CI/CD Pipeline with Jenkins

simplilearn

Automated Deployment

Learning Objectives

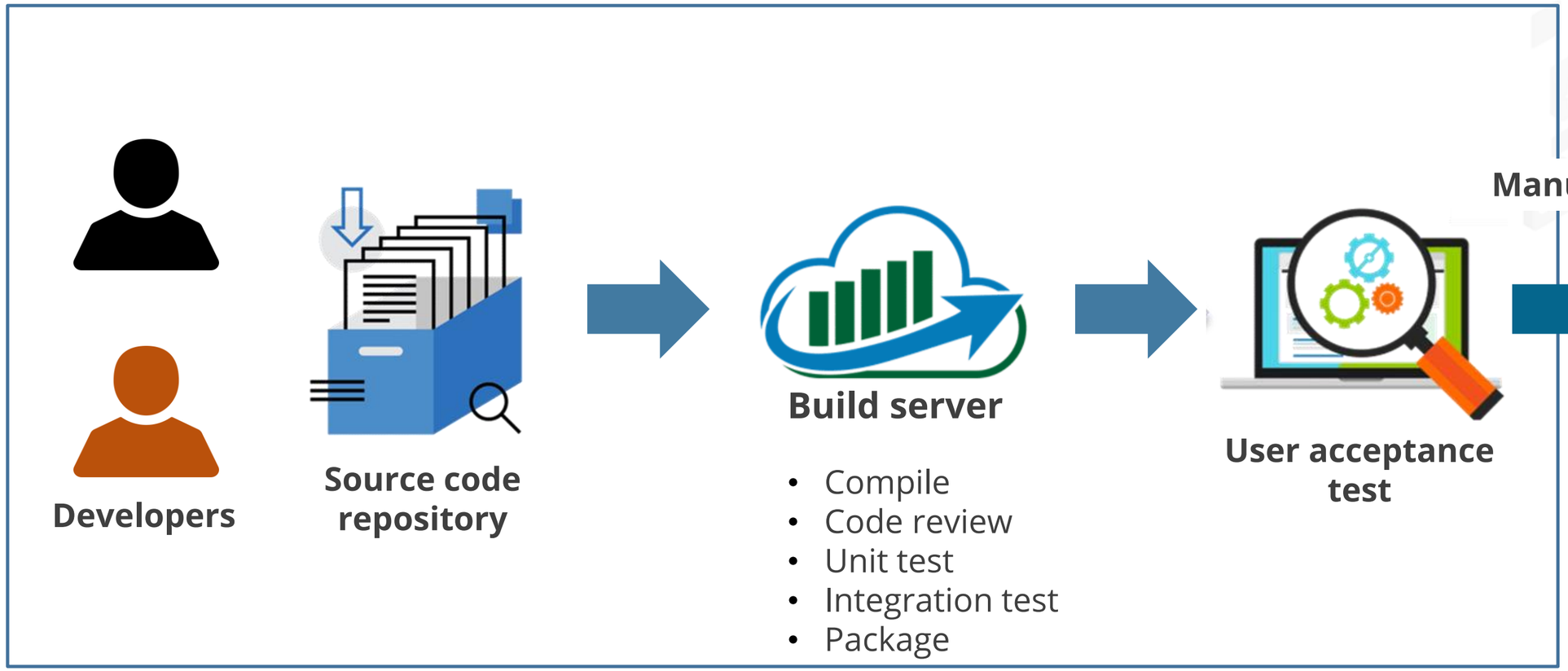
By the end of this lesson, you'll be able to:

- Implement automated and continuous deployment
- Deploy a Python application to an application server
- Launch a simple java web application using Tomcat
- Deploy scripting-based applications like Ruby and PHP

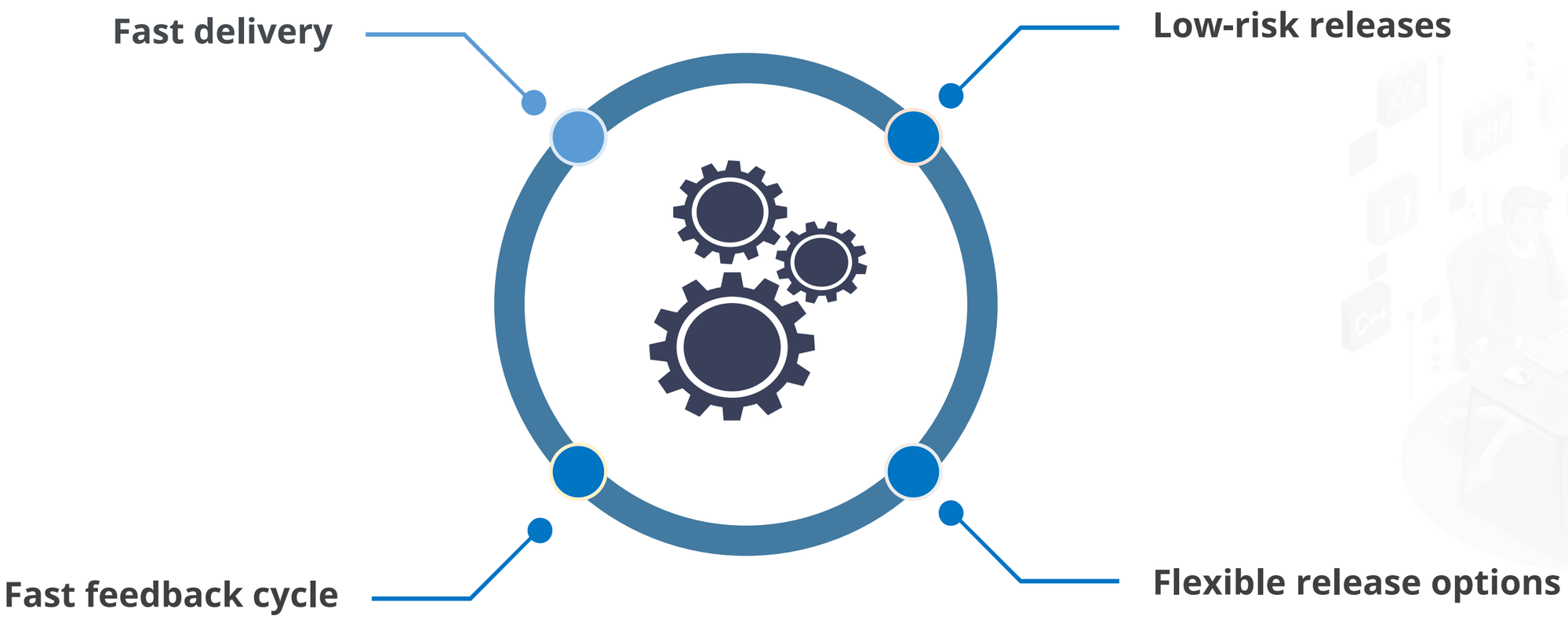
Introduction to Automated Deployment and Continuous Delivery

Continuous Delivery

> Continuous Delivery is the ability to get changes of all types—including new features, configuration changes, bug fixes, and experiments—into production, or into the hands of users, safely and quickly in a sustainable way.
>
> –Jez Humble

