Incident Report Analysis for NixGuard

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Executive Summary

This report details the simulated detection and analysis of suspicious network activities using **NixGuard**, a GUI-based security tool, along with supporting cybersecurity utilities. The primary objectives of this exercise were:

1. Demonstrate **cybersecurity analysis skills** using NixGuard and other security tools.
2. Analyze **network traffic**, identify potential threats, and **detect anomalies**.
3. Develop a **structured incident report** based on the findings.
4. Provide **constructive feedback** on the experience of using NixGuard.

The virtual environment consisted of the following machines:

- **NixGuard Server**: Windows 10 OS (acting as the monitoring system).
- **Employee Workstations**:
    - **Windows 10 PC**
    - **Ubuntu 24.04.1 PC**
- **Attacker System**: Kali Linux (VirtualBox-amd67).

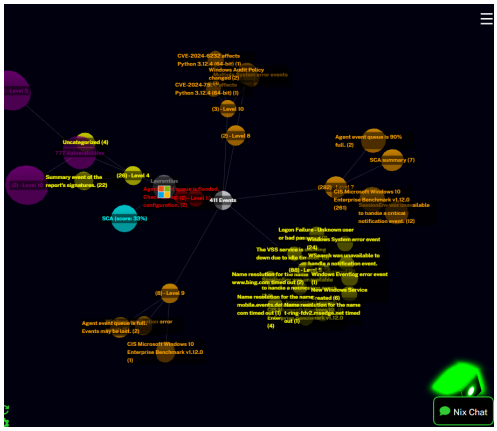
The supporting security tools used in this analysis included:

- **NixGuard**
- **Wireshark** (for network traffic monitoring)
- **Nmap** (for network scanning)
- **Metasploit** (for penetration testing)
- **Windows PowerShell** & **Command Prompt**
- **Kali Linux Terminal Emulator**
- **Firefox Browser**

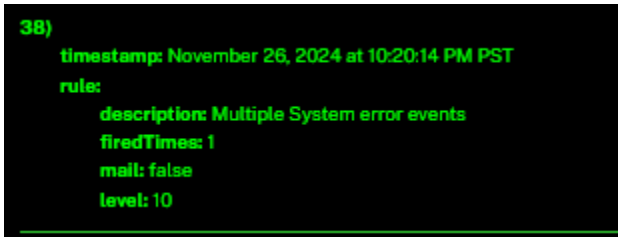
Incident Details

Initial Alerts and Detection

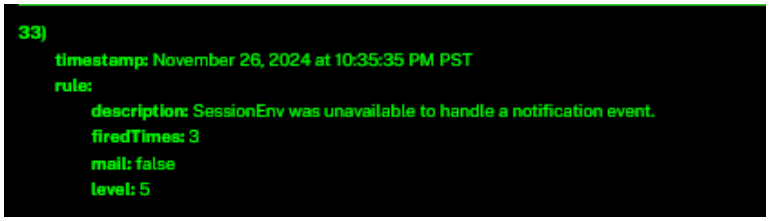
On **November 26, 2024, at 10:20 PM**, NixGuard began generating multiple alerts regarding **system error events**. These events persisted, with key timestamps recorded at:



- **10:20 PM** – Initial system error events detected.



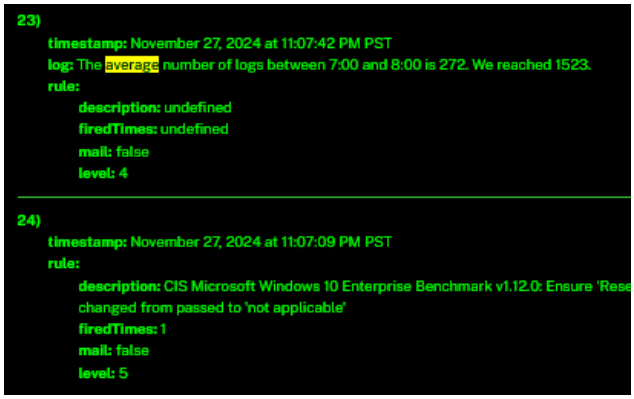
- **10:35 PM** – Repeated alerts indicating **SessionEnv was unavailable** to handle notification events.



