Project Proposal

Project Topic
Title: *Exploring Cybersecurity Techniques with Nmap and Shodan for IoT Security*

Group Name: SecuScan
Members: Sukhdeep Singh (100447918) & Dilraj Kaur (100447804)

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1. What is your project topic?

Our project combines two critical aspects of network and IoT security: **Footprinting and Network Scanning with Nmap** and **Internet of Things (IoT) Security with Shodan.io**. This project aims to demonstrate how these tools can identify and mitigate security risks in connected devices, focusing on IoT vulnerabilities.

2. How is this topic relevant to the course?

This project aligns with the course syllabus, which covers key security areas like network security, intrusion detection, and cryptographic tools. Nmap and Shodan.io are industry-standard tools used by security professionals to assess and secure networks, making them directly relevant to understanding and applying security principles in real-world scenarios.

3. Why did you choose this topic?

With the increasing integration of IoT devices, vulnerabilities are also on the rise. This project will enable us to understand how attackers locate vulnerable IoT devices and networks using tools like Nmap and Shodan, and it will demonstrate how to use these tools for securing these networks. Exploring IoT device vulnerabilities and scanning techniques highlights critical knowledge for a well-rounded cybersecurity education.

4. How will you demonstrate this project or proof of concept?

We will conduct a controlled experiment to simulate a network environment with IoT devices and execute footprinting and scanning processes. Using Nmap, we will perform network scans to identify active devices and open ports. Then, we will use Shodan.io to locate IoT devices and analyze potential vulnerabilities, such as weak passwords and outdated firmware.

5. What is meant with regards to "How the tool works" and "How to work the tool"? How will you convey this in your project artifacts and presentation?

To demonstrate how the tools work, we will provide a technical overview of Nmap and Shodan.io, covering their core functionalities, commands, and usage. For “how to work the tool,” we will include a step-by-step demonstration within our presentation, explaining best practices for using these tools in a security context and ethical guidelines for their application.

6. What is most concerning about your project/topic, and how will you address it?

The most concerning aspect of this project is to maintain ethical standards while using these powerful tools, as scanning and footprinting could target systems without permission. We will mitigate this by creating a secure, isolated environment to test our scans.

Group Contributions

Sukhdeep Singh (100447918)

- **Substantial Contribution:** I will focus on researching and demonstrating the practical use of Nmap for network scanning and footprinting, including identifying devices, open ports, and potential vulnerabilities in a controlled network environment. This will involve documenting the processes and providing step-by-step guidance for the demonstration.
- **Successes:** So far, I have successfully gained a basic understanding of Nmap commands and syntax, which will aid in effectively demonstrating its functionality.
- **Difficulties:** I anticipate challenges in simulating realistic network scenarios and will work around this by studying various configurations to set up an isolated testing environment.

Dilraj Kaur (100447804)

- **Substantial Contribution:** I will focus on using Shodan.io to assess IoT security. This includes researching IoT vulnerabilities that Shodan can identify, demonstrating how it can be used ethically, and documenting key findings and security recommendations.
- **Successes:** I have successfully navigated Shodan's interface and understands its core features, which will contribute to a well-structured demonstration.
- **Difficulties:** I expect some challenges related to ethical use and permission concerns when using Shodan. I will try to address this by thoroughly studying Shodan's terms of use and configuring searches to stay within legal and ethical boundaries.