National College of Ireland

Configuration Manual

MSc Industrial Internship
Cyber Security

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National College of Ireland
Project Submission Sheet
School of Computing

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Programme:	Cyber Security
Year:	2022-2023
Module:	MSc Industrial Internship
Supervisor:	Vikas Sahni
Submission Due Date:	06/01/2023
Project Title:	Automating Security Test-cases using DevSecOps approach for AWS Serverless application with WebSockets
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I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.

ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature:	Deven Ahlawat
Date:	5th January 2023

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Configuration Manual

Deven Ahlawat
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1 Prerequisites

This research would require the below mentioned pre-requisites to replicate it which include some installations and credentials as listed below -

1. Setup a Kali Linux on AWS EC2 instance with minimum t2.medium specification.
2. Install Python3 v3.10 on Kali instance.
3. Install RDP on Kali operating system [1].
4. Install Google Chrome browser on Kali Instance.
5. Install Java JDK on Kali Instance.
6. Email and Password for sending email via SMTP.
7. BurpSuite Professional Licence Key.

This research was conducted with the below system specifications and

Table 1: Preferred configuration for the host

Property	**Description**	**Version**
Platform	AWS	n/a
Instance Type	Type T	t2.medium
Operating System	Kali	2022
Programming Language	Python	3.10
RAM	4GB	n/a
CPU	2vcore	n/a
BurpSuite Professional	2022	n/a