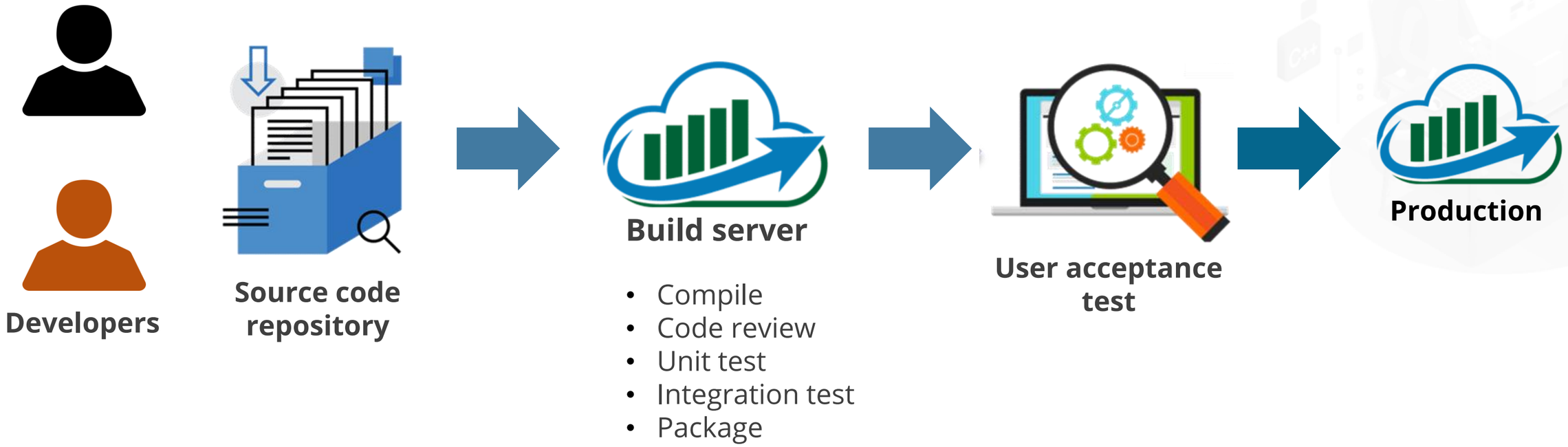


Benefits of Continuous Delivery

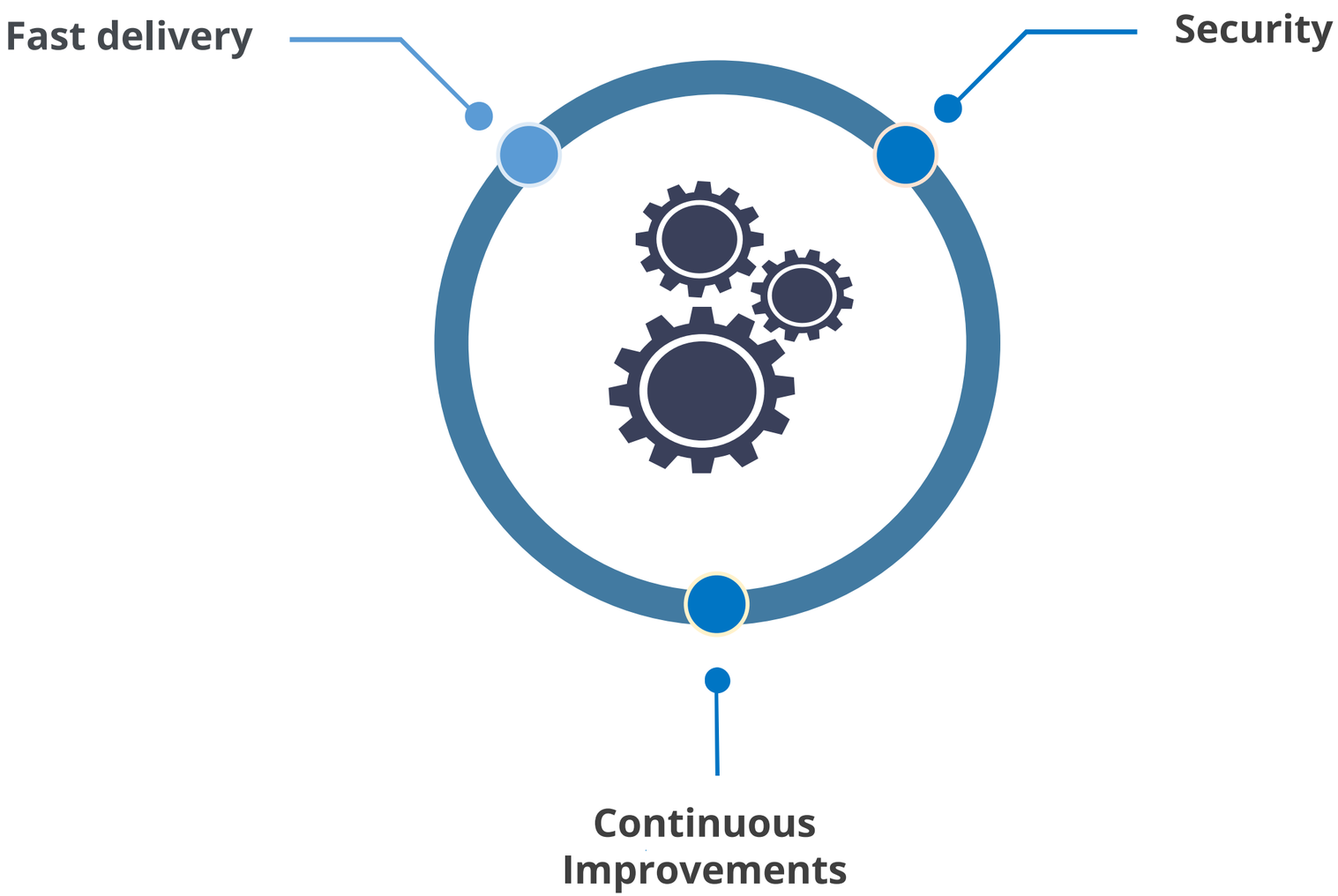


Automated Deployment

> The process wherein any code change subject to automated tests and other appropriate verifications is immediately deployed into production.

