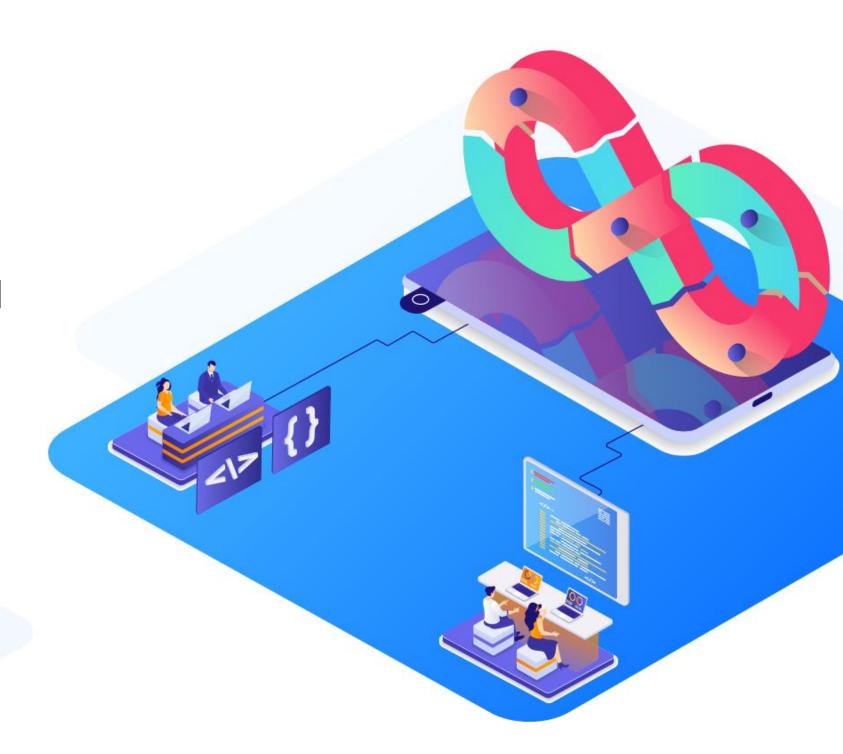
DevOps Foundations: Version Control and CI/CD with Jenkins



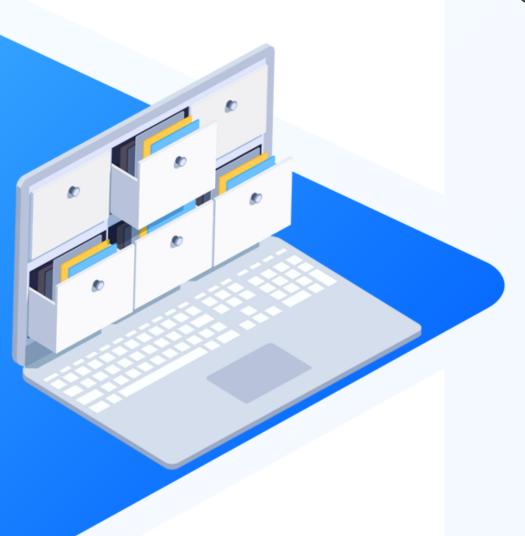
Course-End Project



Insured Assurance

Objective

To create a GitHub Actions CI/CD pipeline workflow for invoking the deployment of a Java application as a Jenkins job using Tomcat Apache



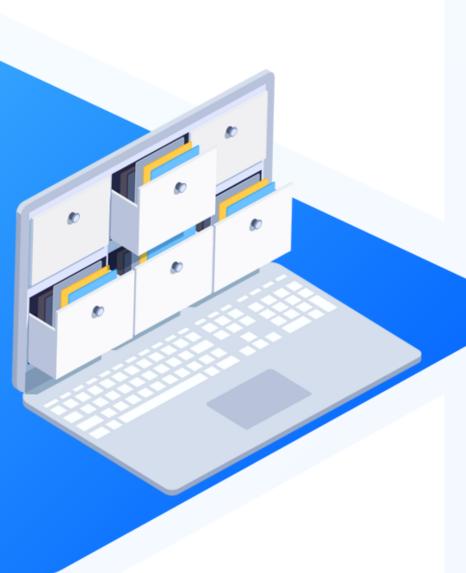
Problem Statement and Motivation



Insured Assurance, a leading global insurance provider based in the US, offers a range of products including home, health, car, and life insurance.

The company is transitioning to a DevOps architecture and aims to automate code builds and deployments across various environments. To meet this need, it has adopted GitHub Actions for code checkout, building, and testing automation and Jenkins for continuous deployment.

