Configuration Manual

MSc Industry Internship
MSCCYB1

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MSc Project Submission Sheet

School of Computing

Student Name:	Nikhil Ahire.
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Programme:	MSCCYB1 **Year:** 2022-2023
Module:	Industry Internship
Supervisor:	Vikas Sahni
Submission Due Date:	04/09/2023
Project Title:	A new hybrid approach combining JWT and PASETO to implement secure authentication
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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.

<u>ALL</u> 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: ……Nikhil Ahire………………………………………………………

Date: ……04/09/2023……………………………………………………………

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Configuration Manual

Nikhil Ahire
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1.Introduction

This configuration manual is replication of work done to implement the newly developed authentication mechanism using JWT and PASETO. A new authentication method is designed using JWT and PASETO which is tested on web applications developed running on PHP and Java at frontend and MySQL in Backend. To validate the results Burp Suite Community Edition is used to intercept the request and confirm the secured token generation.

2.Tools /Languages

Front End – PHP 5, Java 8
Backend – MySQL 8.0.34
IDE – Visual Studio Community Edition 2022
Burp Suite Community Edition v2023.3.3
Xampp Server 8.0.28
Mozilla FireFox 116.0.2

3.Hardware Configuration

Parameter	Specification
Operating System	Windows 11 Home
Processor	AMD Ryzen 5 5500U with Radeon Graphics 2.10 GHz
RAM	16 GB
HDD	256 SSD

4.Lab Setup

- Install Xampp Server (8.0.28) locally to host the application.
- Visual Studio Code Community Edition v.2022
- Burp Suite Community Edition v2023.3.3
- Mozilla Firefox 116.0.2

https://www.apachefriends.org/download.html
https://visualstudio.microsoft.com/vs/community/
https://portswigger.net/burp/releases/professional-community-2023-9-3?requestededition=community&requestedplatform=
https://www.mozilla.org/en-US/firefox/windows/

4.Implemention

4.1 Ecommerce Application Hosted on Xampp Server.

Steps to be followed:
1. Install Xampp Server
2. Import **ecommerce.sql** in MySql database in Xampp server.
3. Start Apache server and MySql server.
4. Host: localhost
   User: root
   Password: MyNewPass
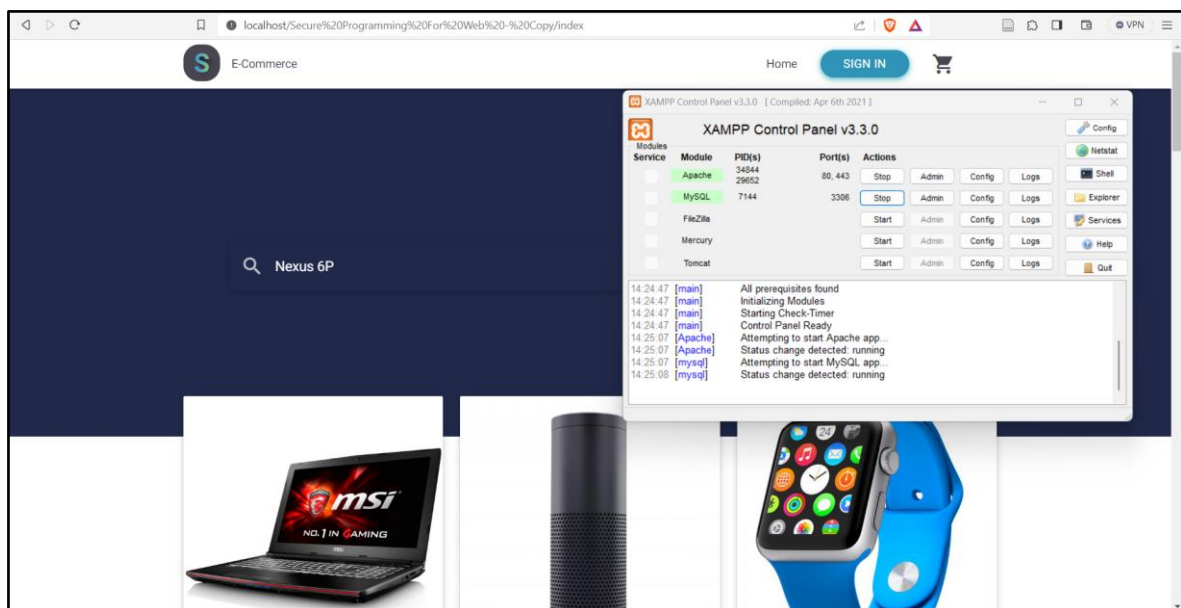5. Visit localhost from the web browser.

