

# DevOps Assessment

## Task1

### Jenkins Installation:

Ensure Jenkins is installed and running.

- Install necessary plugins:
  - Pipeline
  - NodeJS
  - Docker
  - SonarQube Scanner
- Configure Jenkins system settings as needed.

### Node.js and NPM:

- Install Node.js on the Jenkins server. You can use a tool like nvm for version management.
- Ensure that the node and npm commands are available in the Jenkins environment.

### Pipeline Job Creation:

Create a new multi-branch pipeline job in Jenkins.

### Pipeline Configuration:

Configure source code management with the GitHub repository URL.  
Add the Jenkinsfile path in the repository.

### Credentials and Secrets:

Ensure all necessary credentials and secrets are configured in Jenkins.

### Run Pipeline:

Save and run the Jenkins pipeline job.

```
[Pipeline] sn
+ npm install

> hackathon-starter@8.0.1 postinstall
> patch-package && npm run scss

patch-package 8.0.0
Applying patches...
passport@0.6.0 ✓
passport-oauth2@1.7.0 ✓

> hackathon-starter@8.0.1 scss
> sass --no-source-map --load-path=./ --update ./public/css:./public/css

> hackathon-starter@8.0.1 prepare
> if [ "$NODE_ENV" != "production" ]; then husky install; fi

husky - Git hooks installed

up to date, audited 786 packages in 4s

168 packages are looking for funding
  run `npm fund` for details

2 moderate severity vulnerabilities

Some issues need review, and may require choosing
```

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2 moderate severity vulnerabilities

Some issues need review, and may require choosing
```

# Task2

## Install Plugins:

Ensure Jenkins has the necessary plugins installed:

- Pipeline
- Docker
- Trivy

## Configure Global Tools:

Configure Docker and Trivy as global tools in Jenkins.

## Create Jenkinsfile:

Add a Jenkinsfile to the root of your GitHub repository:

## Configure Jenkins:

Create a new multi-branch pipeline job in Jenkins.

Configure the GitHub source for the pipeline, pointing to your repository.

Define Jenkins credentials for Docker registry if needed.

## Run Pipeline:

Trigger the pipeline manually or set up webhooks for automatic triggering on GitHub events.

## View Results:

Jenkins will execute the pipeline stages.

If Trivy detects HIGH or CRITICAL vulnerabilities, the pipeline will abort, preventing deployment.

```
* Trivy --severity HIGH,CRITICAL nodejs-multi_version-10_web:latest
2024-01-10T08:14:07.681Z    [[34nINFO]]0m   Need to update DB
2024-01-10T08:14:07.681Z    [[34nINFO]]0m   Downloading DB...
2.88 MiB / 30.57 MiB [----->] 9.43% ? p/s 76.39 MiB / 30.57 MiB [----->] 20.92% ? p/s 710.01 MiB / 30.57 MiB [----->] 56.92% 17.41 MiB p/s ETA 0s22.15 MiB / 30.57 MiB [----->] 32.75% ? p/s 713.63 MiB / 30.57 MiB [----->] 44.59% 17.92 MiB p/s ETA 0s17.40 MiB / 30.57 MiB [----->] 72.44% 17.92 MiB p/s ETA 0s26.95 MiB / 30.57 MiB [----->] 88.16% 18.19 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 18.19 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 18.19 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 17.41 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 16.28 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 16.28 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 15.23 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 15.23 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 14.25 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 13.33 MiB p/s ETA 0s30.57 MiB / 30.57 MiB [----->] 100.00% 6.89 MiB p/s 5s2024-01-10T08:14:12.473Z
[[31nFATAL]]0m scan error: unable to initialize a scanner: unable to initialize a docker scanner: 3 errors occurred:
  * unable to inspect the image (index.docker.io/library/nodejs-multi_version-10_web:latest): Error: No such image: index.docker.io/library/nodejs-multi_version-10_web:latest
  * unable to initialize Podman client: no podman socket found: stat /run/user/1001/podman/podman.sock: no such file or directory
  * GET https://index.docker.io/v2/library/nodejs-multi_version-10_web/manifests/latest: UNAUTHORIZED: authentication required; [map(Action:pull Class: Name:library/nodejs-multi_version-10_web Type:repository)]