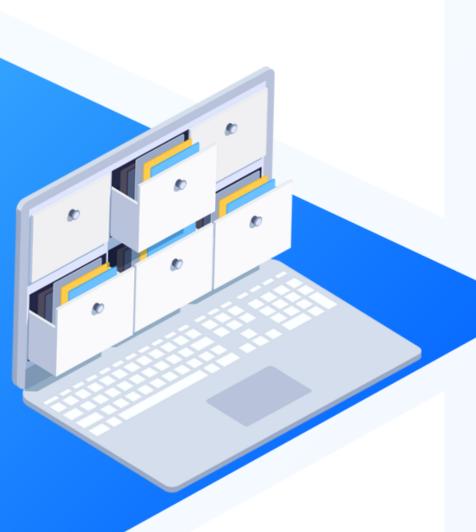
As a DevOps engineer at Insured Assurance, you are tasked with implementing a CI/CD pipeline using GitHub Actions and Jenkins.



Industry Relevance

The following tools used in this project serve specific purposes within the industry:

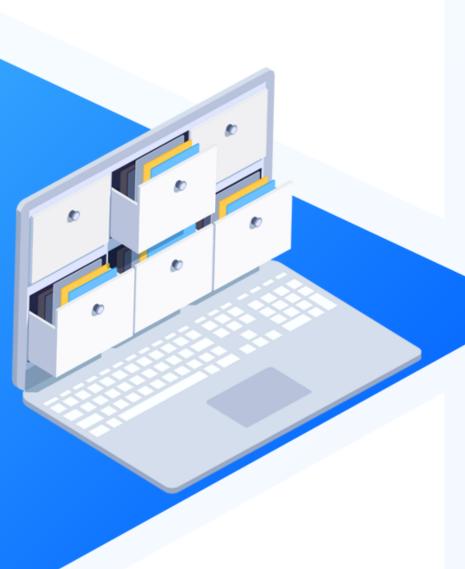
- 1. **Jenkins:** It is an open-source automation server commonly used in the software development industry for building, testing, and deploying projects. It supports continuous integration and continuous delivery (CI/CD) practices, enabling teams to increase efficiency, detect issues early, and accelerate software releases.
- 2. **GitHub Actions:** It is a CI/CD platform that streamlines the code integration and deployment processes by automating the software development process directly within GitHub. This makes it invaluable for developers to manage and deploy code updates efficiently.
- 3. Tomcat Apache: It is an open-source web server and servlet container that supports Java servlets and JSPs, making it a staple in web application development and deployment for organizations relying on Java technologies.



Tasks



- 1. Create a code repository on GitHub
- 2. Create a GitHub Actions pipeline to perform continuous integration
- 3. Configure Tomcat Apache for automated code deployment
- 4. Integrate the GitHub Actions pipeline to invoke the Jenkins pipeline
- 5. Invoke pipeline to validate automated deployment