2 Sign Up for Akeero Serverless

1. Create a free account on Akeero Serverless [2] Fig 1.
2. Enter the required details to make an account.

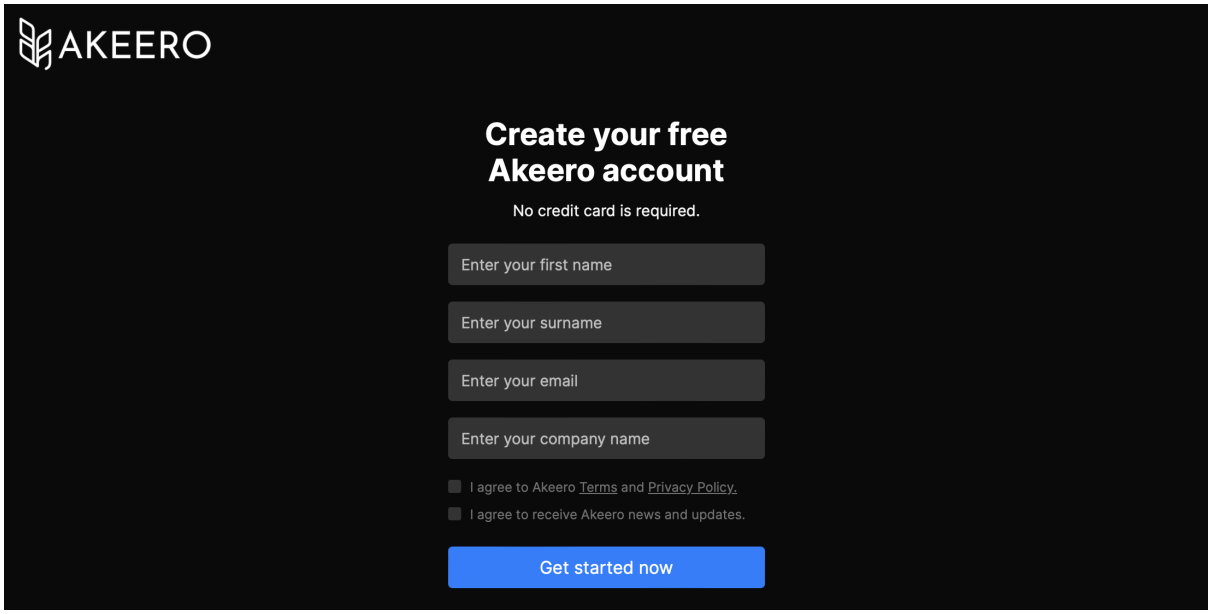

Figure 1: Akeero Serverless Sign Up Page

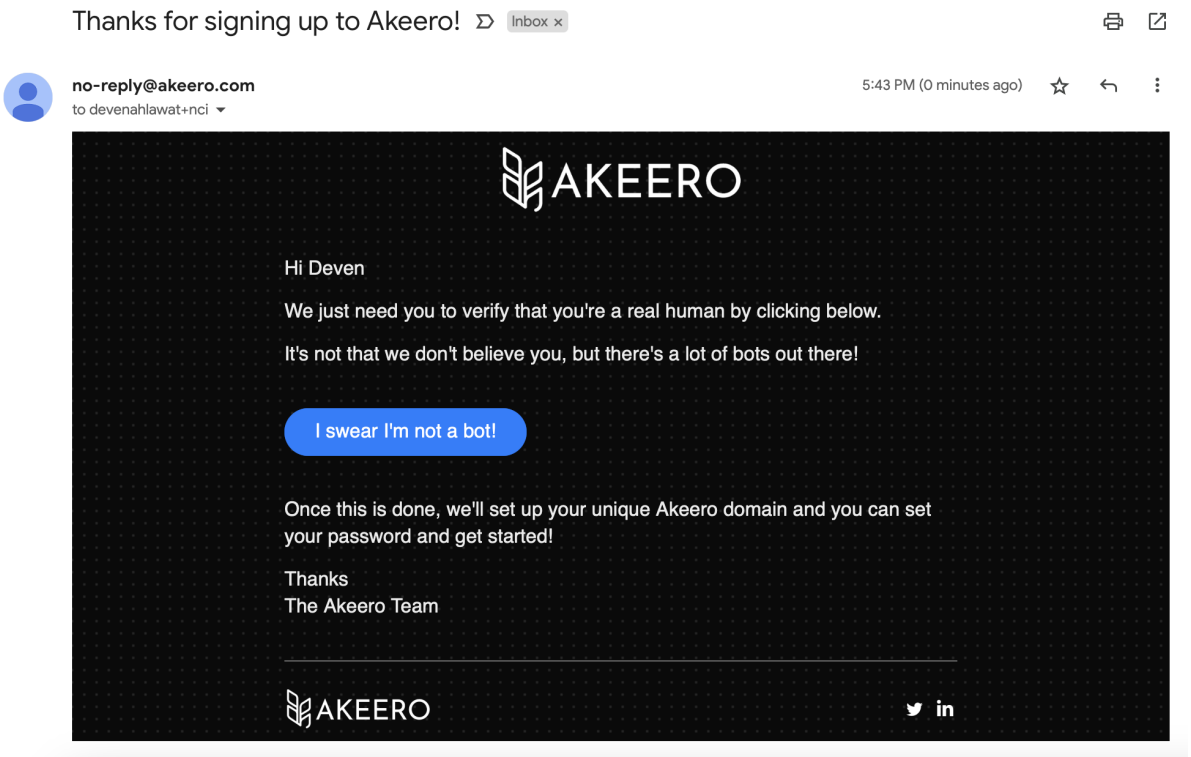

Figure 2: Akeero Serverless Email confirmation

3. Check your email inbox for a sign up mail and click on "I swear I'm not a bot!" Fig 2.

[1]https://www.kali.org/docs/general-use/xfce-with-rdp/
[2]https://www.akeero.com/sign-up

4. A confirmation page will be shown Fig 3 and a welcome email for setting the password should arrive in your inbox Fig 4.

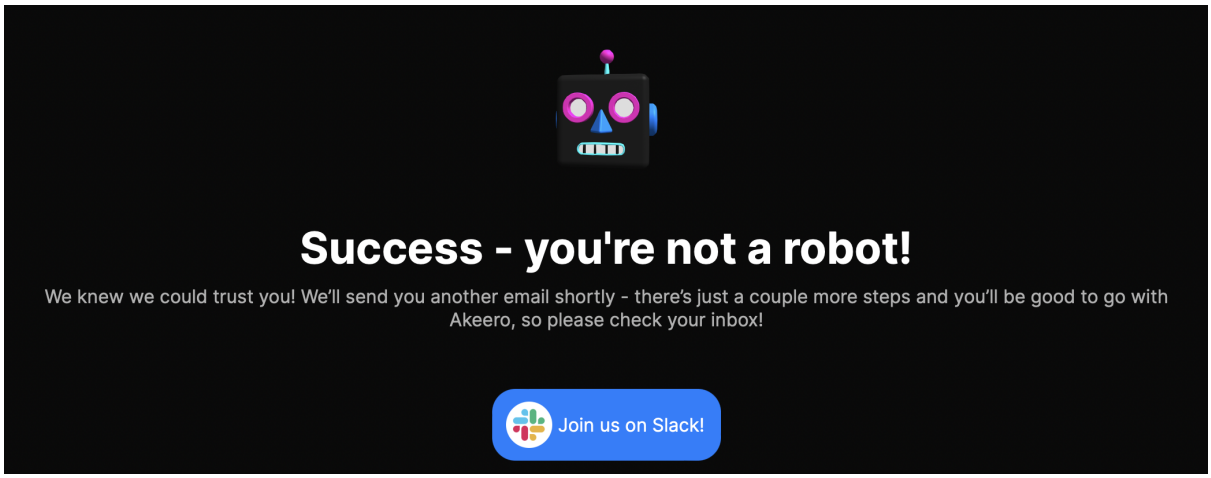

Figure 3: Akeero Serverless Bot confirmation successful page

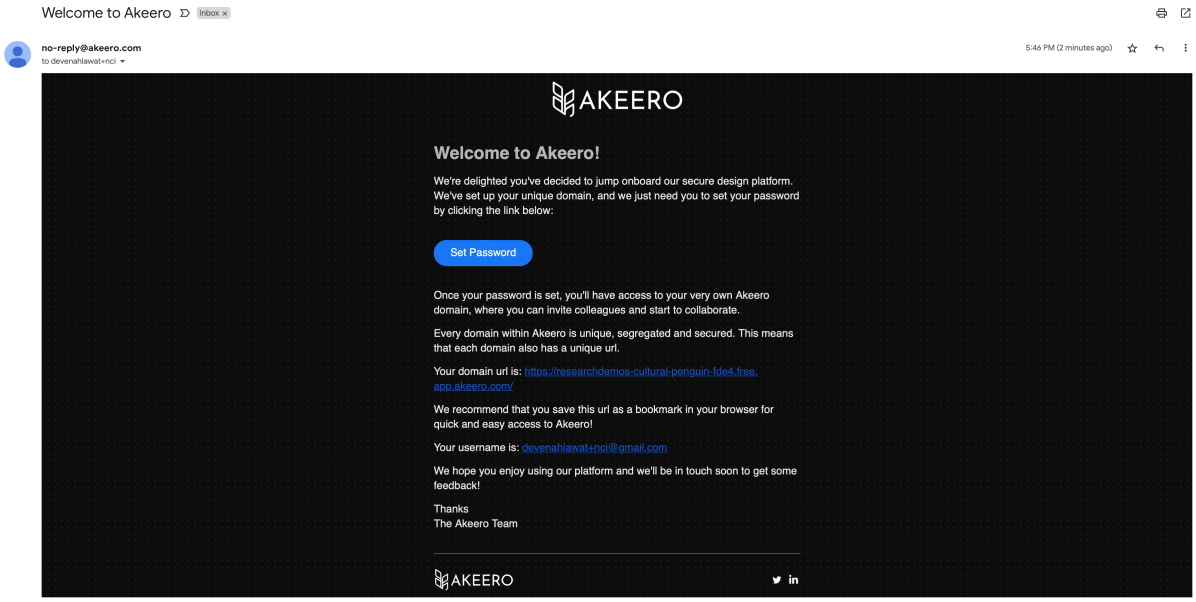

Figure 4: Akeero Serverless Email for setting password

5. Note the domain URL and login username and click on Set Password as shown in Fig 4

6. Set a strong password with the mentioned requirements Fig 5.

7. After setting the password, open the Welcome Email again and click on the custom akeero domain mentioned in the mail Fig 4.