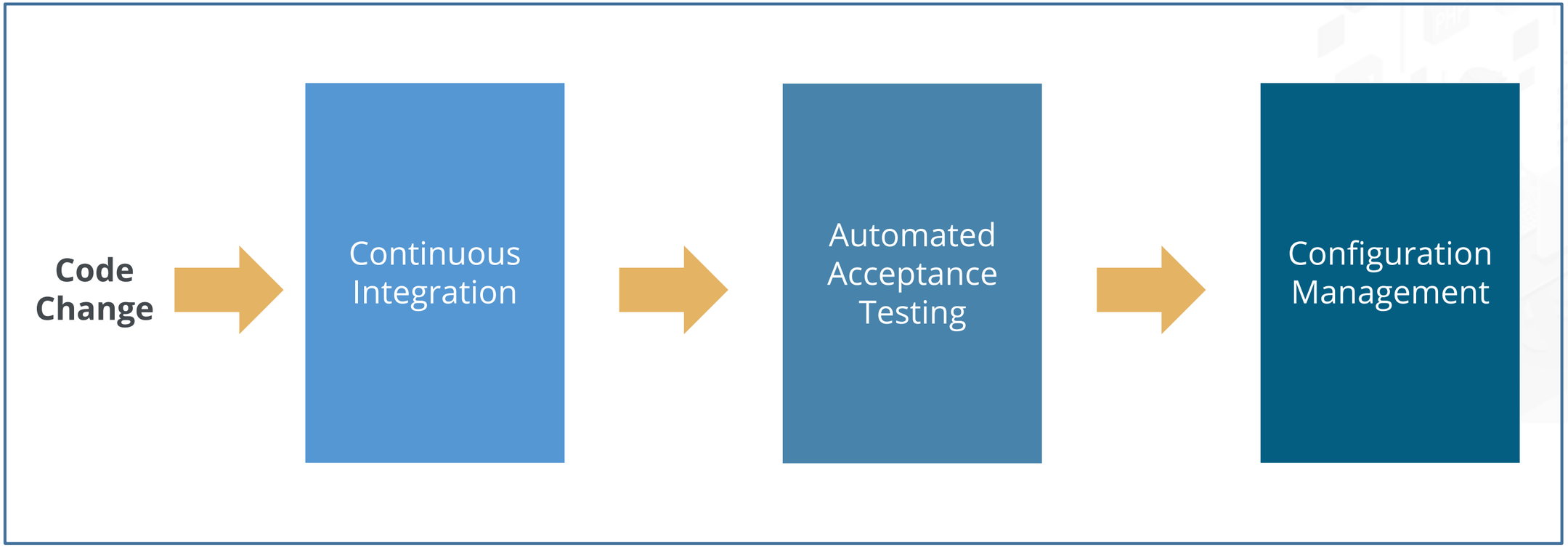


Benefits of Automated Deployment



Automated Deployment Pipeline

The automated pipeline deployment is a sequence of scripts executed following each change of code committed to the repository. If the process succeeds, the deployment ends in the production environment.



Phases of Automated Deployment Pipeline

Each step below corresponds to a phase in the traditional delivery process:

Continuous Integration: Makes sure that the code written by different developers integrates together.

Automated Acceptance Testing: Replaces the manual QA phase and checks if the features implemented by developers meet the client's requirements.

Configuration Management: Replaces the manual operations phase, configures the environment, and deploys the software.

Building the Continuous Delivery Process

Tools Used

Docker ecosystem

Jenkins

Ansible

Java

GitHub

Gradle

Spring boot

Cucumber

Automated Deployment System

Dockerized application

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Jenkins configuration

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Continuous Integration

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Automated acceptance testing

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Configuration management

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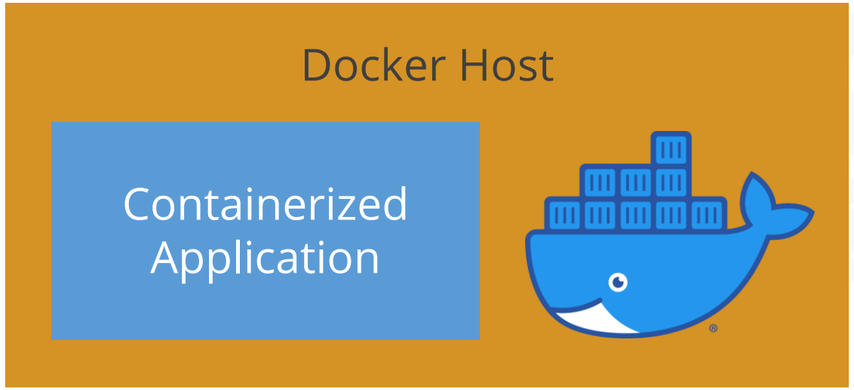
Advanced continuous delivery

A dockerized application (web service) is made to run as a container on a Docker Host. This is reachable as it would run directly on the host machine.



Automated Deployment System

Dockerized application

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Jenkins configuration

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Continuous Integration

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Automated acceptance testing

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Configuration management

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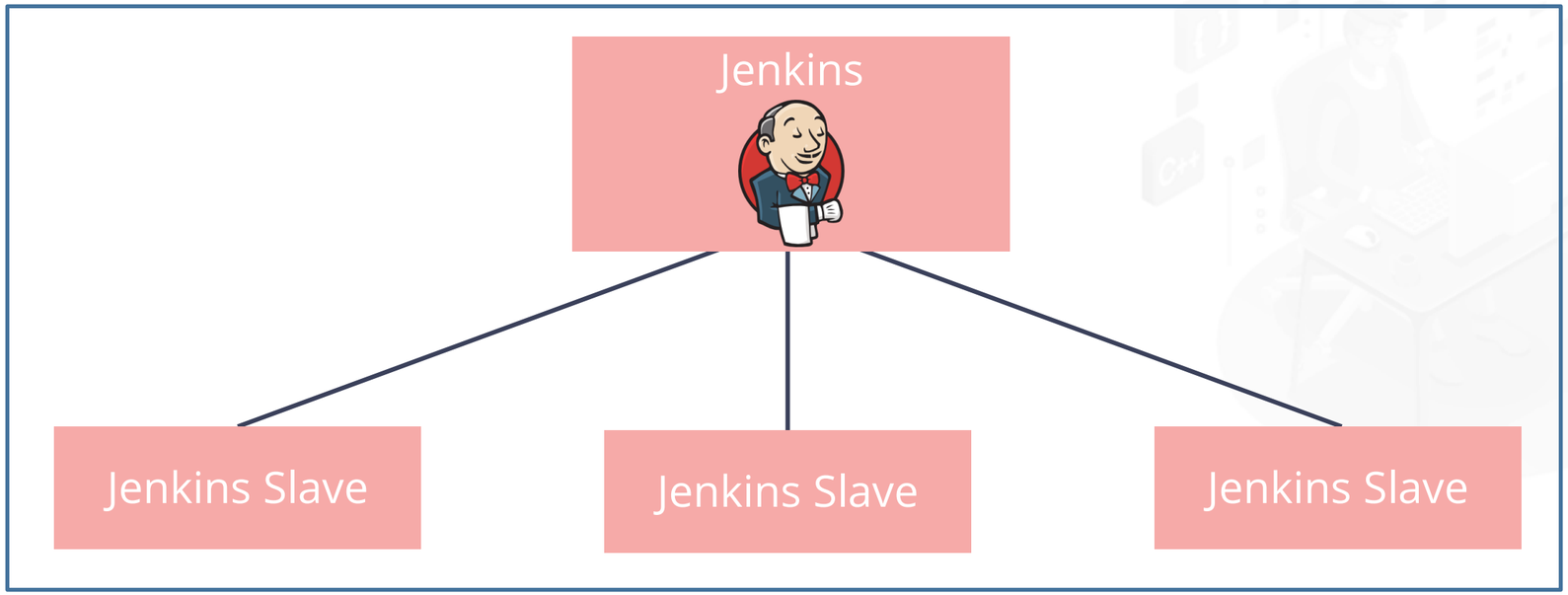
Advanced continuous delivery

The Jenkins master accepts a build request, but the execution is started at one of the Jenkins Slave (agent) machines. This provides horizontal scaling of the Jenkins environment.