Project References

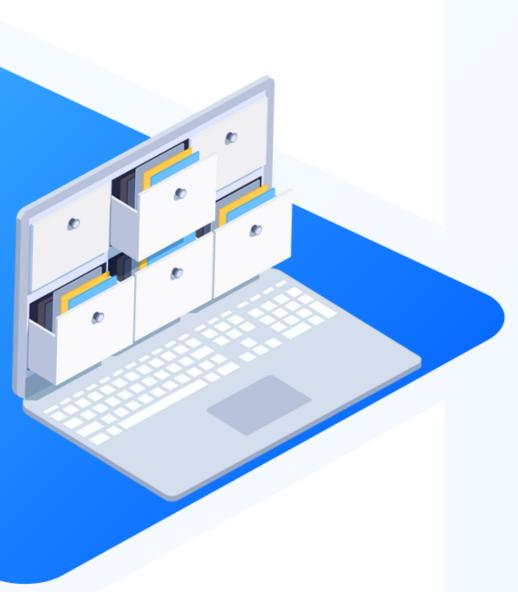
• **Task 1:** Lesson 02

• **Task 2:** Lesson 10

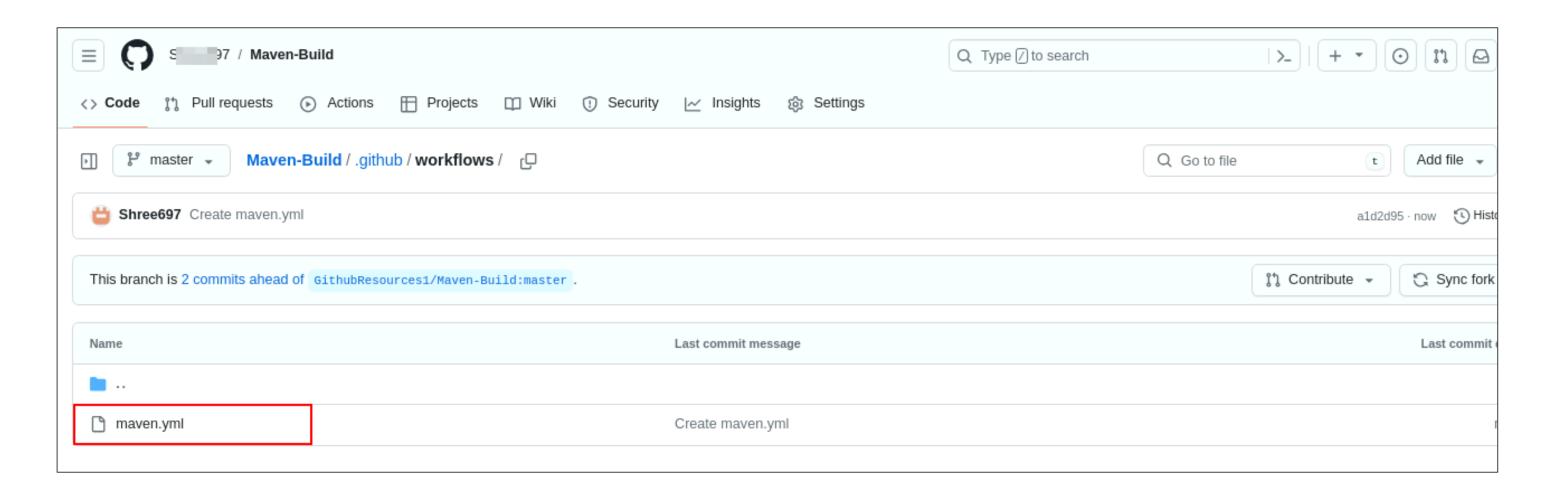
• **Task 3:** Lesson 07

• **Task 4:** Lesson 10

• **Task 5:** Lessons 08 and 10



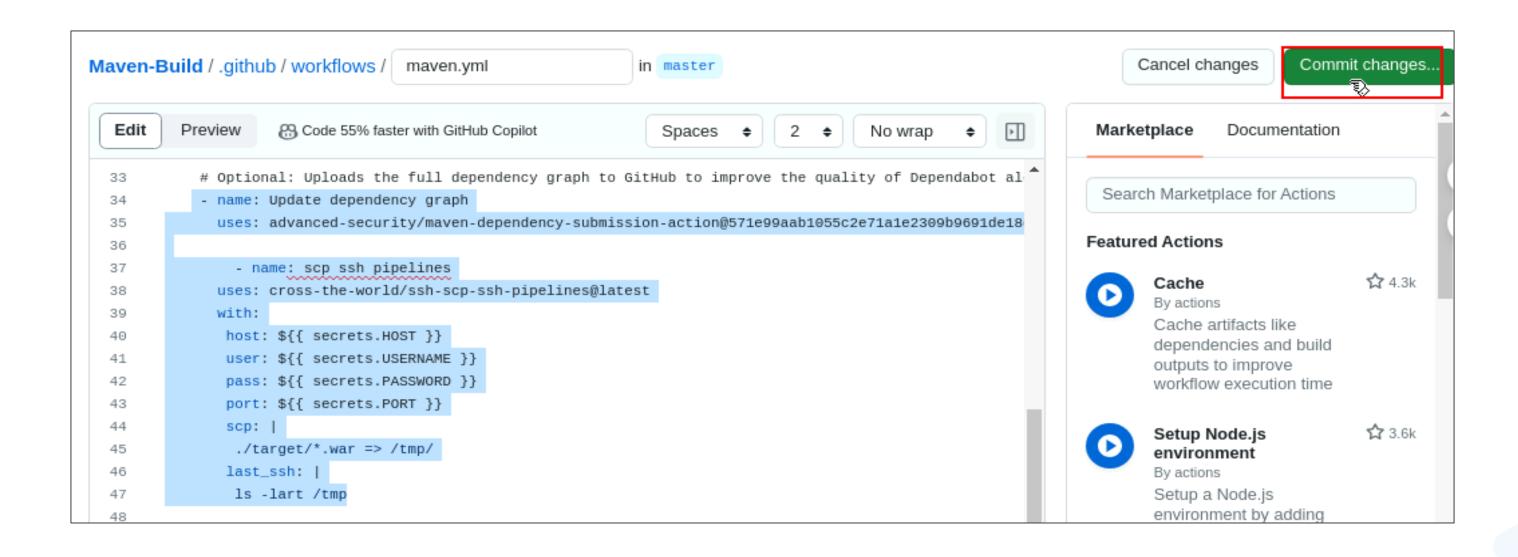
Maven workflow file configured in GitHub Actions:



