splunk>

Enterprise Security Biology III:

Incident Review Framework

John Stoner | Principal Security Strategist

October 2019

Forward-Looking Statements

During the course of this presentation, we may make forward-looking statements regarding future events or plans of the company. We caution you that such statements reflect our current expectations and estimates based on factors currently known to us and that actual events or results may differ materially. The forward-looking statements made in the this presentation are being made as of the time and date of its live presentation. If reviewed after its live presentation, it may not contain current or accurate information. We do not assume any obligation to update any forward-looking statements made herein.

In addition, any information about our roadmap outlines our general product direction and is subject to change at any time without notice. It is for informational purposes only, and shall not be incorporated into any contract or other commitment. Splunk undertakes no obligation either to develop the features or functionalities described or to include any such feature or functionality in a future release.

John Stoner

Principal Security Strategist
@stonerpsu

20+ years kicking around databases, ISPs and cyber

4.5 years at Splunk

Creator of SA-Investigator

Co-editor and author Hunting with Splunk: The Basics blogs

Assist in steering the BOTS ship

Developed APT Scenario for BOTS IV

Develop workshops on hunting and investigating with Splunk

Agenda

Incident Management Framework

Enterprise Security Frameworks

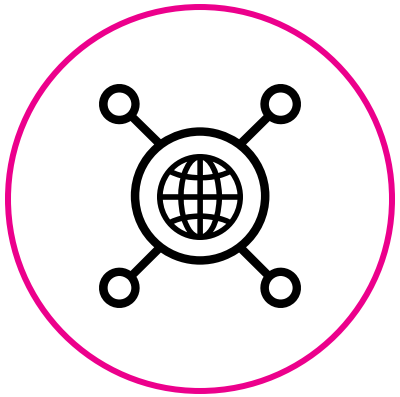
Correlation Searches

Notables

Incident Review

Event Sequencing & Audit

Enterprise Security Frameworks

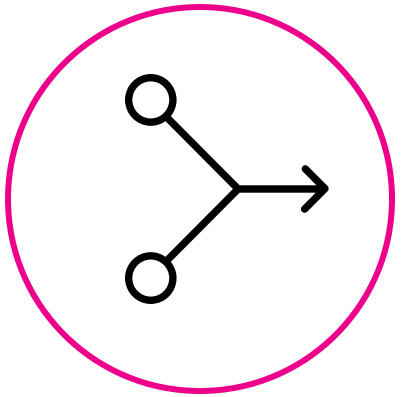


Threat Intelligence

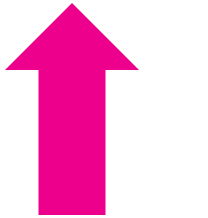
Incident Management

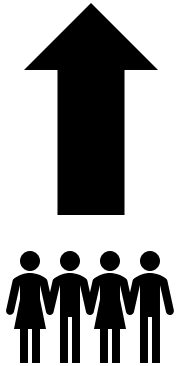
Asset & Identity

Risk



Adaptive Response





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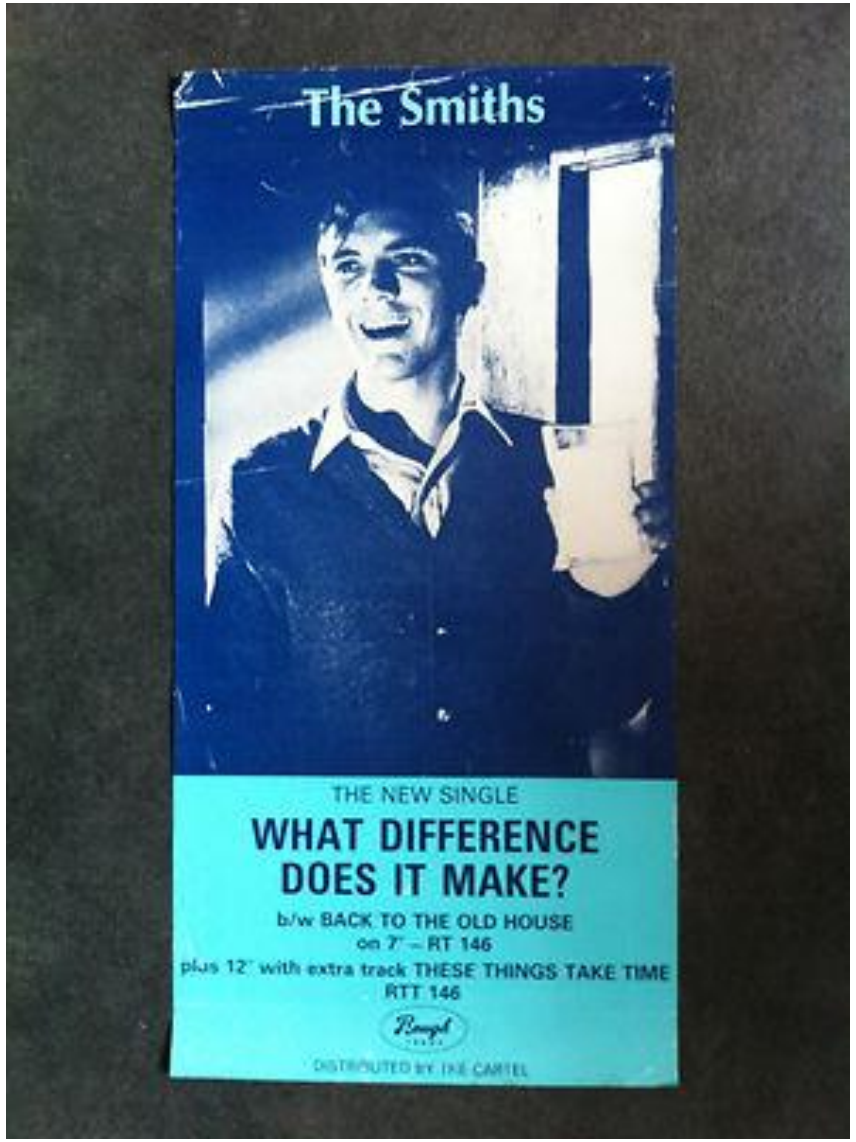
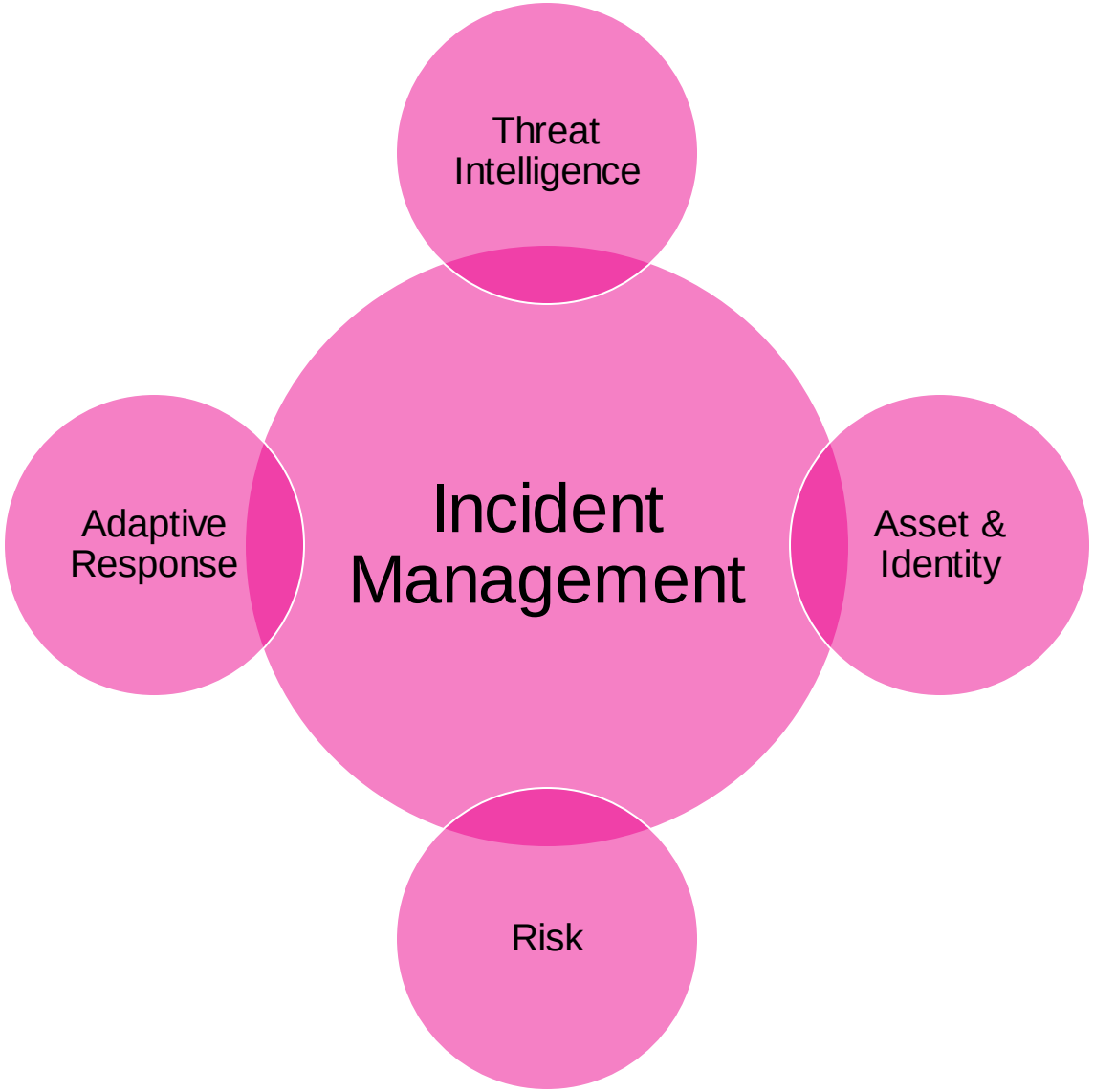
Incident Management aka Notable Event Framework