Fig.1 Ecommerce Web Application

As soon as the user logs on the website a session is started, and a combined token is generated using JWT and PASETO.

Libraries required for the implementation.
Composer using Firebase for JWT and ParagonIE\Paseto\Builder for PASETO

To verify the token generation Burp suite Community Edition is be used.

Steps to be followed:
- Launch Burp Suite
- Set up proxy with Mozilla FireFox.
- Intercept the request with the Burp Suite

https://portswigger.net/burp/documentation/enterprise/configuring-infrastructure/configure-http-proxy-server
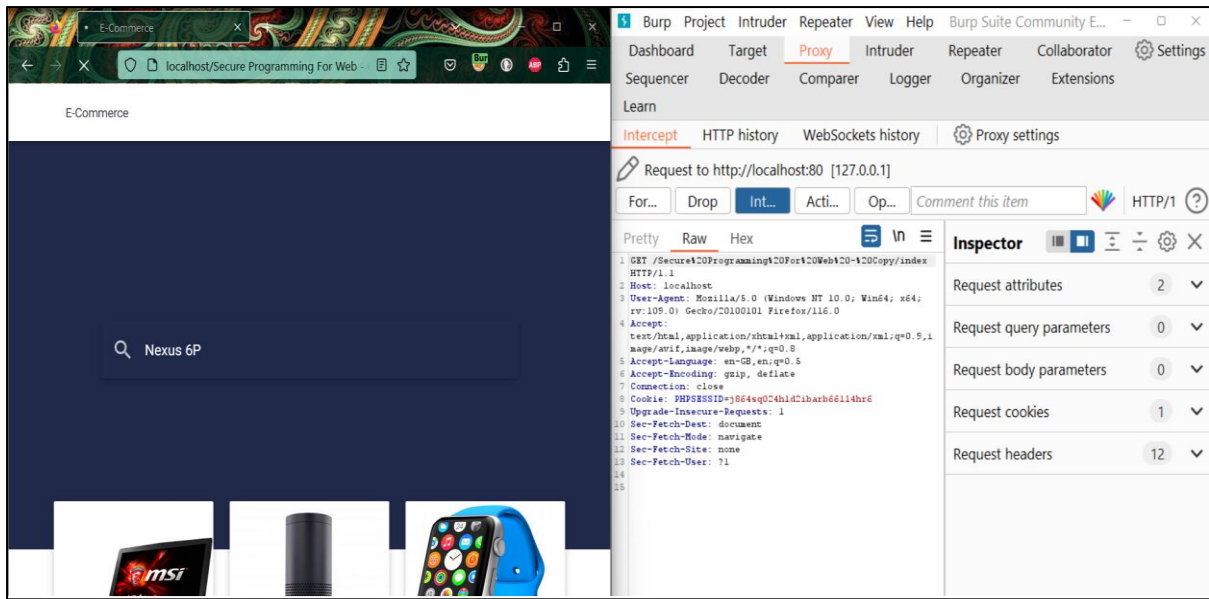
Fig 2. Request Intercepted using Burp Suit

Note – As it can be seen in the above snap no token is generated as the proposed hybrid authentication is only applied to Admin Module
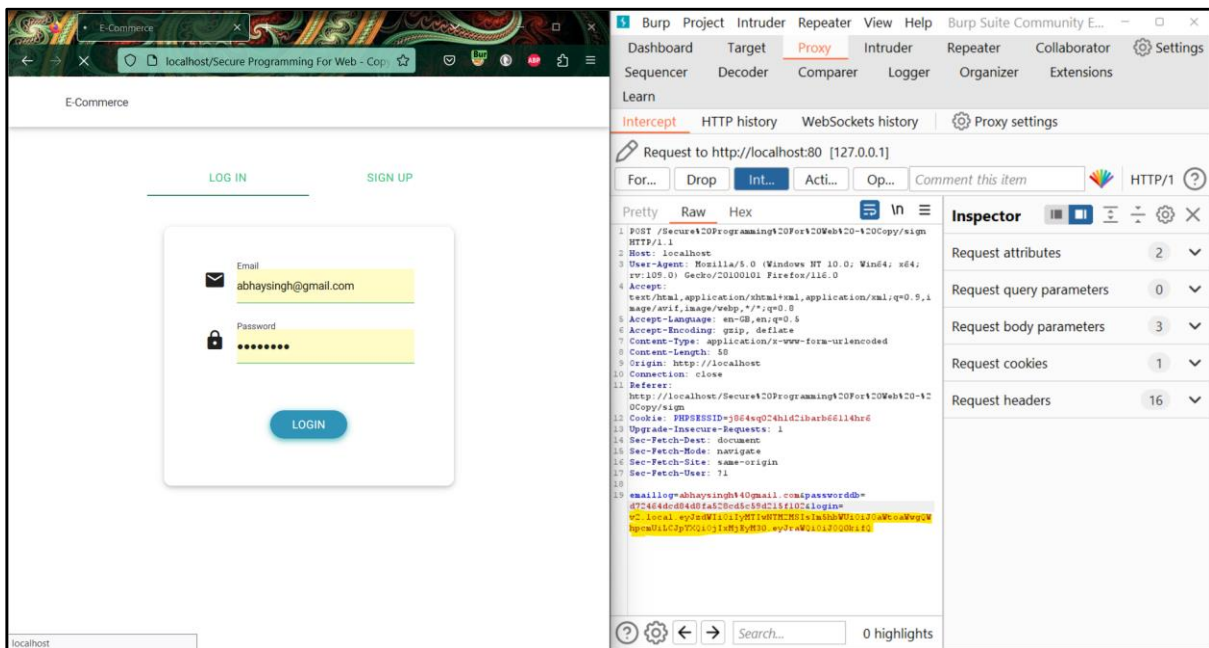

