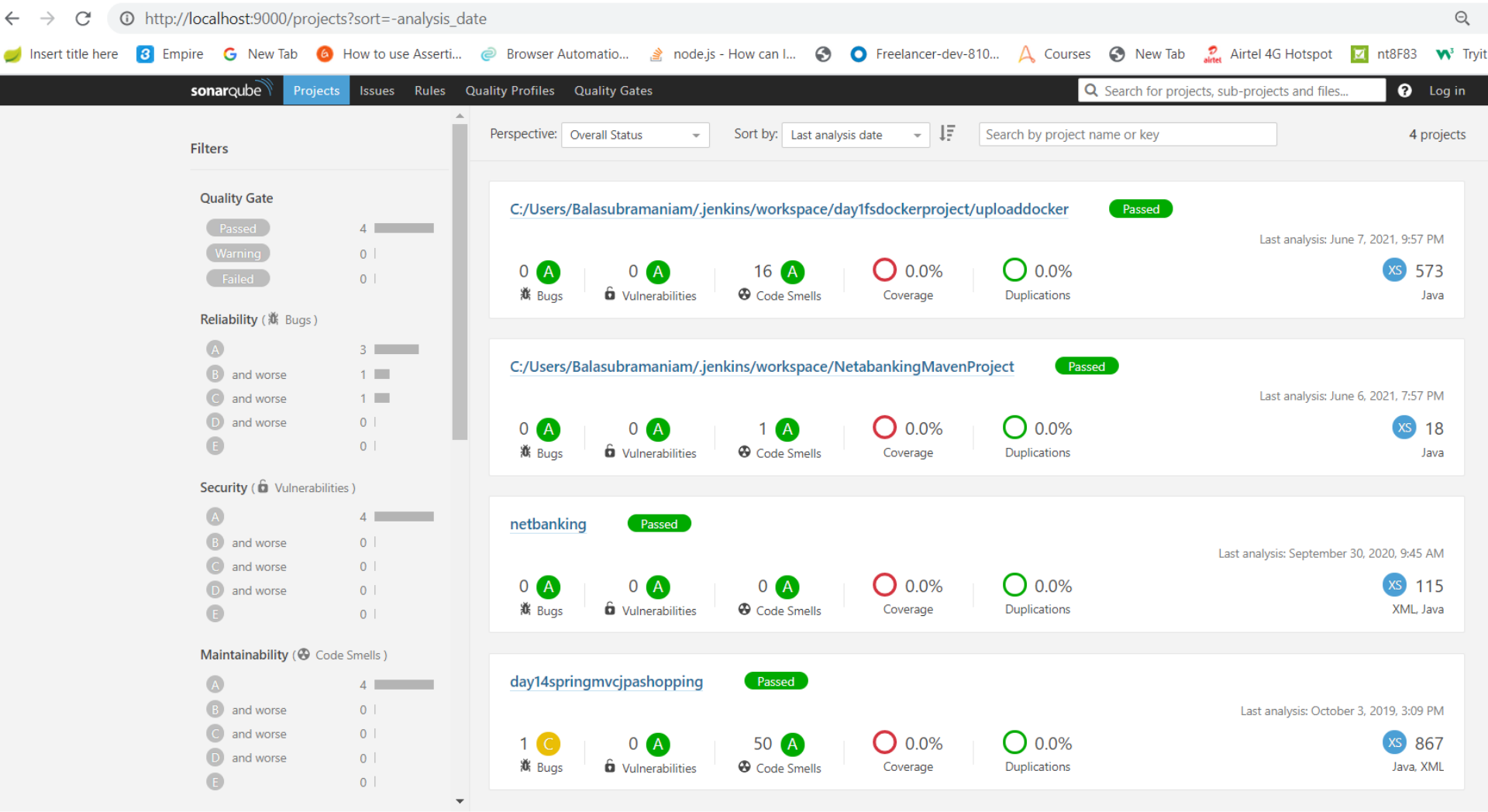
Jenkins Freestyle Project for Docker Container Images with SonarQube



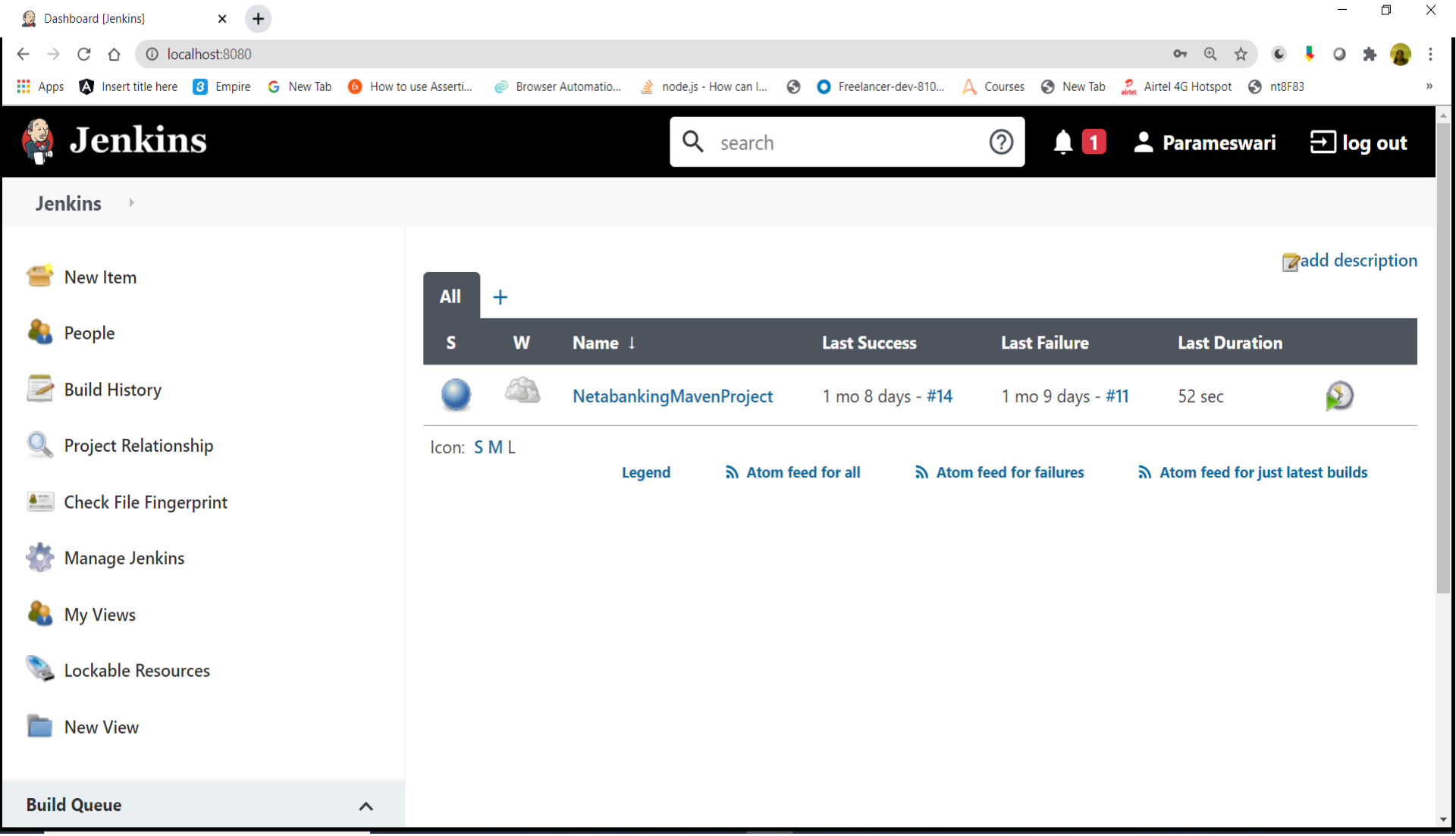
Jenkins Freestyle Project for Docker Container Images with SonarQube