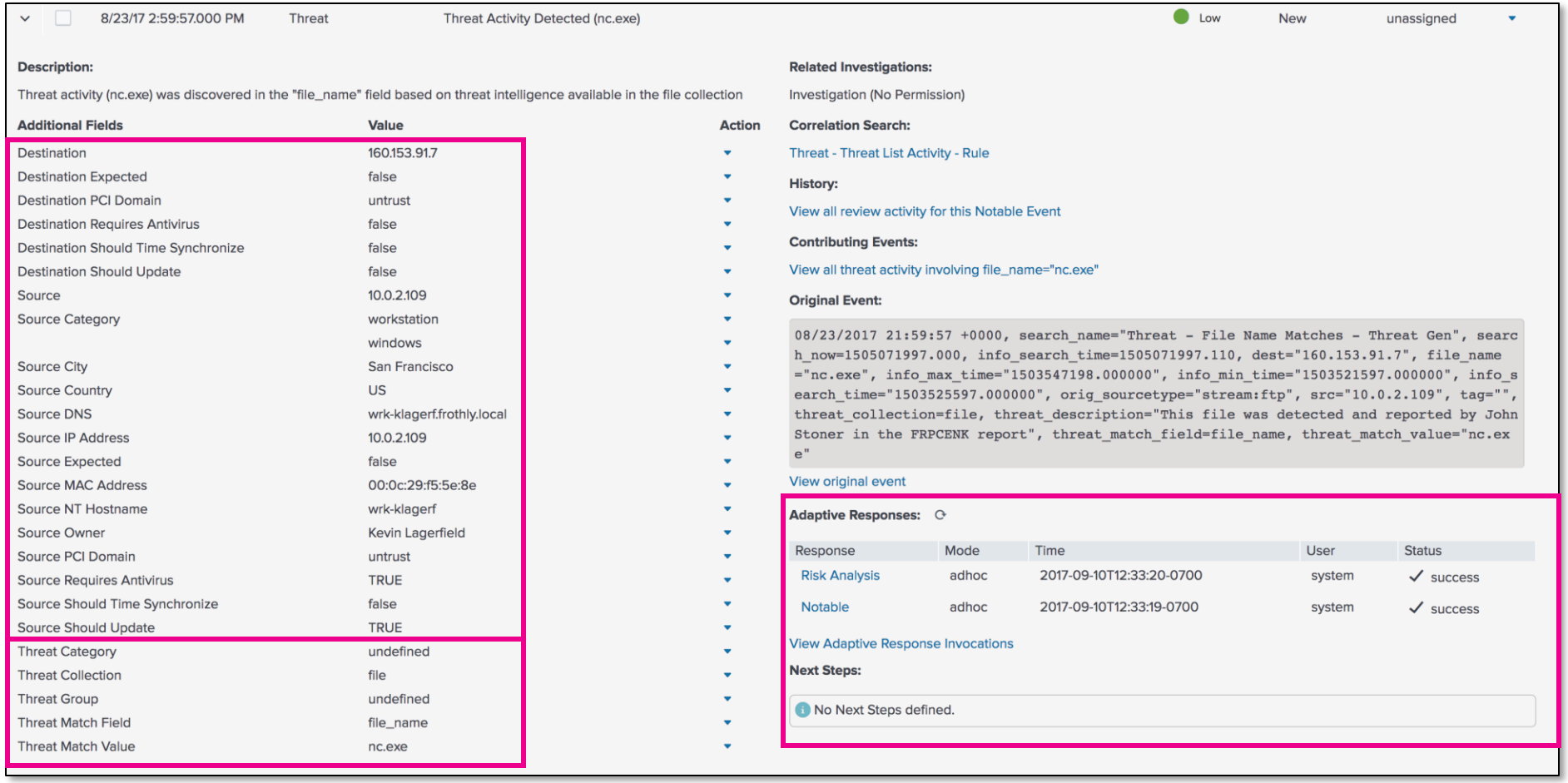


Central to Enterprise Security



Why Should I Care About IM Framework?

Practical Application of Context



8/23/17 2:59:57.000 PM | Threat | Threat Activity Detected (nc.exe) | Low | New | unassigned

Description:

Threat activity (nc.exe) was discovered in the "file_name" field based on threat intelligence available in the file collection

Additional Fields	Value	Action
Destination	160.153.91.7	
Destination Expected	false	
Destination PCI Domain	untrust	
Destination Requires Antivirus	false	
Destination Should Time Synchronize	false	
Destination Should Update	false	
Source	10.0.2.109	
Source Category	workstation	
	windows	
Source City	San Francisco	
Source Country	US	
Source DNS	wrk-klagerf.frothly.local	
Source IP Address	10.0.2.109	
Source Expected	false	
Source MAC Address	00:0c:29:f5:5e:8e	
Source NT Hostname	wrk-klagerf	
Source Owner	Kevin Lagerfield	
Source PCI Domain	untrust	
Source Requires Antivirus	TRUE	
Source Should Time Synchronize	false	
Source Should Update	TRUE	
Threat Category	undefined	
Threat Collection	file	
Threat Group	undefined	
Threat Match Field	file_name	
Threat Match Value	nc.exe	

Related Investigations:

Investigation (No Permission)

Correlation Search:

Threat - Threat List Activity - Rule

History:

View all review activity for this Notable Event

Contributing Events:

View all threat activity involving file_name="nc.exe"

Original Event:

```
08/23/2017 21:59:57 +0000, search_name="Threat - File Name Matches - Threat Gen", searc
h_now=1505071997.000, info_search_time=1505071997.110, dest="160.153.91.7", file_name
="nc.exe", info_max_time="1503547198.000000", info_min_time="1503521597.000000", info_s
earch_time="1503525597.000000", orig_sourcetype="stream:ftp", src="10.0.2.109", tag="",
threat_collection=file, threat_description="This file was detected and reported by John
Stoner in the FRPCENK report", threat_match_field=file_name, threat_match_value="nc.ex
e"
```

View original event

Adaptive Responses:

Response	Mode	Time	User	Status
Risk Analysis	adhoc	2017-09-10T12:33:20-0700	system	✓ success
Notable	adhoc	2017-09-10T12:33:19-0700	system	✓ success

View Adaptive Response Invocations

Next Steps:

No Next Steps defined.

splunk> .conf19

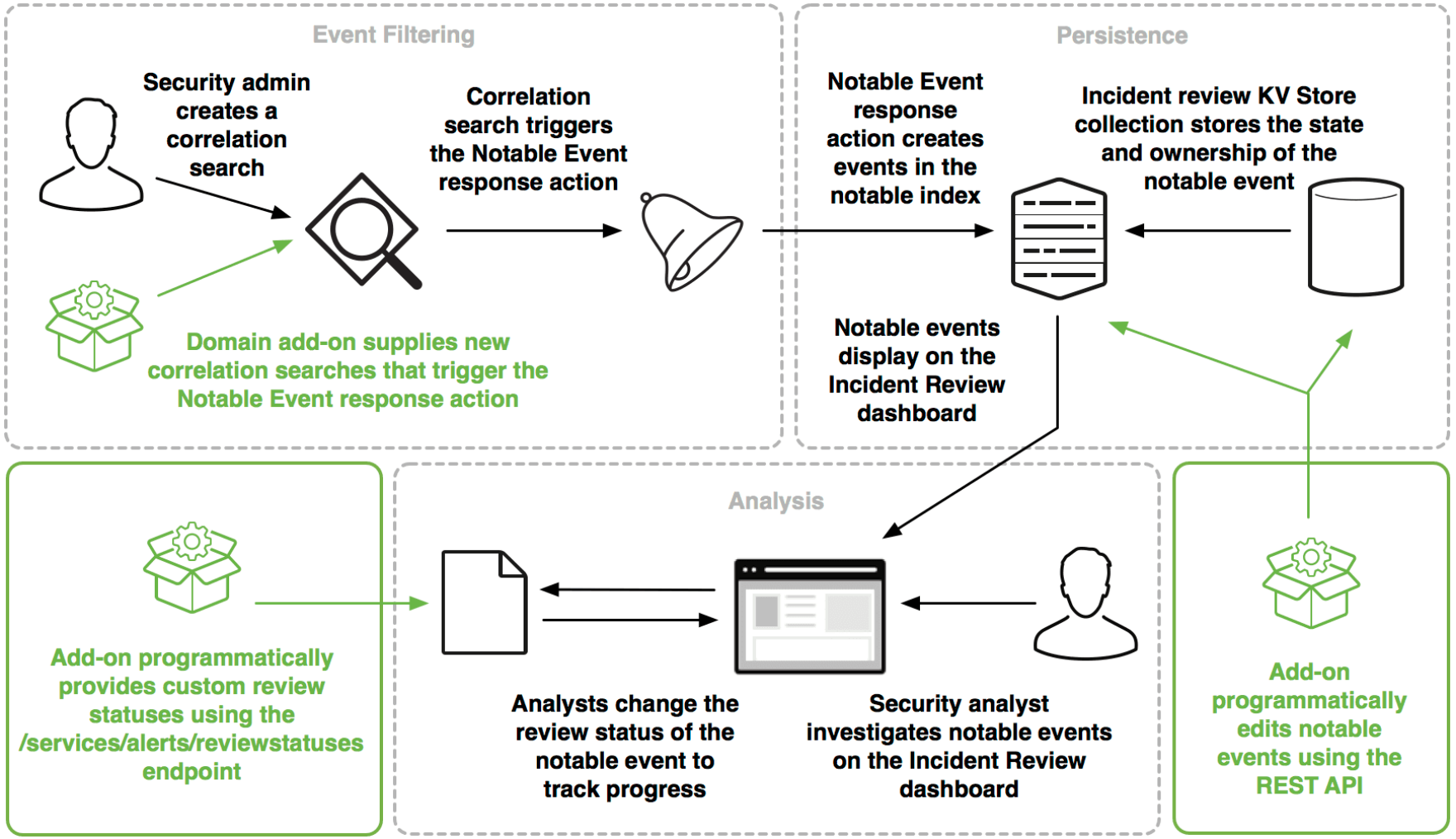
Our Goal Today?

