National College of Ireland

Configuration Manual

MSc Research Project
Programme Name

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MSc Project Submission Sheet

School of Computing

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Programme:	MSc Cybersecurity	**Year:**	2023
Module:	Practicum		
Lecturer:	Dr Raza UI Mustafa		
Submission Due Date:	02/09/2024		
Project Title:	Simulating and Evaluating Security Vulnerabilities in Smart Home IOT Devices Using Node-RED		
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Configuration Manual

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1 Introduction

The configuration manual gives an insight on the technical aspect of the project. The vulnerabilities are configured and then tried to exploit using scripts to show the risks of unpatched systems in a smart home environment.

2 Hardware Requirements

- Processor: Intel i5 or equivalent (sufficient for running Node-RED and virtual devices).
- RAM: Minimum 8 GB (16 GB recommended for smoother performance).
- Storage: Minimum 128 GB HDD/SSD (recommended 256 GB SSD for faster read/write operations).
- Network Interface: Basic Ethernet or Wi-Fi connectivity for accessing localhost services.
- Operating System Compatibility: Windows 10/11, macOS, or Linux (Ubuntu or Debian recommended for running Node-RED).

3 Software Requirements

Operating System

- Preferred OS: Linux (Ubuntu or Debian) for stability and compatibility with Node-RED.
- Alternatives: Windows 10/11 or macOS

Node-Red

Node-Red required Node.js to run. The following steps are followed to install Node.js:

1. Download Node.js
2. Install Node.js.
3. Verify Node.js installation: This is done by running the node -v and the npm -v commands.

After Node.js is successfully installed Node-Red is installed.

1. In the command prompt this command is run “npm install -g --unsafe-perm node-red”
2. After the installation is complete it is verified by the command node-red –version.

3. Once that is complete node-red can be started by typing the command node-red.
4. Once node-red starts it can be accessed via the provided URL. In my case it is http://127.0.0.1:8080/

Postman

Postman is the tool used to communicate with the smart home environment. HTTP POST requests are sent to the URL configured in the function node in node-red. This is used to communicate with the smart home environment.

Libraries Used

1. Axios: This is a promise-based HTTP client for Node.js, which allows us to make HTTP requests to communicate with servers.
2. Fs: This is short for File system which is a core node.js module which is used for interacting with file systems. It is used to read the wordlist file containing the list of all default passwords used by users.
3. Readline: This is a core node.js module which provides an interface for reading data from a readable stream one line at a time.