[Pipeline] error
[Pipeline] }
[Pipeline] // script
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Docker Compose)
Stage "Docker Compose" skipped due to earlier failure(s)
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
ERROR: Vulnerabilities found in the Docker image. Build aborted.
Finished: FAILURE
```

## Task3

### Install Jenkins Plugins:

Install the necessary Jenkins plugins for multi-branch pipelines, Git integration, NodeJS, Docker, and SonarQube Scanner.

### Configure Global Tools:

Configure global tools in Jenkins for NodeJS and the SonarQube Scanner.

### Set Up GitHub Source:

Create a new multi-branch pipeline job in Jenkins. Configure the GitHub source for the job to point to the hackathon-starter repository.

### Create Jenkinsfile:

Add a Jenkinsfile at the root of the repository. Define stages for checkout, build, test, and deploy. Include a stage for SonarQube analysis

### Configure SonarQube in Jenkins:

Configure SonarQube server details in Jenkins. Provide SonarQube server URL and authentication token.

### Set Up Docker Registry Credentials:

If deploying Docker images, configure Docker registry credentials in Jenkins.

### Run Pipeline:

Run the pipeline job in Jenkins. Monitor the progress in the Jenkins console.

```
[Pipeline] {
[Pipeline] sh
+ /home/jenkins/jenkins-agent/tools/hudson.plugins.sonar.SonarRunnerInstallation/SonarQubeScanner/bin/sonar-scanner -Dsonar.projectKey=Nodejs -Dsonar.sources=. -
Dsonar.host.url=http://52.91.148.253:9000 -Dsonar.login=sqa_8ffb79811d285200424245cfa07e74d61bd80e03
INFO: Scanner configuration file: /home/jenkins/jenkins-agent/tools/hudson.plugins.sonar.SonarRunnerInstallation/SonarQubeScanner/conf/sonar-scanner.properties
INFO: Project root configuration file: NONE
INFO: SonarScanner 5.0.1.3006
INFO: Java 17.0.9 Private Build (64-bit)
INFO: Linux 6.2.0-1017-aws amd64
INFO: User cache: /home/jenkins/.sonar/cache
INFO: Analyzing on SonarQube server 9.9.0.65466
INFO: Default locale: "en", source code encoding: "UTF-8" (analysis is platform dependent)
INFO: Load global settings
INFO: Load global settings (done) | time=84ms
INFO: Server id: 92088F0A-A724jyf2yasY5I-jmPK
INFO: User cache: /home/jenkins/.sonar/cache
INFO: Load/download plugins
INFO: Load plugins index
INFO: Load plugins index (done) | time=52ms
INFO: Load/download plugins (done) | time=136ms
INFO: Process project properties
INFO: Process project properties (done) | time=8ms
INFO: Execute project builders
INFO: Execute project builders (done) | time=6ms
INFO: Project key: Nodejs
INFO: Base dir: /home/jenkins/jenkins-agent/workspace/nodejs-multi_version-3.0
INFO: Working dir: /home/jenkins/jenkins-agent/workspace/nodejs-multi_version-3.0/.scannerwork
INFO: Load project settings for component key: 'Nodejs'
INFO: Load project settings for component key: 'Nodejs' (done) | time=26ms
INFO: Auto-configuring with CI 'Jenkins'
```

Not secure | 52.91.148.253:9000/dashboard?id=Nodejs

Apps Gmail Google Keep Chat ChatGPT GitHub AWS

There's an update available for your SonarQube instance. Please update to make sure you benefit from the latest security and bug fixes. [Learn More](#)

sonarqube Projects Issues Rules Quality Profiles Quality Gates Administration

Nodejs main

Overview Issues Security Hotspots Measures Code Activity

Project Settings Project Information

QUALITY GATE STATUS @

Passed  
All conditions passed.

MEASURES

New Code Overall Code

18 Bugs Reliability C

0 Vulnerabilities Security A

3 Security Hotspots 0.0% Reviewed Security Review E

1h 4min Debt 35 Code Smells Maintainability A

0.0% Coverage on 215 Lines to cover Unit Tests 0.0% Duplications on 23k Lines 0 Duplicated Blocks

ACTIVITY

Choose graph type  
Issues

January 11, 2024, 6:32 PM  
not provided

Not secure | 52.91.148.253:9000/project/issues?id=Nodejs&resolved=false

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Nodejs main

Overview Issues Security Hotspots Measures Code Activity

Project Settings Project Information

1 / 122 issues 5h 9min effort

Filters

Issues in new code

Type

- Bug 20
- Vulnerability 0
- Code Smell 102

Severity

- Blocker 0
- Critical 51
- Major 38
- Minor 33
- Info 0

Scope

Resolution

Status

Security Category

Creation Date

Language

Rule

Tag

Directory

File

Assignee

Author

Bulk Change

app.js

This branch's code block is the same as the block for the branch on line 123. 15 minutes ago • L128 % design, suspicious

config/passport.js

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L26 % confusing

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L83 % confusing

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L88 % confusing

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L97 % confusing

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L129 % confusing

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L134 % confusing

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L144 % confusing

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L148 % confusing

