National College Ireland

Configuration Manual

MSc Research Project Cloud Computing

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National College of Ireland Project Submission Sheet School of Computing



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Programme:	Cloud Computing	
Year:	2024	
Module:	MSc Research Project	
Supervisor:	Vikas Sahni	
Submission Due Date:	12/12/2024	
Project Title:	Configuration Manual	
Word Count:	272	
Page Count:	7	

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Configuration Manual

Sri Lakshmi Durga Pavedemukala 22174681

1 Introduction

This guide provides step-by-step instructions to help you set up and customize your system effectively. Whether you're a beginner or an expert, you'll find clear explanations and helpful tips for optimal configuration. Let's get started on making your setup seamless and efficient.

2 System Requirements

2.1 Hardware Requirements

CPU: Dual-core processor Intel Core i3 RAM: 8 GB Storage: 10 GB free disk space OS: Windows 10

2.2 Software Requirements

Python and PIP : Version 3.12 (Python installation; n.d.)
NPM : Version 9.00 (NPM installation; n.d.)
VSCode: Version 1.95
Docker Desktop Version: 4.3.60
Gitbash (Gitbash; n.d.)

2.3 Other Requirements

Private key from the Github App to be saved as privatekey.pem under the same folder as that of app.py Active Azure subscription Azure Container registry and AKS cluster provisioned

3 Installation

- 1. Download the Flask web app.
- 2. Extract the zip file to a desired location on your computer.

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SSL verification A By default, we verify SSL certificates when delivering payloads. ● Enable SSL verification ● Disable (not recommended)	SSL verification By default, we verify SSL certificates when delivering payloads. Enable (rot recommended)	Read our webhook secret documentation for more information.	
By defuilt, we verify SSL certificates when delivering payloads. Enable SSL verification O Disable (not recommended)	By default, we verify SSL certificates when delivering payloads. Enable SSL verification Disable (not recommended)		
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		A By default, we verify SSL certificates when delivering payloads.	
Save changes Cancel	Save changes Cancel	Enable SSL verification	
Save changes Cancel	Save changes Cancel		
		Save changes Cancel	

Figure 1: Configuring OAuth and Webhook Settings for GitHub App

- 3. Open VSCode and navigate to the extracted directory.
- 4. Install the requirements using pip3 install -r requirements.txt
- 5. Install the Smee for port forwarding npm install –global smee-client
- 4. Run the Flask web app Python file using Python 3.12 in VSCode:

sudo python3 app.py

5. Port forward using

smee -u https://smee.io/5AZhNDeV5aRs5U1D -t http://localhost:8080/webhook

3.1 Setup

1. Once the flask web app is running successfully on the local system with smee making our services available on internet a Github App needs to be created and installed on our repository which can be done by following the below steps

- 1) Visit https://github.com/settings/apps after logging in your account
- 2) Click on New Github App

3) Enter the required information by passing the smee URL in the Webhook URL param4) Further the permissions needs to be provided which are as follows

Repository permissions –

Actions – Read Only Checks - Read and Write Metadata – Read only Workflows – Read and Write

Organization permissions – Events – Read only

Subscribe to events Push Check run Check Suite Workflow run Repository

5) Create a repository containing the Dockerfile similar to this one along with the Github actions file available under .github/workflows which would be used to do the releases6) Create branch rules sets by going under the repository settings

https://github.com/username/reponame/settings/rules

With the below rules configuration

- Enforcement status active
- Target branches "main"
- - "release-*"
- - Default branch

Branch Rules

- Restrict creations
- Restrict updates
- Restrict deletions
- Require pull request before merging
- Require status checks to pass with additional settings with a selection of the Github App
- Blocks force pushes

7) Create Repo secrets by going to

https://github.com/username/reponame/settings/secrets/actions

which are as follows

1) ACR_SERVER – Azure container registry server URL

2) REGISTRY_PASSWORD – ACR PASSWORD

3) REGISTRY_USERNAME - ACR USERNAME



Figure 2: Branch Protection Rules and Status Check Requirements

Container-Security Public	Ŕ	Pin 💿 Unwatch 1
🗜 main 🔹 🖓 2 Branches 🚫 0 Tags	Q. Go to file t Add file	✓ Code ▼
📀 saiharika7 Update Dockerfile 🗙 CHECKS		lay 🕚 94 Commits
.github/workflows		
🖿 app1		
🖿 app2		
🖿 арр3		
🖿 app4		
app5	Update Dockerfile	

Figure 3: Container-Security Repository Overview with Recent Dockerfile Updates

4 Configuration

The Dockerfiles pushed to the Github needs to be first built locally ensuring they are able to be build properly precisely the files and folders required are also pushed properly in the respective app folder

The docker files can be tested by starting the docker service from the docker desktop by switching to linux or windows containers as per the requirement

5 Usage

Once the Github repository is created and doccker file is pushed checks will be shown at the top

When this check is clicked it will show the details about the failure and the path of dockerfile