Automated Deployment System

Dockerized application

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Jenkins configuration

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Continuous Integration

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Automated acceptance testing

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Configuration management

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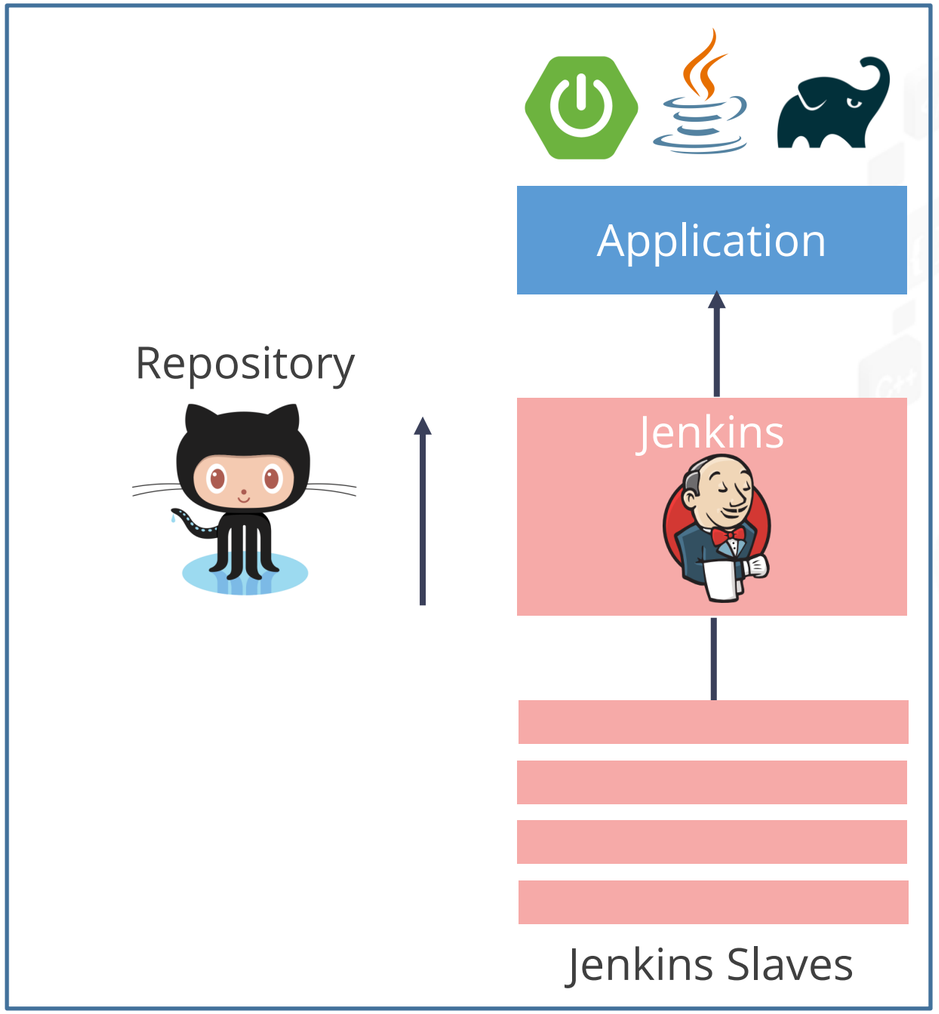
Advanced continuous delivery

The application is a simple web service written in Java with the Spring Boot framework. Gradle is used as a build tool and GitHub as the source code repository.