8. Login with your details in the login prompt Fig 6.

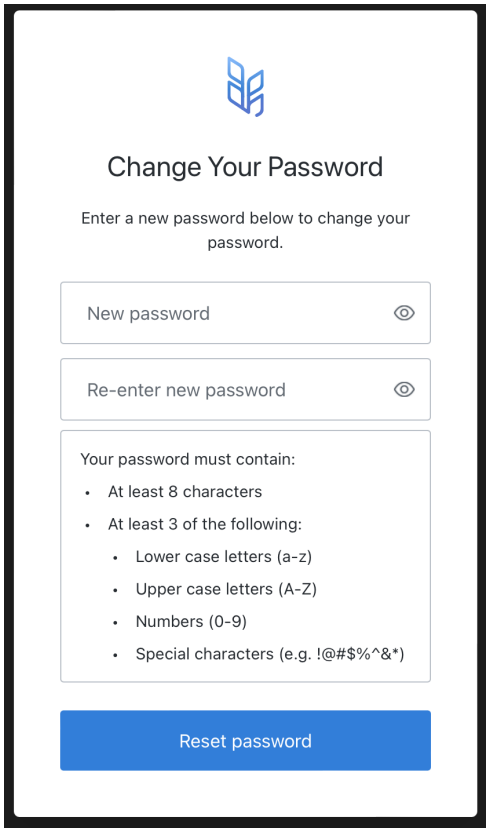

Figure 5: Akeero Serverless Password setup page

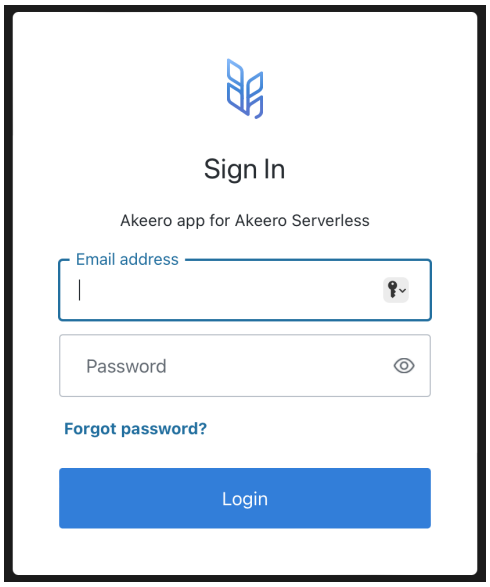

Figure 6: Akeero Serverless Login Page

9. Login page will lead to a page which will ask to set up mandatory multi-factor authentication Fig 7.

10. Click on "Trouble Scanning?" and copy the CODE shown from the next prompt

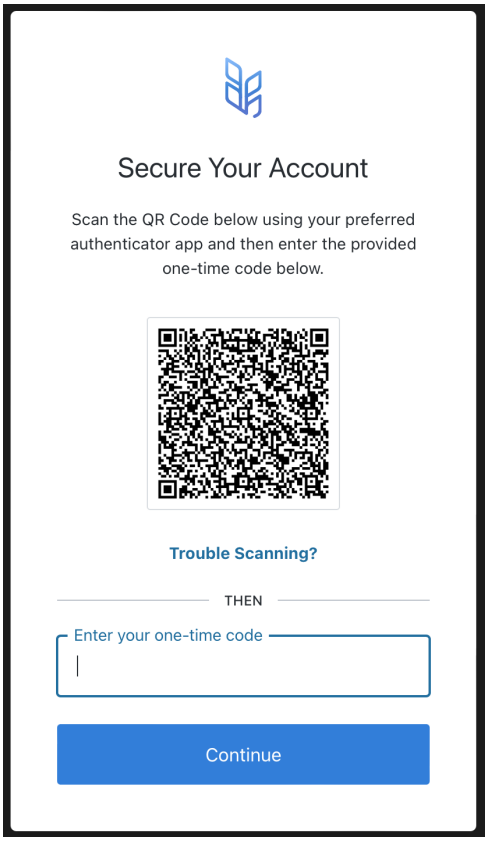

Figure 7: Akeero Serverless Set 2FA prompt

Fig 8.

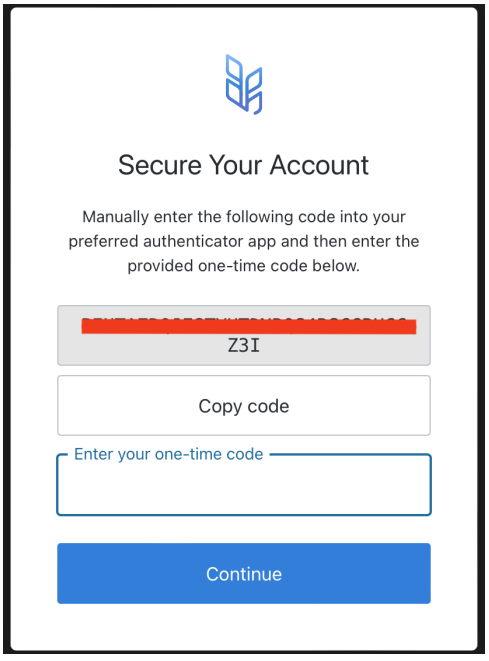

Figure 8: Akeero Serverless 2FA secret code

11. Open a new terminal, write python3 and press Enter. Write the below code line-by-line
    import pyotp
    totp = pyotp.TOTP("<Paste the copied secret CODE here>")
    totp.now()

12. Enter the generated code into the Input field in Fig 8 and click Continue.

13. Save the backup code presented and click Continue.

14. Click Accept on the Authorize app prompt Fid 9 and the sign up is complete now.

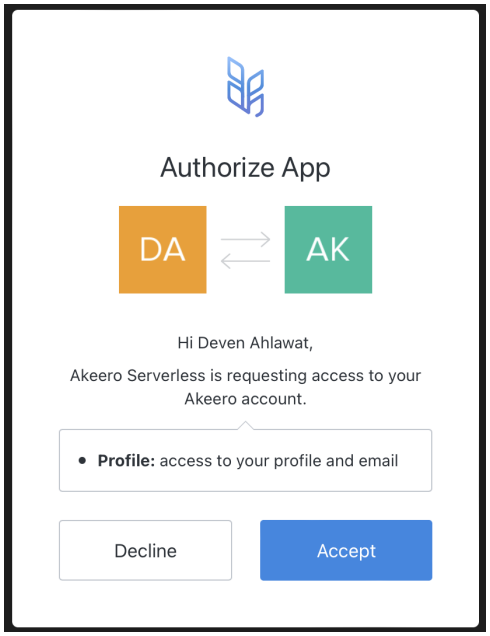

Figure 9: Akeero Serverless Authorize app prompt

Figure 10: Akeero Serverless

3 Burp Installation

BurpSuite Professional was used for this research. BurpSuite is vulnerability scanner that is used to test web applications, this research made use of the Professional version which has Passive Scanner functionality in it. Here are the steps to set it up