Appendix

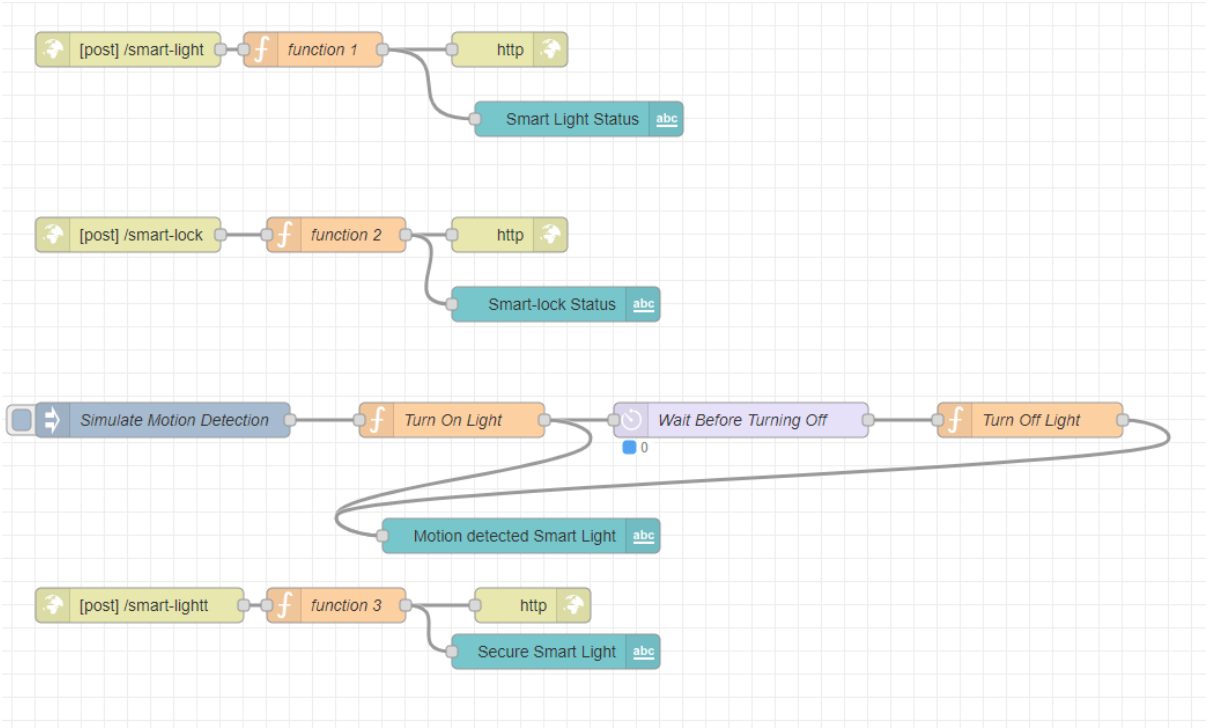

Figure: Architecture of the smart home

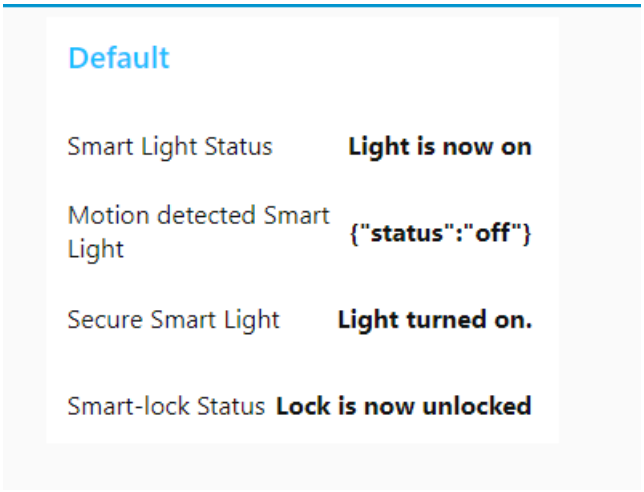

Figure: UI page to monitor the status of the smart devices

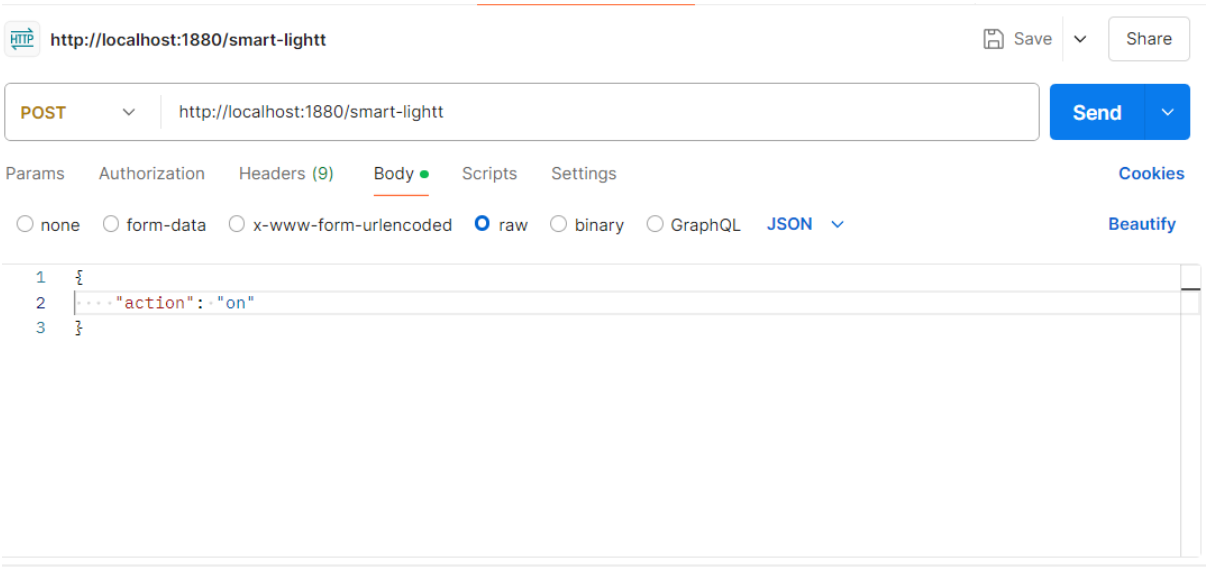

Figure: Postman used to send requests to the endpoint

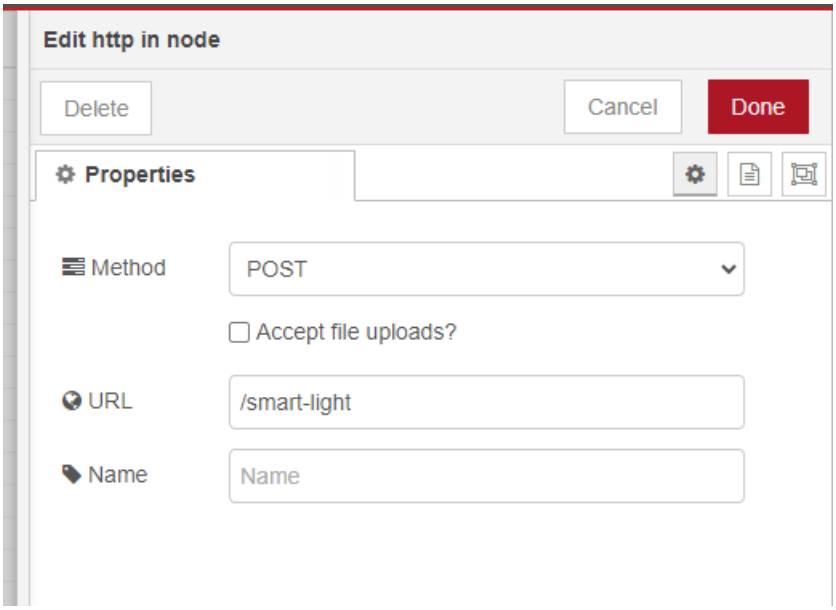

Figure: Configuration of the http in node in node-red