Refactor this redundant 'await' on a non-promise. 15 minutes ago • L180 % confusing

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sonarqube

ProjectsIssuesRulesQuality ProfilesQuality GatesAdministration

Search for projects...

Nodesjs

main

Last analysis of this Branch had 3 warnings

January 11, 2024, 6:32 PM

Version not provided

OverviewIssuesSecurity HotspotsMeasuresCodeActivity

Project SettingsProject Information

Filters

Assigned to meAll

Status

To review

Overall code

Security Hotspots Reviewed 0.0%

14 Security Hotspots to review

Review priority: HIGH

Authentication

Review this potentially hardcoded credential.

testmodels.js

Review this potentially hardcoded credential.

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Review this potentially hardcoded credential.

testmodels.js

Review this potentially hardcoded credential.

testmodels.js

Review priority: MEDIUM

Denial of Service (DoS)

Permission

Review priority: LOW

Review this potentially hardcoded credential.

Hard-coded credentials are security-sensitive [javascript:52068](#)

Status: TO REVIEW

This security hotspot needs to be reviewed to assess whether the code poses a risk.

Change status

Assignee: Not assigned

Where is the risk?What's the risk?Assess the riskHow can I fix it?

testmodels.js

Open in IDE

Get Permalink

1const { expect } = require('chai');  
2const sinon = require('sinon');  
3const user = require('../models/user');  
4  
5describe('User Model', () => {  
6 it('should create a new user', (done) => {  
7 const userMock = sinon.mock(new User({ email: 'test@gmail.com', password: 'root' }));  
8  
9 const user = userMock.object;  
10  
11 userMock.expects('save')  
12 .yield(null);  
13  
14 user.save((err) => {  
15 userMock.verify();  
16 userMock.restore();  
17 expect(err).to.be.null;  
18 });  
19 });  
20});

Review this potentially hardcoded credential.

Comment

← → ↻ Not secure | 52.91.148.253:9000/component\_measures?id=Nodesjs

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Update

Other bookmarks

There's an update available for your SonarQube instance. Please update to make sure you benefit from the latest security and bug fixes. [Learn More](#)

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Search for projects...

Nodesjs

main

Last analysis of this Branch had 3 warnings

January 11, 2024, 6:32 PM

Version not provided

OverviewIssuesSecurity HotspotsMeasuresCodeActivity

Project SettingsProject Information

Project Overview

Nodesjs

New Code: Since January 11, 2024

> Reliability

> Security

> Security Review

> Maintainability

> Coverage

> Duplications

> Size

> Complexity

> Issues

Risk

Color: Worse of Reliability Rating and Security Rating. Size: Lines of Code

See the data presented on this chart as a list

0.0%100%

020.0%40.0%60.0%80.0%

010min20min30min40min50min

Coverage

Technical Debt

## **Task4**

### **Install Jenkins Plugins:**

Install Jenkins plugins for Git, Docker, Kubernetes, and GitHub integration.

### **Set Up Credentials:**

Add GitHub credentials and Docker registry credentials in Jenkins.

### **Setup K8 Cluster**

Create a kubernetes using terraform and ansible

### **Global Tool Configuration:**

Configure NodeJS and Docker tools in Jenkins global tool configuration.

### **Create Jenkinsfile:**

Write a Jenkinsfile in the repository with stages for checkout, build, test, and deploy.

### **Define Multi-Branch Pipeline:**

Create a new multi-branch pipeline job in Jenkins, link it to the GitHub repository, and set up the repository source.

### **Pipeline Script:**

In the Jenkinsfile, define pipeline steps:

- Checkout code.
- Build and tag Docker image.
- Push Docker image to the registry.
- Deploy the application using Kubernetes manifests.

### **Jenkins Build Trigger:**

Configure the Jenkins job to build on push events and pull requests for all branches.

### **Run Pipeline:**

Run the pipeline manually or wait for automatic triggers to test the CI process.

← → ↻ Not secure | 54.211.199.79:8080/job/nodesjs-multi/job/version-3.0/22/console

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Dashboard > nodesjs-multi > version-3.0 > #22

a4b976477163: Pushed

9b3bb343a679: Pushed

latest: digest: sha256:fb3cadbb9269e8c5c5060f2e0fc45e591a8a4711c8453559a11c9f8ae9b3e41a size: 2418

[Pipeline] }

[Pipeline] // withEnv

[Pipeline] }

[Pipeline] // withDockerRegistry

[Pipeline] }

[Pipeline] // withEnv

[Pipeline] }

[Pipeline] // script

[Pipeline] }

[Pipeline] // stage

[Pipeline] stage

[Pipeline] { (Deployment KB)

[Pipeline] script

[Pipeline] {

[Pipeline] sh

+ kubectl apply -f deployment.yaml

deployment.apps/hackerrank created

service/hackerrank-service created

persistentvolumeclaim/hackerrank-pvc created

[Pipeline] }

[Pipeline] // script

[Pipeline] }

[Pipeline] // stage

[Pipeline] }

[Pipeline] // withEnv

[Pipeline] }

[Pipeline] // withCredentials

[Pipeline] }

[Pipeline] // withEnv

[Pipeline] }

[Pipeline] // node

[Pipeline] End of Pipeline

Finished: SUCCESS

REST API Jenkins 2.476.2