1. Download the BurpSuite Professional Jar file from Burp Downloads page [3] as shown in Fig 11

[3] https://portswigger.net/burp/releases#professional

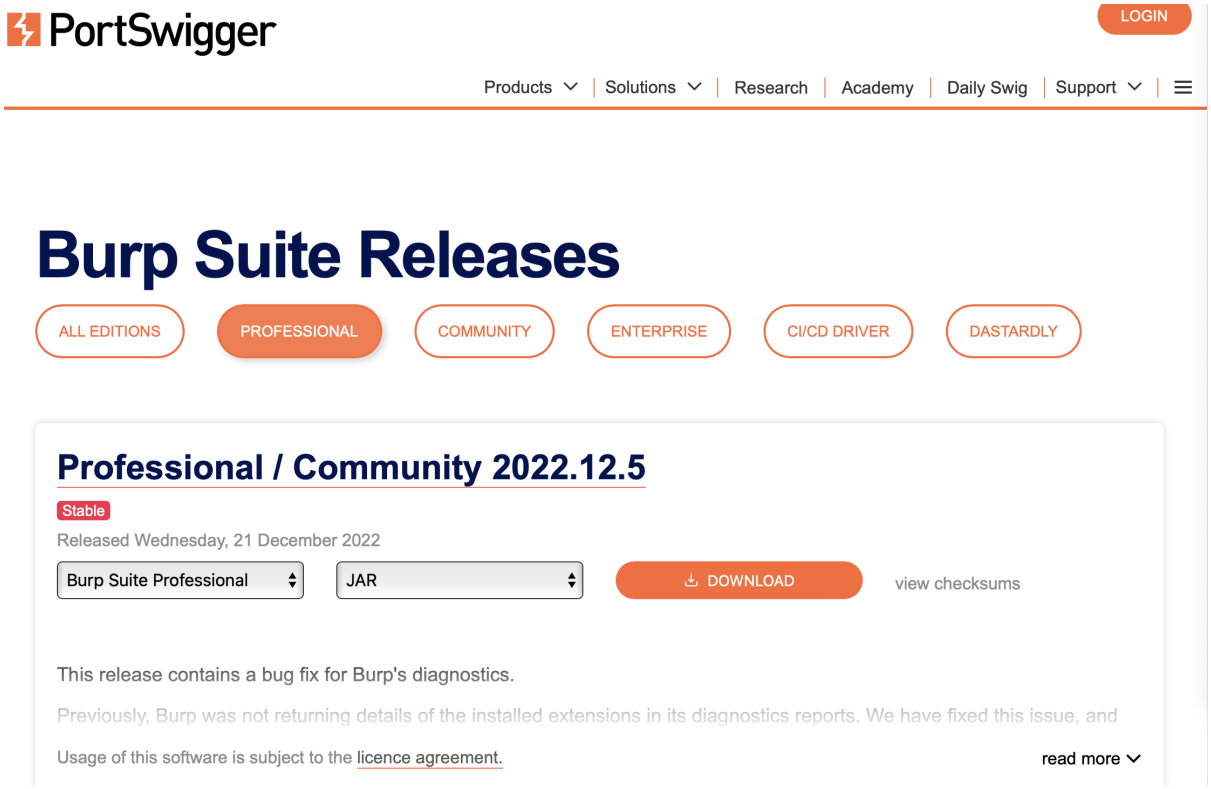

Figure 11: BurpSuite Professional Download page

2. Save the JAR file to a location on your Kali instance.
3. Download the Jython Standalone JAR file from the Jython website[4].
4. Save the JAR file to a location on your Kali instance.
5. Open BurpSuite Professional JAR file from the saved location using the command "java -jar burpsuite_pro_v2022.12.5.jar"
6. Activate BurpSuite Professional by entering the Licence Key.
7. Select "Temporary project" and Click Next Fig 12.
8. Select "Use Burp defaults" on the configuration page and click Continue Fig 13
9. Go to the "Extensions" tab and then to the "Options" tab.
10. Click on the "Select file ..." button in the "Python Environment" section.
11. Browse to and select the Jython Standalone JAR file as shown in Fig 14.
12. Browse to "Installed" tab within Extensions tab and click on "Add".
13. Select the "Python" option in the "Extension type" dropdown menu and locate the "burp_ext.py" file from Research Artifacts as shown in Fig 15.
14. Select the "Save to file" option in the "Standard Output" section and create a file name "Passive-Scan-Output.txt" in the downloaded Research Artifacts folder 15.

