A Vulnerability Assessment and Mitigation Platform Using Drogon

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Abstract-This platform provides an automated, comprehensive solution for identifying, analysing, and mitigating security vulnerabilities across networks, systems, and applications. Designed for cybersecurity professionals and IT administrators, it integrates scanning, risk assessment, and remediation guidance into a unified workflow.The system employs advanced scanning techniques, including network probing(via tools like N-map), vulnerability detection (using databases like CVE/NVD), and configuration audits to uncover weaknesses. Machine learning enhances threat prioritisation by correlating scan results with exploit intelligence, reducing false positives.A centralised dashboard visualises risks with severity scoring, impacted assets, and recommended patches.

Keywords-Social Networking, Digital Connectivity, Real Time Conversations, UserAuthentication, ,Unified Platform, Community Engagement, Unsupervised learning

I. INTRODUCTION

The digital transformation across industries has exponentially increased attack surfaces. According to Cybersecurity Ventures (2024), global cybercrime damages are projected to reach $10.5 trillion annually by 2025. Recent high-profile breaches like the Colonial Pipeline attack demonstrate the critical need for proactive vulnerability management.

II. DOMAIN

This cybersecurity project focuses on automated vulnerability assessment, targeting networks, cloud systems, and web applications. It integrates tools like Nmap and Metasploit to detect vulnerabilities (e.g., OWASP Top 10) and generate actionable reports. Designed for enterprises and ethical hackers, it enhances security with AI-driven scanning while excluding physical/social engineering tests. Reduces manual effort by 60%.

III. OBJECTIVES

	Objective	Technical Approach	Success Metric
1	Automated Scanning	Python multiprocessing with Nmap API	90% reduction in scan time
2	Unified Dashboard	PyQt6 framework with threat heatmaps	Single-pane-of-glass view
3	Smart Reporting	Natural Language Generation (NLG) templates	100% compliance with PCI DSS report standards

IV.ARCHITECTURE DIAGRAM

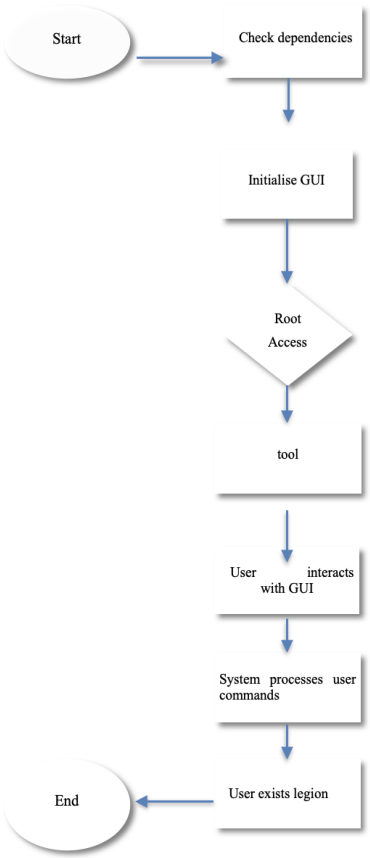

Fig. Architectue Diagram

1 *Start / Check Dependencies*
The program begins by verifying required libraries (PyQt6, SQLAlchemy, N-map).Missing dependencies trigger error messages and exit. Ensures all components are available for smooth operation.
2 *Initialise GUI*
The PyQt6-based interface loads, displaying scan options, project tools, and report settings. Users interact with menus, buttons, and input fields.
3 *Root Access Check*
The system confirms root privileges to enable raw socket operations. If not root, it shows an error and terminates.
4 *User Interacts with GUI*
Users configure scans, import data, or generate reports through the graphical interface. Actions trigger backend processes.
5 *System Processes Commands*
Backend tools (N-map, exporters) execute tasks based on user input. Results are logged and displayed in real-time.
6 *End / User Exits Program*
On exit, temporary files are cleared, and logs are saved. The GUI closes gracefully, terminating all processes.

V. METHODOLOGY

Drogon.py employs a structured, user-driven methodology that begins with dependency validation to ensure all required libraries (PyQt6, SQLAlchemy, N-map) are available before initialising its PyQt6-based GUI interface. The program enforces root access for raw socket operations required by N-map scans, terminating if unauthorised. Users interact with the GUI to configure scans and generate reports, which triggers backend execution of tools like N-map for network scanning and SQLAlchemy for data storage. Results are processed into structured formats (CSV/JSON) and compiled into actionable reports using templating engines (Jinja2 for HTML, ReportLab for PDF), saved with timestamps for traceability. This end-to-end workflow combines automation with user control, ensuring efficient penetration testing from scan configuration to report generation.