Automated Deployment System

Dockerized application

Jenkins configuration

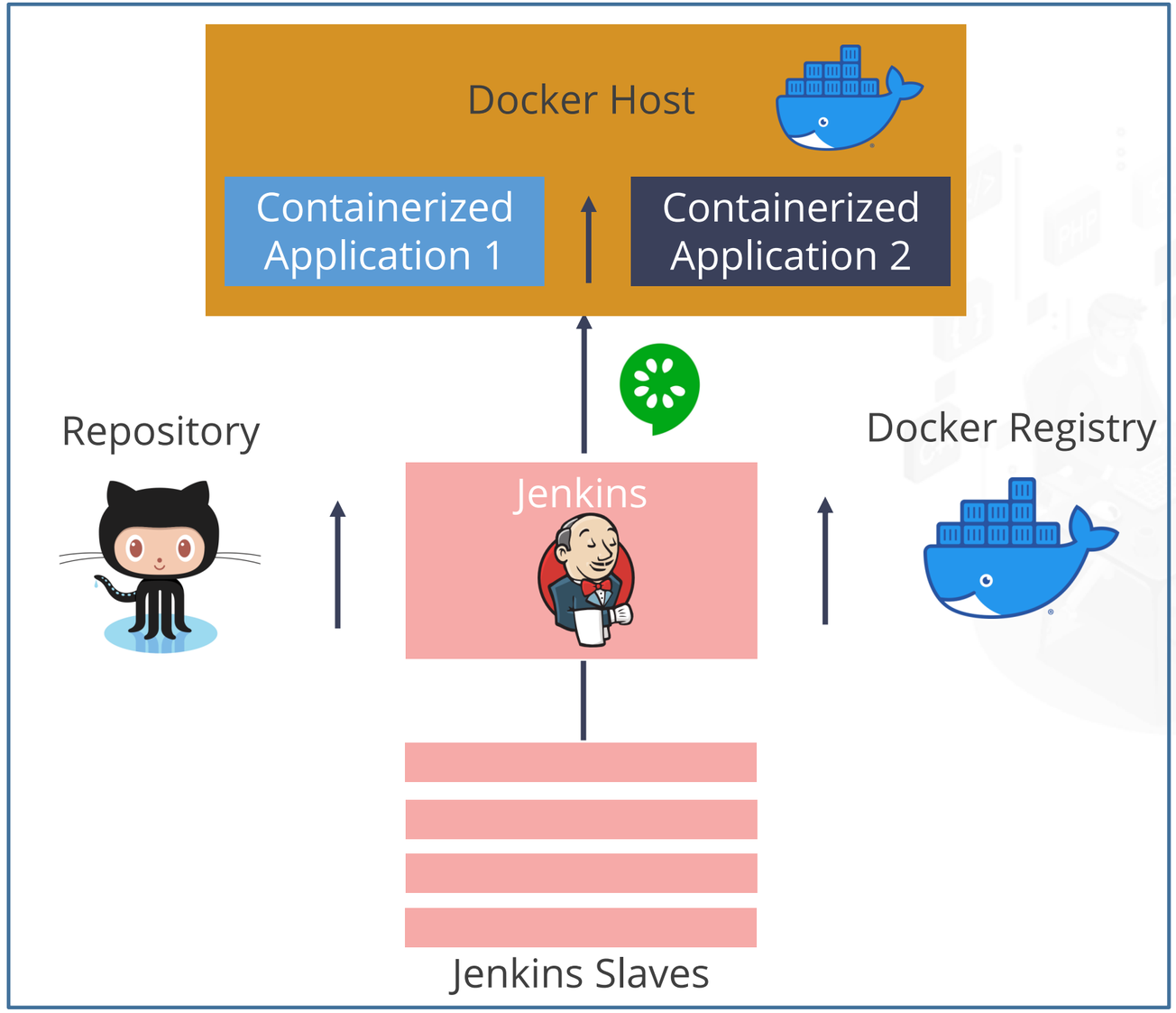
Continuous Integration

Automated acceptance testing

Configuration management

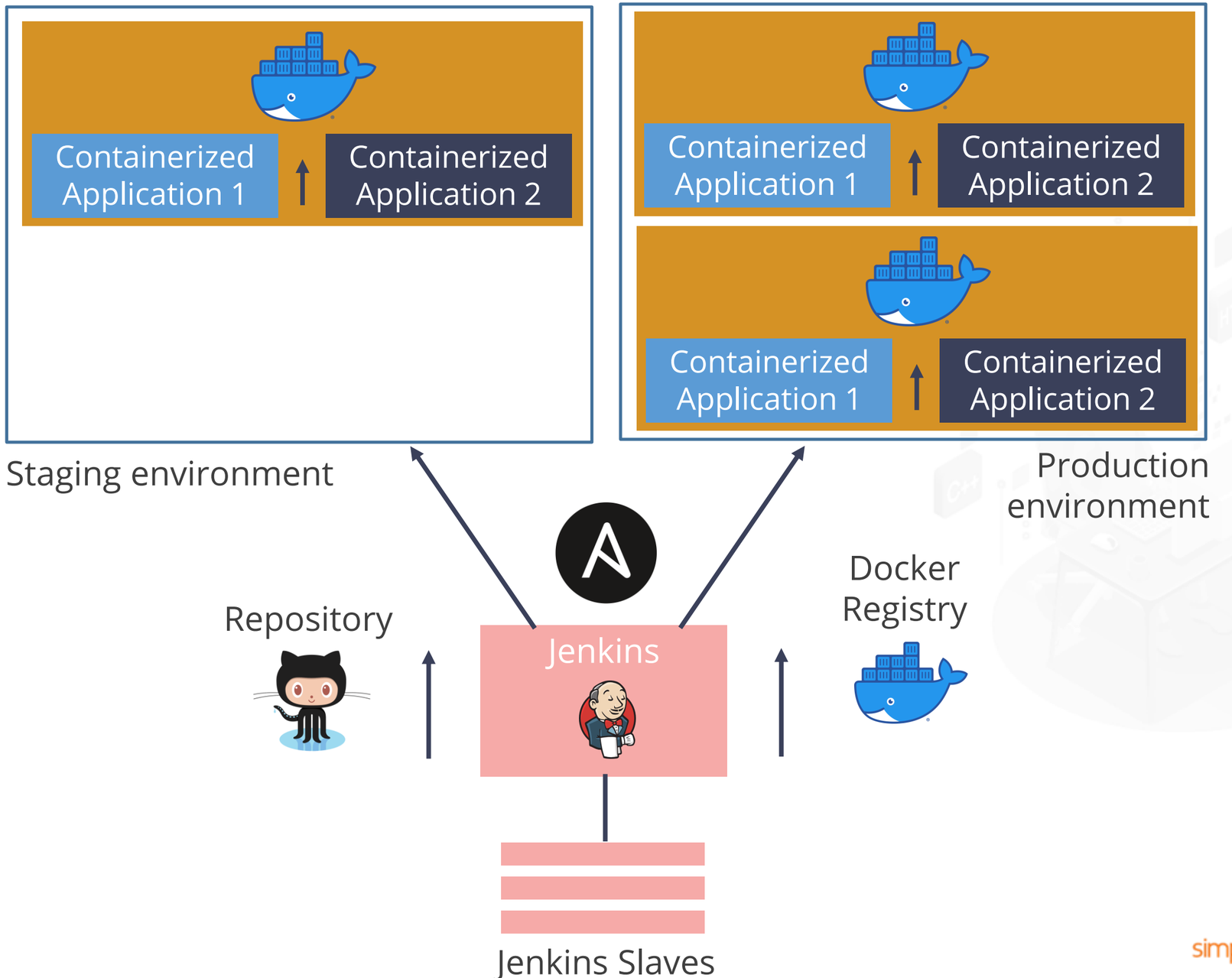
Advanced continuous delivery

After the application is started on the Docker Host, Jenkins runs a suite of acceptance tests written in the Cucumber framework.