Further a similar result would be seen whenever a pr is raised

For scanning the images the workflow needs to be triggered from the main branch

the pipeline further detects the cve's and lists them in the logs



Figure 4: Dockerfile Scan Results for Container-Security/app2

→ C 🔹 github.com/saiharika7/Container-Security/pull/2	
Q Conversation 0 - Commits 2 C Checks 5 E Files changed 1	
saiharika7 commented yesterday	Owner ····
No description provided.	N Si
saiharika7 added 2 commits <u>yesterday</u>	A
o- ∰ Update requirements.txt	Verified × 0b5090a
∽ 💮 Merge branch 'main' into feature-1	Verified × 5c0d16a N
R Saiharika7 self-assigned this yesterday	Pi N
Review required At least 1 approving review is required by reviewers with write access. Learn more about pull request review is required by reviewers with write access.	M eviews.
Some checks were not successful 4 failing, 1 expected, and 1 successful checks	Hide all checks Si th
X 💽 Dockerfile Scan - Container-Security/app2/Dockerfile — Dockerfile Scan - Dockerfile	Details
X 💽 Dockerfile Scan - Container-Security/app3/Dockerfile — Dockerfile Scan - Dockerfile	
× 🗊 Dockerfile Scan - Container-Security/app4/Dockerfile – Dockerfile Scan - Dockerfile	Details
🗙 팅 Dockerfile Scan - Container-Security/app5/Dockerfile — Dockerfile Scan - Dockerfile	Details w
ContainerBuildScan Expected — Waiting for status to be reported	(Required)
✓ Dockerfile Scan - Container-Security/appt/Dockerfile — Dockerfile Scan - Dockerfile	Details
Merging is blocked Merging can be performed automatically with 1 approving review.	View rules

Figure 5: Pull Request Status with Dockerfile Scan Checks

← → ♂ 🛱 githul	b.com/saiharika7/C	ontainer-Security/actions/workflows/release.yml		다 오 ☆ む 🕕 🗄
= 💭 saiharika7 / C	ontainer-Security		Q Type / to search	+ • O n @
<> Code ⊙ Issues 11	Pull requests 1	⊙ Actions ⊞ Projects □ Wiki ③ Security 31 🗠 Insights இ Settings		
Actions All workflows	New workflow	ScanPushDockerImage release.yml		
ScanPushDockerImage Management		Help us Improve CitHub Actions Tell us how to make GitHub Actions work better for you with three quick questions.		Give feedback ×
Caches		4 workflow runs		
 Runners Usage metrics 		This workflow has a workflow_dispatch event trigger.		Run workflow +
Performance metrics		ScanPushDockerImage ScanPushDockerImage #4: Manually run by saiharika7		Use workflow from Branch: main *
		ScanPushDockerImage ScanPushDockerImage #3: Manually run by saiharika7		Comma-separated list of Dockerfile paths (leave empty to auto-detect all) app1/Dockerfile
		ScanPushDockerImage ScanPushDockerImage #2: Manually run by saiharika7		Provide the Image Version to Build = 3.0 Branch to trigger the workflow #
		ScanPushDockerImage ScanPushDockerImage #1: Manually run by salharika7		main Run workflow

Figure 6: GitHub Actions Workflow - Scan and Push Docker Image

· · ·	Process Dockernies					555
315	!	1	I		https://avd.aquasec.com/nvd/cve=2024=10963	
316						
317		n CVE-2024-10041	1	1	pam: libpam: Libpam vulnerable to read hashe	d account
517		1 1 002-2024-10041				
318					https://avd.aquasec.com/nvd/cve-2024-10041	
319		⊢				
320	Leads to	CVE-2024-10963	I	I	pam: Improper Hostname Interpretation in pam	_access
321					Access Control Bypass	
322					https://avd.aquasec.com/nvd/cve-2024-10963	
323						
324	libpam-runtime	CVE-2024-10041	I		pam: libpam: Libpam vulnerable to read hashe	ed password
325					https://avd.aquasec.com/nvd/cve-2024-10041	
326		⊢				
327	+	CVE-2024-10963	I		pam: Improper Hostname Interpretation in pam	_access
328	Leads to 				Access Control Bypass	
329					https://avd.aquasec.com/nvd/cve-2024-10963	
330		+				
331	libpam0g	CVE-2024-10041	I		 pam: libpam: Libpam vulnerable to read hashe	ed password
332					https://avd.aguasec.com/nvd/cve-2024-10041	
333		⊢I				
334		CVE-2024-10963	I		pam: Improper Hostname Interpretation in pam	_access

Figure 7: CVE Vulnerability Details for Docker Images

6 Troubleshooting

If you encounter any problems while using the Flask web app the following troubleshooting tips:

1. Make sure the required libraries (e.g., flask, etc) are installed before running the model..

2. Docker Issues: Ensure Docker Desktop is running, and the Docker daemon is properly initialized.

3. if any issues in checks not showing check for appprpriate permissions for github app

References

Gitbash (n.d.). URL: https://git-scm.com/downloads

NPM installation (n.d.). URL: https://docs.npmjs.com/downloading-and-installing-node-js-and-npm

Python installation (n.d.). URL: https://pip.pypa.io/en/stable/installation/