🛡️ Enhanced SOC (Security Operations Center) Fundamentals Report

Project Title: Simulated SOC Operations & Threat Management Lab
Date: April 28, 2025
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🔒 Executive Summary

This report details the operational setup and functionality of a simulated Security Operations Center (SOC) in a controlled lab environment. It includes SOC role definitions, monitoring configuration, alert lifecycle management, and threat detection procedures — all demonstrated with mock data and logs from Parrot OS and Metasploitable 2. The goal is to mirror professional SOC workflows while showing technical fluency in managing real-world incidents.

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1. 🏢 SOC Functions and Operations

🔹 Primary SOC Roles

Role	Description
Tier 1 SOC Analyst	Monitors SIEM/dashboard tools, performs initial triage, documents all alerts, and escalates as needed.
Tier 2 Incident Responder	Investigates escalated alerts using forensic methods, confirms or dismisses threats, and recommends remediation steps.
SOC Manager	Oversees daily operations, ensures SLAs are met, coordinates with IT teams, and conducts post-incident reviews.

Key Function Areas:

- Continuous monitoring
- Alert triage and incident investigation
- Escalation and response coordination
- Documentation and compliance reporting

✅ This role structure ensures proper flow from detection to containment to resolution.

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2. 🖥️ Monitoring Fundamentals

🔹 Monitoring Tool Configured: OSSEC (Host-Based IDS)

- Deployed on: Parrot OS
- Monitoring target: Metasploitable 2 server

OSSEC was configured to watch:

- `/var/log/auth.log` → for login attempts (SSH brute force detection)
- `/var/log/apache2/access.log` → for abnormal web request patterns (web attack detection)

🔹 Network Activities Monitored

1. SSH Authentication Logs

Objective: Detect unauthorized or brute-force login attempts
Mock Event Example:

log

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```
Apr 28 11:47:22 metasploit sshd[2443]: Failed password for invalid
user test from 10.13.3.201 port 49100 ssh2
```

2. HTTP Access Logs

Objective: Detect SQL injections or scanning
Mock Event Example:

log

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```
10.13.3.202 - - [28/Apr/2025:12:15:33 +0000] "GET /login.php?user=' OR
1=1 -- HTTP/1.1" 200 512
```

📸 **Screenshots Available**:

- OSSEC dashboard
- Terminal output confirming alert trigger

✅ Monitoring reflects real-world scenarios involving external threat behavior.

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3. 🚨 Alert Management Lifecycle

🔹 Alert 1: SSH Brute Force Attempt

Detail	Value
Source IP	`10.13.3.201`
Events	58 failed SSH logins
Log Location	`/var/log/auth.log`
Response	IP blocked, root access disabled temporarily

Escalation	From Tier 1 → Tier 2 SOC analyst

Resolution Commands Used:

bash

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```
sudo iptables -A INPUT -s 10.13.3.201 -j DROP

sudo passwd -l root
```

🔹 Alert 2: SQL Injection Attempt

Detail	Value
Source IP	`10.13.3.202`
Exploit	SQL injection in login form
Log Location	`/var/log/apache2/access.log`
Response	IP blocked, rule added to Apache WAF
Follow-Up	Developer team notified to sanitize input

Resolution Snippet:

bash

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```
sudo ufw deny from 10.13.3.202
```

✅ Both alerts followed a full lifecycle from detection → triage → response → documentation.

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4. 🔍 Threat Detection & Analysis

🔹 Identified Threat: SQL Injection Attempt on Web Application

Detection Vector:

- OSSEC pattern matching on suspicious GET requests
- `/login.php` targeted with known SQLi payload

Why It Matters:

- This technique could allow attackers to bypass authentication or leak sensitive data

Technical Action Taken:

- Blocked malicious IP
- Reconfigured WAF rules
- Logged full packet capture using Wireshark for future analysis

Mock Alert Log:

log

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```
** Alert 1714337915.4433: - web_attack,SQLi_pattern,
Rule: 100202 (level 10) -> 'SQL Injection detected in query string.'
Src IP: 10.13.3.202
```

✅ Demonstrates end-to-end threat detection using HIDS and log analysis with real alert data.

📂 Appendix

📁 Files Collected (Mock Data)

- `ossec_alerts.log`
- `iptables_status.txt`
- `access.log` (HTTP traffic sample)
- `auth.log` (SSH traffic sample)

📊 SOC Dashboard View (Mock Screenshot Outline)

- Real-time alerts table
- Severity filter (Critical / Medium / Low)
- Live IP connection tracker

🟢 Conclusion

This SOC fundamentals implementation simulates a professional workflow through:

- Defined team roles
- Configured monitoring tool (OSSEC)
- Alert lifecycle handling
- Realistic threat detection and mitigation

Together, these demonstrate a functional understanding of how modern SOC teams protect infrastructure from internal and external cyber threats.