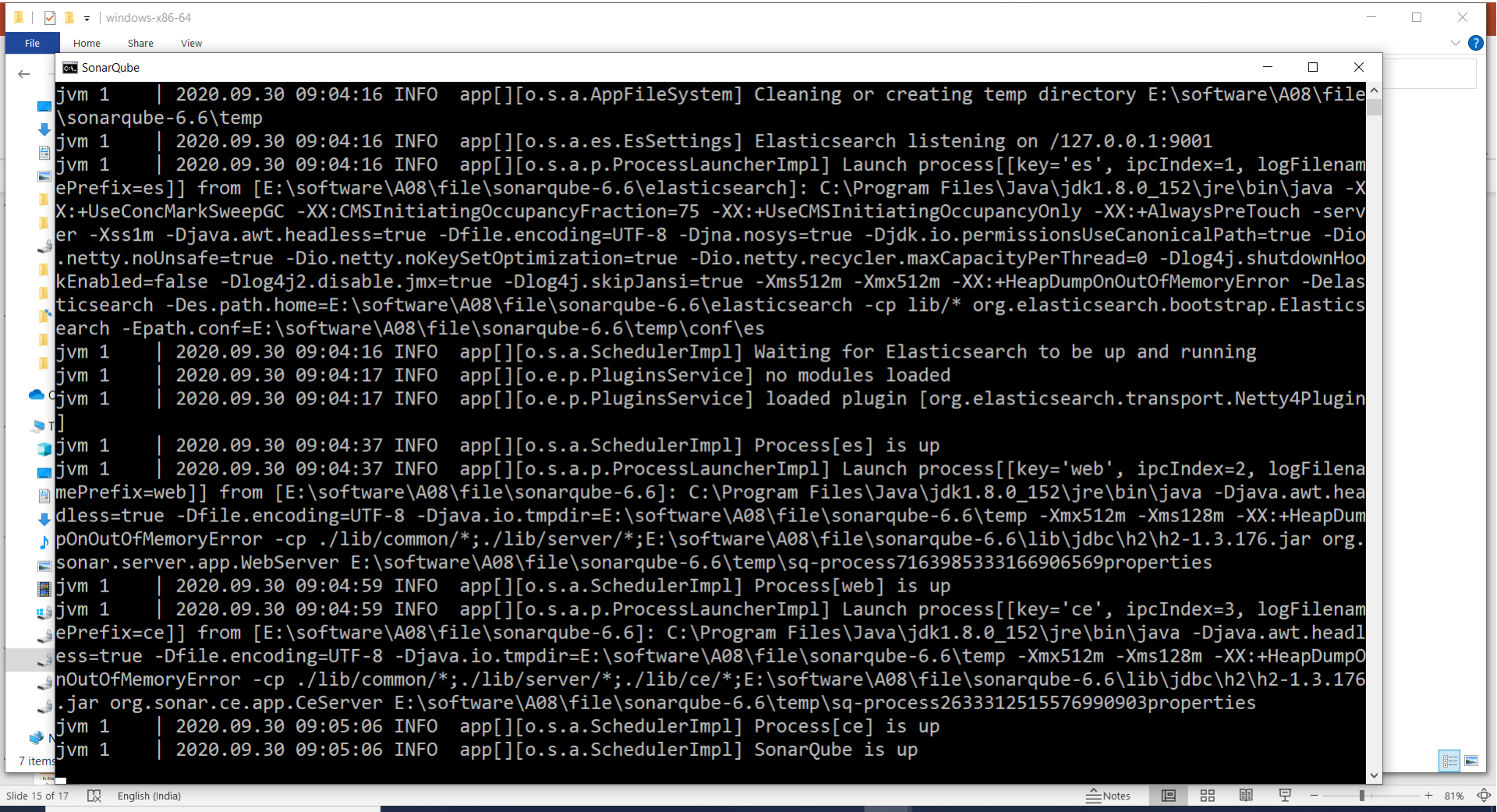
Jenkins Freestyle Project for Docker Container Images with SonarQube



Jenkins

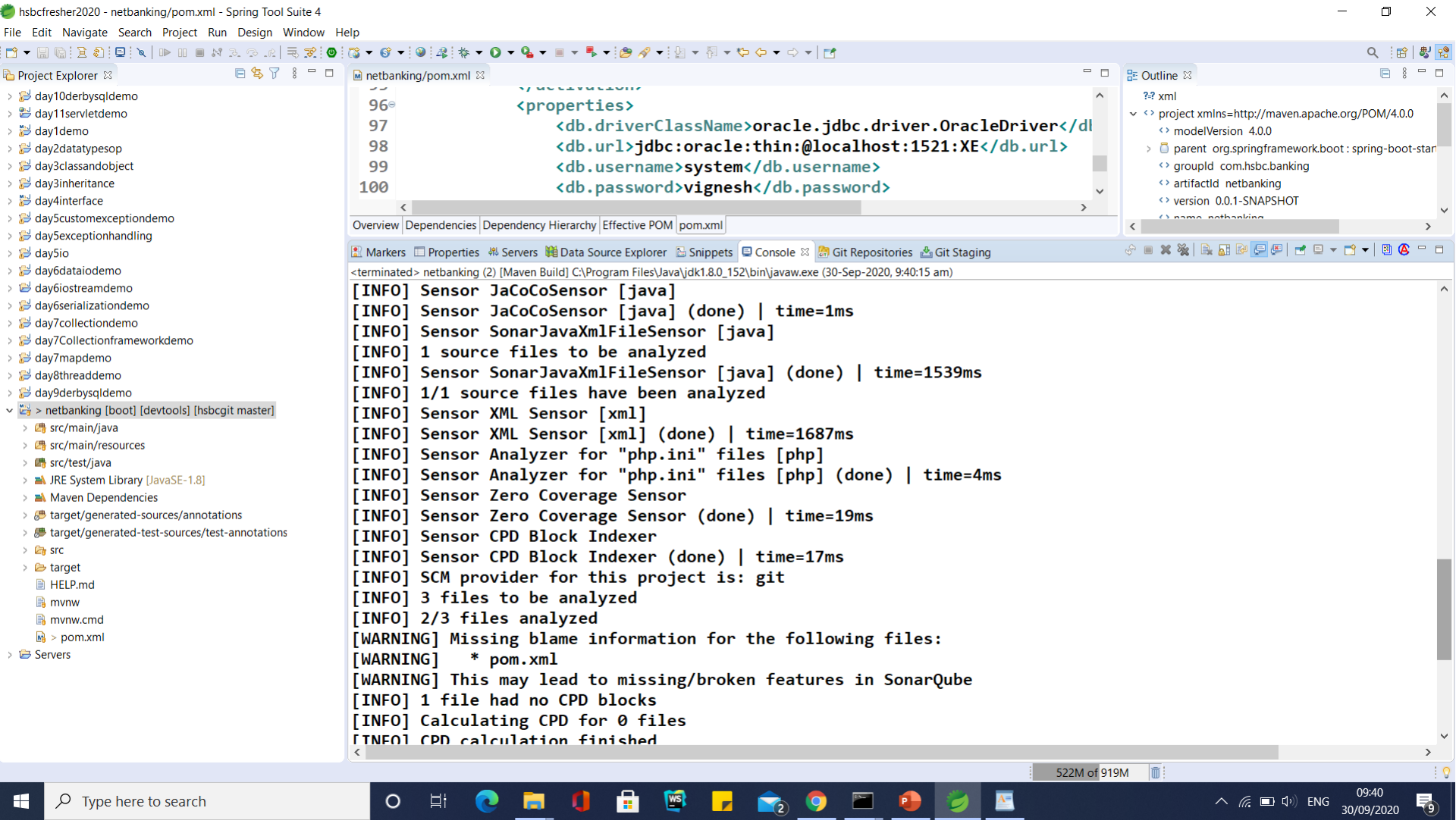

Dashboard [Jenkins]
localhost:8080
Apps
Insert title here
Empire
New Tab
How to use Asserti...
Browser Automatio...
node.js - How can I...
Freelancer-dev-810...
Courses
New Tab
Airtel 4G Hotspot
nt8F83
Jenkins
search
1
Parameswari
log out
Jenkins
New Item
People
Build History
Project Relationship
Check 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