```
root@Master:/home/ubuntu/dep# kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
argocd-application-controller-0	1/1	Running	0	132m
argocd-applicationset-controller-568bbf57d8-7hr27	1/1	Running	0	132m
argocd-dex-server-bf667bf68-g9nz2	1/1	Running	0	132m
argocd-notifications-controller-67bfbcb5bf8-lngt8	1/1	Running	0	132m
argocd-redis-db489f5bf-445b9	1/1	Running	0	132m
argocd-repo-server-85d8455d48-nwvff	1/1	Running	0	132m
argocd-server-549c85d755-tflkv	1/1	Running	0	132m
hackerrank-67bdbcf9f-mmwrq	2/2	Running	0	17s

```
root@Master:/home/ubuntu/dep# kubectl get svc
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
argocd-applicationset-controller	ClusterIP	10.96.187.170	<none>	7000/TCP	132m
argocd-dex-server	ClusterIP	10.99.2.212	<none>	5556/TCP,5557/TCP	132m
argocd-redis	ClusterIP	10.98.48.150	<none>	6379/TCP	132m
argocd-repo-server	ClusterIP	10.110.66.248	<none>	8081/TCP	132m
argocd-server	ClusterIP	10.109.227.25	<none>	80/TCP,443/TCP	132m
hackerrank-service	LoadBalancer	10.101.163.93	<pending>	8080:31830/TCP	26s
kubernetes	ClusterIP	10.96.0.1	<none>	443/TCP	156m



## Task5

### Install ArgoCD:

Set up ArgoCD in your Kubernetes cluster.

### Create Helm Charts:

Design Helm charts for your application.

Organize the charts in a way that allows easy configuration via the values.yaml file.

```
drwxrwxr-x 4 rahul rahul 4096 Jan 11 23:32 ./
drwxrwxr-x 3 rahul rahul 4096 Jan 11 23:30 ../
drwxrwxr-x 2 rahul rahul 4096 Jan 11 23:30 charts/
-rw-rw-r-- 1 rahul rahul 119 Jan 11 23:55 Chart.yaml
drwxrwxr-x 2 rahul rahul 4096 Jan 11 23:31 templates/
-rw-rw-r-- 1 rahul rahul 159 Jan 11 23:55 values.yaml
```

```
root@Master:/home/ubuntu/dep# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
argocd-application-controller-0     1/1     Running   0           132m
argocd-applicationset-controller-568bbf57d8-7hr27 1/1     Running   0           132m
argocd-dex-server-bf667bf68-g9nz2   1/1     Running   0           132m
argocd-notifications-controller-67bfb5bf8-lngt8 1/1     Running   0           132m
argocd-redis-db489f5bf-445b9        1/1     Running   0           132m
argocd-repo-server-85d8455d48-nwvff 1/1     Running   0           132m
argocd-server-549c85d755-tflkv      1/1     Running   0           132m
hackerrank-67bdbcf9f-mmwrq          2/2     Running   0           17s
root@Master:/home/ubuntu/dep# kubectl get svc
```