Better understand how Splunk processes notable events in Enterprise Security

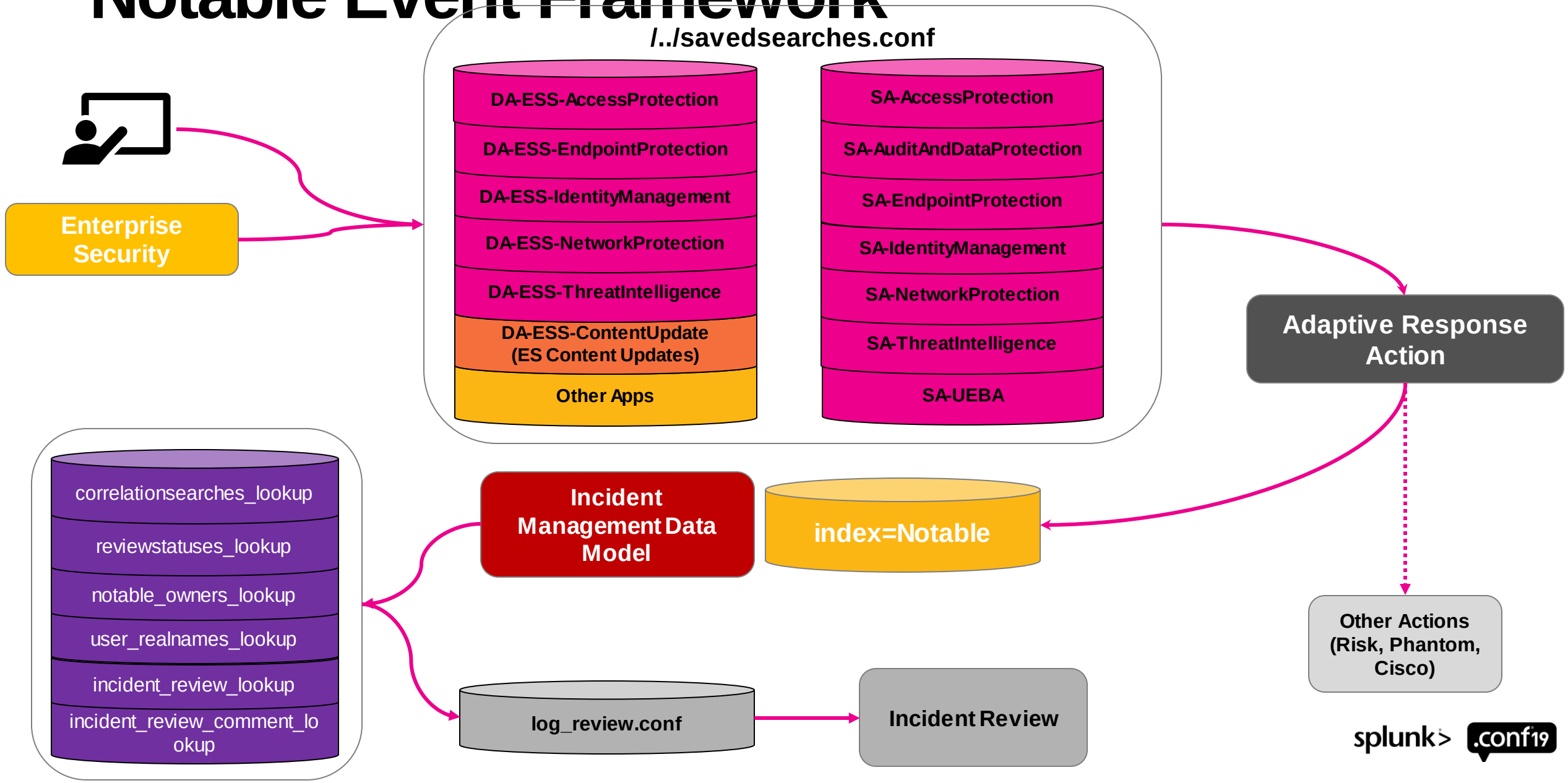
Better Insight =
Better Understanding =
Better Troubleshooting =
More Effective Use

Notable Event Framework

http://dev.splunk.com/view/enterprise-security/SP-CAAAFA9

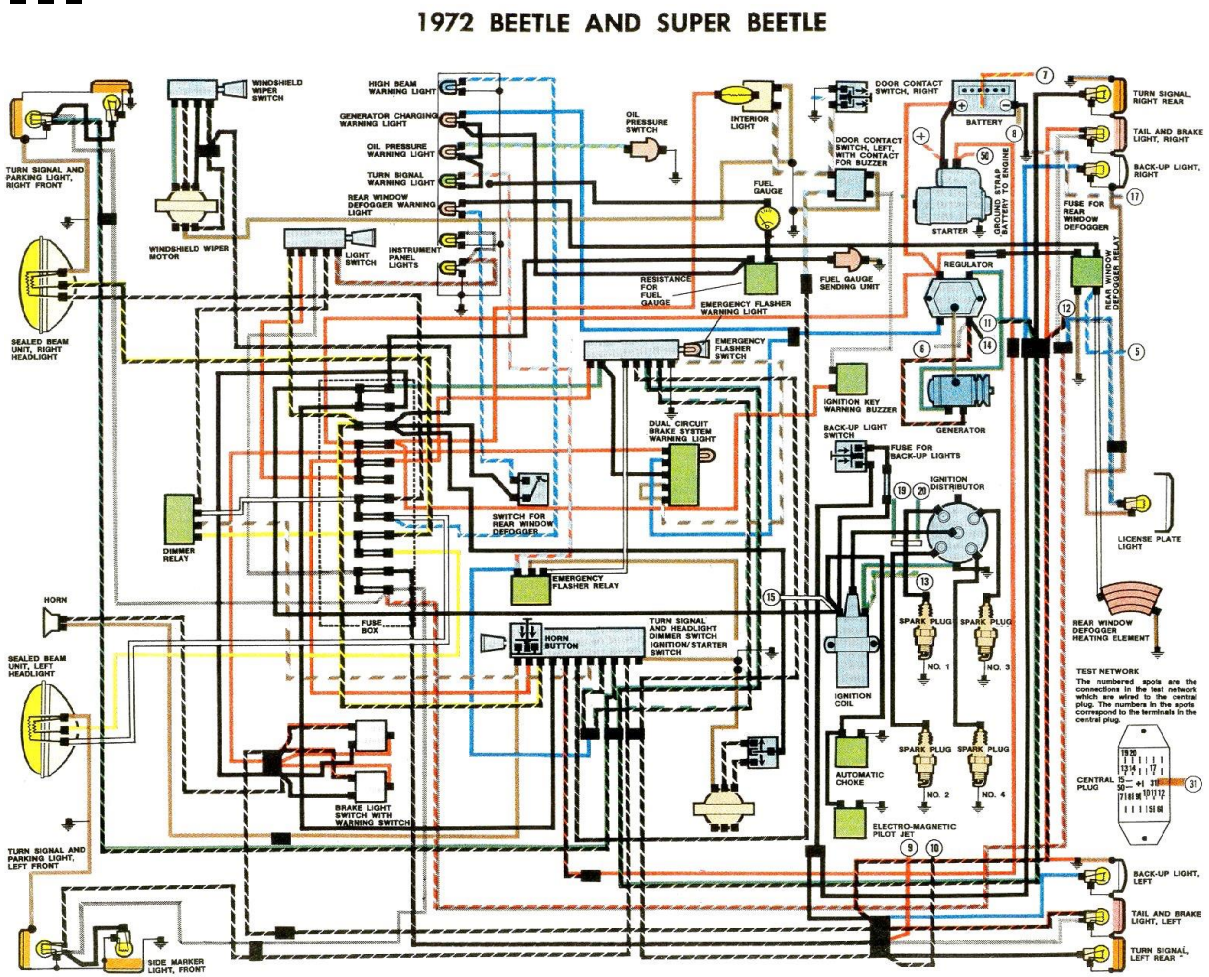


Notable Event Framework



splunk> .conf19

Why This Presentation...



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Correlation Searches

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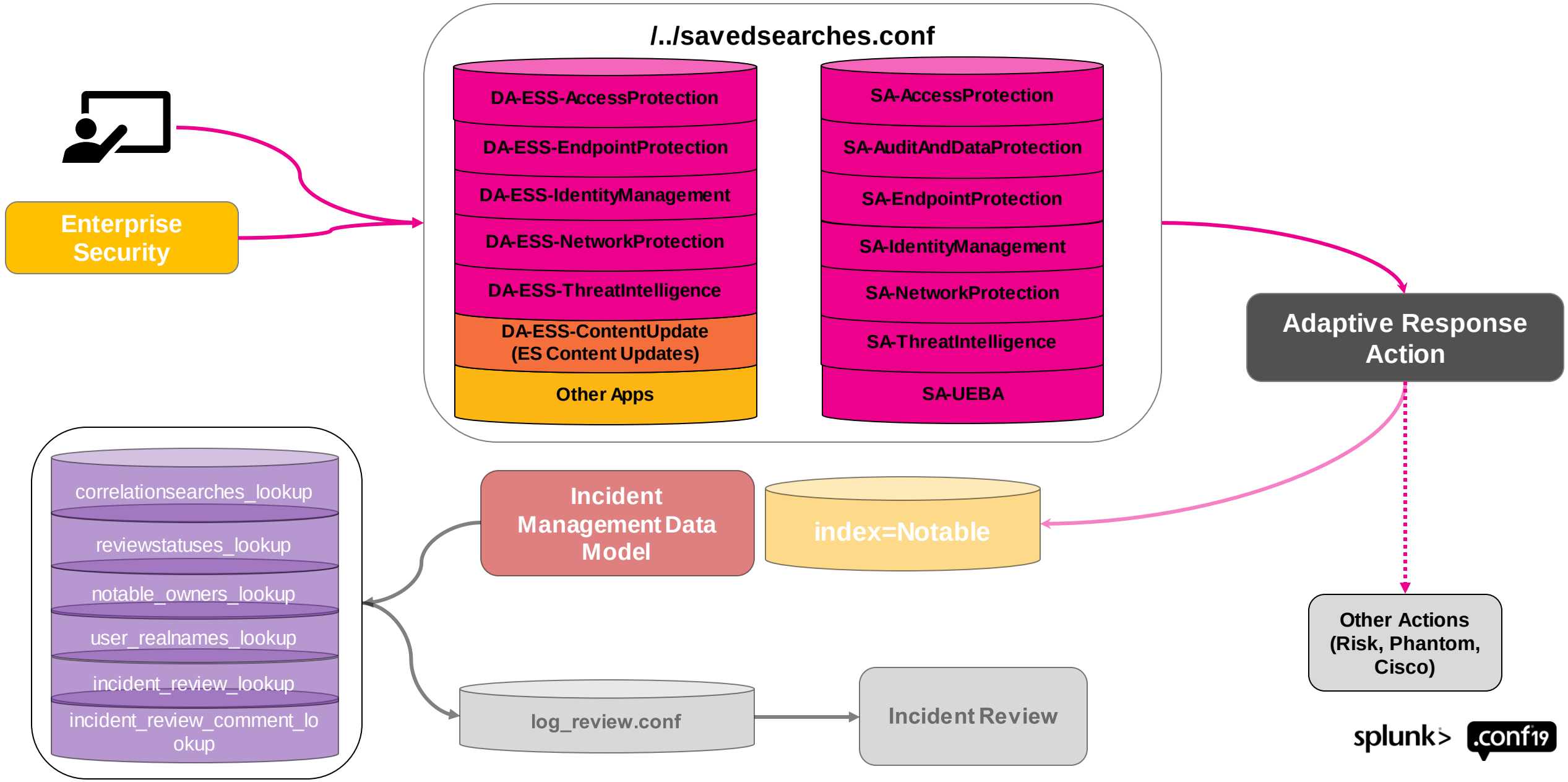
Notable Event Framework



splunk> .conf19

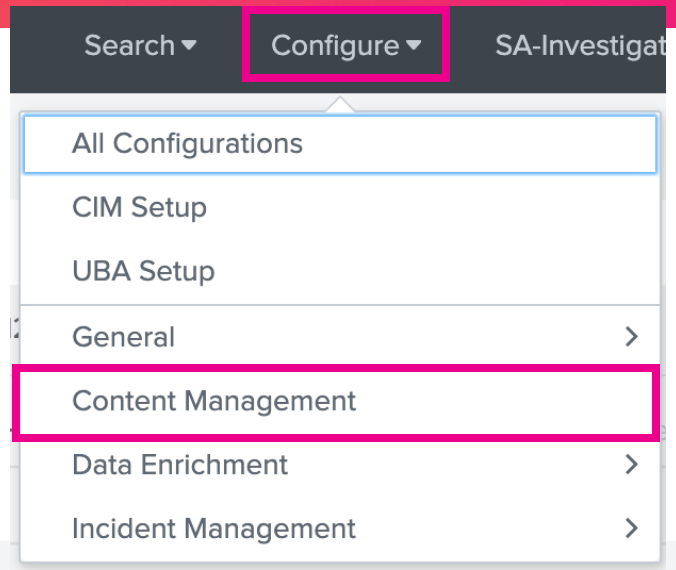
savedsearches.conf v. correlationsearches.conf

correlationsearches.conf was deprecated in ES4.6
confcheck_es_correlationmigration.py