[4]https://www.jython.org/downloads.html

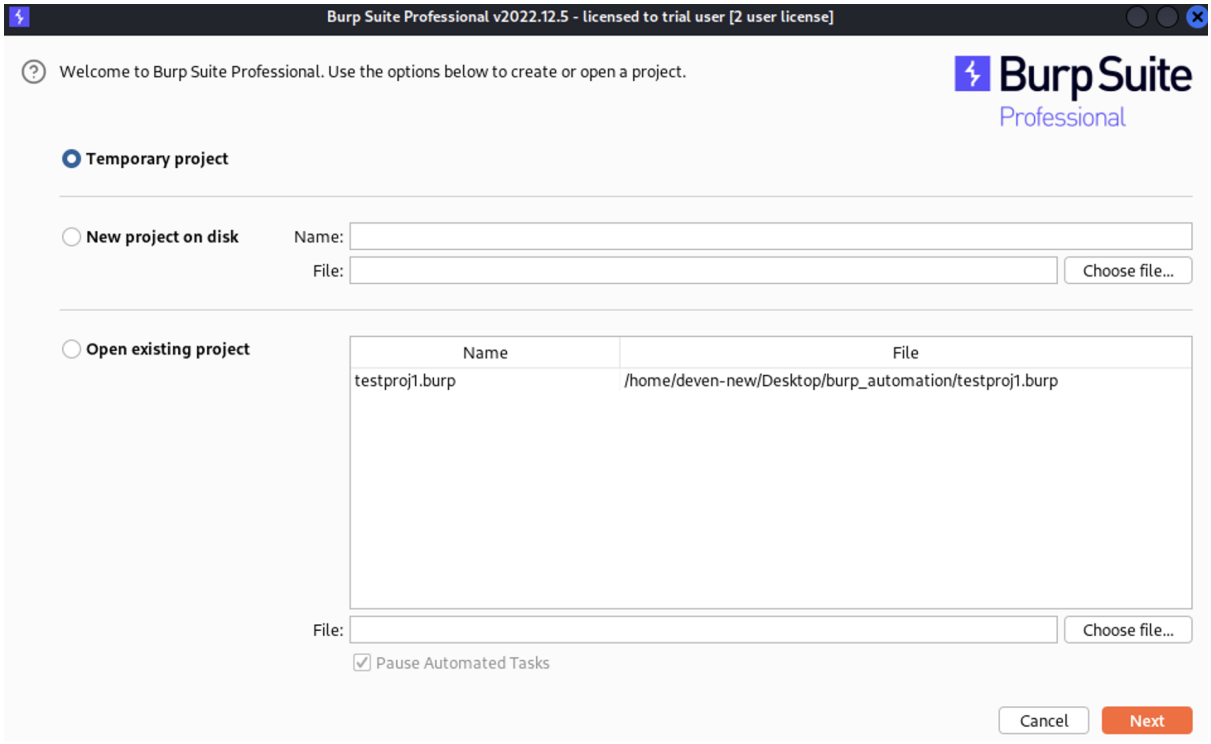

Figure 12: BurpSuite Professional Start Page

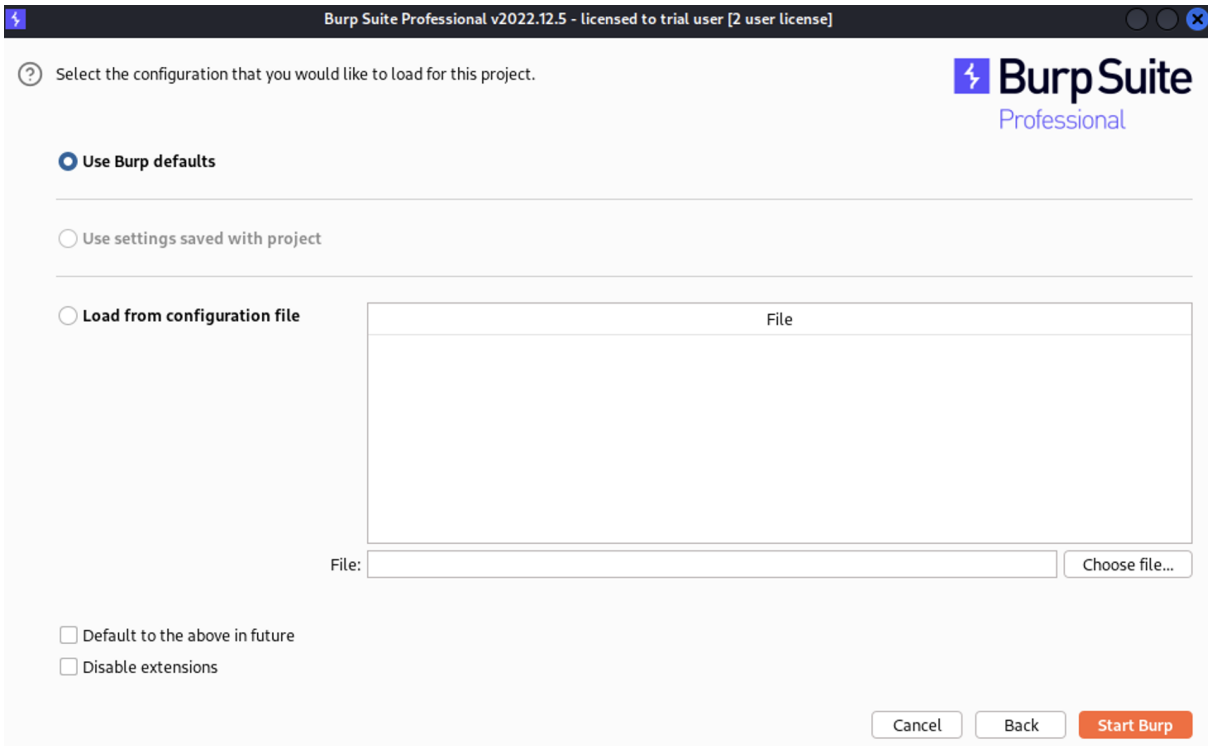

Figure 13: BurpSuite Professional load configuration page

15. Click on "BApp Store" Tab within the Extensions tab and search for "software"

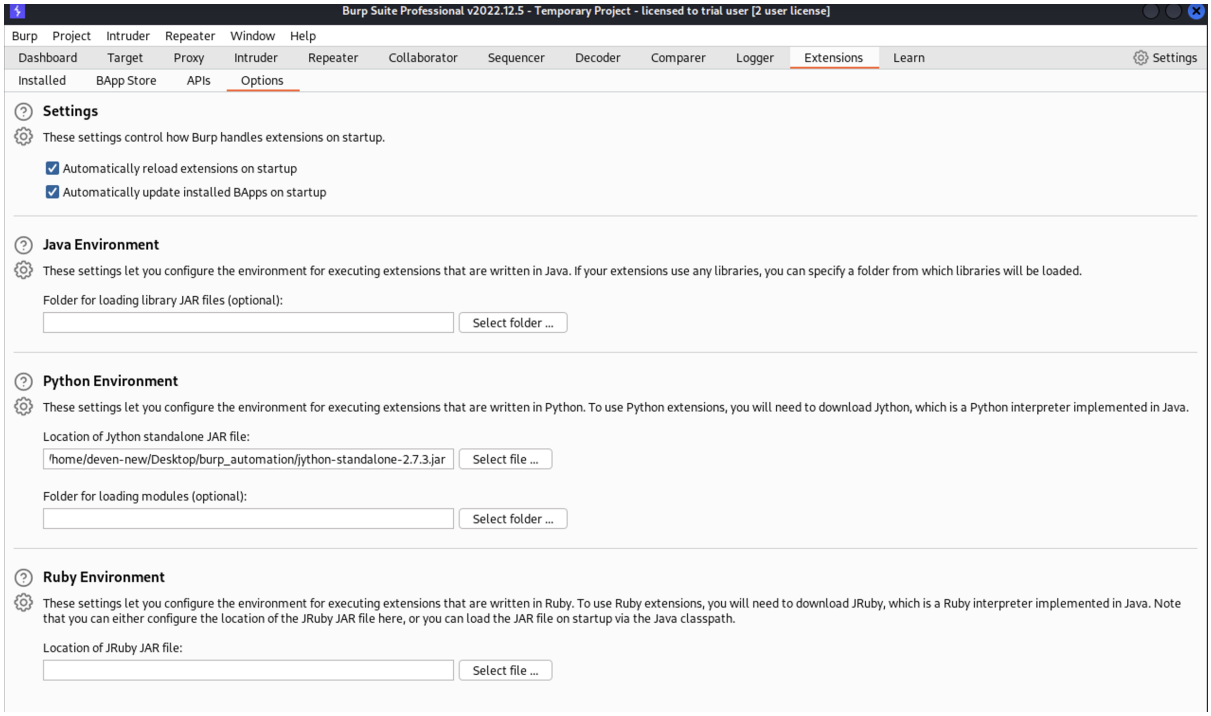

Figure 14: Load Jython standalone in BurpSuite Professional

16. Select Software Version Reporter and Click Install as shown in Fig 16.
17. Select Software Vulnerability Scanner and Click Install as shown in Fig 16
18. Click on the Proxy Tab
19. Select Options Tab within Proxy and check if Proxy is running on interface "127.0.0.1:8080" as shown in Fig 17
