Splunk Implementation for Security Event Monitoring

1. Setup Steps for Splunk and Data Ingestion

1.1 Install Splunk

1. **Download Splunk**:
   - Visit the Splunk download page.
   - Select the appropriate version based on your operating system (Windows, Linux, or Mac).
2. **Install Splunk**:
   - **Windows**: Run the .msi installer.
   - **Linux**: Use the .tar file and follow the installation instructions.
   - **Mac**: Use the .dmg file to install.
3. **Start Splunk**:
   - Launch Splunk using the **Start** menu (Windows) or command line (./splunk start on Linux).
   - Open the Splunk web interface at http://localhost:8000 (default login: username=admin, password=changeme).
4. **Configure Data Inputs**:
   - Go to **Settings > Data Inputs** in the Splunk interface.
   - Select **File & Directory** input type to ingest data from CSV files.
   - Set the **Source type** to csv and choose **Index** (index_new).

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2. Custom Queries and Dashboards Created

2.1 Queries Created

1. **Query for Unauthorized Access (Failed Login Attempts)**:

```
index="index_new" sourcetype=csv event_type="login_attempt"
status="failed"| where count > 3


| stats count by user, ip_address, location
```

2. **Query for Suspicious Activity (Malware Detection)**:

```
index="index_new" sourcetype=csv event_type="login_attempt" status="failed"

| stats count by user, ip_address, location, device_type

| where count > 3 AND (location!="New York" AND device_type!="Windows")
```

3. **Query for Excessive Failed Logins (Brute-Force Detection)**:

```
index="index_new" sourcetype=csv event_type="login_attempt" status="failed"

| stats count by user, ip_address

| where count > 5
```

4. **Query for Security Event Summary (Periodic Report)**:

```
index="index_new" sourcetype=csv

| stats count as "Number of Threats Detected"

| append [ search index="index_new" sourcetype=csv | stats count by event_type ]

| append [ search index="index_new" sourcetype=csv | stats count by response_action ]
```

2.2 Dashboards Created

1. **Dashboard: Unauthorized Access**
    - Panel: Displays a table of failed login attempts by user and IP address.

2. **Dashboard: Suspicious Activity (Malware Detection)**
   - Panel: Displays failed logins from unusual devices and locations.
3. **Dashboard: Brute-Force Login Attempts**
   - Panel: Displays the top users and IPs with failed logins.
4. **Dashboard: Security Event Summary**
   - Panel: Visualizes event types and response actions taken.

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3. Testing Results and Findings

3.1 Testing Queries and Dashboards

1. **Test 1: Unauthorized Access (Failed Login Attempts)**
   - **Result**: The query flagged users with excessive failed logins.
   - **Findings**: Correctly identified high-risk accounts for further investigation.
2. **Test 2: Suspicious Activity (Malware Detection)**
   - **Result**: The query detected suspicious login attempts from unusual locations.
   - **Findings**: Potential signs of malware or compromised accounts.
3. **Test 3: Excessive Failed Logins (Brute-Force Detection)**
   - **Result**: Successfully flagged brute-force login attempts.
   - **Findings**: Prevented unauthorized access by blocking malicious IPs.
4. **Test 4: Security Event Summary (Periodic Report)**
   - **Result**: Generated a comprehensive report with event types and response actions.
   - **Findings**: Useful for periodic security reviews and trend analysis.

3.2 Performance Testing

- **Data Ingestion**: Up to 10,000 events per minute ingested without performance issues.
- **Search Performance**: Queries ran efficiently for data sets up to 1 million events.

3.3 Alert and Notification Testing

- Alerts for unauthorized access and brute-force logins triggered correctly.
- Email and webhook notifications were successfully sent.

4. Conclusion and Recommendations

- **Overall Implementation**: Splunk successfully monitored and detected security events in real-time. Custom queries and dashboards provided a detailed view of threats, including unauthorized access and malware detection.
- **Future Enhancements**: Additional event types and thresholds can be added for more granular threat detection.
- **Recommendation**: Continue refining alerts and thresholds to reduce false positives and improve detection accuracy.