Threat - Correlation Searches - Lookup Gen

All searches including correlation are found in savedsearches.conf

- action.correlationsearch.enabled=1



Content Management

Manage knowledge objects and other content specific to Splunk Enterprise Security, such as correlation searches, lookups, investigations, key indicators, glass tables, and reports.

Create New Content

< Back to ES Configuration

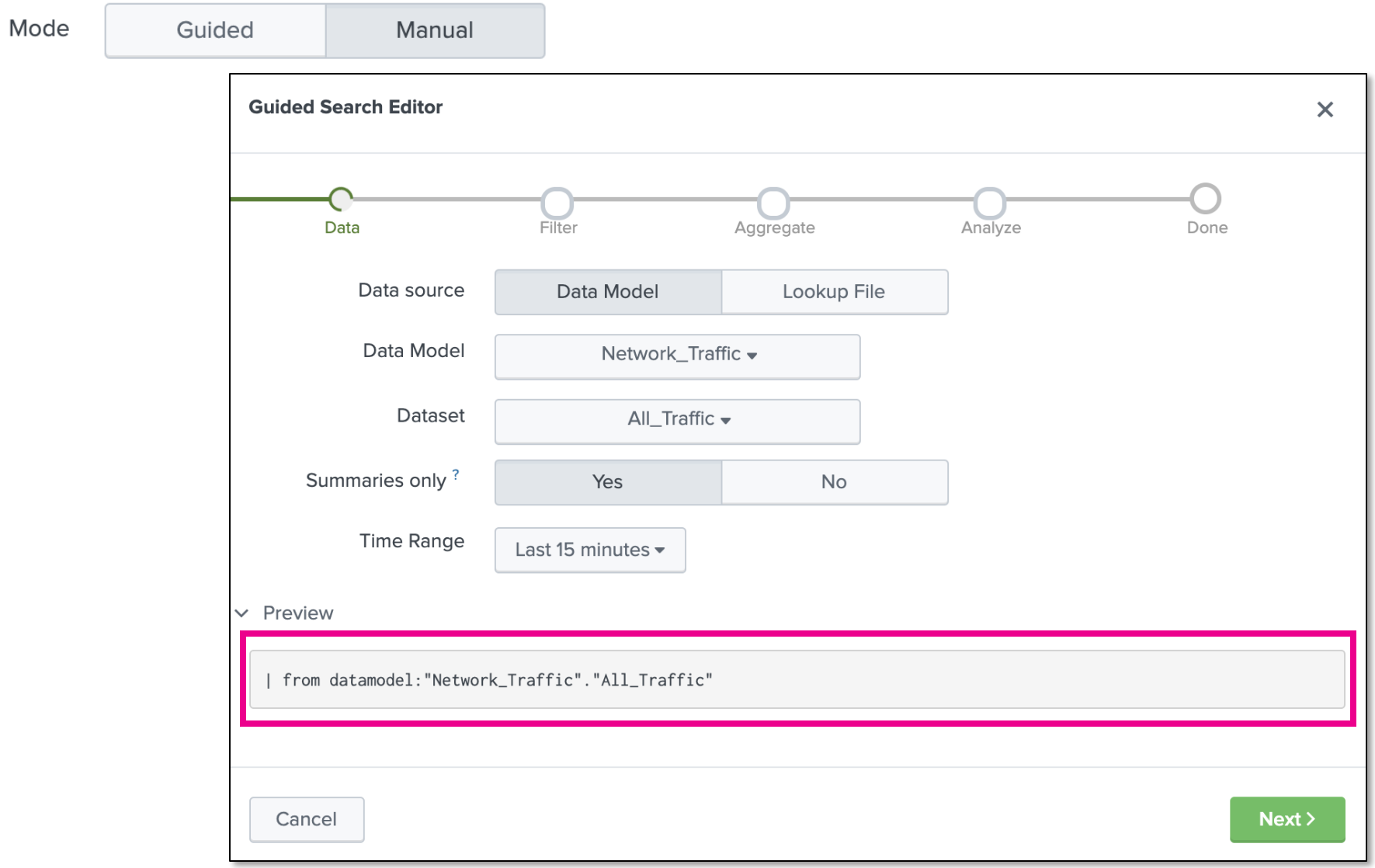
8 Objects | Edit selection | Type: Correlation Search | App: ES Content Updates | Status: All | ad | Clear filters | 25 per page

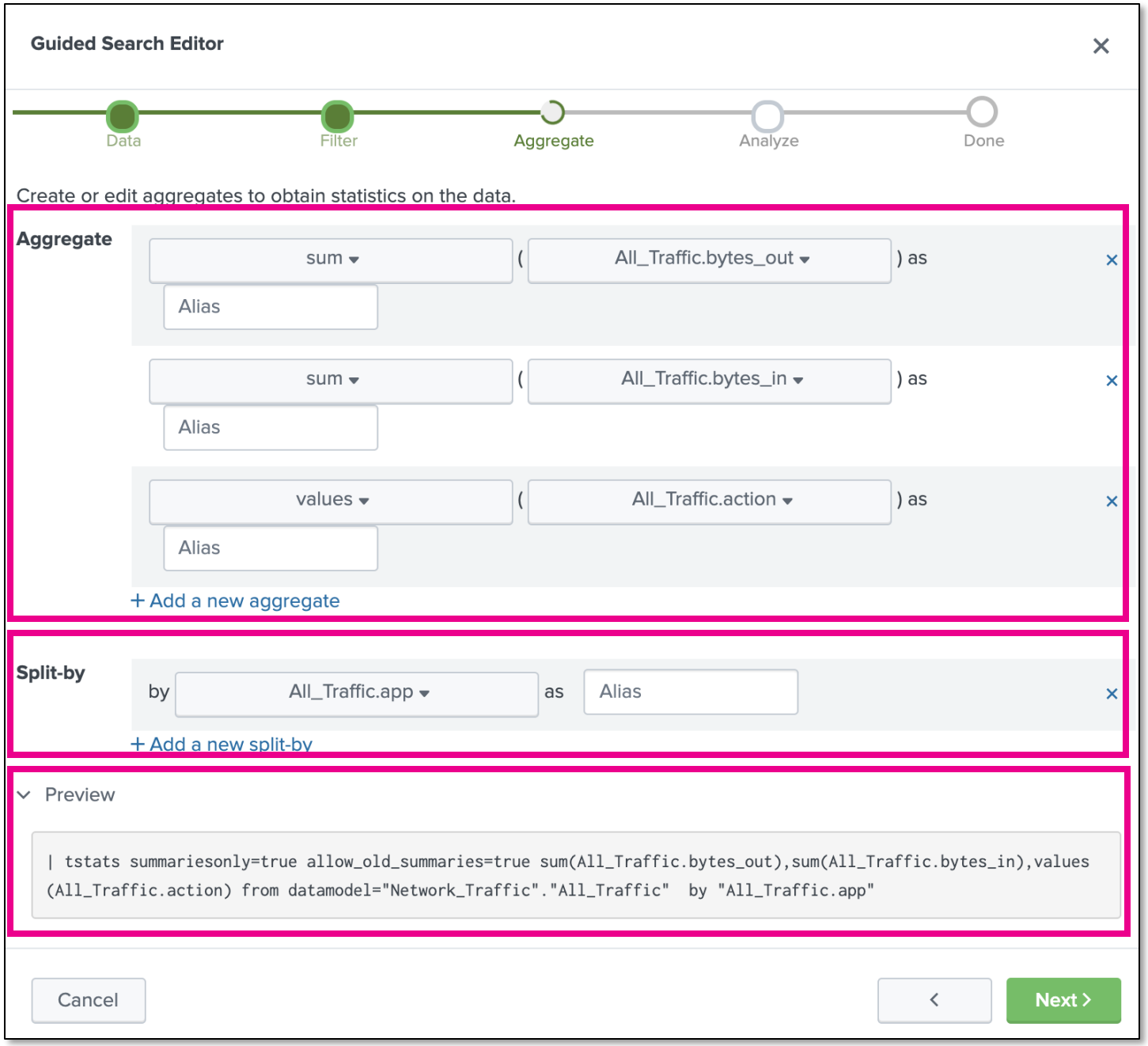
Name	Type	App	Next Scheduled Time	Actions
Attempt To Add Certificate To Untrusted Store	Correlation Search	ES Content Updates		Enable | Disabled
AWS Cloud Provisioning From Previously Unseen IP Address	Correlation Search	ES Content Updates		Enable | Disabled
Create local admin accounts using net.exe	Correlation Search	ES Content Updates		Enable | Disabled
Deleting Shadow Copies	Correlation Search	ES Content Updates		Enable | Disabled
Detect New Local Admin account	Correlation Search	ES Content Updates	Aug 14, 2019 9:00 AM GMT	Enabled | Disable
Detect Unauthorized Assets by MAC address	Correlation Search	ES Content Updates		Enable | Disabled
RunDLL Loading DLL By Ordinal	Correlation Search	ES Content Updates		Enable | Disabled
Scheduled tasks used in BadRabbit ransomware	Correlation Search	ES Content Updates		Enable | Disabled