Tomcat Apache setup:

```
root@ip-172-31-31-214: ~
File Edit View Search Terminal Help
ravitulsianisim@ip-172-31-31-214:~$ sudo su -
root@ip-172-31-31-214:~# apt -y update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [11]
9 kB]
Get:3 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:5 https://download.docker.com/linux/ubuntu jammy InRelease
Ign:6 https://pkg.jenkins.io/debian-stable binary/ InRelease
Hit:7 https://pkg.jenkins.io/debian-stable binary/ Release
Hit:8 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stabl
e:/v1.28/deb InRelease
Fetched 229 kB in 1s (340 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
60 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@ip-172-31-31-214:~# apt -y install tomcat9 tomcat9-admin
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
tomcat9 is already the newest version (9.0.58-1ubuntu0.1).
tomcat9-admin is already the newest version (9.0.58-lubuntu0.1).
0 upgraded, 0 newly installed, 0 to remove and 60 not upgraded.
```

SSH pipeline configuration in **maven.yml** workflow file:



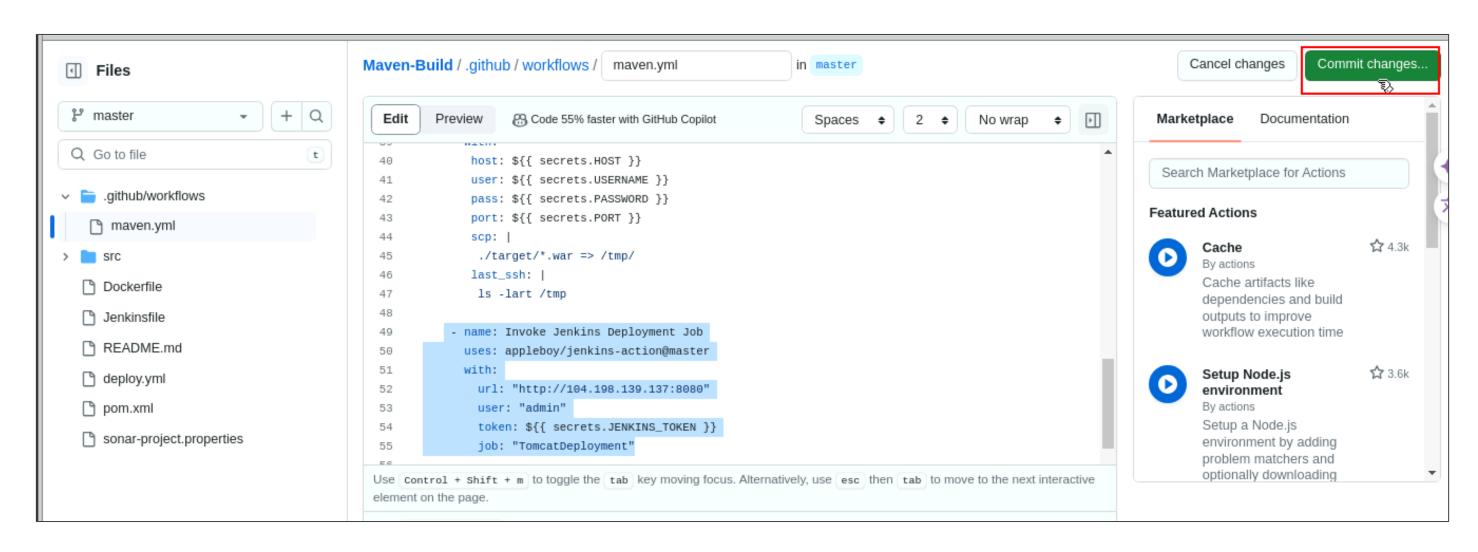
GitHub repository secrets:

Security	Repository secrets	New repository secr
Code security and analysis	Name ≞↑	Last updated
Deploy keys	A HOST	4 minutes ago 🥒 🗓
Secrets and variables		
Actions	A PASSWORD	1 minute ago
Codespaces	A PORT	now ℓ ů
Dependabot		
Integrations	→ USERNAME	2 minutes ago
GitHub Apps		

