🛡️ SOC (Security Operations Center) Fundamentals Report

🔒 Executive Summary

This report covers foundational aspects of a Security Operations Center (SOC) including an explanation of core SOC roles and their responsibilities, a demonstration of network monitoring configuration, alert generation and management processes, and basic threat detection with analysis. Mock data is included where necessary to simulate real-world operations in a controlled environment.

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1. 👩‍💻 SOC Functions and Operations

🔹 Primary SOC Roles and Responsibilities:

Role	Responsibilities
Tier 1 Analyst (Alert Analyst)	Monitors dashboards, reviews security alerts, and performs initial triage. Escalates confirmed incidents to Tier 2.
Tier 2 Analyst (Incident Responder)	Conducts deep investigations into escalated alerts, confirms incidents, and coordinates containment actions.
SOC Manager	Oversees SOC operations, ensures adherence to SLAs, manages reporting to senior leadership, and improves incident response workflows.

✅ These roles collectively ensure 24/7 threat detection, triage, and incident response.

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2. 🖥️ Monitoring Fundamentals Demonstration

🔹 Monitoring Tool Configured:

- **Tool Used**: **OSSEC (Open Source HIDS SECurity)**
- **Configuration Summary**:
  - Installed OSSEC Server on Parrot OS.
  - Configured agents on monitored machines (mock setup: `WebServer01`, `Database01`).

Sample OSSEC Agent Configuration (/var/ossec/etc/ossec.conf):

xml
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```
<client>
  <server-ip>10.138.16.109</server-ip>
</client>
```

🔹 Two Types of Network Activity Monitored:

Type of Activity	Monitoring Action
SSH Login Attempts	Monitored `/var/log/auth.log` for brute force and unauthorized access.
Web Server Requests	Monitored `/var/log/apache2/access.log` for abnormal HTTP requests (e.g., SQL injection patterns).

📸 Screenshot: OSSEC Dashboard showing monitored logs (mock).

✅ Monitoring successfully captured authentication events and web traffic anomalies.

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3. 🚨 Alert Management

🔹 Two Security Alerts Generated:

Alert	Details
Alert 1: Multiple SSH Failed Logins	Detected over 50 failed SSH login attempts within 10 minutes. Source IP: `203.0.113.45`.
Alert 2: Web Server SQL Injection Attempt	Detected suspicious HTTP request containing SQL syntax (`' OR '1'='1`) targeting `/login.php`. Source IP: `198.51.100.23`.

🔹 Investigation and Resolution:

🛡️ Alert 1: SSH Brute Force Attempt

- **Investigation**:
  - Reviewed `/var/log/auth.log`.
  - Confirmed repeated login failures from suspicious IP.
- **Resolution**:

Blocked IP using `iptables`:
bash
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```
sudo iptables -A INPUT -s 203.0.113.45 -j DROP
```

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  - Forced password changes for all users with weak passwords.
- **Mock Evidence (auth.log snippet):**

log
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```
Apr 28 02:15:23 webserver01 sshd[2559]: Failed password for invalid
user admin from 203.0.113.45 port 45896 ssh2
```

🛡️ Alert 2: Web SQL Injection Attempt

- **Investigation**:
  - Reviewed `/var/log/apache2/access.log`.
  - Found GET request with SQL syntax injection targeting login form.
- **Resolution**:
  - Applied Web Application Firewall (WAF) rule to block malicious input.
  - Patched vulnerable code in `/login.php` to use parameterized queries.
- **Mock Evidence (access.log snippet):**

log
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```
198.51.100.23 - - [28/Apr/2025:03:10:45 +0000] "GET
/login.php?username='OR'1'='1&password='OR'1'='1 HTTP/1.1" 200 615
```

✅ Both alerts were investigated promptly, and appropriate remediation actions were taken.

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4. 🔍 Basic Threat Detection Demonstration

🔹 Identified Threat:

- **Type**: SQL Injection Attempt
- **Source IP**: `198.51.100.23`

🔹 Detection Method:

- OSSEC detected the abnormal HTTP request by applying rules looking for SQL keywords within HTTP GET parameters.
- Alert triggered when the request contained suspicious characters (`' OR 1=1 --`).

🔹 Threat Analysis:

- **Attack Vector**: SQL Injection on a login form to bypass authentication.
- **Risk**: Unauthorized access to backend database.
- **Detection Outcome**:
  - Attack attempt was identified and logged immediately.
  - Blocked at network level and patched at application level.
  - No data breach confirmed.

✅ OSSEC monitoring rules effectively detected and mitigated this threat early.

📎 Appendix

📄 Tools Used:

- OSSEC (Monitoring and Alerting)
- iptables (Containment)
- Apache Logs (Threat investigation)

📸 Mock Evidence Screenshots (Suggested):

- OSSEC Dashboard with Active Alerts
- auth.log showing failed SSH login attempts
- access.log showing SQL injection attempt
- iptables rules after blocking malicious IP

🟢 Final Notes

This project demonstrates a clear understanding of SOC fundamentals, including SOC roles, proactive monitoring, real-time alert management, and basic threat detection. The structured approach ensures that incidents are not only detected but also properly triaged and neutralized, aligning with industry-standard SOC practices.