Fig 3. Highlighted Section represents hybrid authentication token

The above snap is of the request intercepted while logging in to the admin module of the application. As can be seen the highlighted section is the combination of JWT and PASETO token.

Altering or tampering with the token will result in dropping of the request. This proves that the newly developed authentication mechanism is successfully implemented.

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: Nikhil Ahire   Student number: x21205361

Company: Geniobits Private Limited   Month Commencing: 01/06/2023

In the first month of internship, the following activities were performed.
- Granted access to Microsoft 365 Account.
- Granted access to internal dev tools and CI/CD pipelines.
- Discussed current security topics with Manager.
- Introduced to live development projects within the company.

Employer Comments:

- In the first week new user ID and necessary access was given to Nikhil.
- In the second week Nikhil had welcome meetings with other team members and was introduced to ongoing projects and his contribution in the team as a security intern.
- Initial discussion w.r.t to research topic as advised by his supervisor was done and few topics were selected to be worked on.

Student Signature: Nikhil Ahire   Date: 28/06/2023

Industry Supervisor: Mayuresh Satao   Date: 28/06/2023

Industry Supervisor Signature: *M.satao*

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Student Name: Nikhil Ahire   Student number: x21205361

Company: Geniobits Private Limited   Month Commencing: 01/07/2023

In the second month of internship, the following activities were performed

- Finalized the topic for the research.
- Started the Penetration Testing of a live web application.
- Completed the mandatory security training of the company.
- Did a first round of manual source code review with senior developers.

Employer Comments:

- Finalized the research topic which was based on Token Authentication.
- Assigned task to do OWASP Top 10 Vulnerability check on a web application.
- Assigned Mandatory Information Security Training to Nikhil
- Tagged Nikhil with Development team to make him understand the source code and do a manual review from security perspective.
- A test server access was requested by Nikhil to complete his testing process.

Student Signature: Nikhil Ahire   Date: 25/07/2023

Industry Supervisor: Mayuresh Satao   Date: 25/07/2023

Industry Supervisor Signature: *M.satao*

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Student Name: Nikhil Ahire   Student number: x21205361

Company: Geniobits Private Limited   Month Commencing: 01/08/2023

In the Third month of internship, the following activities were performed.
- Developed first sample module of a hybrid token authentication.
- Resolved the errors with dev team and did a second iteration of the code review.
- Submitted the report of penetration testing of the web application to team lead along with some critical findings.
- In last week Nikhil submitted the final model of the hybrid token authentication.
- Documented all the findings and data which was completed during the internship period and submitted to Manager for final sign off.

Employer Comments:

A final report was submitted by Nikhil in the last month of his internship. He has completed all the assigned task on time and have delivered very good results. He actively participated in all the meetings and gave good inputs. His time during the internship was fruitful to the organization.

He had some access issue at the end of his internship, but the task was completed by him using his own resource locally as remote access to some resources was still a challenge.

Student Signature: Nikhil Ahire   Date: 21/08/2023

Industry Supervisor: Mayuresh Satao   Date: 21/08/2023

Industry Supervisor Signature: *M.satao*

References

PortSwigger, 2021. Configuring Burp to work with an external browser [WWW Document]. URL https://portswigger.net/burp/documentation/desktop/external-browser-config (accessed 9.1.23).

Apache (2021) Apache Friends, Apache Friends RSS. Available at: https://www.apachefriends.org/download.html (Accessed: 01 September 2023).

Microsoft (2021) *Visual studio code - code editing. redefined*, *RSS*. Available at: https://code.visualstudio.com/ (Accessed: 01 September 2023).