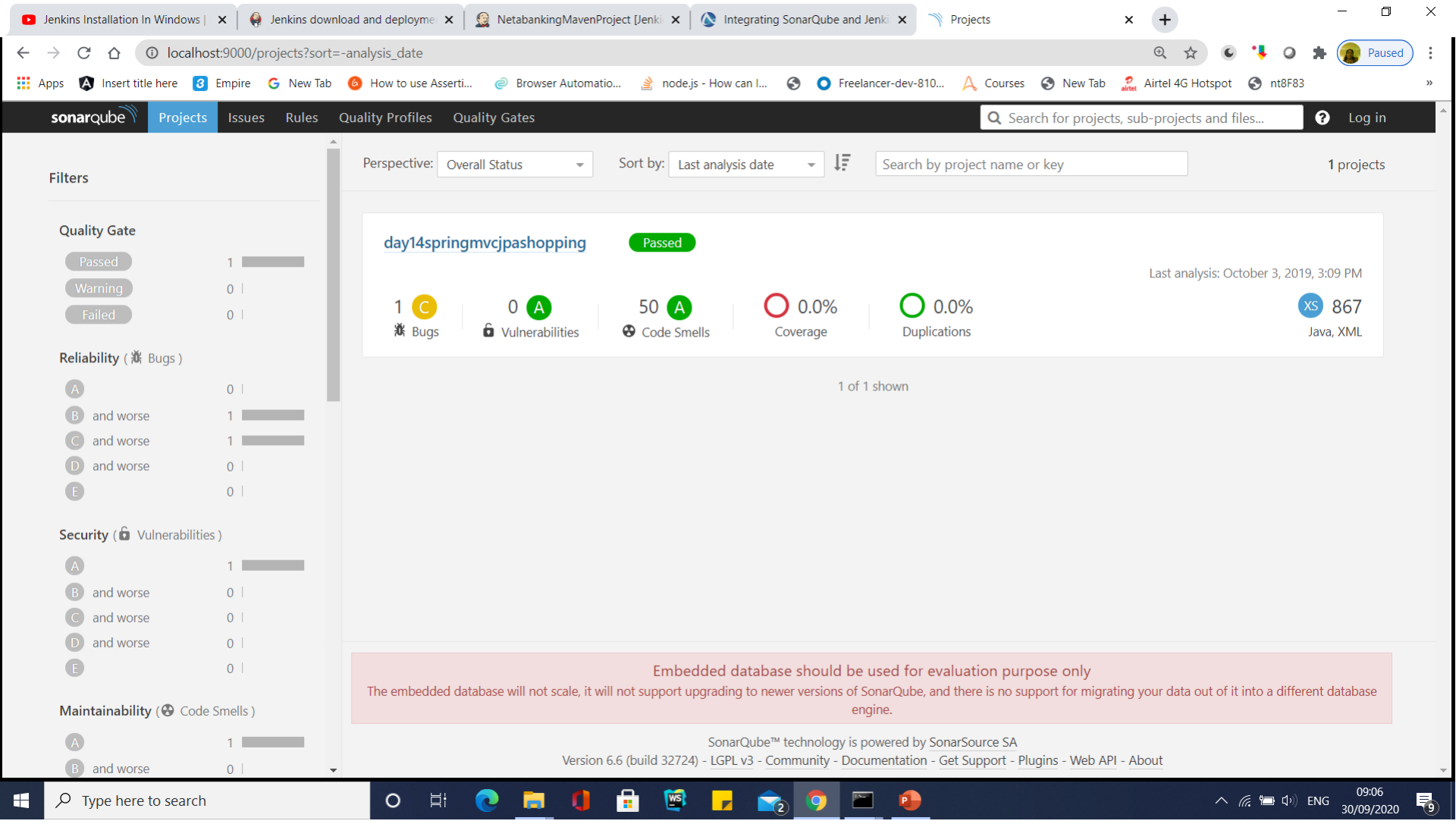

windows-x86-64
File
Home
Share
View
SonarQube
jvm 1 | 2020.09.30 09:04:16 INFO app[][o.s.a.AppFileSystem] Cleaning or creating temp directory E:\software\A08\file\sonarqube-6.6\temp
jvm 1 | 2020.09.30 09:04:16 INFO app[][o.s.a.es.EsSettings] Elasticsearch listening on /127.0.0.1:9001
jvm 1 | 2020.09.30 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