- **11:05 PM & 11:10 PM** – Additional alerts for **SessionEnv and WSearch failures**.
- **11:07 PM** – A **significant spike** in log activity was observed:
    - The system's **normal log activity** averaged around **272 entries**, but suddenly

surged to **1,523 entries** within a short timeframe.

- The description for these logs was **undefined**, which raised suspicion.



Preliminary Hypothesis

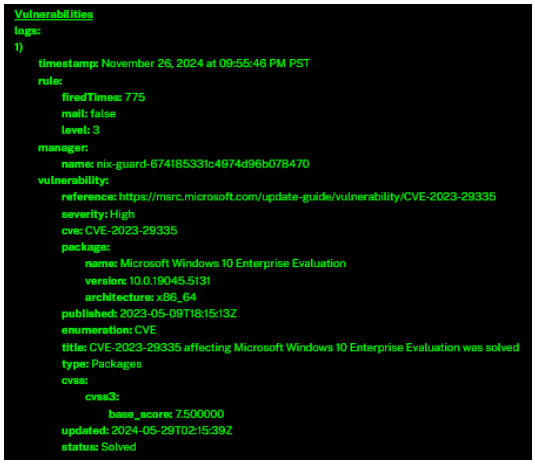
Initially, the **SessionEnv notifications** appeared to be regular system maintenance or health-check alerts. However, the **persistence of these logs** combined with **anomalous log volume surges** suggested potential **suspicious activity within the network**.

Threat Identification & Analysis

Step 1: Reviewing NixGuard Logs

A new log branch titled "**Vulnerabilities**" was identified. These logs repeatedly highlighted two key security concerns:

1. **Windows OS** vulnerabilities present on the NixGuard server.
2. **Python package** vulnerabilities within the program files.



Given that vulnerability scans often precede an attack, this raised concerns about reconnaissance activity by an unauthorized actor.

Step 2: Network Traffic Analysis (Wireshark)

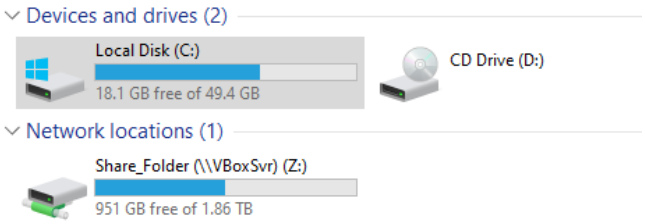
To confirm possible reconnaissance, Wireshark was used to analyze network traffic. The following anomalies were discovered:

- Multiple **ARP requests** were observed, with a **"Who has"** request being sent sequentially across the subnet.
    - The **source IP** of these ARP requests: **192.168.10.8**.
    - The ARP protocol is commonly used for **mapping IP addresses to MAC addresses**, but sequential scanning suggests host enumeration.
    - This indicates that an **internal actor** was actively scanning for live hosts.

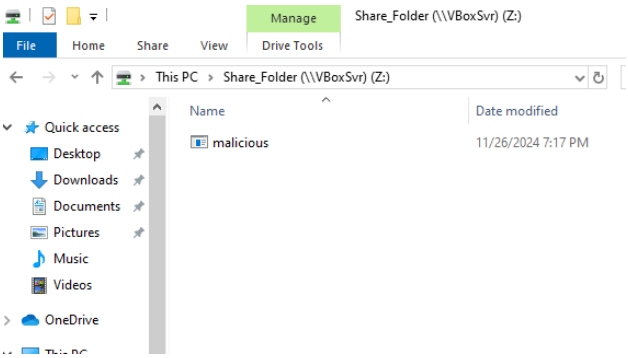
```
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.51? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.52? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.53? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.54? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.55? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.56? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.57? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.4? Tell 192.168.10.8
PCSSystemtec_7b:5d:… PCSSystemtec_ad:25:… ARP      42 192.168.10.4 is at 08:00:27:7b:5d:27
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.60? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.61? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.62? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.63? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.64? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.67? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.68? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.69? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.70? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.71? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.72? Tell 192.168.10.8
PCSSystemtec_ad:25:… Broadcast           ARP       60 Who has 192.168.10.73? Tell 192.168.10.8
```

Step 3: File Inspection

Given the possibility of post-reconnaissance activity, a **file integrity check** was conducted in the **Share Folder**.