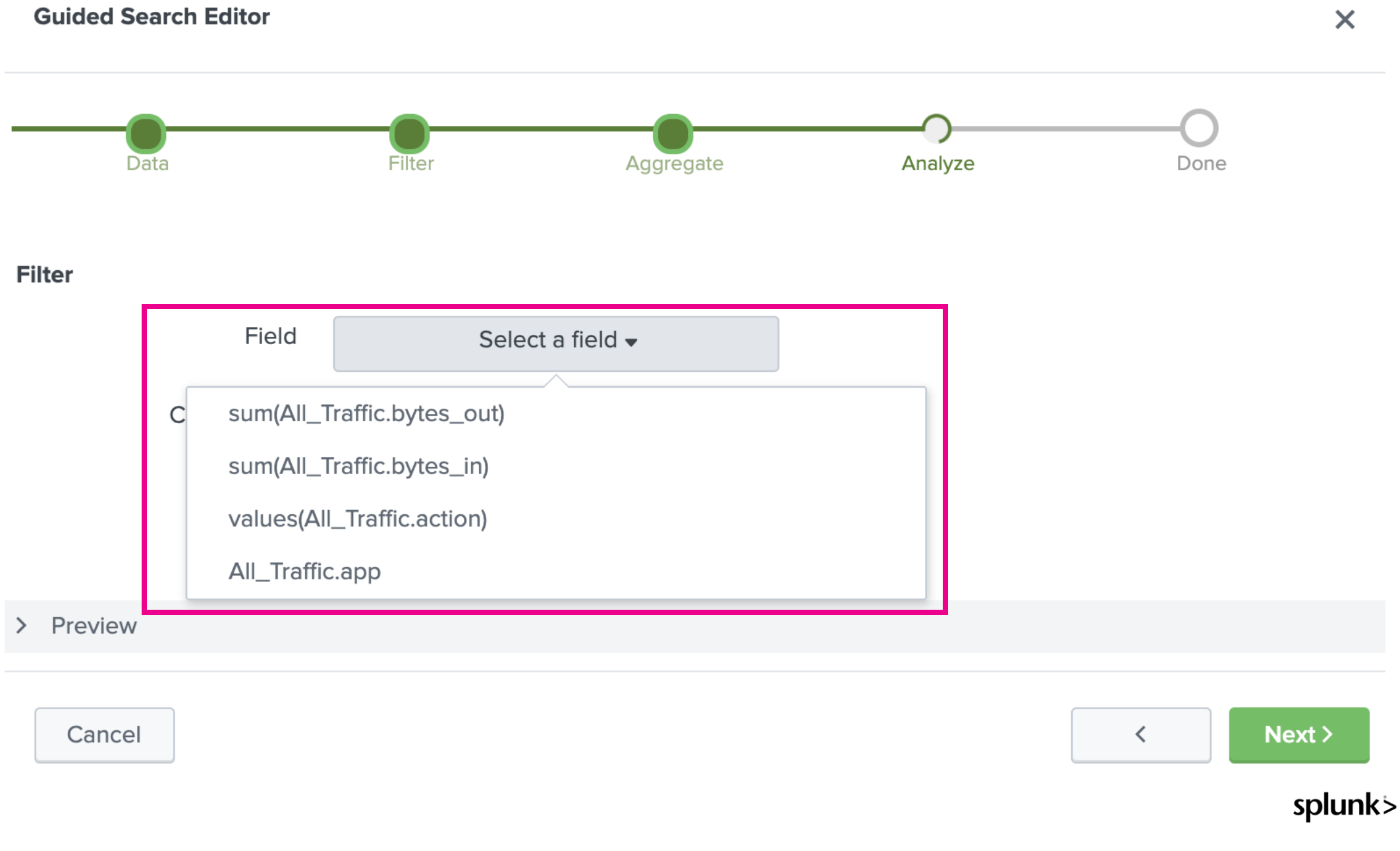
disabled = 0

realtime_schedule = 0

Guided Search Briefly

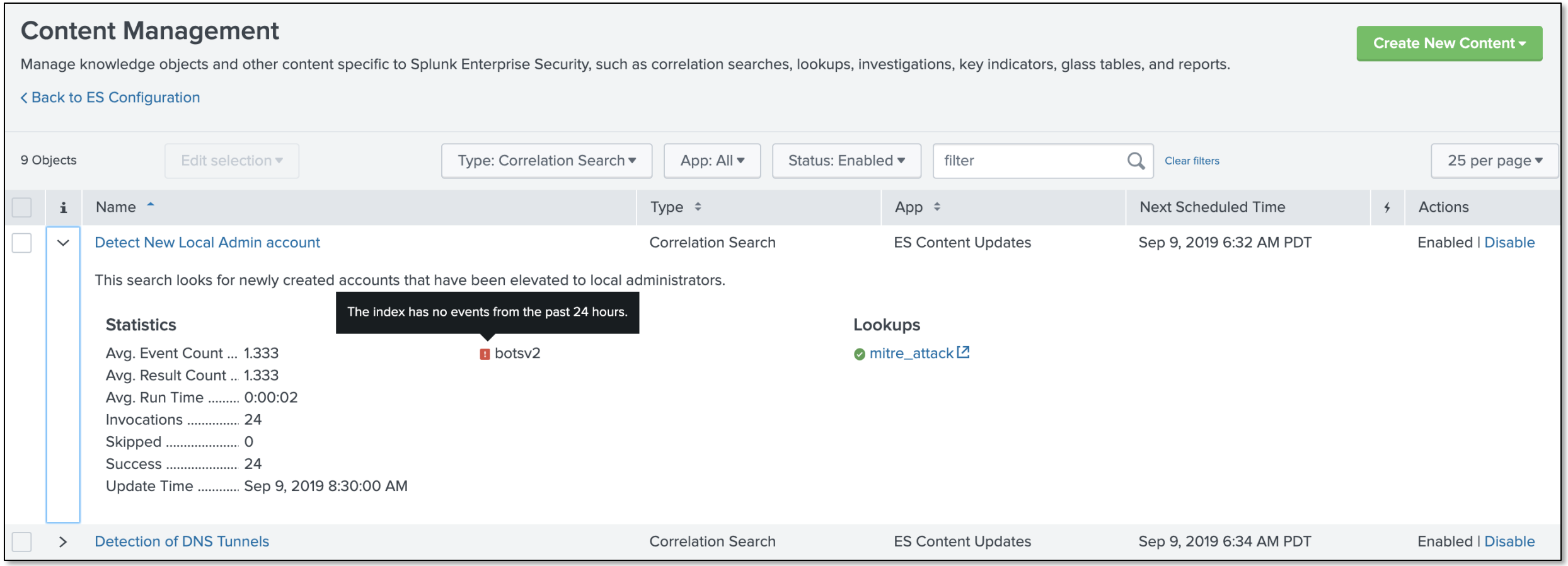






Content Management

Statistics



Responses – Notables

splunk> .conf19

Notable Event Framework

Enterprise Security

DA-ESS-AccessProtection
DA-ESS-EndpointProtection
DA-ESS-IdentityManagement
DA-ESS-NetworkProtection
DA-ESS-ThreatIntelligence
DA-ESS-ContentUpdate (ES Content Updates)
Other Apps

SA-AccessProtection
SA-AuditAndDataProtection
SA-EndpointProtection
SA-IdentityManagement
SA-NetworkProtection
SA-ThreatIntelligence
SA-UEBA

Adaptive Response Action

correlationsearches_lookup
reviewstatuses_lookup
notable_owners_lookup
user_realnames_lookup
incident_review_lookup
incident_review_comment_lookup

Incident Management Data Model

index=Notable

Other Actions (Risk, Phantom, Cisco)

log_review.conf

Incident Review

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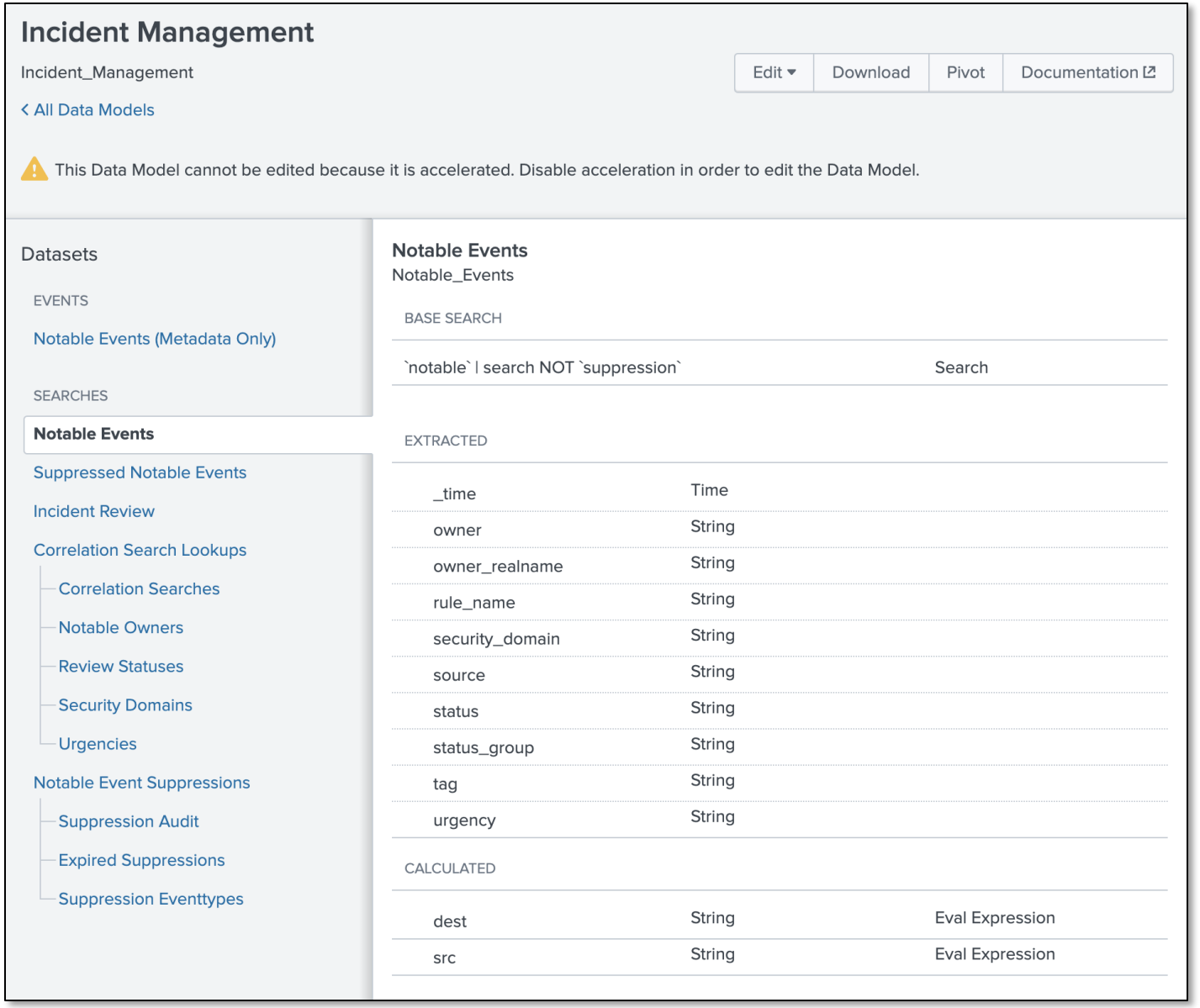
Incident Management Data Model