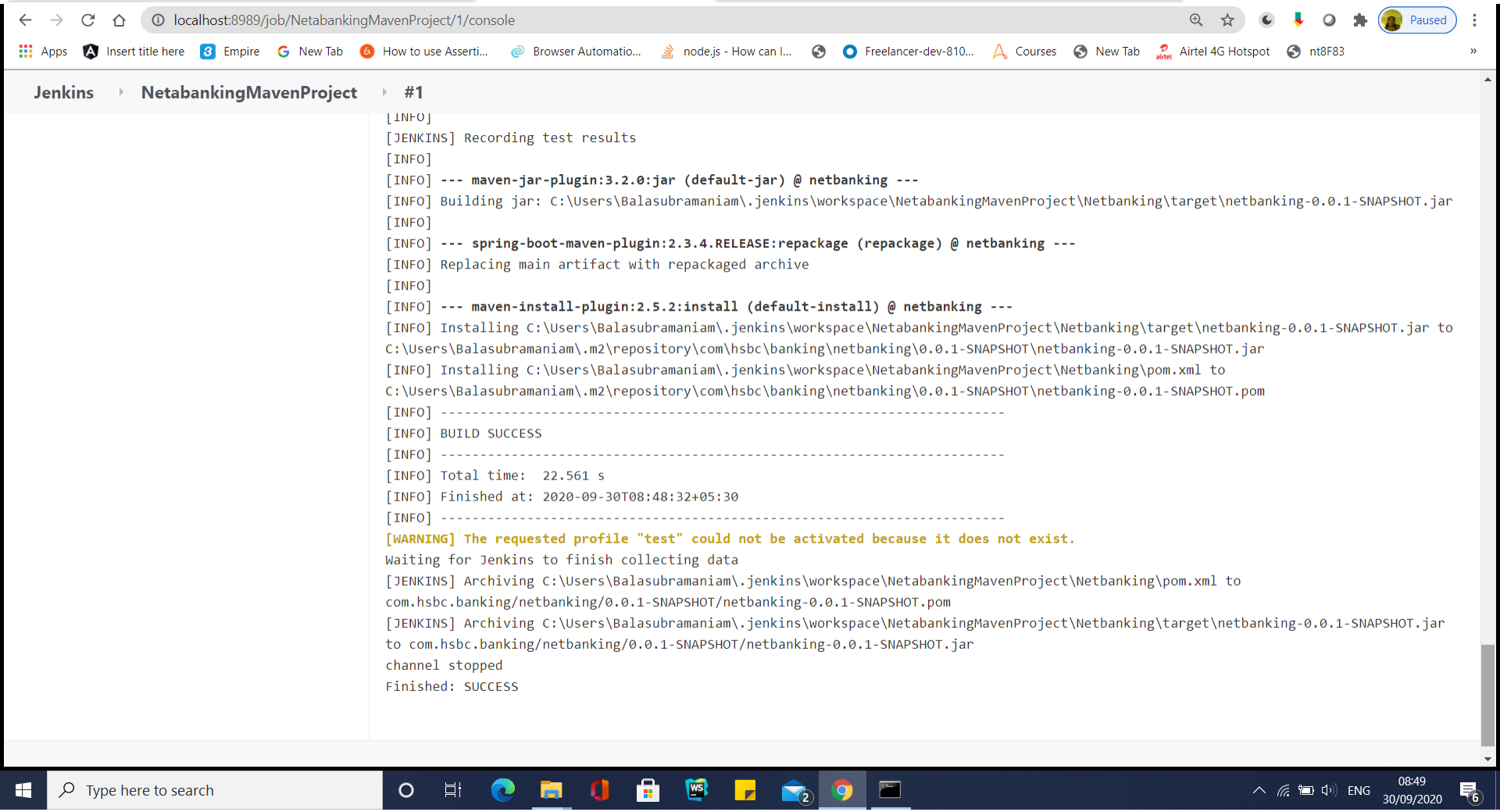
SonarQube


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

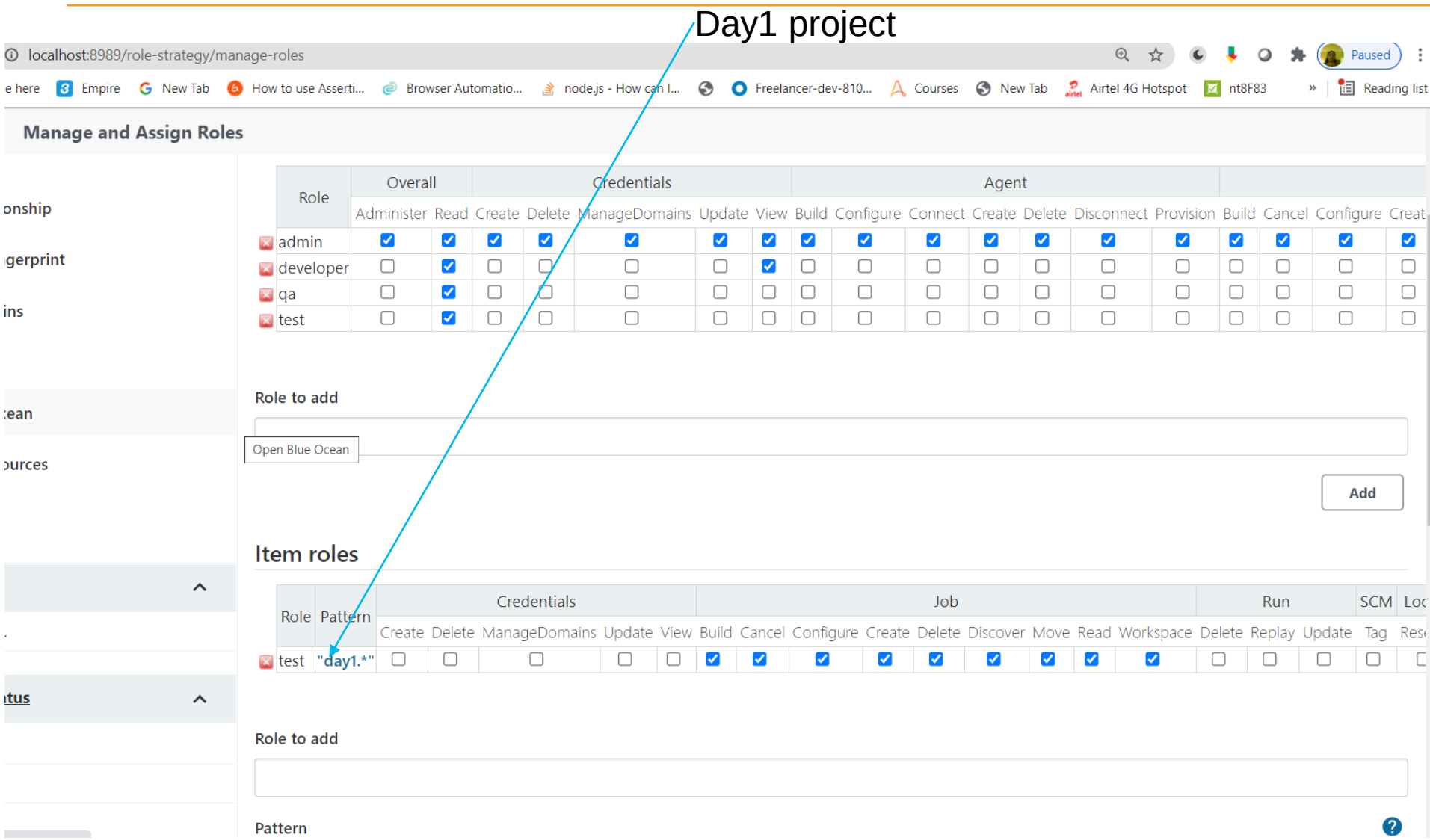
SonarQube Properties

- 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

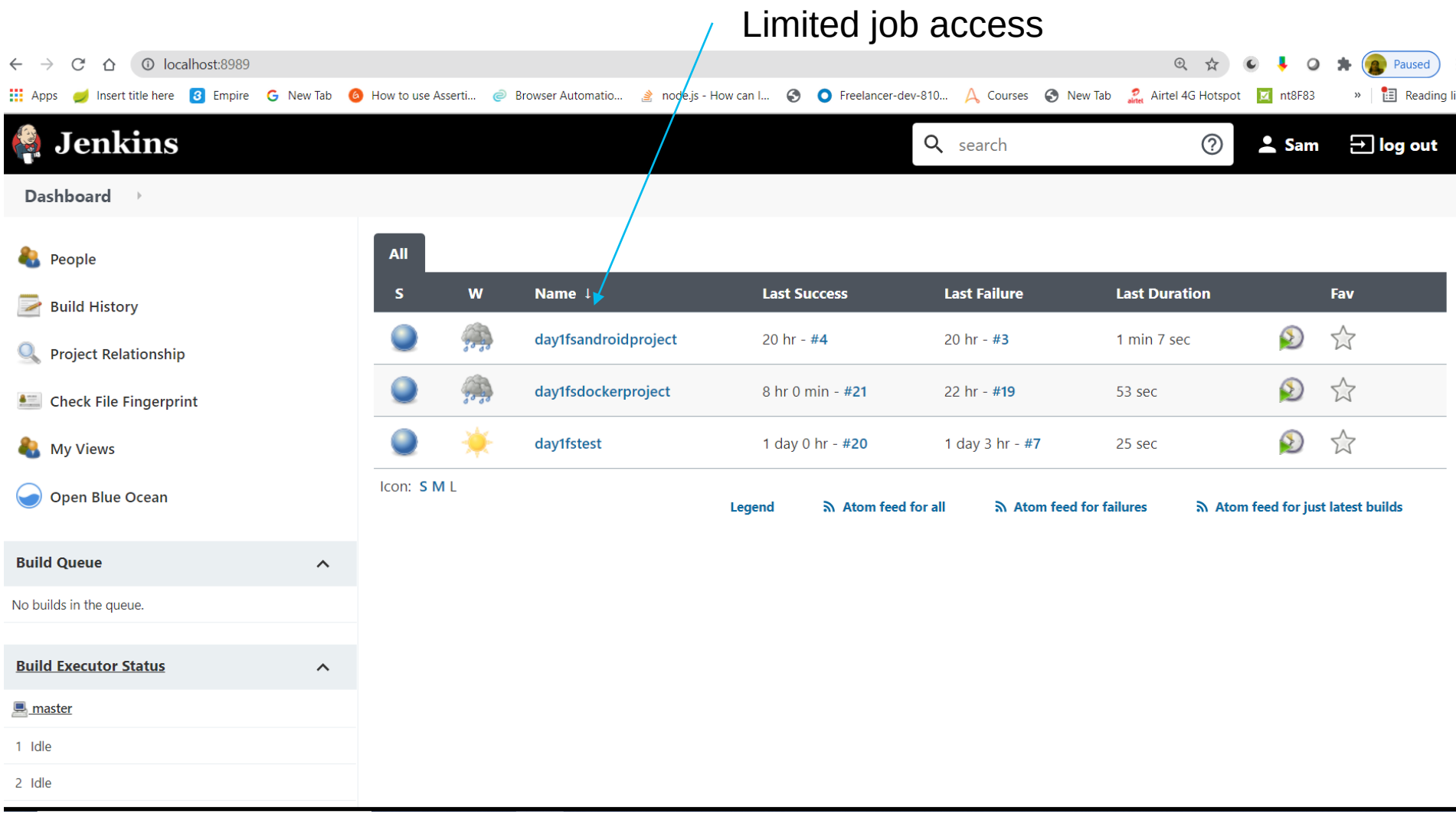
Jenkins Build



Role Based Strategy



Role Based Strategy



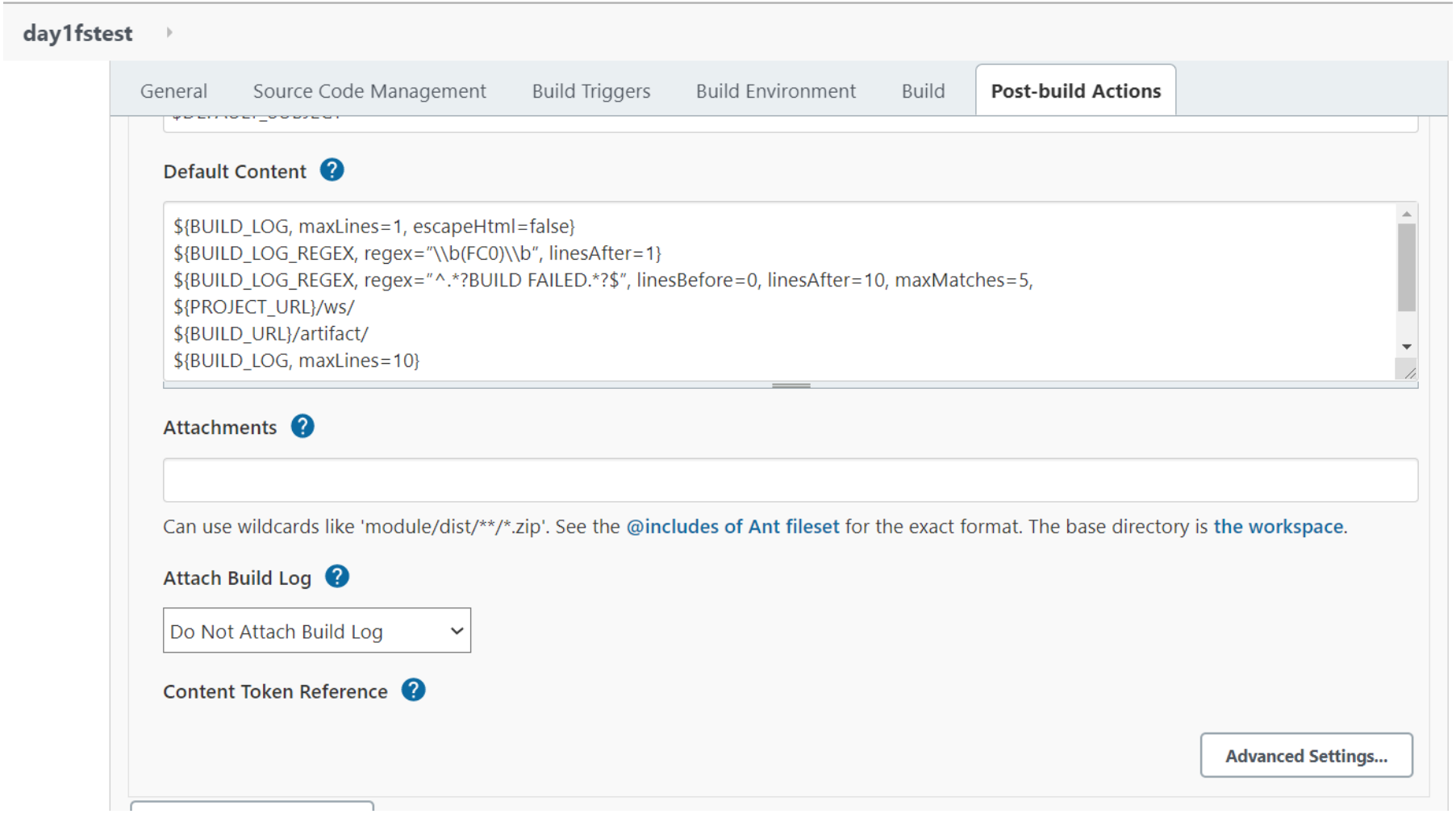
Jenkins Build log Regex

- Way 1 –
  - Put following lines as part of Default Content text box
  - ${BUILD_LOG, maxLines=9999, escapeHtml=false}
  - this works for free style projects
- Way 2 – If you want send only specific line using regex
  - ${BUILD_LOG_REGEX, regex="\\b(Buildfile|BUILD)\\b", linesAfter=1}
  - ${BUILD_LOG_REGEX, regex="^.*?BUILD FAILED.*?$", linesBefore=0, linesAfter=10, maxMatches=5, showTruncatedLines=false, escapeHtml=true}
  - ${BUILD_LOG_REGEX, regex="\\b(FC0)\\b", linesAfter=1}
  - ${BUILD_LOG_REGEX, regex="^.*?BUILD FAILED.*?$", linesBefore=0, linesAfter=10, maxMatches=5, showTruncatedLines=false, escapeHtml=true}
  - ${BUILD_LOG_REGEX, regex="^.*?FC0.*?$", maxMatches=95, showTruncatedLines=false, escapeHtml=false, matchedLineHtmlStyle=true}
- This will show exactly which is expected lines as part of the regEx.

