FUTURE_CS_02

Security Alert Monitoring & Incident Response

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Tools Used :- Splunk Cloud and sample log file
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Introduction

Cybersecurity threats are constantly evolving, and organizations must be prepared to detect, monitor, and respond to security incidents in real time. **Security Alert Monitoring and Incident Response (IR)** are core functions of a Security Operations Center (SOC) that help in minimizing risk, ensuring compliance, and maintaining business continuity.

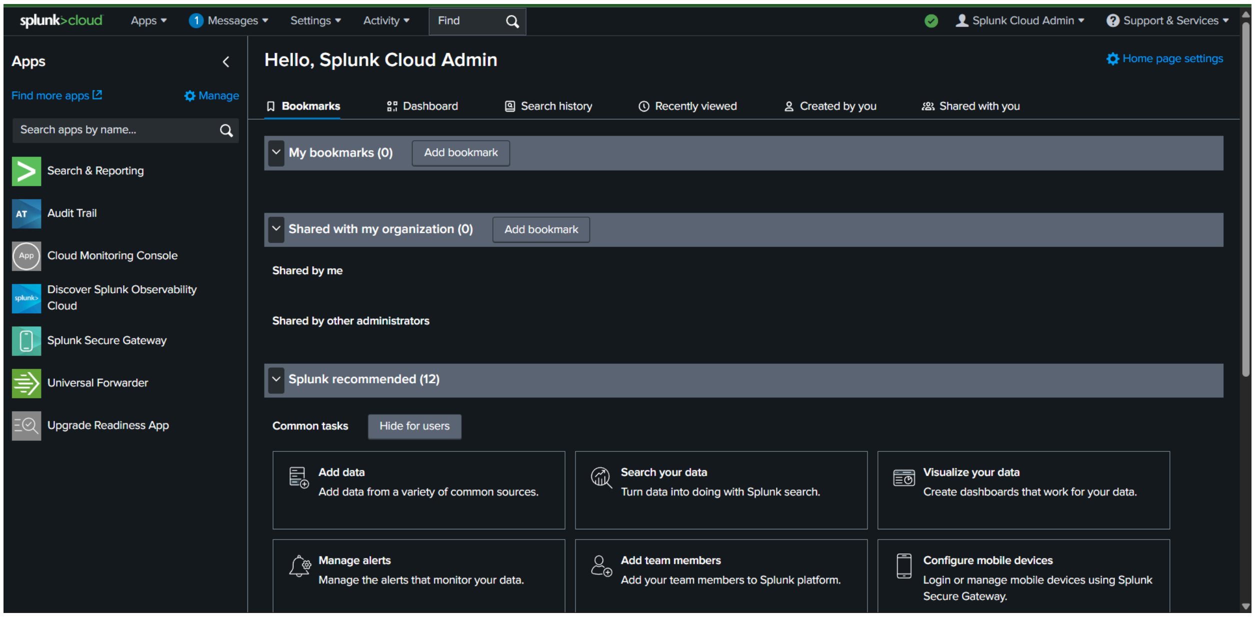
This report demonstrates the use of **Splunk Cloud (Free Trial)** to ingest and analyze logs for security alert monitoring, with a focus on malware detection, failed logins, brute-force attempts, and suspicious IP activity.

Objective

- Ingest and analyze sample security logs using Splunk Cloud.
- Detects abnormal patterns such as multiple failed login attempts, malware infections, and brute-force attacks.
- Configure alerts for suspicious activities.

Tools & Environment

- **Splunk Cloud Free Trial**: Used for log ingestion, queries, dashboards, and alerts.
- **Custom Security Logs**: Simulated authentication events, brute-force attempts, and malware detections.



Hello, Splunk Cloud Admin

Add data
Add data from a variety of common sources.

Search your data
Turn data into doing with Splunk search.

Visualize your data
Create dashboards that work for your data.

Manage alerts
Manage the alerts that monitor your data.

Add team members
Add your team members to Splunk platform.

Configure mobile devices
Login or manage mobile devices using Splunk Secure Gateway.

Splunk Cloud Tool :- Splunk Cloud is a cloud-based SIEM (Security Information and Event Management) and data analytics platform provided by Splunk. Instead of installing and managing Splunk on your own servers, you use Splunk as a hosted service on the cloud.