Events

- Notable Events (Metadata Only)

Searches

- Notable Events
- Suppressed Notable Events
- Incident Review
- Correlation Search Lookups
  - Correlation Searches
  - Notable Owners
  - Review Statuses
  - Security Domains
  - Urgencies
- Notable Event Suppressions
  - Suppression Audit
  - Expired Suppressions
  - Suppression Eventtypes



index=notable

| from datamodel:"Incident_Management.Notable_Events"

`notable`

1567951985, search_name="Threat - Threat List Activity - Rule", ppf_cell="", ppf_cell="file_name", ppf_cell="nc.exe", orig_raw="08/23/2017 21:59:57 +0000, search_name=\"Threat - File Name Matches - Threat Gen\", search_now=1505071997.000, info_search_time=1505071997.110, dest=\"160.153.91.7\", file_name=\"nc.exe\", info_max_time=\"1503547198.000000\", info_min_time=\"1503521597.000000\", info_search_time=\"1503525597.000000\", orig_sourcetype=\"stream:ftp\", src=\"10.0.2.109\", tag=\"\", threat_collection=file, threat_description=\"This file was detected and reported by John Stoner in the FRPCENK report\", threat_match_field=file_name, threat_match_value=\"nc.exe\"", dest="160.153.91.7", info_max_time="1567951680.000000000", info_min_time="1483257600.000000000", info_search_time="1567951982.621676000", risk_object="nc.exe", risk_object_type="other", orig_source="Threat - File Name Matches - Threat Gen", src="10.0.2.109", threat_category="undefined", threat_collection="file", threat_group="undefined", threat_match_field="file_name", threat_match_value="nc.exe"

Incident Review

| from datamodel:"Incident_Management.Incident_Review"

_time	host	source	sourcetype	comment	owner	reviewer	rule_id	security_domain	status_label	status_group	tag	urgency
2019-09-09 06:28:49.585				Running through investigative steps...	abluebird	admin	C8A9AB2D-487E-49CB-99D8-A570ABDD07AF@@notable@@197aa4ceabf8bb5985d541cc66e9017b		In Progress	Open		

| `incident_review`

_time	comment	owner	owner_realname	reviewer	reviewer_realname	rule_id
2019-09-09 06:28:49.585	Running through investigative steps...	abluebird	Alice Bluebird	admin	Administrator	C8A9AB2D-487E-49CB-99D8-A570ABDD07AF@@notable@@197aa4ceabf8bb5985d541cc66e9017b

rule_name	status	status_default	status_description	status_end	status_group	status_label	time	urgency
Threat Activity Detected	2	false	Investigation or response is in progress.	false	Open	In Progress	09/09/2019 06:28:49	

Incident Review

i	Time	Security Domain	Title	Urgency	Status	Owner	Actions
⌄	9/8/19 7:13:05.000 AM	Threat	Threat Activity Detected (nc.exe)	Low	In Progress	Alice Bluebird	

Description:

Threat activity (nc.exe) was discovered in the "file_name" field based on threat intelligence available in the file collection

Additional Fields	Value	Action
Destination	160.153.91.7 0	
Source	10.0.2.109 0	
Source DNS	wrk-klagerf.frothly.local	
Threat Category	undefined	
Threat Collection	file	
Threat Group	undefined	
Threat Match Field	file_name	
Threat Match Value	nc.exe	

Related Investigations:

Currently not investigated.

Correlation Search:

Threat - Threat List Activity - Rule

History:

```
2019 Sep 9 9:28:49 AM        Administrator

Running through investigative steps...
```

View all review activity for this Notable Event

Contributing Events:

View all threat activity involving file_name="nc.exe"

Original Event:

```
08/23/2017 21:59:57 +0000, search_name="Threat - File Name Matches - Threat
Gen", search_now=1505071997.000, info_search_time=1505071997.110, dest="160.
153.91.7", file_name="nc.exe", info_max_time="1503547198.000000", info_min_t
ime="1503521597.000000", info_search_time="1503525597.000000", orig_sourcety
pe="stream:ftp", src="10.0.2.109", tag="", threat_collection=file, threat_de
scription="This file was detected and reported by John Stoner in the FRPCENK
report", threat_match_field=file_name, threat_match_value="nc.exe"
```

`notable`

|`incident_review`

splunk> .conf19

Another Example

Detect New Local Admin Account - Notable

```
1503548335, search_name="ESCU - Detect New Local Admin account - Rule", EventCode="4720 4732", Group_Name="Administrators", Message="A
member was added to a security-enabled local group.

Subject:
        Security ID:            FROTHLY\\service3
        Account Name:           service3
        Account Domain:         FROTHLY
        Logon ID:               0x927DF4B

Member:
        Security ID:            FROTHLY\\svcvnc
        Account Name:           -
```

<snip>

```
Additional Information:
        Privileges              -", Security_ID="BUILTIN\\Administrators FROTHLY\\service3 FROTHLY\\svcvnc", orig_time="1503548335", d
escription="Adversaries may steal the credentials of a specific user or service account using Credential Access techniques or capture
credentials earlier in their reconnaissance process through social engineering for means of gaining Initial Access.", dest="mercury.fr
othly.local", identifier="T1078", info_max_time="1568031720.000000000", info_min_time="1483257600.000000000", info_search_time="156803
2322.654381000", src_user="service3", tactic="Initial Access, Persistence, Privilege Escalation, Defense Evasion", technique="Valid Ac
counts", user="svcvnc"
```

9/9/19 5:32:08.000 AM | Access | New local admin account svcvnc created by service3. | High | Pending | Jacob Smythe

Description:

The new user account svcvnc was created on mercury.frothly.local by service3.

Additional Fields	Value	Action
Event Code	4720 4732	
Group Name	Administrators	
Message	A member was added to a security-enabled local group. Subject: Security ID: FROTHLY\service3 Account Name: service3 Account Domain: FROTHLY Logon ID: 0x927DF4B Member: Security ID: FROTHLY\svcvnc Account Name: - Group: Security ID: BUILTIN\Administrators Group Name: Administrators Group Domain: Builtin Additional Information: Privileges: - A user account was created. Subject: Security ID: FROTHLY\service3 Account Name: service3 Account Domain: FROTHLY Logon ID: 0x927DF4B New Account: Security ID: FROTHLY\svcvnc Account Name: svcvnc Account Domain: FROTHLY Attributes: SAM Account Name: svcvnc Display Name: <value not set> User Principal Name: - Home Directory: <value not set> Home Drive: <value not set> Script Path: <value not set> Profile Path: <value not set> User Workstations: <value not set> Password Last Set: <never> Account Expires: <never> Primary Group ID: 513 Allowed To Delegate To: - Old UAC Value: 0x0 New UAC Value: 0x15 User Account Control: Account Disabled 'Password Not Required' - Enabled 'Normal Account' - Enabled User Parameters: <value changed, but not displayed> SID History: - Logon Hours: <value not set> Additional Information: Privileges -	

`notable`

Related Investigations:

Currently not investigated.

Correlation Search:

ESCU - Detect New Local Admin account - Rule

History:

```
2019 Sep 9 10:03:21 AM        Administrator

Waiting for review...
```

|`incident_review`

View all review activity for this Notable Event

Adaptive Responses:

Response	Mode	Time	User	Status
Notable	saved	2019-09-09T05:32:05-0700	admin	✓ success
Risk Analysis	saved	2019-09-09T05:32:05-0700	admin	✓ success

View Adaptive Response Invocations

Next Steps:

Recommended following steps:

1. ESCU-Contextualize: Based on ESCU context gathering recommendations:
- ESCU - Get Authentication Logs For Endpoint
- ESCU - Get Notable History
- ESCU - Get Notable Info
- ESCU - Get Risk Modifiers For Endpoint
- ESCU - Get Risk Modifiers For User
- ESCU - Get User Information from Identity Table