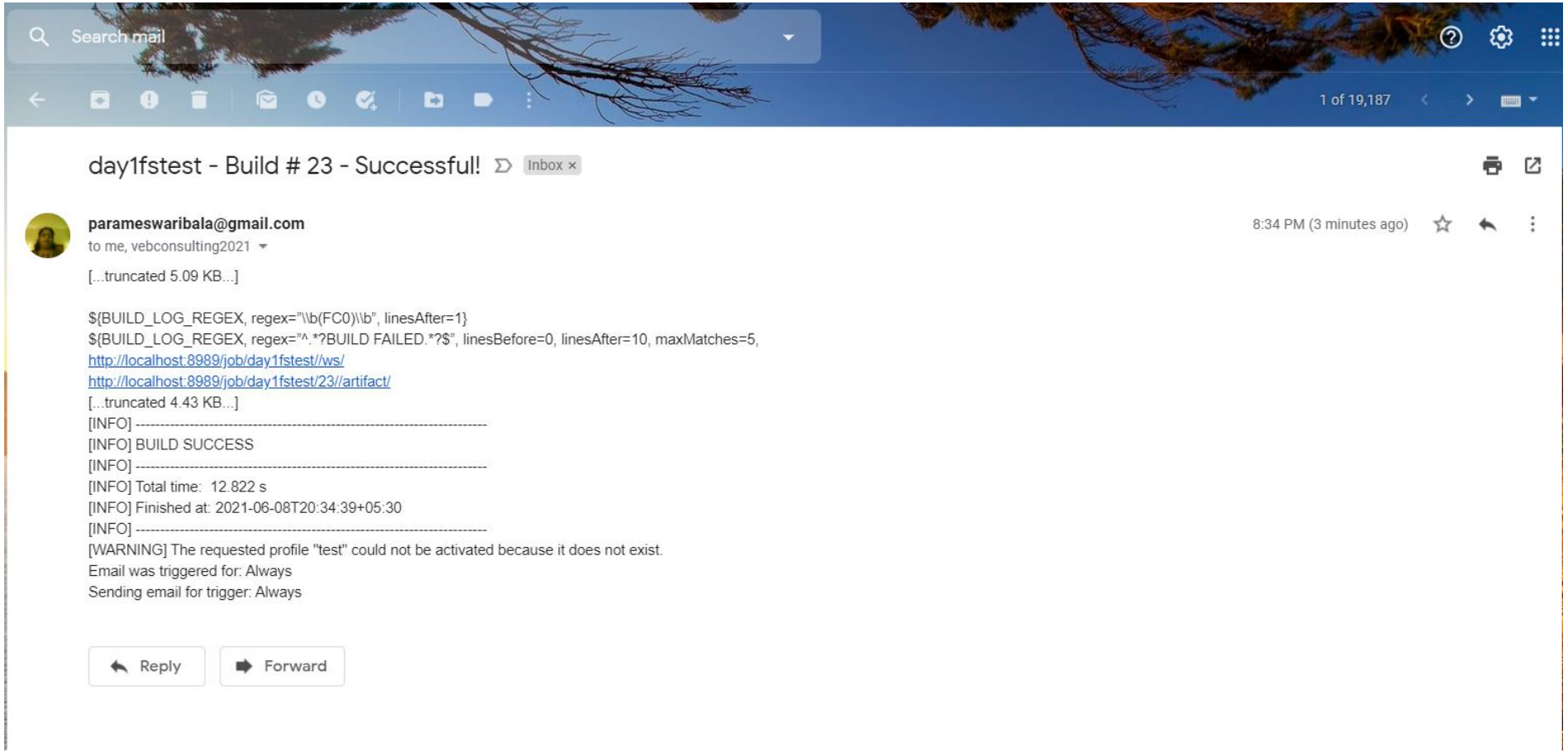
Jenkins Build log Regex

- List of other variables as part of email body
- ${PROJECT_URL}/ws/
- ${BUILD_URL}/artifact/
- ${BUILD_LOG, maxLines=1000}
- More ref
- Content Token Reference
- In string arguments, escape “, \, and line terminators (\n or \r\n) with a \, e.g. arg1=”\”quoted\””; arg2=”c:\\path”; and arg3=”one\ntwo”. The brackets may be omitted if there are no arguments.
- New Lines – Use
 or “\”