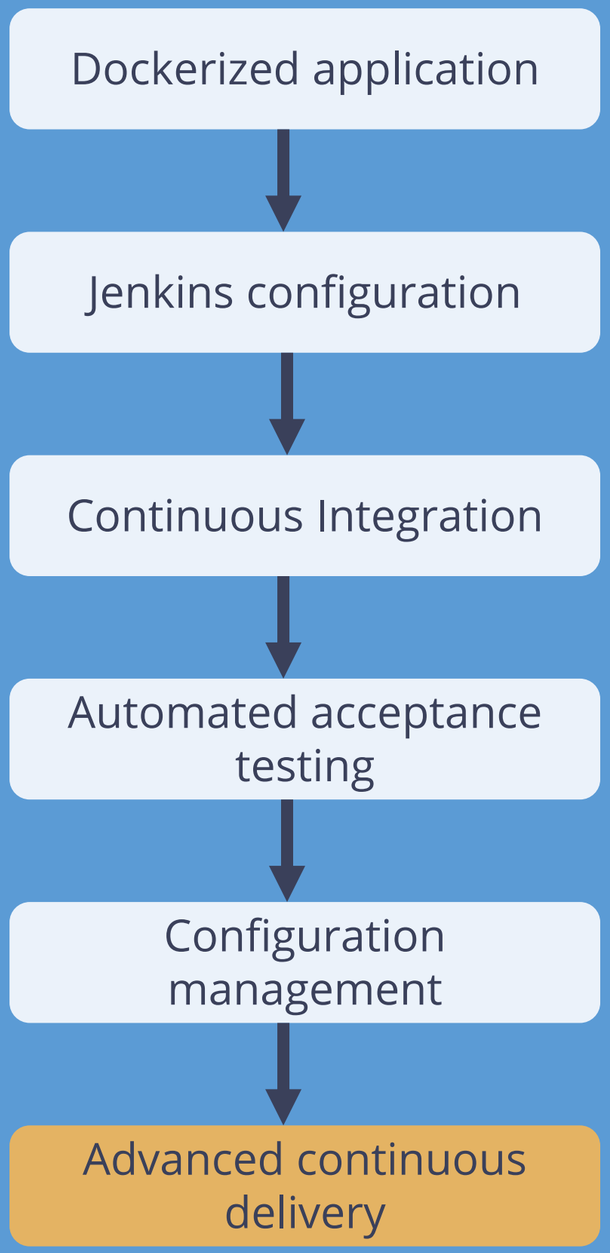


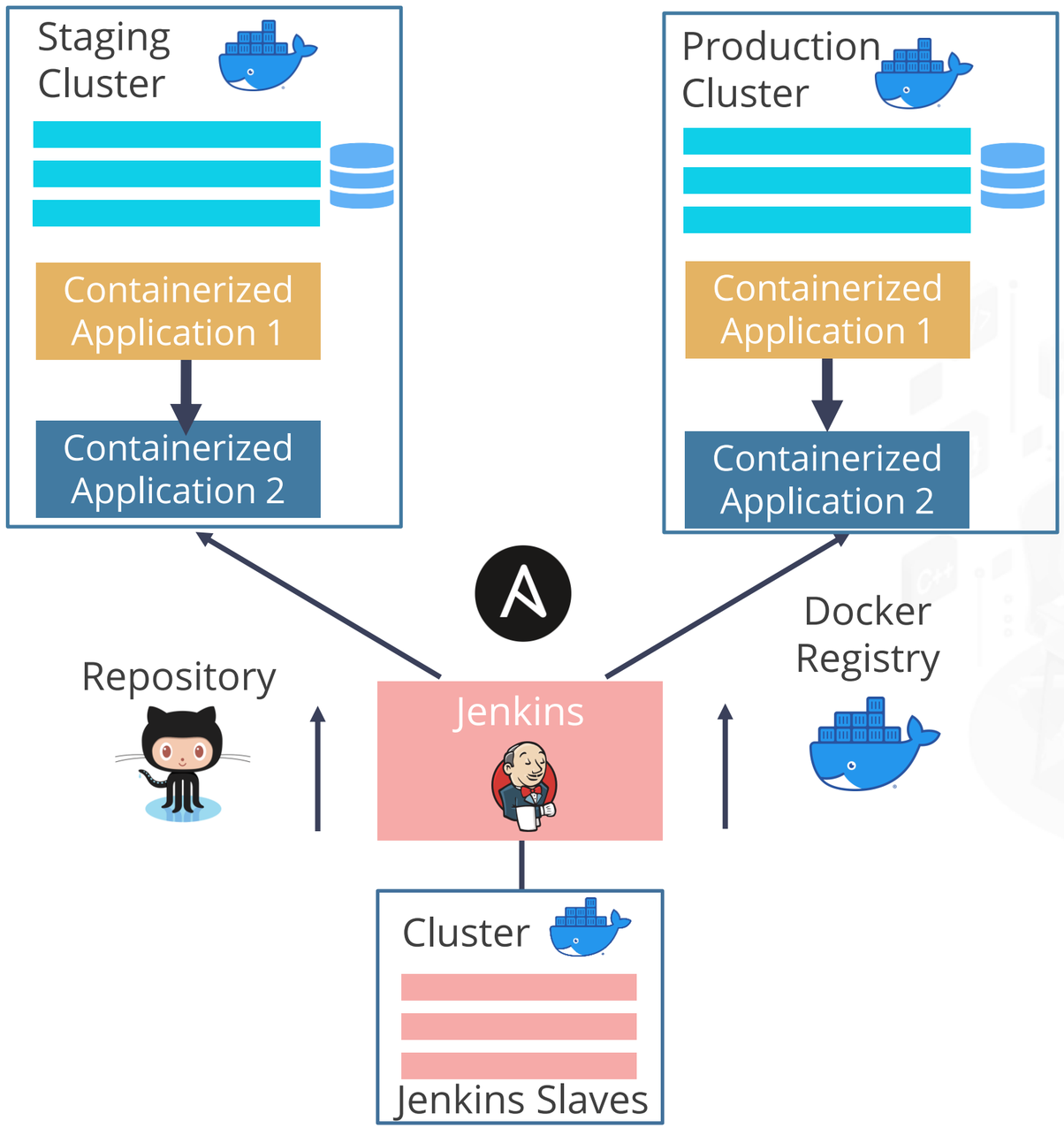
Automated Deployment System

- Dockerized application
- Jenkins configuration
- Continuous Integration
- Automated acceptance testing
- **Configuration management**
- Advanced continuous delivery



Automated Deployment System





Implementing Automated and Continuous Deployment

The Deployment Script

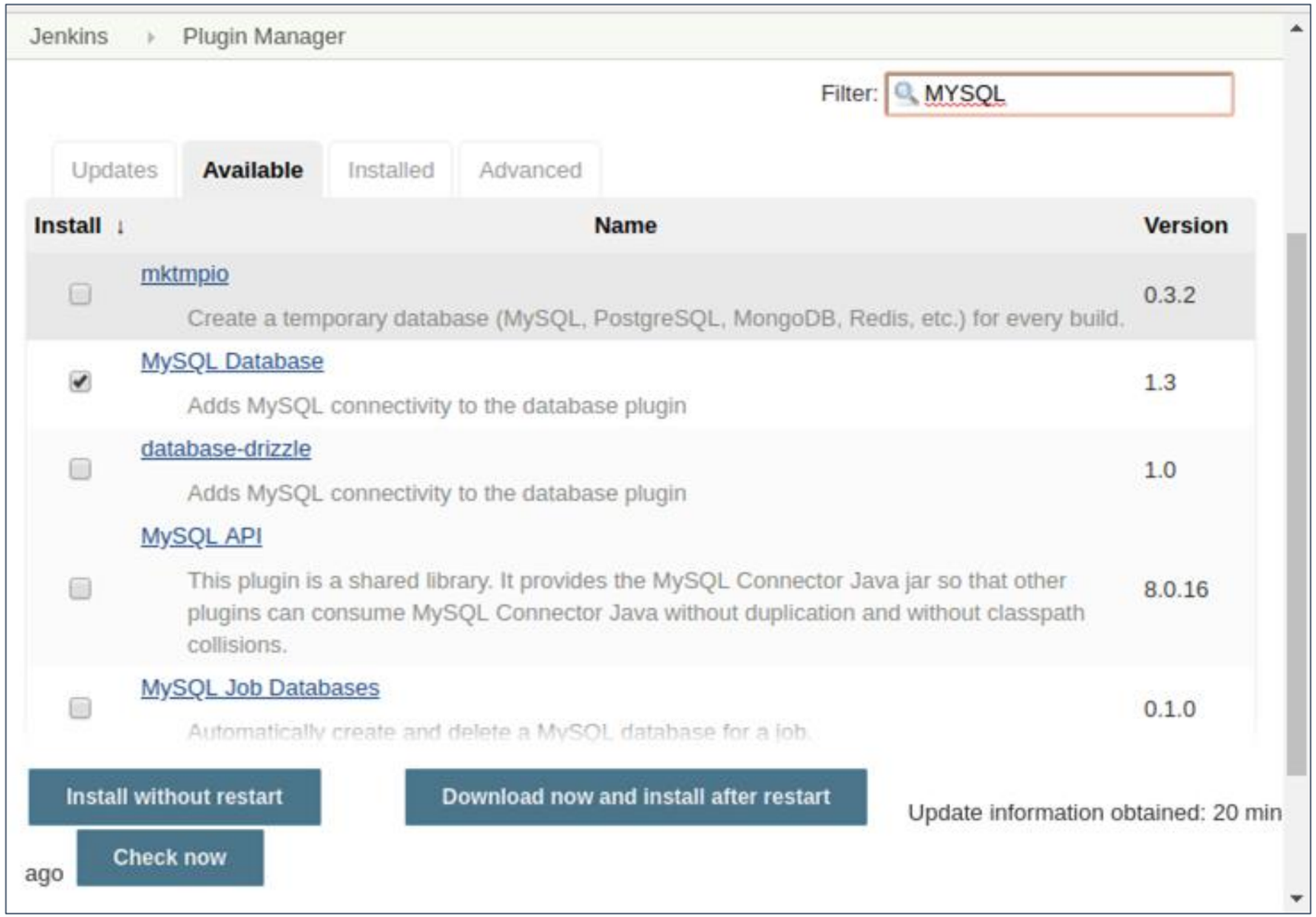
Scriptable deployment process is an important part in any automated deployment. Essentially, the deployment stage executes only after the successful completion of the **Build** and **Test** stages.

```
Jenkinsfile (Declarative Pipeline)
pipeline {
   agent any

   stages {
     stage('Deploy') {
       when {
         expression {
           currentBuild.result == null || currentBuild.result ==
'SUCCESS’
         }
       }
       steps {
           sh 'make publish’
       }
     }
   }
}
```