2. ESCU-Investigate: Based on ESCU investigate recommendations:

Incident Review

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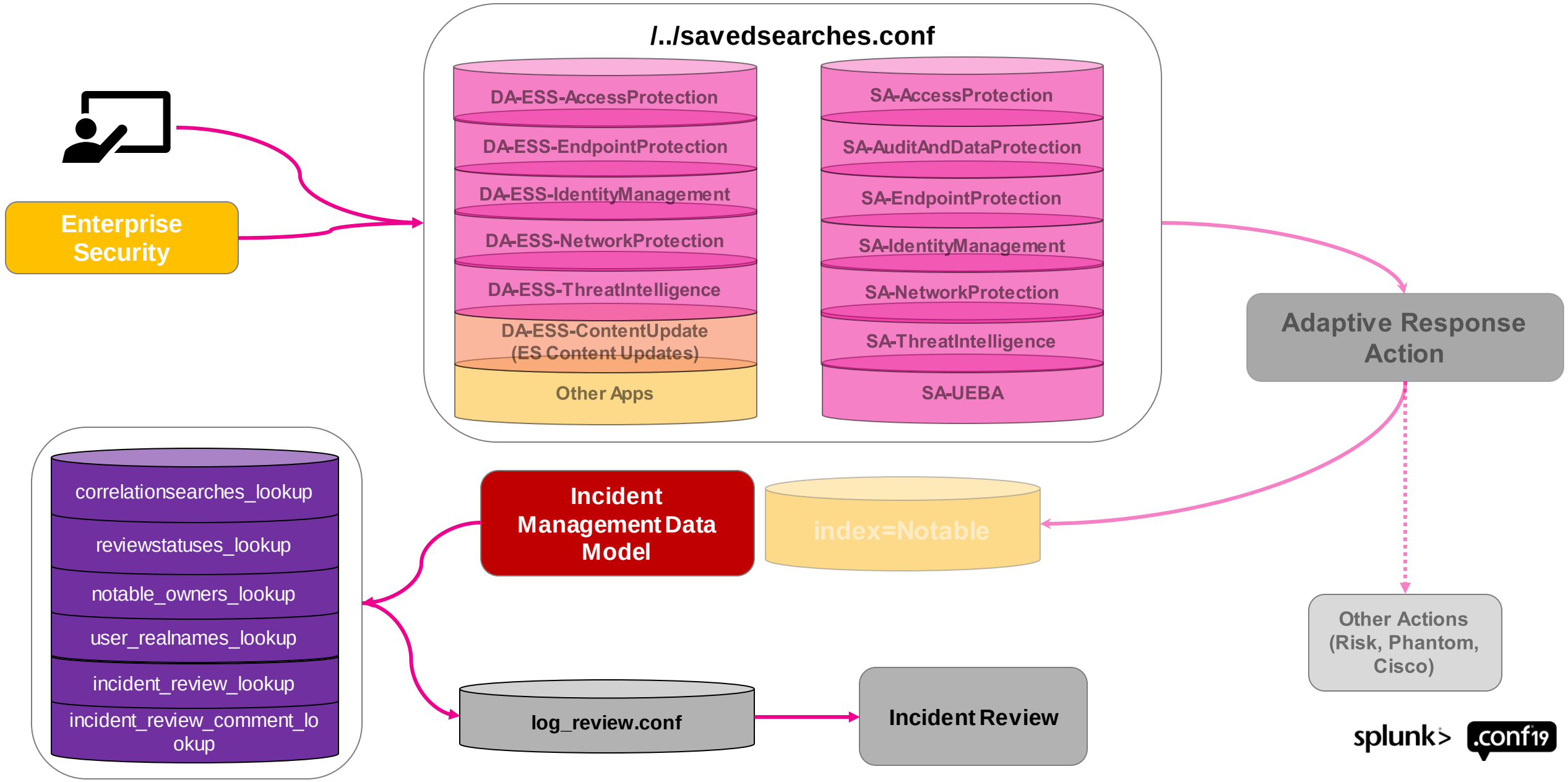
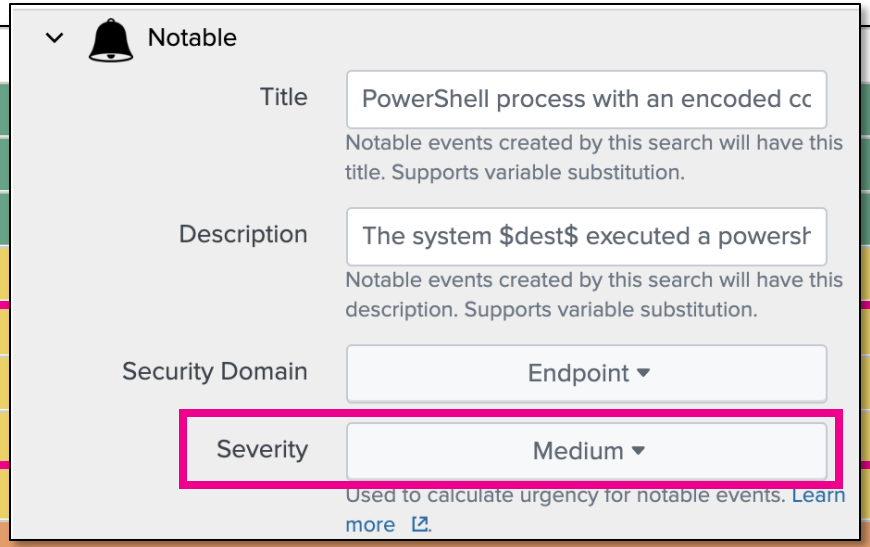
Notable Event Framework



Urgency Calculation

severity	priority	urgency
low	medium	low
low	high	medium
low	critical	medium
medium	unknown	low
medium	low	low
medium	medium	medium
medium	high	high
medium	critical	high
high	unknown	medium
high		medium
high		high
high		high
high		critical
critical		high
critical		high



ip	mac	nt_host	dns	owner	priority
10.0.2.107	00:0c:29:6f:d0:2f	wrk-btun	wrk-btun.frothly.local	Billy Tun	low
10.0.1.101		venus	venus.frothly.local	Fyodor Malteskesko	high

PowerShell process with an encoded command detected on wrk-btun.frothly.local — Low

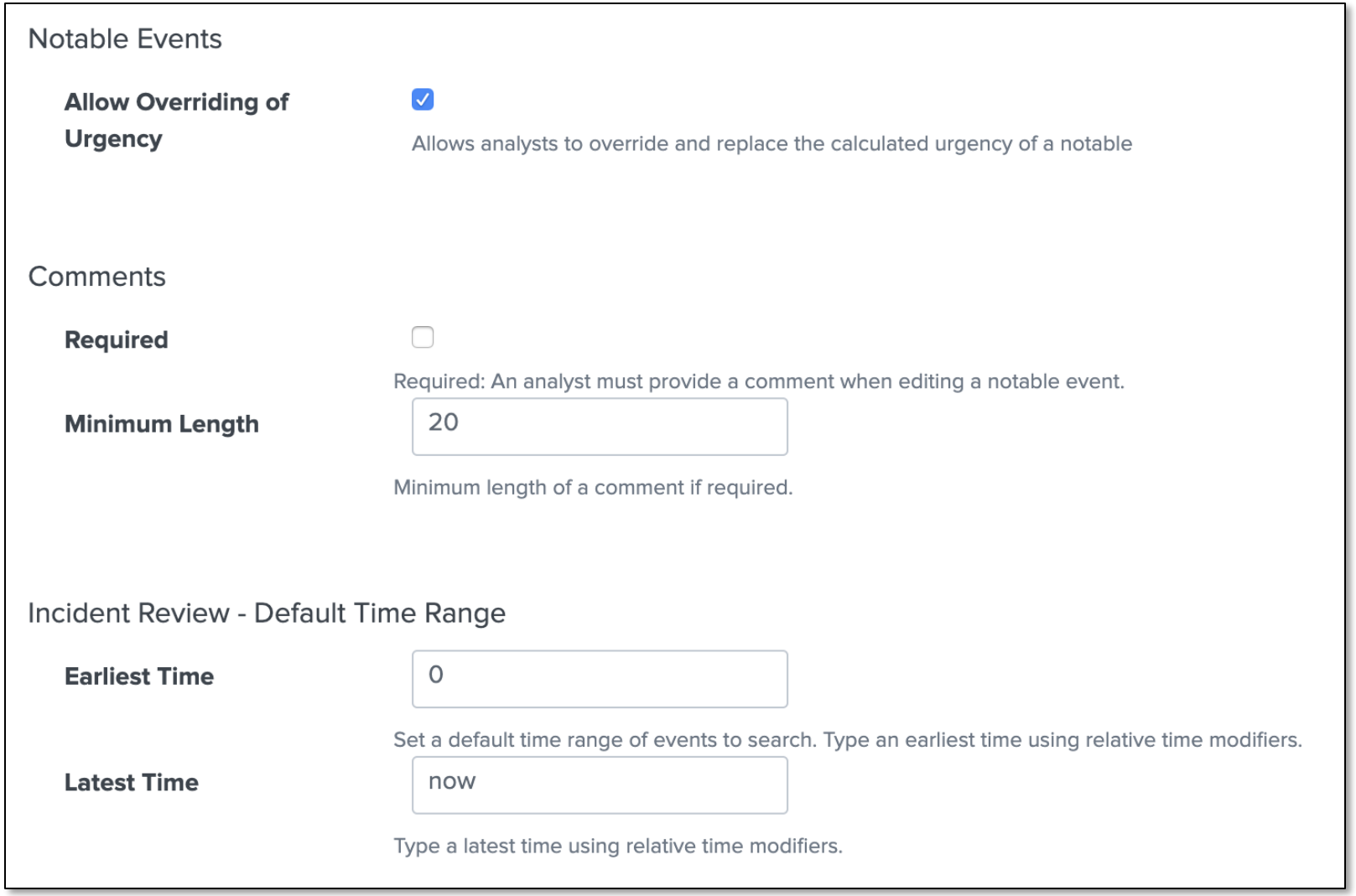
PowerShell process with an encoded command detected on venus.frothly.local — High

Customizing Incident Review - log_review.conf


```
[root@OD-FM-CONF-NA-i-072e4f10e55fe412a default]# cat log_review.conf
[notable_editing]
allow_urgency_override = true

[comment]
minimum_length = 20
is_required    = false

[incident_review]
default_earliest = -24h@h
default_latest   = now

table_attributes = [{"field": "_time",                "label": "Time"},\
                    {"field": "security_domain",      "label": "Security Domain"},\
                    {"field": "rule_title",          "label": "Title"},\
                    {"field": "urgency",             "label": "Urgency"},\
                    {"field": "status_label",        "label": "Status"},\
                    {"field": "owner_realname",      "label": "Owner"}\
                   ]

event_attributes = [{"field": "action",                    "label": "Action"},\
                    {"field": "app",                       "label": "Application"},\
                    {"field": "bytes_in",                  "label": "Bytes In"},\
                    {"field": "bytes_out",                 "label": "Bytes Out"},\
                    {"field": "category",                  "label": "Category"},\
                    {"field": "change_type",               "label": "Change Type"},\
```