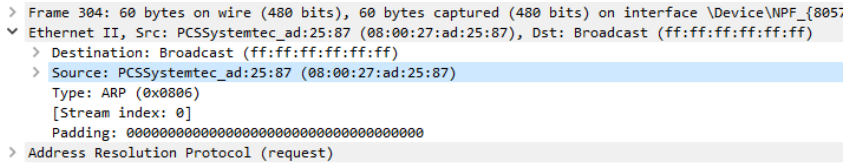
- A suspicious file named **"malicious"** was found inside the folder.



- NixGuard did not flag it as a malicious file, prompting further investigation.
- A scan using **VirusTotal** confirmed that the file was empty (suggesting it may have been a placeholder or an attempt to bypass security measures).

Step 4: Attribution

Using **Wireshark's packet capture** analysis, the MAC address of the scanning entity was identified as:
08:00:27:ad:25:87 (corresponding to 192.168.10.8).



Given this information, it was concluded that:

- The malicious activity originated from within the **internal network** (an insider threat scenario).
- The actor used **ARP scanning to map** live hosts.
- They likely used **vulnerability assessment techniques** to identify system weaknesses.
- They attempted to introduce a file into the system, but it was either unsuccessful or a test probe.

Incident Response & Mitigation

1. Protection Measures

To **prevent similar incidents** in the future, the following security measures are recommended:

1. **Cybersecurity Awareness & Training**
    - Employees should be educated about **common attack techniques** (phishing, reconnaissance, privilege escalation).
    - Regular **security workshops** should be conducted.
2. **Access Control & Least Privilege**
    - Ensure **strict access control policies** are implemented.
    - Follow the **Principle of Least Privilege (PoLP)** to restrict unnecessary system access.
3. **Insider Threat Detection Tools**
    - Deploy **behavioral monitoring solutions** to detect **anomalous internal**

activity.
    - Implement **enhanced logging and user access auditing**.

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2. Detection Enhancements

To **improve threat detection capabilities**, the following modifications should be made to **NixGuard's configuration**:

1. **Enhanced Alerting System**
    - Configure NixGuard to **immediately alert on critical events** instead of aggregating logs without priority filtering.
2. **Log Filtering & Categorization**
    - Implement **custom log filtering** to separate **system health events** from **security incidents**.
    - Prioritize **security-related logs** to improve **incident detection time**.
3. **File-Based Threat Detection**
    - Improve NixGuard's **file analysis module**.
    - Conduct **regular penetration tests** to ensure security tools function properly.

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3. Incident Containment & Response

To **limit potential damage**, the following actions were taken:

1. **Immediate Network Disconnection**
    - The **compromised PC was disconnected** from the network to **prevent further reconnaissance**.
2. **File Removal & Firewall Hardening**
    - The **suspicious file was deleted**.
    - **Firewall policies were updated** to restrict traffic:
        - **Only allow traffic from the default gateway**.
        - **Block the attacker's MAC address** to prevent **further exploitation attempts**.

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4. Recovery & Post-Incident Monitoring

To ensure the **integrity of the system and prevent future attacks**, the following steps were taken:

1. **Full System Scan & Integrity Check**
    - Conducted a **thorough antivirus scan** to ensure no other malicious files were present.
    - Verified **Share Folder integrity**.
2. **Reconnection & Continued Monitoring**
    - The system was **gradually reintroduced** to the network.
    - **Additional monitoring** was conducted using NixGuard to **watch for any follow-up attacks**.
3. **Incident Documentation & Reporting**
    - Findings were **reported to the supervisor**.
    - A **post-mortem analysis** was conducted to identify **areas of improvement** in security posture.

Final Thoughts & Key Takeaways

This incident highlights the **importance of proactive monitoring and rapid incident response**. The key lessons learned include:

- **NixGuard is useful for log-based detection**, but **requires additional configuration for optimal security monitoring**.
- **Wireshark proved invaluable** in detecting **internal network reconnaissance**.
- **ARP scanning remains a common tactic** for attackers mapping networks—proper detection and response mechanisms must be in place.
- **Regular vulnerability assessments and firewall restrictions** can prevent similar incidents in the future