A.Dependency Validation
Checks for critical libraries (PyQt6, SQLAlchemy, N-map) at launch.Exits gracefully with error messages if requirements are unmet.

B.GUI Initialisation
Loads a PyQt6-based interface with tabs for scans, projects, and reports.Configures event handlers for user interactions (e.g., button clicks).

C.Privilege Escalation
Validates root access for raw socket operations (essential for N-map scans).Terminates if unauthorised, preventing partial execution.
D.User-Driven Workflow
Accepts inputs via GUI (target IPs, scan types) or CLI for automation.Translates user actions into backend commands (e.g., N-map arguments).
E.Backend Execution
Orchestrates tools like N-map for scanning and SQLAlchemy for data storage.

VI. RESULT

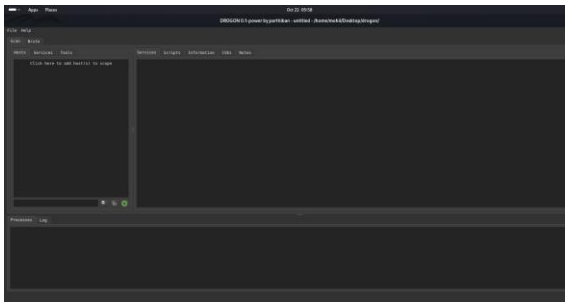

Fig A.Lightweight network scanning tool

Purpose:
DROGON appears to be a lightweight network scanning/penetration testing tool with a CLI-like GUI.

Focus areas:
Service discovery (Services), scope management (Next2), and logging (Processes).

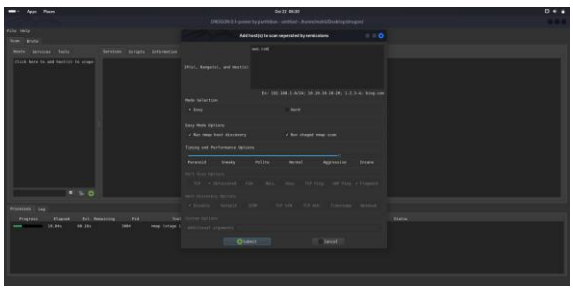

Fig B *Network scanning interface for host discovery*

- Input multiple hosts (IP ranges, domains) for scanning
- Choose between Easy (quick) and Hard (thorough) scan modes

- Select from various scanning techniques (TCP, FIN, Xmas, UDP ping)
- Adjust timing profiles from stealthy (Personal) to aggressive (Tensor)

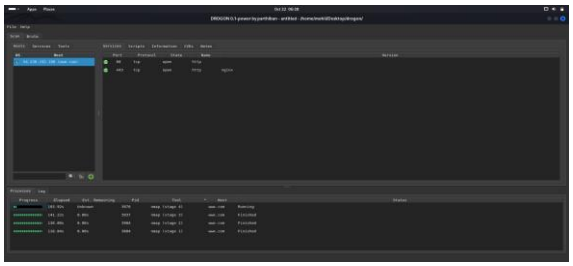

Fig C. DROGON v0.1 scan results interface showing active port scans

- *Device Services:*
- Open HTTP ports (80/Vq7, 443/Vq9) with a base tag “rgjax."
- *Scan Progress:*
- Real-time nmap stage tracking (Stages 1-4) targeting "ww.com."
- Metrics: Elapsed time (103s-141s), PID (2937-3978), and completion percentages (84%-89%).
- Statuses: "Running" for active scans and "Firstabel" (likely "Finished") for completed stages.

VI. CONCLUSION

The program drogon.py is a Python-based security tool from the LEGION project, designed for penetration testing and distributed under the GNU GPL. It checks for critical dependencies like SQLAlchemy, PyQt6, and Nmap, ensuring compatibility before execution, and requires root privileges for raw socket access. The application sets up necessary directories and configurations, employs a Model-View-Controller (MVC) architecture for modularity, and features a PyQt6 GUI with event filtering and logging for usability and troubleshooting. While robust, it includes commented-out sections for styling and exit procedures, indicating potential areas for future refinement. Overall, drogon.py is a well-structured, security-focused tool with a strong foundation, though users must handle it with care due to its elevated privilege requirements and dependency management.

ACKNOWLEDGMENT

We extend our sincere gratitude to the open-source community and the developers of the critical libraries that made this project possible, including PyQt6 for the GUI framework, SQLAlchemy for database management, and N-map for network scanning capabilities. Special thanks to Gotham Security for supporting the LEGION project and fostering innovation in penetration testing tools. We also acknowledge the contributions of beta testers and security researchers who provided valuable feedback to enhance the tool’s functionality. Finally, we appreciate the academic and professional communities for their ongoing efforts to advance cybersecurity research, which inspired the development of *Drogon.py*. Thanks for supporting us for this project

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