Use Cases

- **Security Monitoring** (SIEM) → Detect brute-force, malware, suspicious IPs.
- **IT Operations** → Monitor system logs, uptime, and errors.
- **DevOps** → Debugging application logs, performance monitoring.
- **Business Analytics** → User behavior tracking, fraud detection.

Methodology

1. Log Collection

A sample dataset (`samplesplunklog.csv`) was created containing events such as:

- Failed logins
- Successful logins
- Brute-force attempts
- Malware detections (Trojan, Worms, Ransomware, etc.)

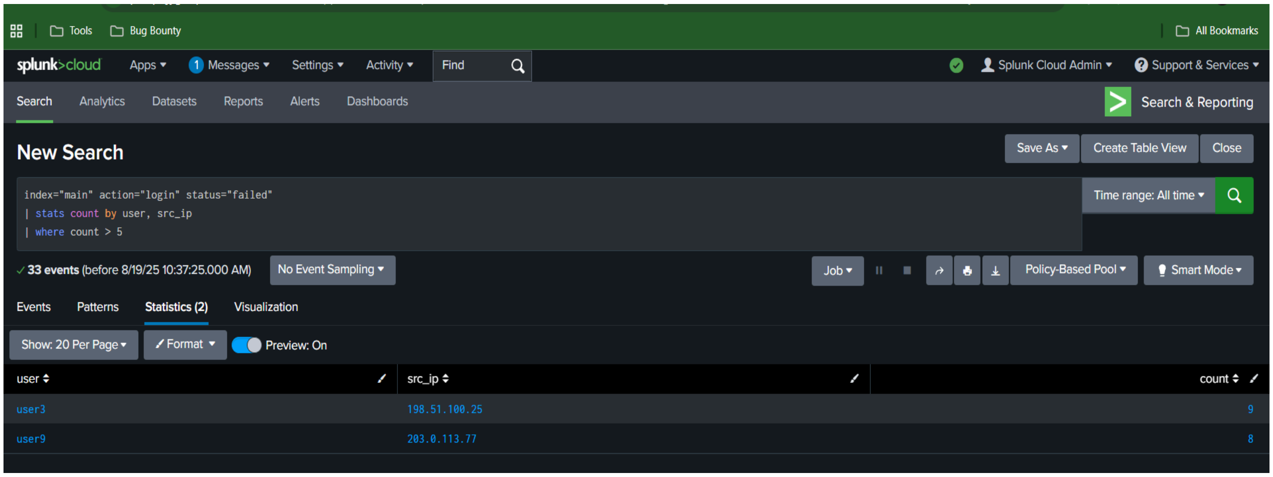
The dataset was uploaded into Splunk Cloud using the **Add Data → Upload File** option.

2. Log Analysis (SPL Queries)

Some example Splunk SPL queries used for analysis:

- **Detect multiple failed logins from the same IP**: (Bruteforce attack Possibility)

```
index=main action="login" status="failed"
| stats count by user, src_ip
| where count > 5
```



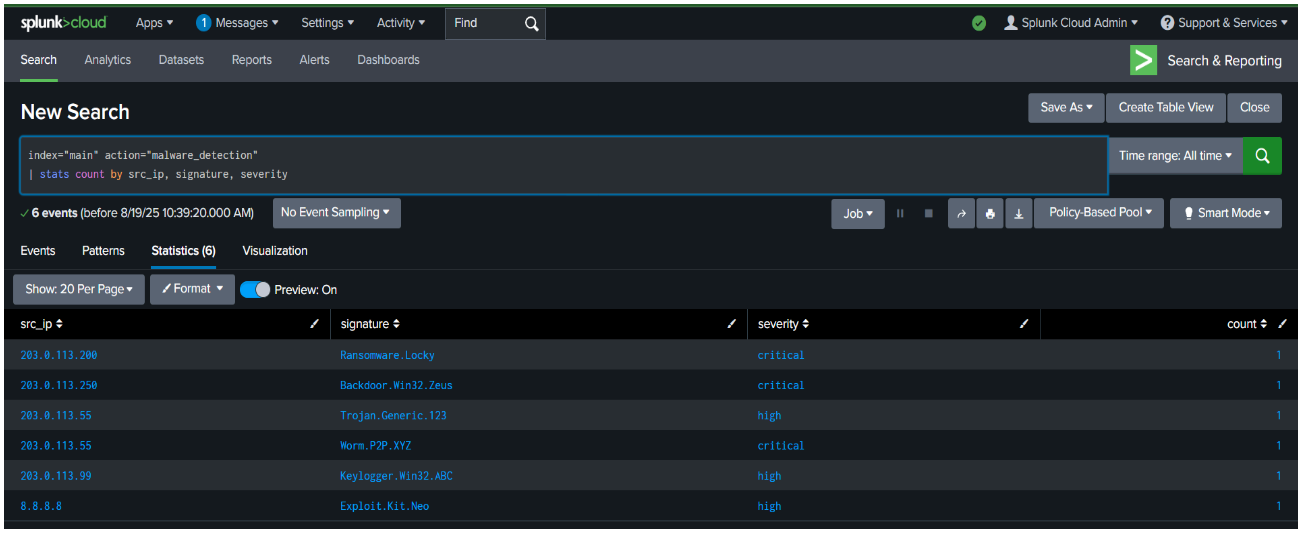
```
index="main" action="login" status="failed"
| stats count by user, src_ip
| where count > 5
```