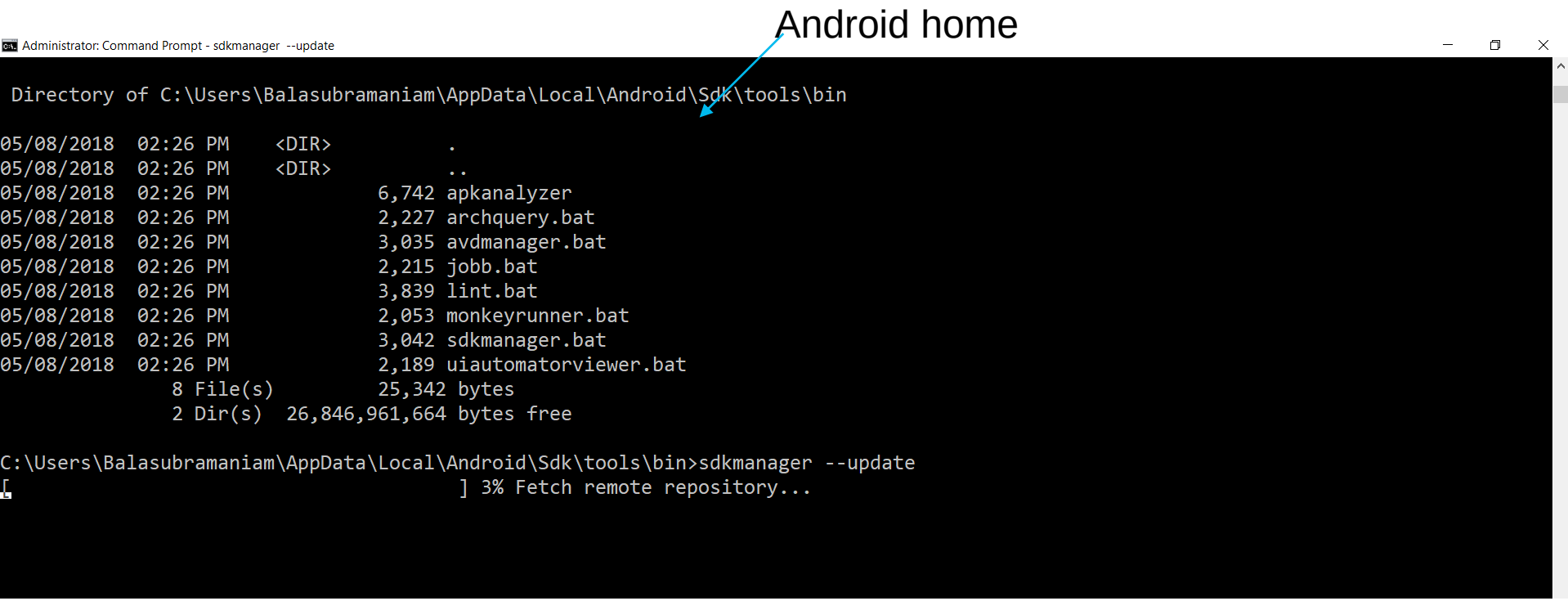
Jenkins Build log regex



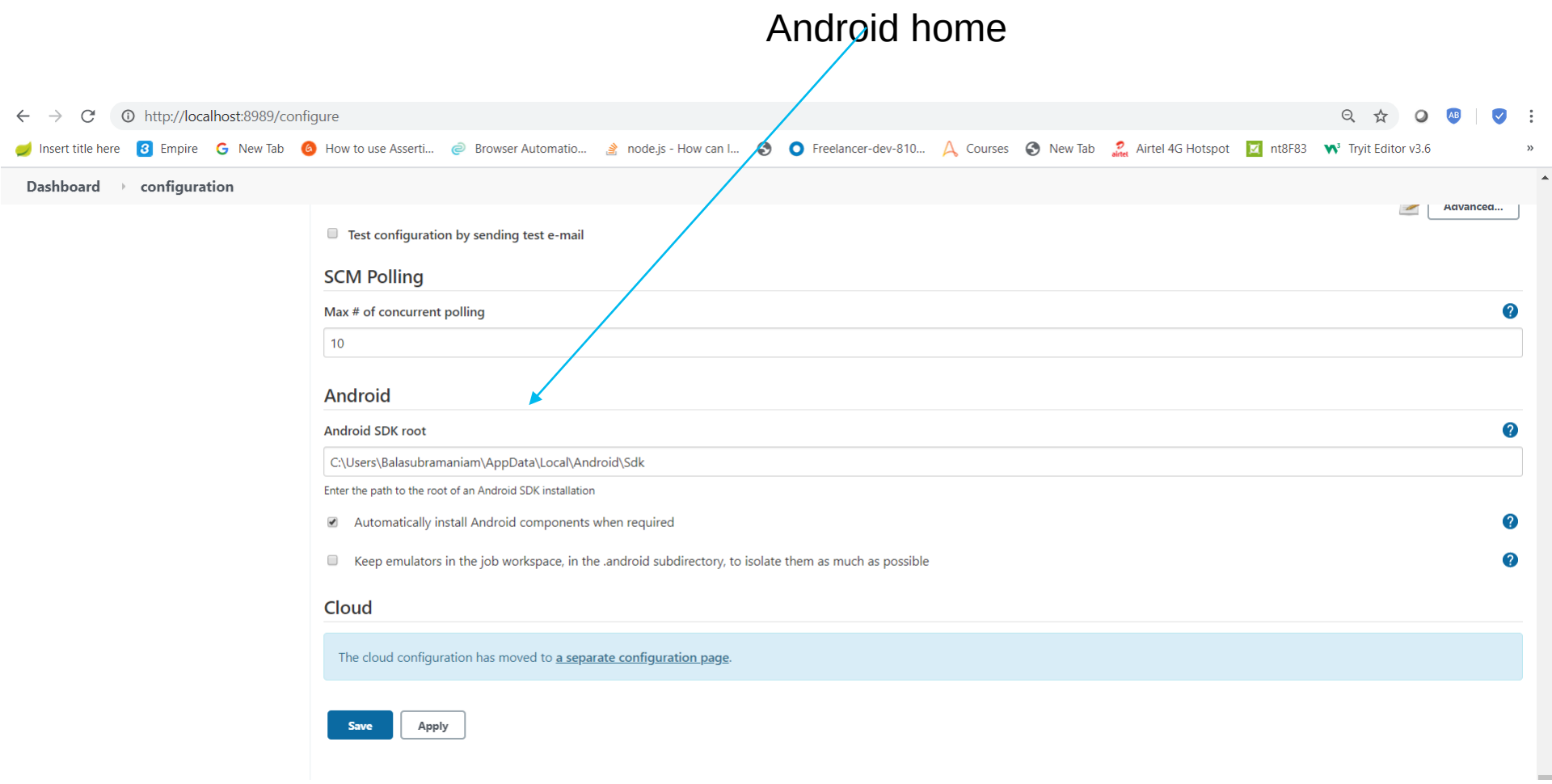
Jenkins Build log regex



Android Jenkins Project



Android Jenkins Project



Before Jenkins Pipeline

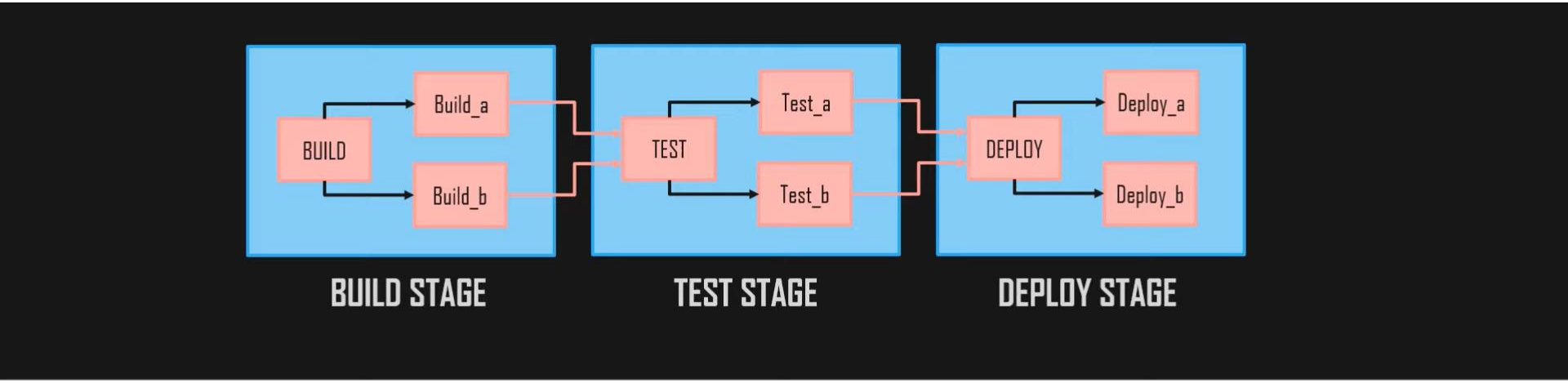
Over the years, there have been multiple Jenkins pipeline releases including, **Jenkins Build flow**, **Jenkins Build Pipeline plugin**, **Jenkins Workflow**, etc.

What are the key features of these plugins?

- Represent multiple Jenkins jobs as one pipeline
- What do these pipelines do?

  These pipelines are a collection of Jenkins jobs which trigger each other in a specified sequence