20. Select "Burp>User Settings>Save user settings" and save it to a file as shown in Fig 18
21. Select "Project>Project Settings>Save project settings" and save it to a file as shown in Fig 19
22. Close BurpSuite Professional

BurpSuite Professional is now installed and fully configured with necessary settings and extensions. Please close the burp suite window before proceeding to the next step.

4 Install Dependencies

Install Python dependencies using the following commands

```
pip3 install selenium
pip3 install pyotp
pip3 install smtplib
pip3 install datetime
```

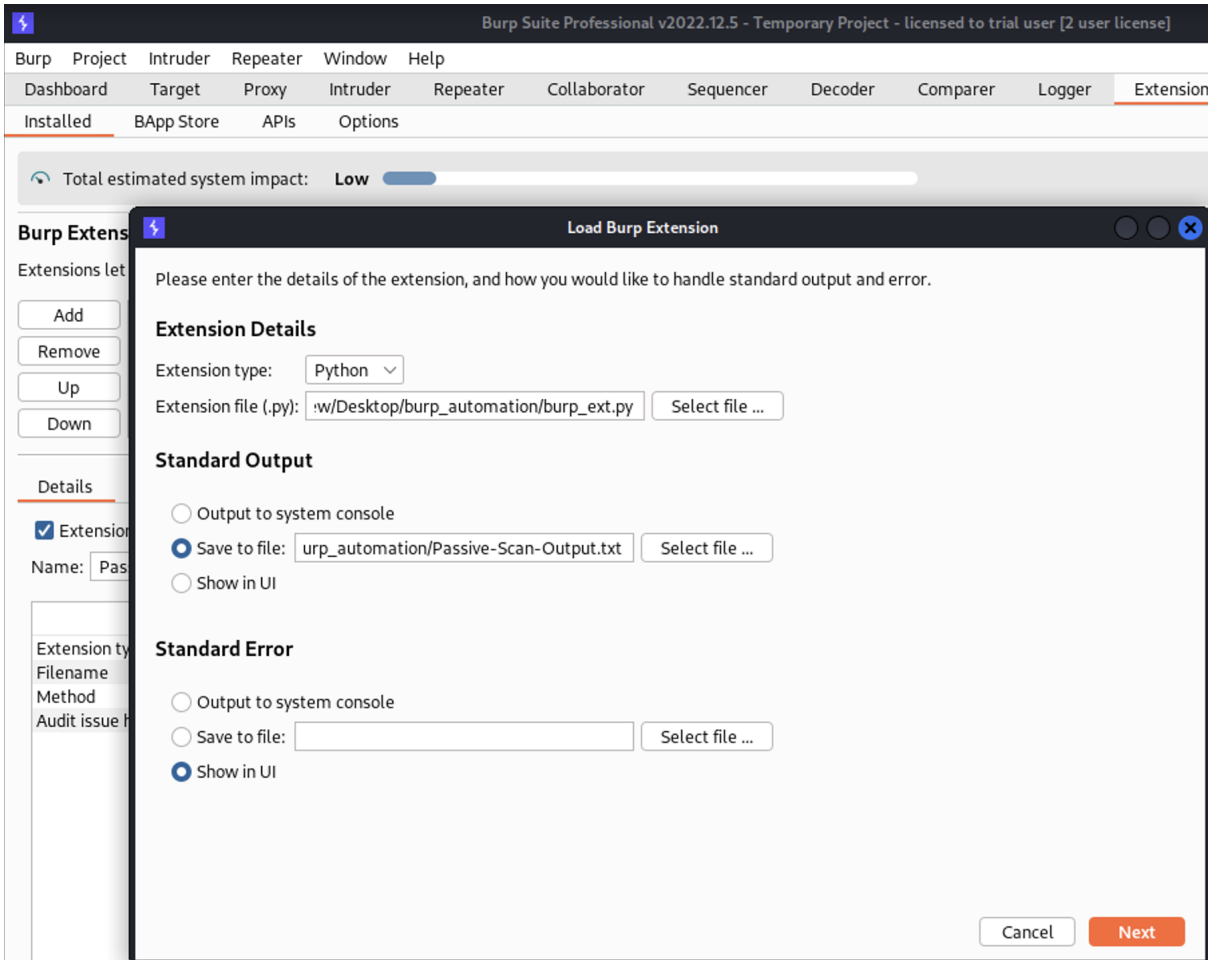

Figure 15: Load custom extension in BurpSuite Professional

```
pip3 install email
pip3 install csv
```

