Free and Open-Source Security Orchestration, Automation, and Response Platform (FOSS-SOAR)

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Introduction

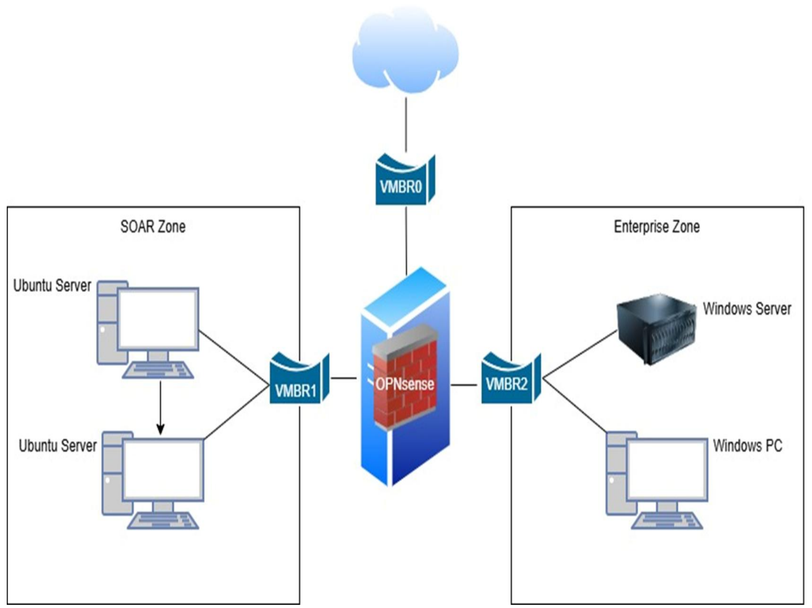
Security Operations Centers (SOCs) rely on SOAR platforms to streamline alert triage and incident response. Commercial solutions are often proprietary and costly, limiting access for students and researchers.

FOSS-SOAR integrates open-source tools to simulate SOC workflows in an educational setting, providing hands-on experience with real-world security automation pipelines at no cost to institutions.

Research Goals

- Integrate open-source tools into a cohesive SOC pipeline
- Simulate real SOC workflows for educational use
- Demonstrate cost-effective alternatives to proprietary SOAR

System Architecture



SOC Tool Stack

SU Suricata | SY Sysmon | WZ Wazuh | TH TheHive | CX Cortex

Suricata Sysmon Wazuh TheHive Cortex

Monitoring

- Suricata – Network intrusion detection
- Sysmon – Windows endpoint telemetry

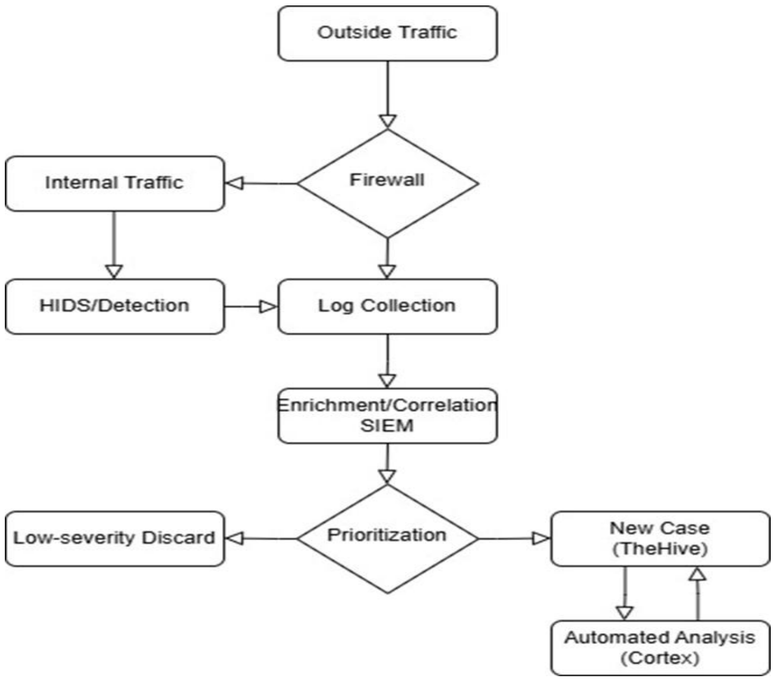
Logging / SIEM

- Wazuh – Log aggregation & SIEM

Analysis & Automation

- TheHive – Incident case management
- Cortex – Automated threat enrichment

Automation Workflow



Infrastructure

Network Design

- OPNsense firewall for traffic control and segmentation
- Isolated SOAR analysis zone and enterprise zone
- Ubuntu SOAR servers and Windows enterprise endpoints

Platform

- VMware-based virtualization environment
- Internal DNS and DHCP for realistic network simulation
- All components deployed as open-source, zero-cost stack

Conclusion

FOSS-SOAR demonstrates that open-source security tools can be integrated into a fully functional SOC automation pipeline at no cost to institutions.

The platform lets students experiment with automated incident response while maintaining full analyst visibility into triage and decision-making processes.

Key Takeaways

- Open-source tools rival commercial SOAR capability
- Practical hands-on learning for cybersecurity students
- Extensible framework for continued CAE research

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