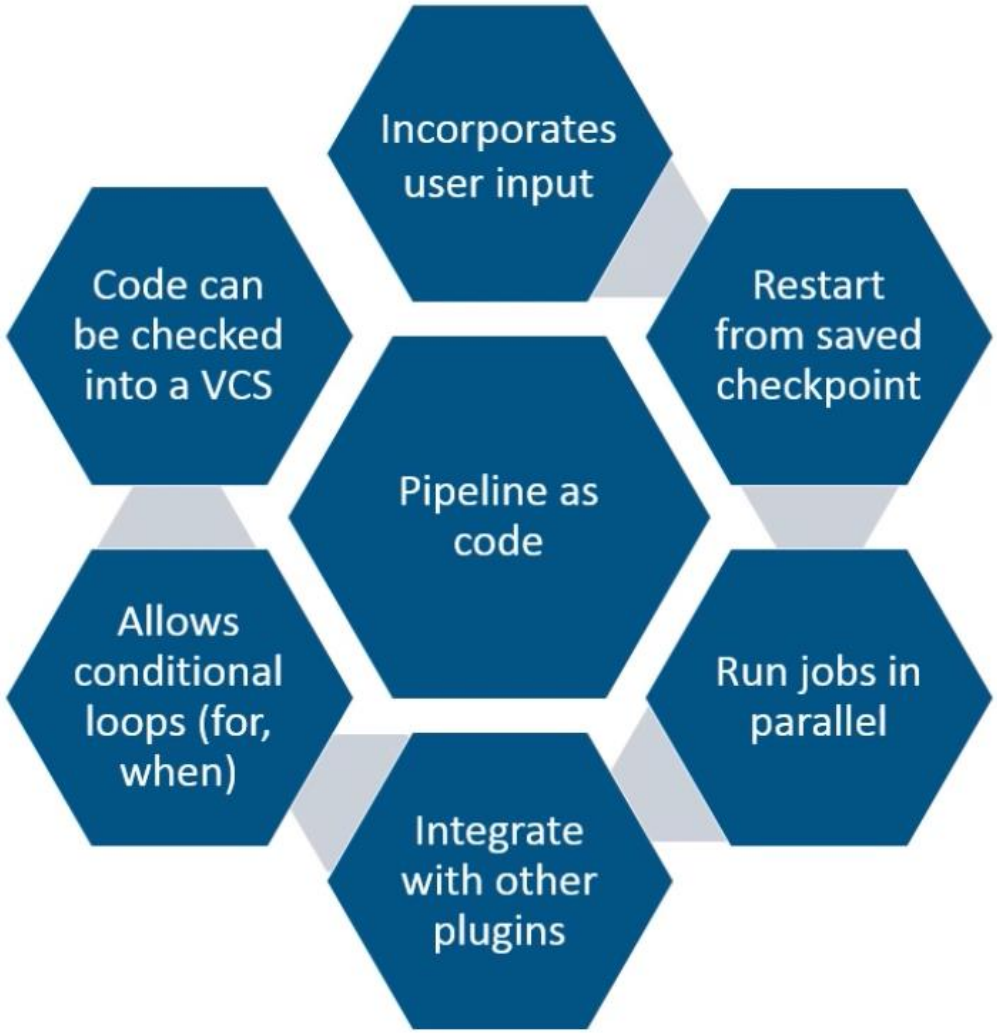
Jenkins Pipeline



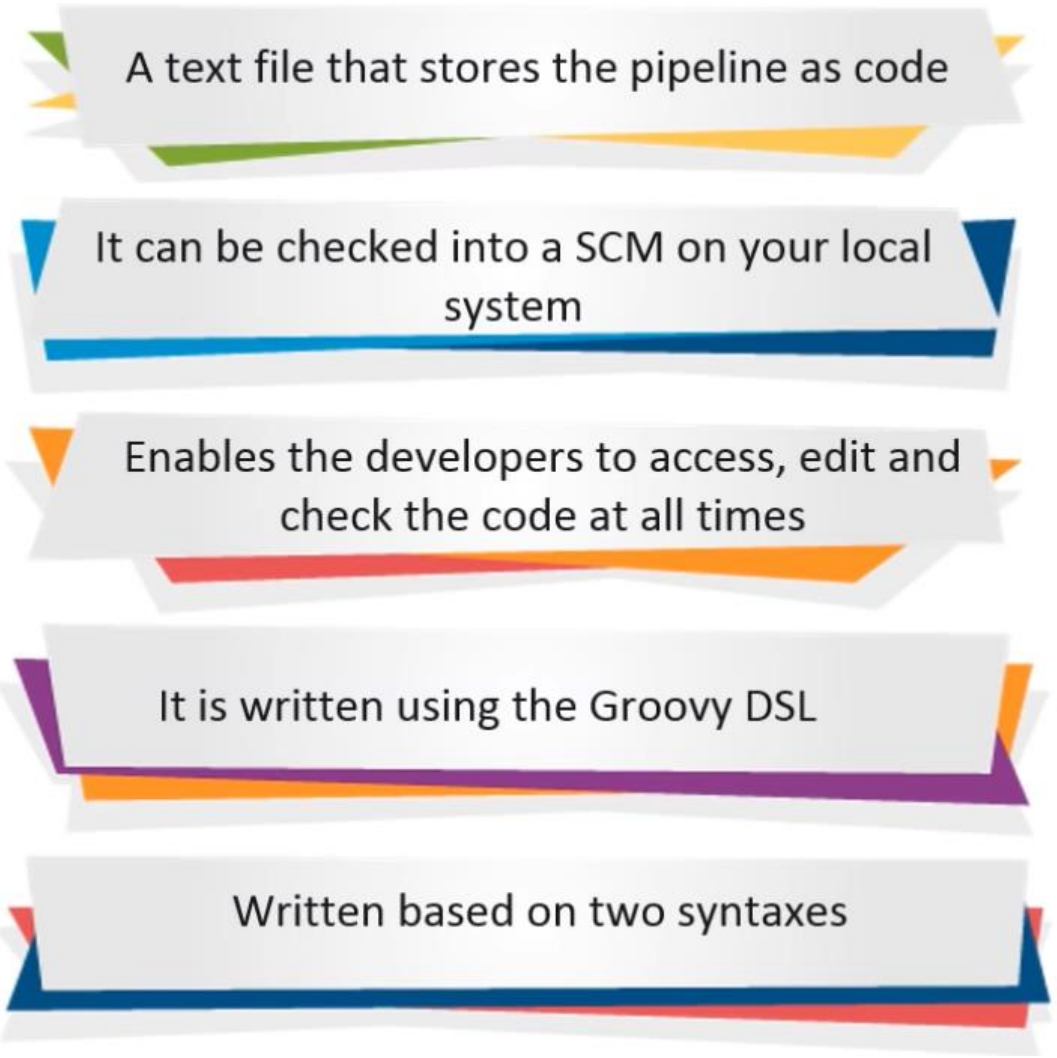
Jenkins Pipeline

- **Jenkins pipeline** is a single platform that runs the entire *pipeline as code*
- All the standard jobs defined by Jenkins are manually written in one script and they can be stored in a VCS
- Instead of building several jobs for each phase, you can now code the entire workflow and put it in a Jenkinsfile

Jenkins Pipeline key Features



Jenkins File



Jenkins Pipeline

```
// Example of Jenkins pipeline script

pipeline {
  stages {
    stage("Build") {
       steps {
          // Just print a Hello, Pipeline to the console
          echo "Hello, Pipeline!"
          // Compile a Java file. This requires JDKconfiguration from Jenkins
          javac HelloWorld.java
          // Execute the compiled Java binary called HelloWorld. This requires JDK configuration from Jenkins
          java HelloWorld
          // Executes the Apache Maven commands, clean then package. This requires Apache Maven configuration from
Jenkins
          mvn clean package ./HelloPackage
          // List the files in current directory path by executing a default shell command
          sh "ls -ltr"
       }
    }
    // And next stages if you want to define further...
 } // End of stages
} // End of pipeline
```

then we're using me one as the build

Jenkins Pipeline

- Jenkins Pipeline (or simply "Pipeline" with a capital "P") is a suite of plugins which supports implementing and integrating continuous delivery pipelines into Jenkins.
- A continuous delivery (CD) pipeline is an automated expression of your process for getting software from version control right through to your users and customers.
- Every change to your software (committed in source control) goes through a complex process on its way to being released.
- This process involves building the software in a reliable and repeatable manner, as well as progressing the built software (called a "build") through multiple stages of testing and deployment.
- Pipeline provides an extensible set of tools for modeling simple-to-complex delivery pipelines "as code" via the Pipeline domain-specific language (DSL) syntax.

Jenkins Pipeline

- The definition of a Jenkins Pipeline is written into a text file (called a Jenkinsfile) which in turn can be committed to a project’s source control repository.
- This is the foundation of "Pipeline-as-code"; treating the CD pipeline a part of the application to be versioned and reviewed like any other code.

Jenkins Pipeline

- Creating a Jenkinsfile and committing it to source control provides a number of immediate benefits:
  - Automatically creates a Pipeline build process for all branches and pull requests.
  - Code review/iteration on the Pipeline (along with the remaining source code).
  - Audit trail for the Pipeline.
  - Single source of truth for the Pipeline, which can be viewed and edited by multiple members of the project.

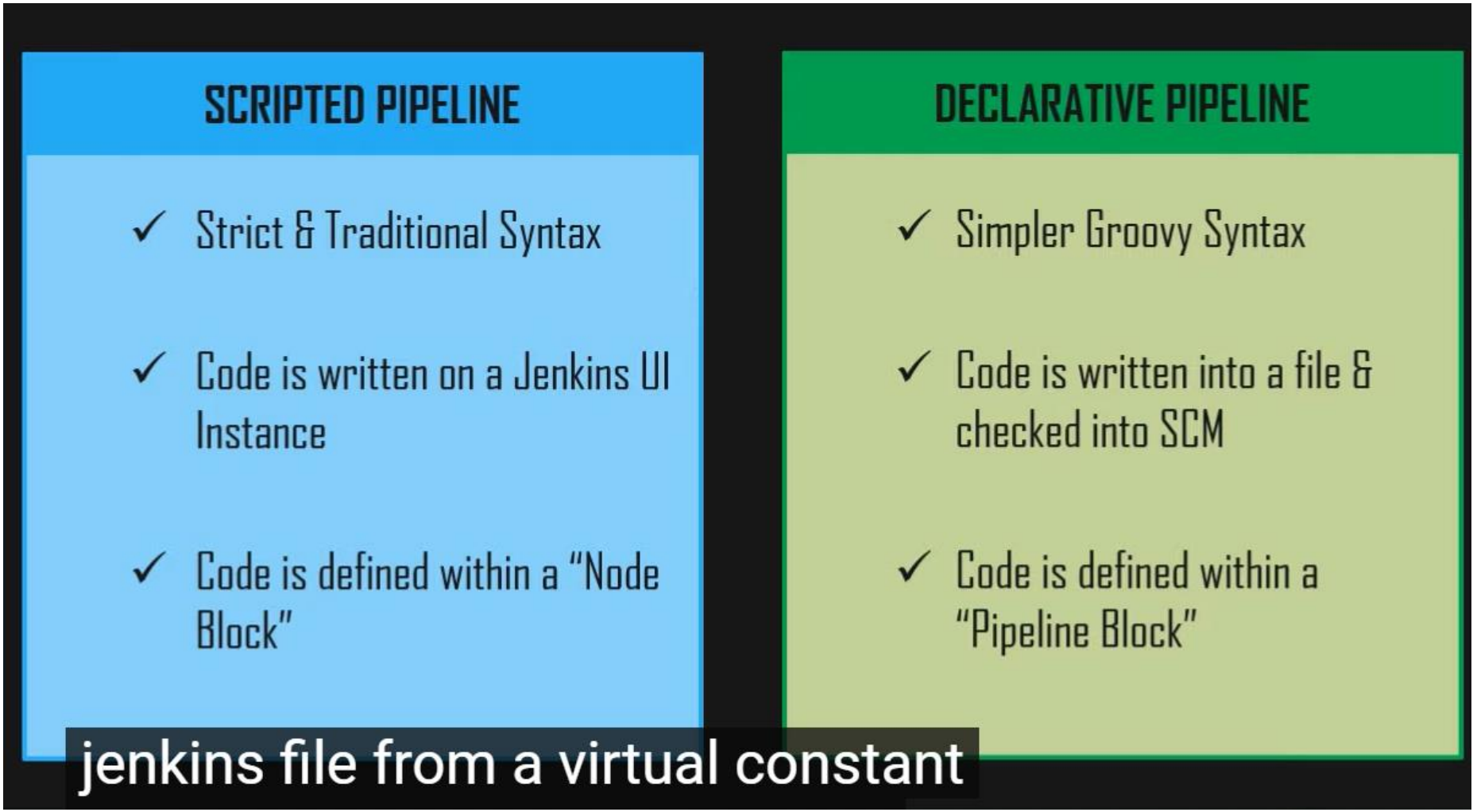
Declarative versus Scripted Pipeline syntax

- Declarative:
  - Declarative pipeline syntax offers an easy way to create pipelines.
  - It contains a predefined hierarchy to create Jenkins pipelines.
  - It gives you the ability to control all aspects of a pipeline execution in a simple, straight-forward manner.