It is assumed that the artifacts have been downloaded and extracted into a folder. File Structure overview is listed below -

1. main.py - Core file which performs all the operation, appropriate comments are present to explain each block of code.
    - Edit Line 26 with <burp jar file location>, <project file location>, <project config file location>and <user config file location>
    - Edit Line 23 with <burp project file location>and <Report output file in artifacts folder>
    - Edit Line 42 with your MFA code.
    - Edit Line 47,62,82,92 and 109 with your custom Akeero domain without changing the rest of the URL.
    - Edit Line 119 with akeero-test-di.json file fome artifacts with absolute path location.
    - Edit Line 216 to configure recipient email address to receive the report.

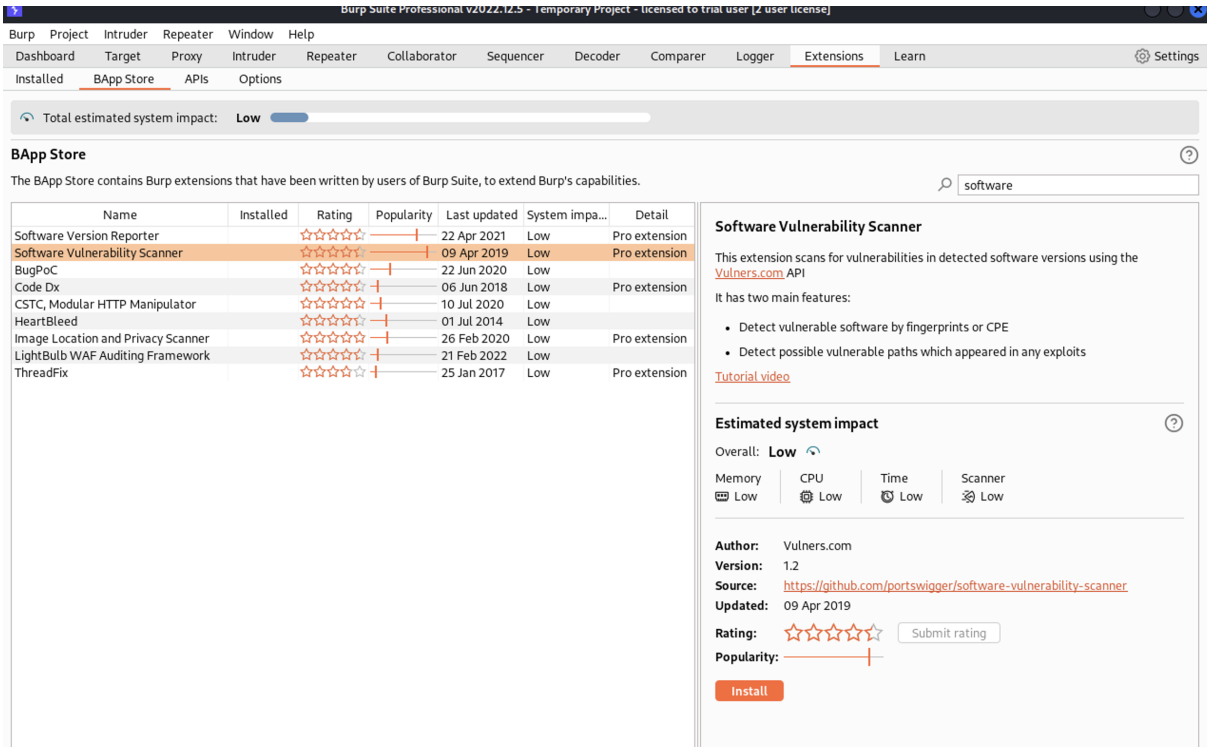

Figure 16: Install BurpPro extensions

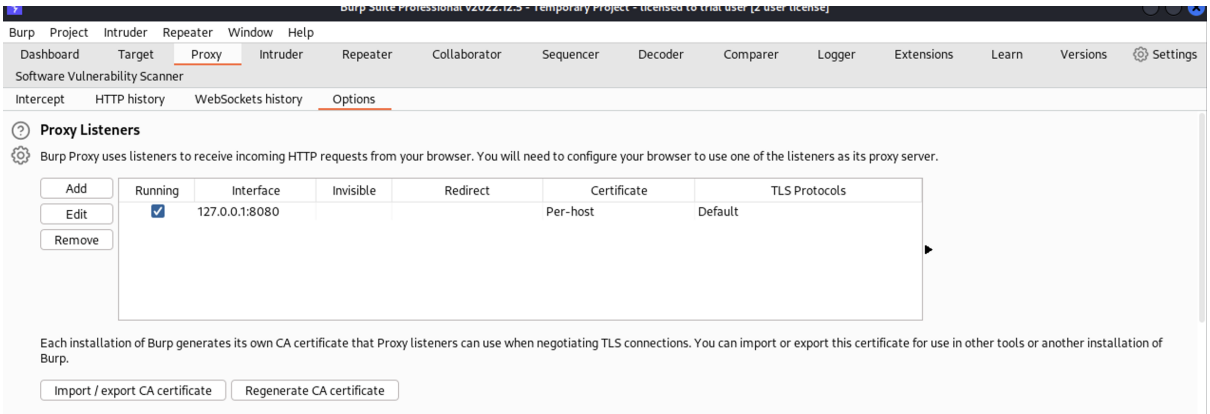

Figure 17: BurpSuite Proxy settings

2. config.py - Contains configuration used in the main but must be protected. Please replace username and password with your Akeero Login credentials as well as SMTP_USERNAME and SMTP_PASSWORD. Check the SMTP_SERVER and SMTP_PORT, please make the necessary changes as per your environment and system.