✓ **33 events** (before 8/19/25 10:37:25.000 AM)

user	src_ip	count
user3	198.51.100.25	9
user9	203.0.113.77	8

- **List all malware detections**:

  index=main action="malware_detection"
  | stats count by src_ip, signature, severity



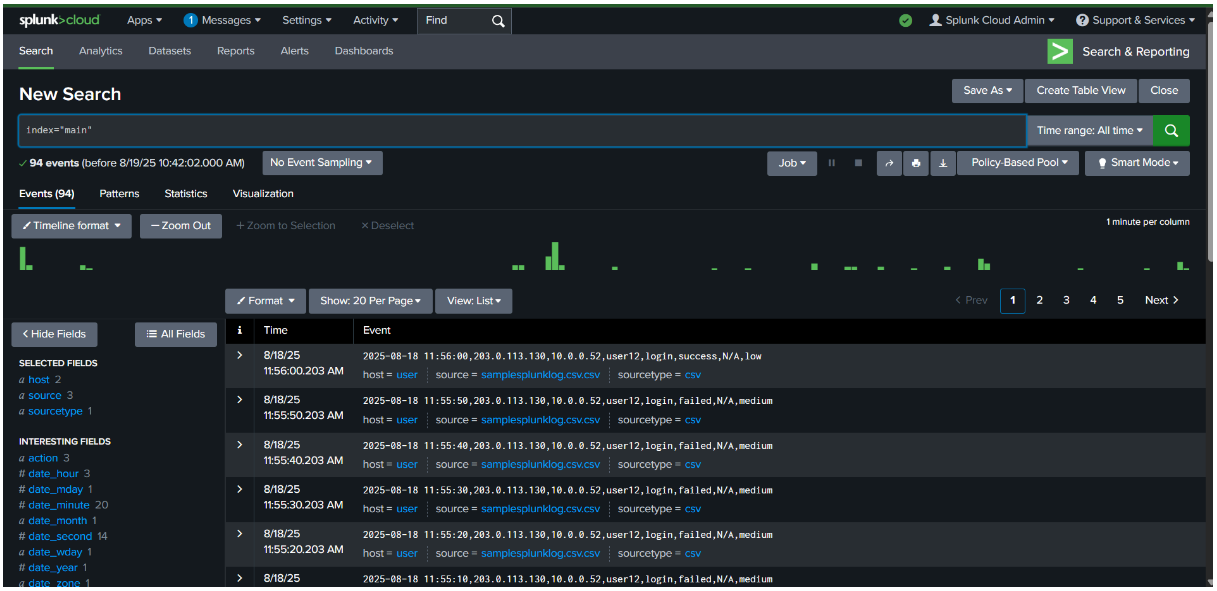
```
index="main" action="malware_detection"
| stats count by src_ip, signature, severity
```

✓ 6 events (before 8/19/25 10:39:20.000 AM)

src_ip	signature	severity	count
203.0.113.200	Ransomware.Locky	critical	1
203.0.113.250	Backdoor.Win32.Zeus	critical	1
203.0.113.55	Trojan.Generic.123	high	1
203.0.113.55	Worm.P2P.XYZ	critical	1
203.0.113.99	Keylogger.Win32.ABC	high	1
8.8.8.8	Exploit.Kit.Neo	high	1