Freestyle job creation in Jenkins for continuous deployment:



Workflow configuration to integrate Jenkins and GitHub Actions:

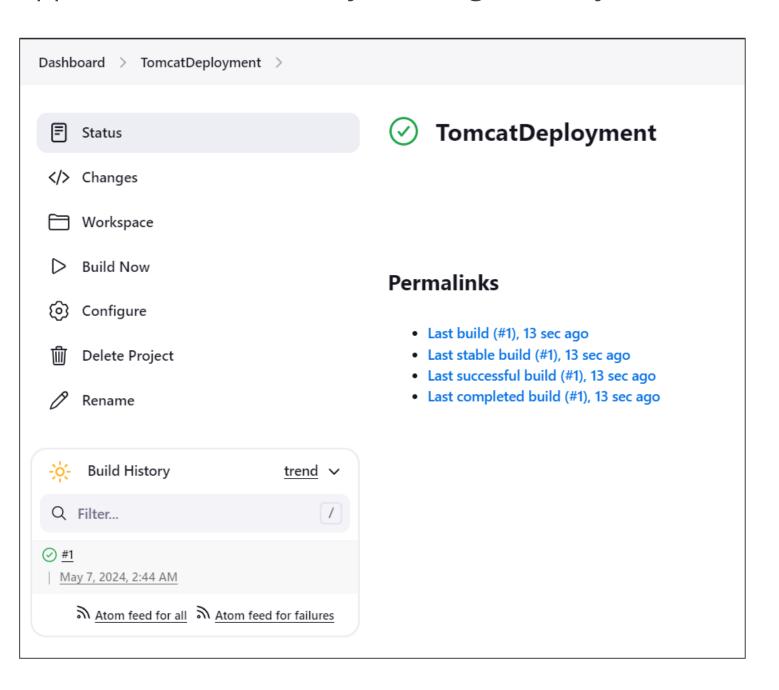


Jenkins job being invoked from the GitHub Actions pipeline for continuous deployment:

```
    Invoke Jenkins Deployment Job

                                                                                                                                                              0s
   ▼ Run appleboy/jenkins-action@master
      with:
        url: http://***:8080
        user: admin
        token: ***
        job: TomcatDeployment
8
        JAVA HOME: /opt/hostedtoolcache/Java_Temurin-Hotspot_jdk/17.0.10-7/x64
        JAVA_HOME_17_X64: /opt/hostedtoolcache/Java_Temurin-Hotspot_jdk/17.0.10-7/x64
10 /usr/bin/docker run --name b519c0c1d7c619f1114fc480944d876b9e7937_1b9369 --label b519c0 --workdir /github/workspace --rm -e "JAVA_HOME" -e "JAVA_HOME_17_X64"
    -e "INPUT_URL" -e "INPUT_USER" -e "INPUT_TOKEN" -e "INPUT_JOB" -e "HOME" -e "GITHUB_JOB" -e "GITHUB_REF" -e "GITHUB_SHA" -e "GITHUB_REPOSITORY" -e
    "GITHUB_REPOSITORY_OWNER" -e "GITHUB_REPOSITORY_OWNER_ID" -e "GITHUB_RUN_ID" -e "GITHUB_RUN_NUMBER" -e "GITHUB_RETENTION_DAYS" -e "GITHUB_RUN_ATTEMPT" -e
    "GITHUB REPOSITORY ID" -e "GITHUB ACTOR ID" -e "GITHUB ACTOR" -e "GITHUB TRIGGERING ACTOR" -e "GITHUB WORKFLOW" -e "GITHUB HEAD REF" -e "GITHUB BASE REF" -e
    "GITHUB_EVENT_NAME" -e "GITHUB_SERVER_URL" -e "GITHUB_API_URL" -e "GITHUB_GRAPHQL_URL" -e "GITHUB_REF_NAME" -e "GITHUB_REF_PROTECTED" -e "GITHUB_REF_TYPE" -e
    "GITHUB_WORKFLOW_REF" -e "GITHUB_WORKFLOW_SHA" -e "GITHUB_WORKSPACE" -e "GITHUB_ACTION" -e "GITHUB_EVENT_PATH" -e "GITHUB_ACTION_REPOSITORY" -e
    "GITHUB ACTION REF" -e "GITHUB PATH" -e "GITHUB ENV" -e "GITHUB STEP SUMMARY" -e "GITHUB STATE"
```

Deployment of the Java application on Tomcat by invoking Jenkins job from a GitHub Actions pipeline:



Thank you