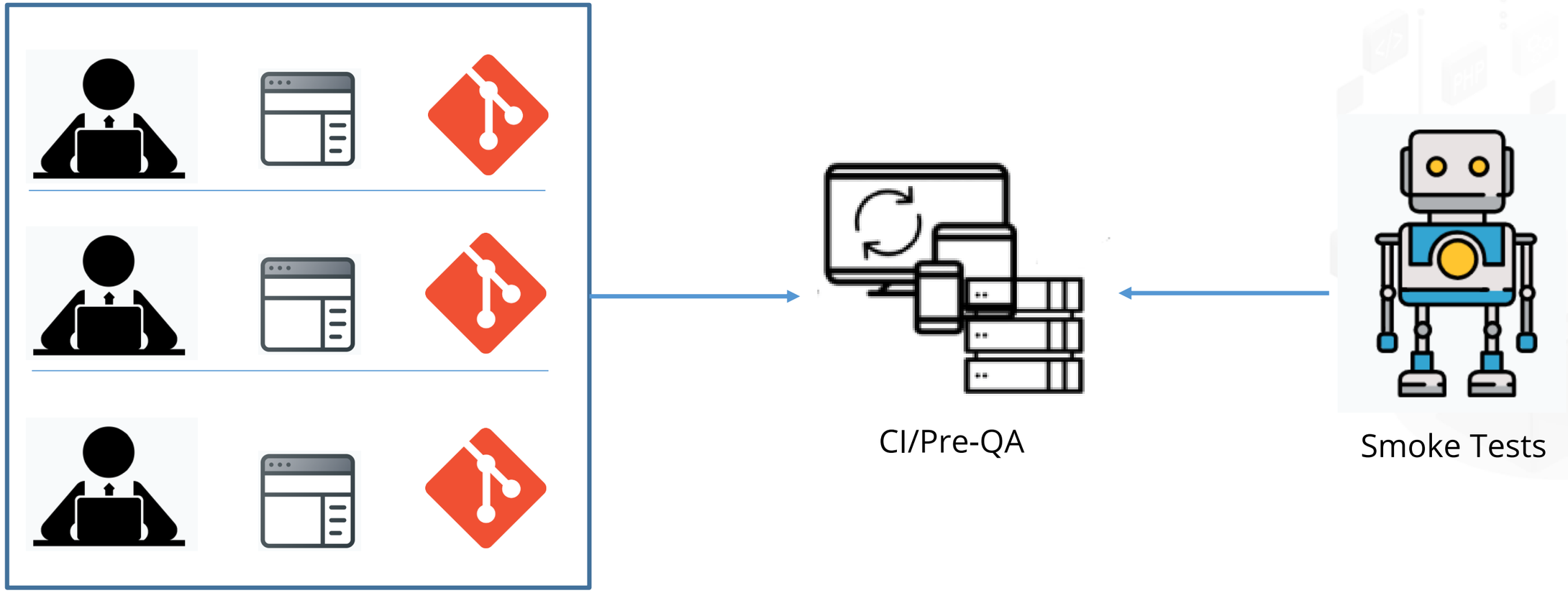
Database Updates: MySQL Plugin

Database plugin adds a system configuration entry to let the administrator configure the database used by Jenkins. MySQL Database plugin is a driver plugin for Database plugin that adds MySQL database driver.



Smoke Tests

A series of automated smoke checks must be executed for any significant automated implementation. An automated acceptance test subset can be a good smoke test candidate.