3. burp_ext.py - Custom Jython based burp suite extension which is used to log issues logged by burp scanner and output it to a file.

4. payloads.txt - Text file containg all the payloads that are to executed in different inpput fields present in the app.

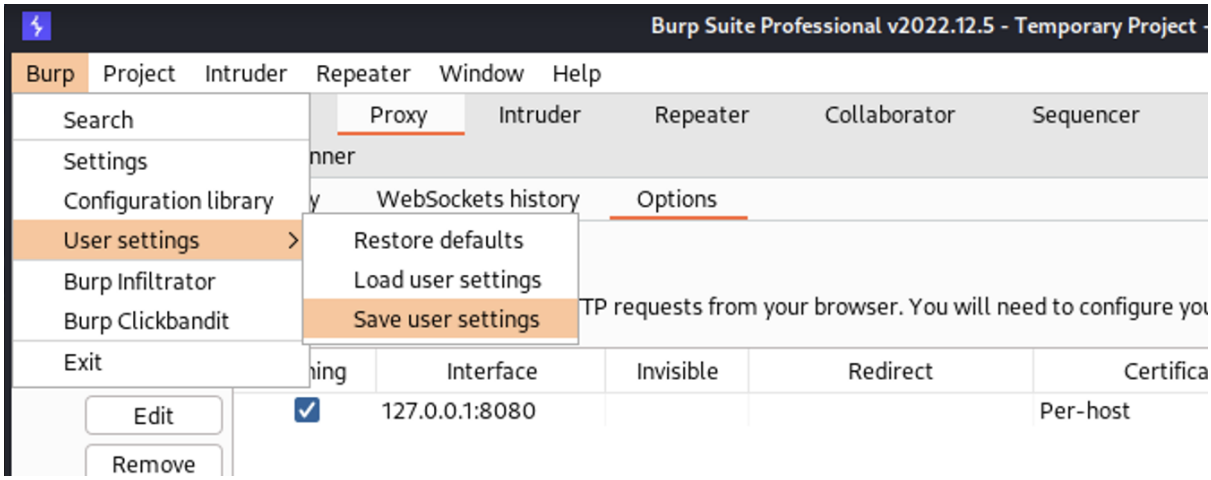

Figure 18: Save BurpSuite User settings

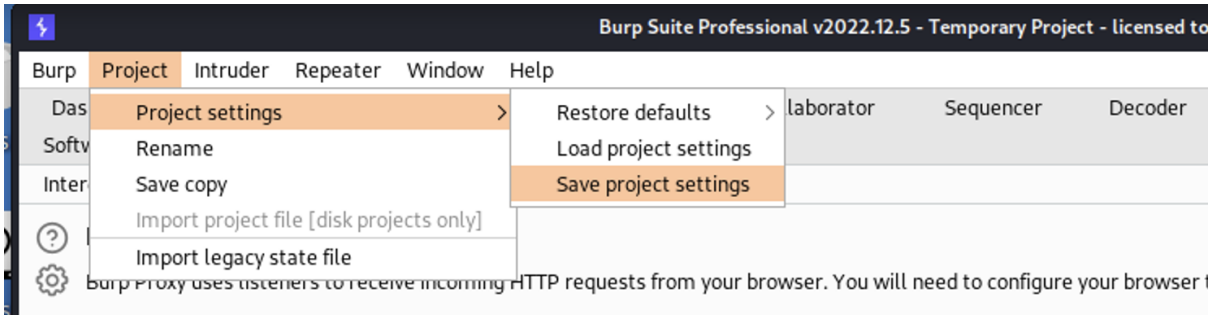

Figure 19: Save BurpSuite Project settings

5. akeero-test-di.json - Template file to create projects in the Akeero serverless application.

6. burp-files - Directory that contains all the config files used during the research and were required by burp to load with the desired extensions and configurations. These files shall be replaced with the saved user and project configuration files in the above section 3.

5 Running the Code

Before running the code please ensure that all artifacts are downloaded and all the necessary changes are made as highlighted in the above section 4 and all the dependencies are installed. To run the code

1. Open a new terminal

2. Browse to the updated artifacts folder with main.py file in it.

3. Enter command <python3 main.py>.

4. Press Enter

5. Check Terminal for console logs
6. Check Email for Testing Report.

Appendix H – Monthly Internship Activity Report

The Internship Activity Report is a 1-page monthly summary of the activities performed by you and what you have learned during that month. The Internship Activity Report must be signed off by your Company and included in the configuration manual as part of the portfolio submission.

Student Name: Deven Ahlawat Student number: x20214341

Company: Akeero Technologies Limited Month Commencing: October 2022

This month was spent on performing the Literature review on the WebSocket, serverless implementation and automation of security test cases on application based on these technology.

This was followed by identifying methodology to be employed for this research. Multiple models were analyzed before finalizing Waterfall model which was very in-line given the time-frame of research and steps.

Employer comments

Student Signature: Deven Ahlawat Date: 4 Jan 2023

Industry Supervisor Signature: Anthi Gilligan Date: 4 Jan 2023

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Student Name: Deven Ahlawat Student number: x20214341

Company: Akeero Technologies Limited Month Commencing: November 2022

Manual Penetration testing of the Akkero Serverless application was carried out in this month with the help of BurpSuite Professional and Kali linux installed on AWS EC2 instance.

This was followed by exploring multiple automation frameworks to automate the testcases from the Manual penetration testing. Selenium was chosen because of its vast resources available online along with its cross-browser implementation and greater flexibility with to choose element with multiple identifiers using Python.

Employer comments

Student Signature: Deven Ahlawat Date: 4 Jan 2023

Industry Supervisor Signature: Anthi Gilligan Date: 4 Jan 2023

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Student Name: Deven Ahlawat Student number: x20214341

Company: Akeero Technologies Limited Month Commencing: December 2022

Automation of test-cases was done in this month using Selenium and BurpSuite Professional. This was followed by writing the burp extension to generate report and deliver it to the respective stakeholders.

Employer comments

Student Signature: Deven Ahlawat Date: 4 Jan 2023

Industry Supervisor Signature: Anthi Gilligan Date: 4 Jan 2023