Declarative versus Scripted Pipeline syntax

- Scripted:
  - Scripted Jenkins pipeline runs on the Jenkins master with the help of a lightweight executor.
  - It uses very few resources to translate the pipeline into atomic commands.
  - Both declarative and scripted syntax are different from each other and are defined totally differently.

Declarative versus Scripted Pipeline syntax



Declarative versus Scripted Pipeline syntax

- A Jenkinsfile can be written using two types of syntax - Declarative and Scripted.
- Declarative and Scripted Pipelines are constructed fundamentally differently.
- Declarative Pipeline is a more recent feature of Jenkins Pipeline which:
  - provides richer syntactical features over Scripted Pipeline syntax, and
  - is designed to make writing and reading Pipeline code easier.

Declarative Syntax

- A valid Declarative pipeline must be defined with the “pipeline” sentence and include the next required sections:
  - agent
  - stages
  - stage
  - steps

Declarative Syntax

- Also, these are the available directives:
  - environment (Defined at stage or pipeline level)
  - input (Defined at stage level)
  - options (Defined at stage or pipeline level)
  - parallel
  - parameters
  - post
  - script
  - tools
  - triggers
  - when

Declarative Syntax

- Agents should be labeled so they can be easily identified from each other. For example, nodes can be labeled by their platform (Linux, Windows, etc), by their versions or by their location, among others.
- The “agent” section configures on which nodes the pipeline can be run. Specifying “agent any” means that Jenkins will run the job on any of the available nodes.

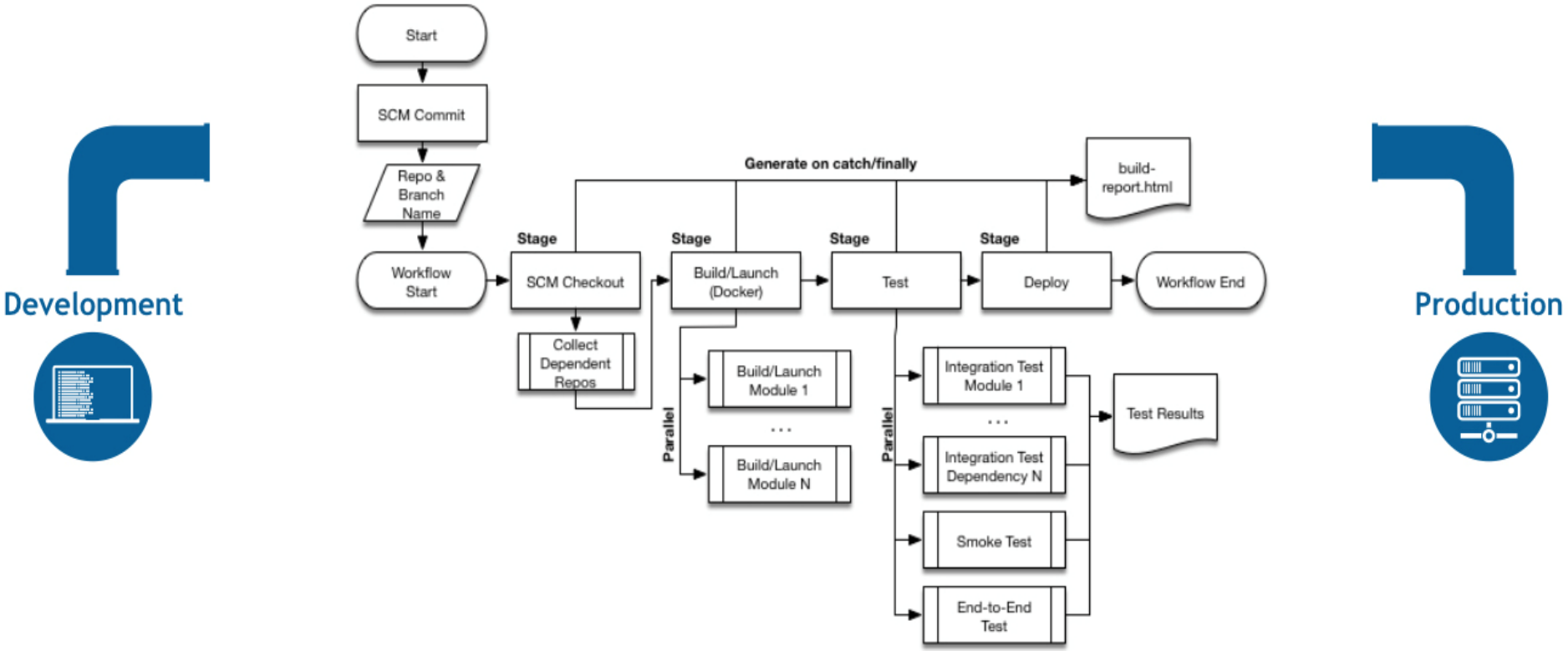
Why Pipeline?

- Jenkins is, fundamentally, an automation engine which supports a number of automation patterns.
- Pipeline adds a powerful set of automation tools onto Jenkins, supporting use cases that span from simple continuous integration to comprehensive CD pipelines.
- By modeling a series of related tasks, users can take advantage of the many features of Pipeline:

Why Pipeline?

- Code: Pipelines are implemented in code and typically checked into source control, giving teams the ability to edit, review, and iterate upon their delivery pipeline.
- Durable: Pipelines can survive both planned and unplanned restarts of the Jenkins controller.
- Pausable: Pipelines can optionally stop and wait for human input or approval before continuing the Pipeline run.
- Versatile: Pipelines support complex real-world CD requirements, including the ability to fork/join, loop, and perform work in parallel.
- Extensible: The Pipeline plugin supports custom extensions to its DSL footnote:dsl:[] and multiple options for integration with other plugins.

Why Pipeline?



Pipeline Concepts

Agent: instructs Jenkins to allocate an executor for the builds. It is defined for an entire pipeline or a specific stage.
It has the following parameters:

- *Any*: Runs pipeline/ stage on any available agent
- *None*: applied at the root of the pipeline, it indicates that there is no global agent for the entire pipeline & each stage must specify its own agent
- *Label*: Executes the pipeline/stage on the labelled agent.
- *Docker*: Uses docker container as an execution environment for the pipeline or a specific stage.

```
pipeline {
    agent {
        docker {
            image 'ubuntu'
        }
    }
}
```

Pipeline Concepts

Stages: It contains all the work, each stage performs a specific task.

```
pipeline {
        agent any
        stages {
                stage ('Build') {
                        ...
                }
                stage ('Test') {
                        ...
                }
                stage ('QA') {
                        ...
                }
                stage ('Deploy') {
                        ...
                }
                stage ('Monitor') {
                        ...
                }
        }
}
```

Steps: steps are carried out in sequence to execute a stage

```
pipeline {
        agent any
        stages {
                stage ('Build') {
                        steps {
                                echo 'Running build phase...'
                        }
                }
        }
}
```

Why Pipeline?

Declarative Pipeline fundamentals

In Declarative Pipeline syntax, the `pipeline` block defines all the work done throughout your entire Pipeline.

Jenkinsfile (Declarative Pipeline)

```
pipeline {
    agent any (1)
    stages {
        stage('Build') { (2)
            steps {
                // (3)
            }
        }
        stage('Test') { (4)
            steps {
                // (5)
            }
        }
        stage('Deploy') { (6)
            steps {
                // (7)
            }
        }
    }
}
```

Why Pipeline?

1. Execute this Pipeline or any of its stages, on any available agent.
2. Defines the "Build" stage.
3. Perform some steps related to the "Build" stage.
4. Defines the "Test" stage.
5. Perform some steps related to the "Test" stage.
6. Defines the "Deploy" stage.
7. Perform some steps related to the "Deploy" stage.

Why Pipeline?

- In Scripted Pipeline syntax, one or more node blocks do the core work throughout the entire Pipeline.
- Although this is not a mandatory requirement of Scripted Pipeline syntax, confining your Pipeline's work inside of a node block does two things:
- Schedules the steps contained within the block to run by adding an item to the Jenkins queue.
- As soon as an executor is free on a node, the steps will run.
- Creates a workspace (a directory specific to that particular Pipeline) where work can be done on files checked out from source control.
- Caution: Depending on your Jenkins configuration, some workspaces may not get automatically cleaned up after a period of inactivity.

Why Pipeline?

Jenkinsfile (Scripted Pipeline)

```
node { (1)
    stage('Build') { (2)
        // (3)
    }
    stage('Test') { (4)
        // (5)
    }
    stage('Deploy') { (6)
        // (7)
    }
}
```

(1) Execute this Pipeline or any of its stages, on any available agent.

(2) Defines the "Build" stage. `stage` blocks are optional in Scripted Pipeline syntax. However, implementing `stage` blocks in a Scripted Pipeline provides clearer visualization of each `stage's subset of tasks/steps in the Jenkins UI.

(3) Perform some steps related to the "Build" stage.

(4) Defines the "Test" stage.

(5) Perform some steps related to the "Test" stage.

(6) Defines the "Deploy" stage.

(7) Perform some steps related to the "Deploy" stage.

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