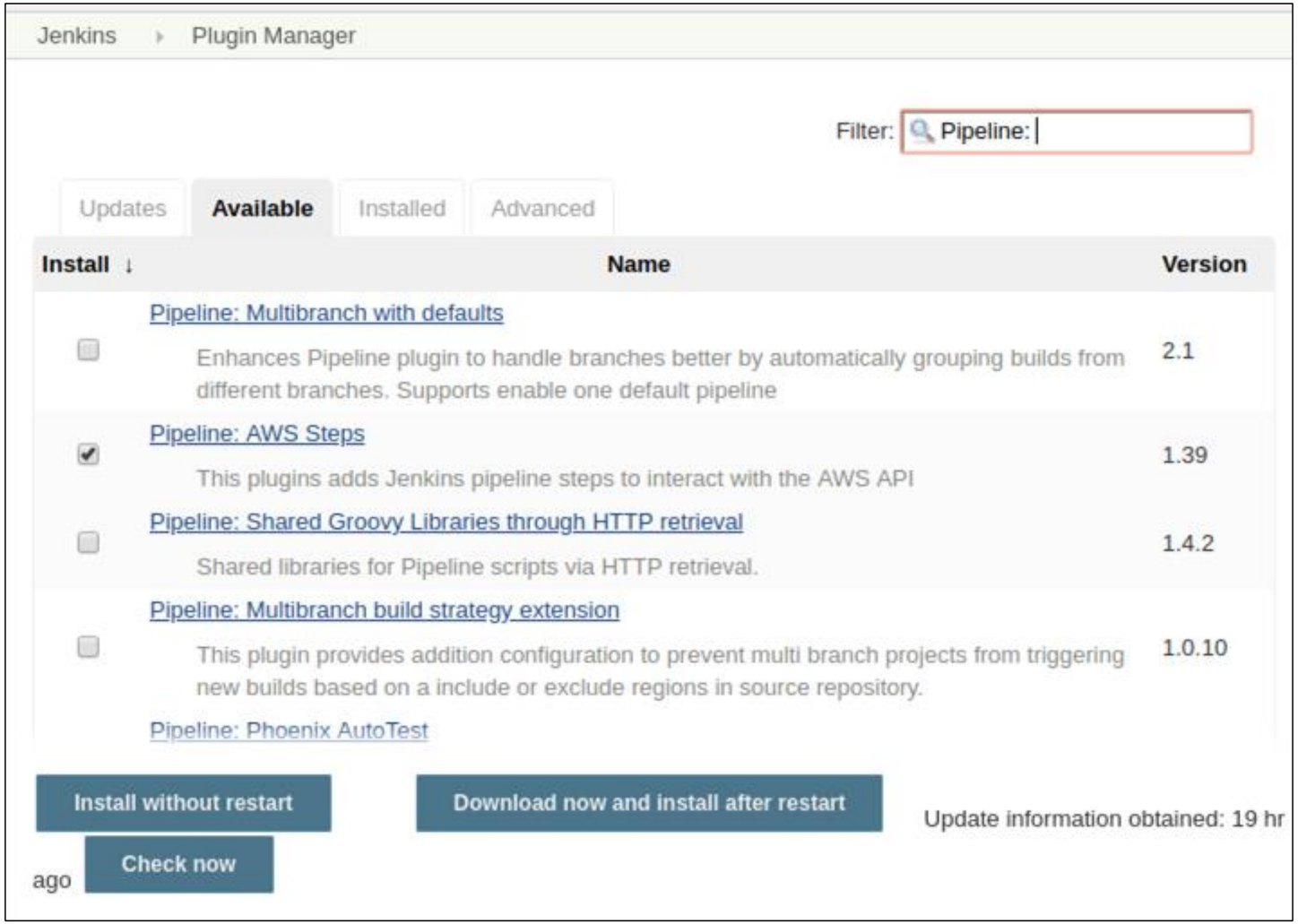


Hot Deploy

Hot deployment is the process of adding new components (such as WAR files, EJB Jar files, enterprise Java beans, servlets, and JSP files) to a running server without having to stop the application server process and start it again.

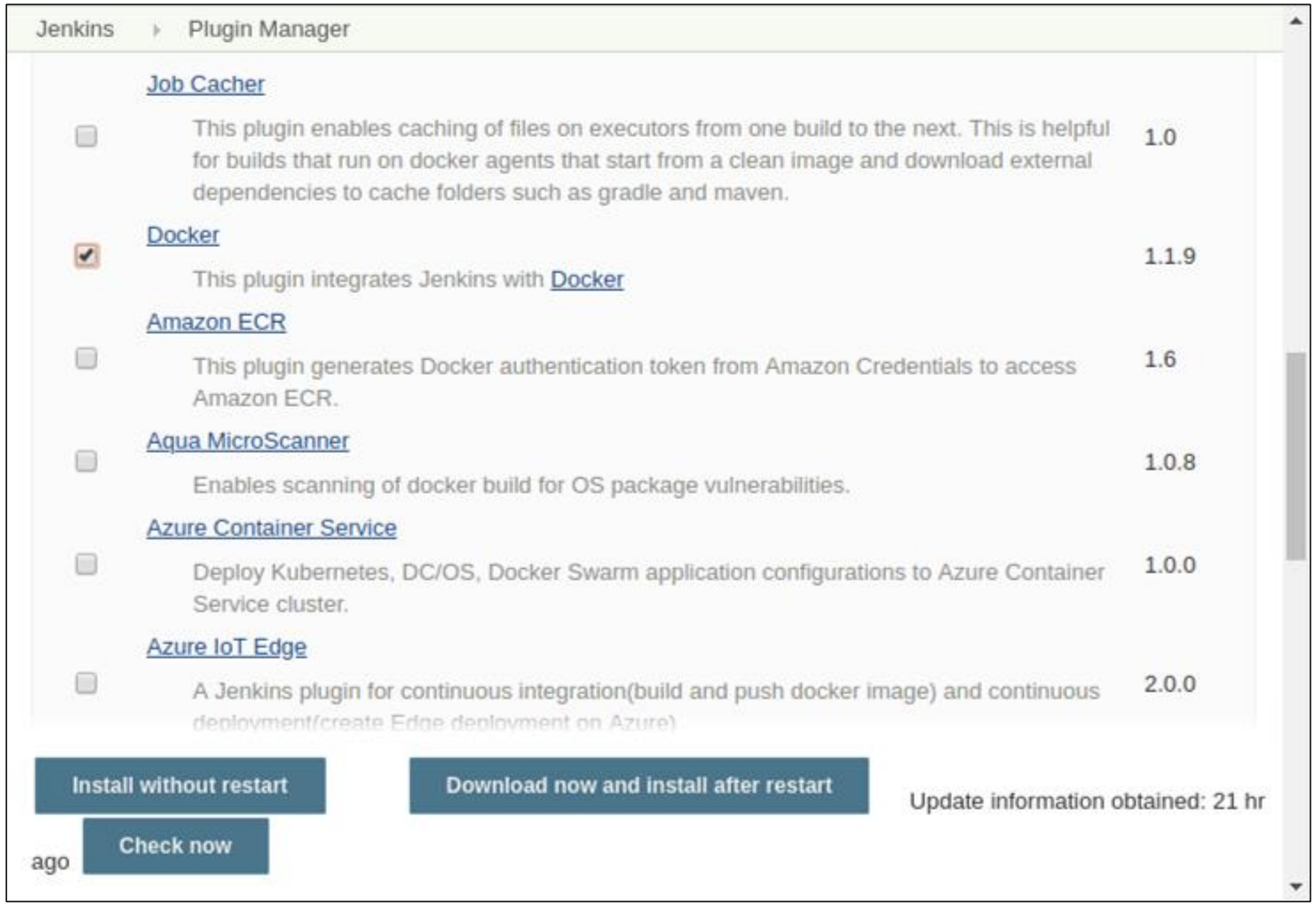
AWS Pipeline

AWS pipeline plugin adds Jenkins pipeline steps to interact with the AWS API.



Jenkins and Docker

Docker plugin allows to use a docker host dynamically to provision build agents, run single build, tear-down agent. This plugin integrates Jenkins with Docker.



Deploying a Python Application

Problem statement: You have been asked to connect and deploy a python application to an application server.

Steps to perform:

1. Push code to GitHub repositories
2. Login to Jenkins
3. Create Jenkins job for Python
4. Run the job and deploy the app

ASSISTED PRACTICE

Tomcat and Jenkins

Problem statement: You have been asked to connect and deploy a Java application on Tomcat using Jenkins.

Steps to perform:

1. Push code to GitHub repositories
2. Configure Tomcat
3. Login to Jenkins
4. Create Jenkins job for deployment
5. Run the job and deploy the app

ASSISTED PRACTICE

PHP and Jenkins

Problem statement: You have been asked to connect and deploy a PHP application on Ant using Jenkins.

Steps to perform:

1. Push code to GitHub repositories
2. Login to Jenkins
3. Create Jenkins job for PHP
4. Run the job and deploy the app

ASSISTED PRACTICE

Key Takeaways

- Continuous Deployment is a development practice of releasing software on production servers continuously in an automated manner.
- Continuous delivery is a process, where code changes are automatically built, tested, and prepared for production.
- Smoke testing is a software testing method that determines whether the employed build is stable or not.

Deploying Maven App to Tomcat Server

Problem Statement:

You're a DevOps engineer at Hooli, a computer vision company that started out as an image search platform. The company is celebrating its 25th anniversary and the CEO wants to celebrate the occasion by replacing the Hooli website with the original website that the company started out with for a day. You're required to build a Maven web app that says "Welcome to Hooli", set up a Tomcat server on an EC2 instance, set up a Jenkins pipeline to compile the app, and deploy it to Tomcat. The Jenkins job has to compile the app, generate a war file, and deploy the war file to the Tomcat server.

Requirements:

- The app should be built with Maven.
- The Tomcat server should allow remote deployment.
- The pipeline should be built with the Maven Project plugin.
- The build job should compile the app and do the deployment as a post-build action.

LESSON-END PROJECT