- **Show all logs**

  index=”main”



```
index="main"
```

✓ 94 events (before 8/19/25 10:42:02.000 AM)

SELECTED FIELDS
a host 2
a source 3
a sourcetype 1

INTERESTING FIELDS
a action 3
# date_hour 3
# date_mday 1
# date_minute 20
a date_month 1
# date_second 14
a date_wday 1
# date_year 1
a date_zone 1

i	Time	Event
›	8/18/25 11:56:00.203 AM	2025-08-18 11:56:00,203.0.113.130,10.0.0.52,user12,login,success,N/A,low host = user source = samplesplunklog.csv.csv sourcetype = csv
›	8/18/25 11:55:50.203 AM	2025-08-18 11:55:50,203.0.113.130,10.0.0.52,user12,login,failed,N/A,medium host = user source = samplesplunklog.csv.csv sourcetype = csv
›	8/18/25 11:55:40.203 AM	2025-08-18 11:55:40,203.0.113.130,10.0.0.52,user12,login,failed,N/A,medium host = user source = samplesplunklog.csv.csv sourcetype = csv
›	8/18/25 11:55:30.203 AM	2025-08-18 11:55:30,203.0.113.130,10.0.0.52,user12,login,failed,N/A,medium host = user source = samplesplunklog.csv.csv sourcetype = csv
›	8/18/25 11:55:20.203 AM	2025-08-18 11:55:20,203.0.113.130,10.0.0.52,user12,login,failed,N/A,medium host = user source = samplesplunklog.csv.csv sourcetype = csv
›	8/18/25	2025-08-18 11:55:10,203.0.113.130,10.0.0.52,user12,login,failed,N/A,medium

Steps to Create an Alert in Splunk

1. **Run a Search / SPL Query**
    - Go to **Search & Reporting** app.

Enter your SPL query (e.g., failed logins in the last 10 minutes):

```
 index=security_logs action="login" status="failed"
| stats count by src_ip, user
| where count > 5
```

- This query finds users or IPs with more than 5 failed login attempts.
- **Save As Alert**
- After running the query → click **Save As** → select **Alert**.

2. **Configure Alert Settings**

    - **Title**: e.g., *Brute Force Login Alert*
    - **Description**: "Triggered when more than 5 failed logins are detected from the same IP within 10 minutes."
    - **Permissions**: Private or shared with the team.

3. **Define Alert Type**

    - **Scheduled Alert** → Runs on a fixed interval (e.g., every 5 minutes, every hour).
    - **Real-Time Alert** → Fires as soon as matching events occur.
      (For security monitoring, scheduled alerts every 5–15 minutes are common to reduce noise.)

5. **Set Trigger Conditions**
    - Trigger when **Number of Results > 0**
    - Or when **Custom Condition is Met** (e.g., `count > 5`).

6. **Add Actions**
    - You can configure Splunk to:
        - **Send Email** to your SOC team
          Webhook/Script (e.g., notify Slack, Microsoft Teams, PagerDuty)
        - **Add to Incident Dashboard**

7. **Save & Test**
    - Save the alert.
    - Trigger it with test data (e.g., insert multiple failed login events).

3. Incident Response Workflow

- **Detection**: Alert triggered for multiple failed logins.

- **Analysis**: Investigated IPs using Splunk dashboards.

- **Containment**: Blocked malicious IP addresses at the firewall.

- **Eradication**: Reset compromised accounts and enforced MFA.

- **Recovery**: Monitored logs for reoccurrence and tuned Splunk alerts.

Conclusion

This task demonstrated how **Splunk Cloud** can be leveraged for **Security Alert Monitoring & Incident Response**. By simulating real-world attack patterns, it showcased:

- Proactive detection of threats.
- Streamlined incident response.
- The importance of automation in modern SOC environments.

Even with a trial environment and synthetic logs, Splunk provided valuable insights, proving its utility for both learning and enterprise-level defense

What I Learned

- How to **set up and use Splunk Cloud** (free trial) for log ingestion and analysis.
- The importance of **structured log data** (CSV format) for effective search and visualization.
- Writing **SPL queries** to detect failed logins, brute-force attempts, and malware infections.
- The step-by-step process of **Incident Response**: Detection → Analysis → Containment → Eradication → Recovery.
- Gained practical understanding of how a **SOC team monitors security events** in real time.
- Learned the value of **proactive monitoring and automation** in strengthening cybersecurity defenses.