Customizing Incident Review

Config -> Incident Management -> Incident Review Settings



Adding Fields to Incident Review

Incident Review - Event Attributes

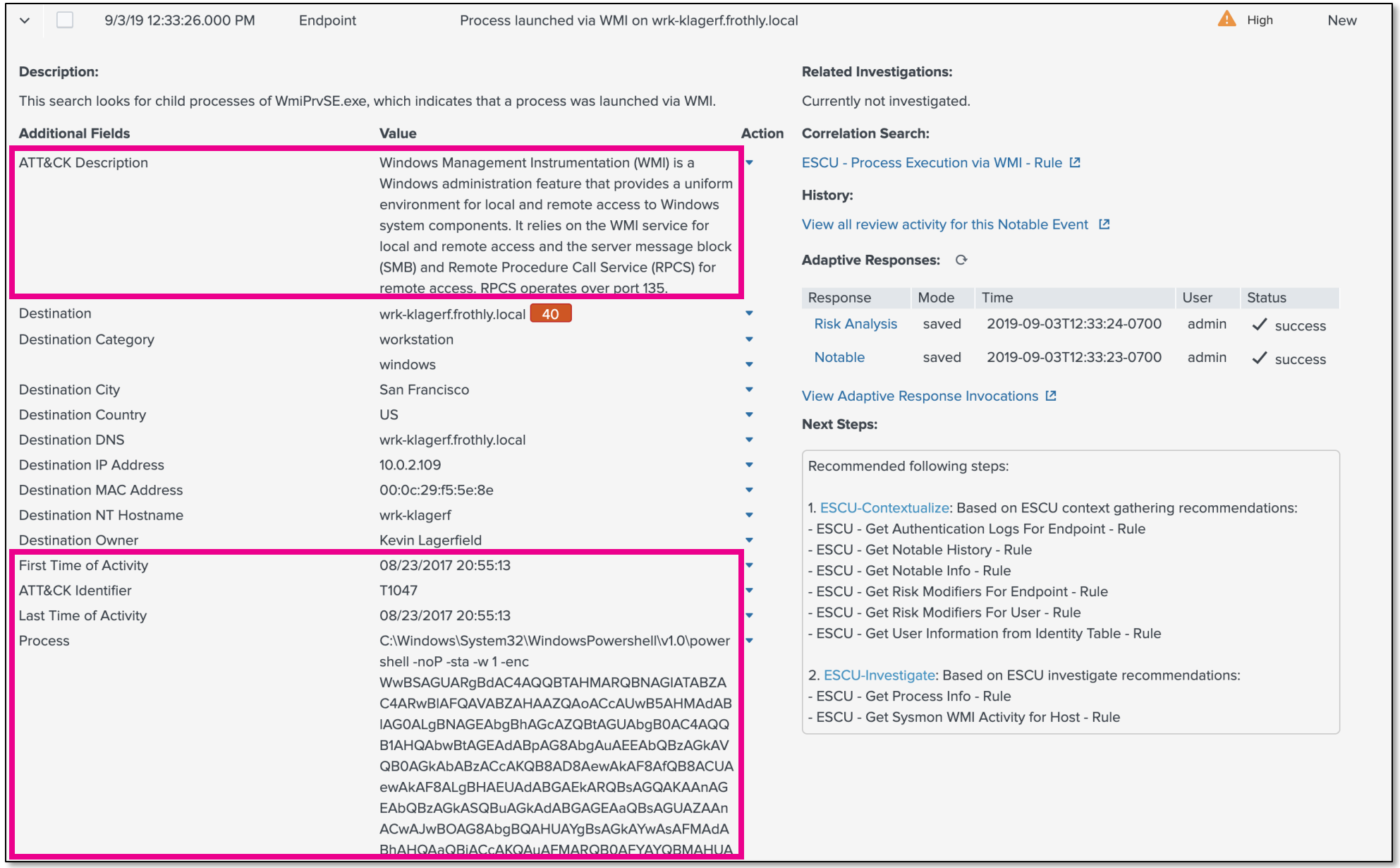
List of available attributes for notable event details.

Label	Field	Action
Description - ATT&CK	description	Edit | Remove
Identifier - ATT&CK	identitier	Edit | Remove
Tactic - ATT&CK	tactic	Edit | Remove
Technique - ATT&CK	technique	Edit | Remove
Message	Message	Edit | Remove
Command	cmdline	Edit | Remove
Parent Process	parent_process	Edit | Remove

Correlation Search Example

Process Execution via WMI

```
index=botsv2 (sourcetype=XmlWinEventLog:Microsoft-Windows-
Sysmon/Operational OR tag=process)
parent_process_name=*WmiPrvSE.exe | stats count min(_time) as
firstTime max(_time) as lastTime by dest, user, parent_process, process,
parent_process_name, process_name | `ctime(firstTime)`|
`ctime(lastTime)` | eval identifier= "T1047" | lookup mitre_attack id AS
identifier OUTPUT tactic technique description
```



9/3/19 12:33:26.000 PM | Endpoint | Process launched via WMI on wrk-klagerf.frothly.local | High | New

Description:

This search looks for child processes of WmiPrvSE.exe, which indicates that a process was launched via WMI.

Additional Fields	Value	Action
ATT&CK Description	Windows Management Instrumentation (WMI) is a Windows administration feature that provides a uniform environment for local and remote access to Windows system components. It relies on the WMI service for local and remote access and the server message block (SMB) and Remote Procedure Call Service (RPCS) for remote access. RPCS operates over port 135.	
Destination	wrk-klagerf.frothly.local 40	
Destination Category	workstation	
	windows	
Destination City	San Francisco	
Destination Country	US	
Destination DNS	wrk-klagerf.frothly.local	
Destination IP Address	10.0.2.109	
Destination MAC Address	00:0c:29:f5:5e:8e	
Destination NT Hostname	wrk-klagerf	
Destination Owner	Kevin Lagerfield	
First Time of Activity	08/23/2017 20:55:13	
ATT&CK Identifier	T1047	
Last Time of Activity	08/23/2017 20:55:13	
Process	C:\Windows\System32\WindowsPowershell\v1.0\powershell -noP -sta -w 1 -enc WwBSAGUARgBdAC4AQQBTAHMARQBNAGIATABZAC4ARwBlAFQAVABZAHAAZQAoACcAUwB5AHMAdABlAG0ALgBNAGEAbgBhAGcAZQBtAGUAbgB0AC4AQQB1AHQAbwBtAGEAdABpAG8AbgAuAEEAbQBzAGkAVQB0AGkAbABzACcAKQB8AD8AewAkAF8AfQB8ACUAewAkAF8ALgBHAEUAdABGAEkARQBsAGQAKAAnAGEAbQBzAGkASQBuAGkAdABGAGEAaQBsAGUAZAAnACwAJwBOAG8AbgBQAHUAYgBsAGkAYwAsAFMAdABhAHQAaQBjACcAKQAuAFMARQB0AFYAYQBMAHUA	

Related Investigations:

Currently not investigated.

Correlation Search:

ESCU - Process Execution via WMI - Rule

History:

View all review activity for this Notable Event

Adaptive Responses:

Response	Mode	Time	User	Status
Risk Analysis	saved	2019-09-03T12:33:24-0700	admin	✓ success
Notable	saved	2019-09-03T12:33:23-0700	admin	✓ success

View Adaptive Response Invocations

Next Steps:

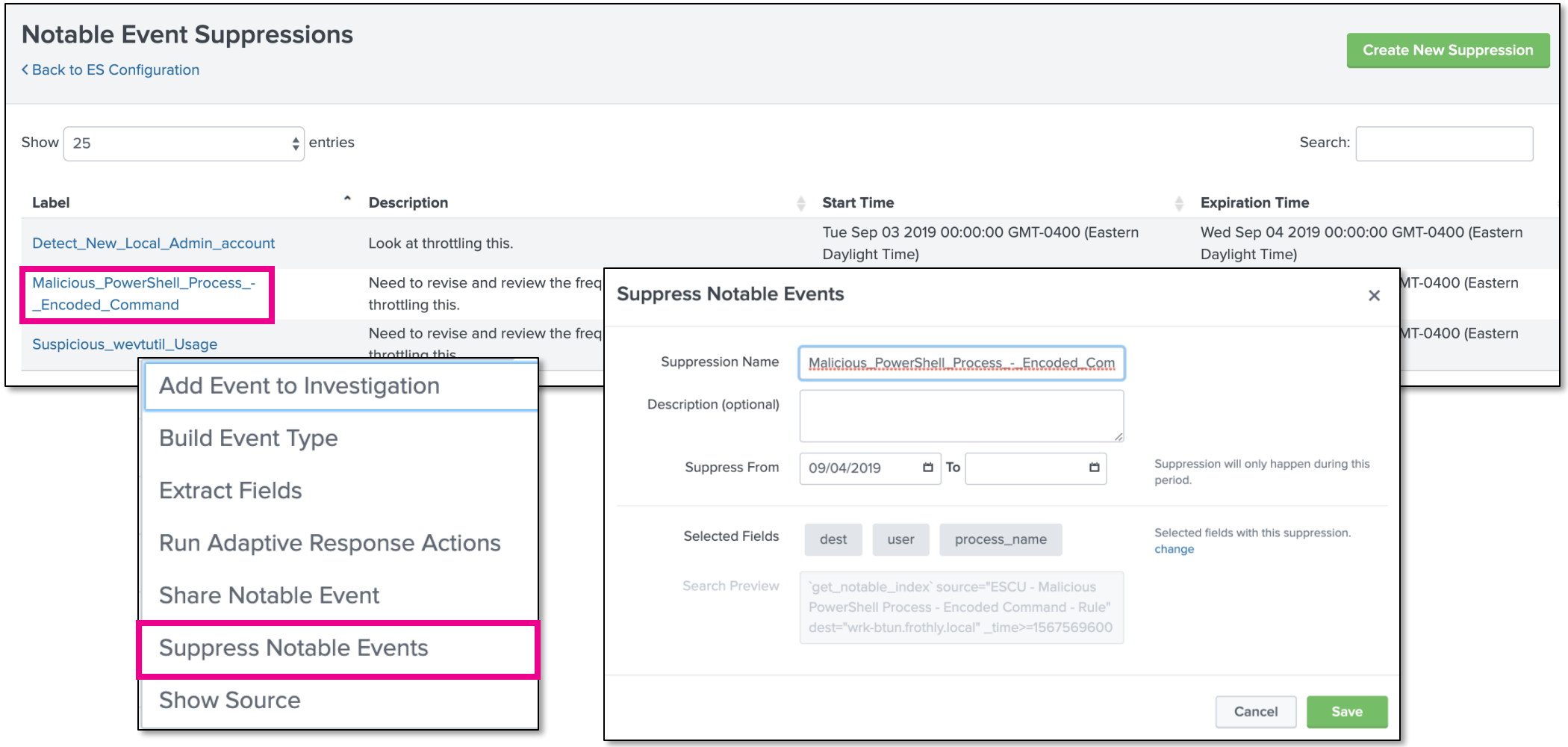
Recommended following steps:

1. ESCU-Contextualize: Based on ESCU context gathering recommendations:
- ESCU - Get Authentication Logs For Endpoint - Rule
- ESCU - Get Notable History - Rule
- ESCU - Get Notable Info - Rule
- ESCU - Get Risk Modifiers For Endpoint - Rule
- ESCU - Get Risk Modifiers For User - Rule
- ESCU - Get User Information from Identity Table - Rule

2. ESCU-Investigate: Based on ESCU investigate recommendations:
- ESCU - Get Process Info - Rule
- ESCU - Get Sysmon WMI Activity for Host - Rule

Notable Event Suppression

Incident Review & Configure -> Notable Event Suppressions



Notable Event Suppression

```
`get_notable_index` source="ESCU - Malicious PowerShell Process - Encoded Command - Rule" dest="wrk-klagerf
    .frothly.local" _time>=1567483200 _time<=1567656000 | table _time eventtype
```

All time

✓ 14 events (9/2/19 9:00:00.000 PM to 9/4/19 9:00:01.000 PM) No Event Sampling

Job Smart Mode

Events Patterns **Statistics (14)** Visualization

10 Per Page Format Preview < Prev 1 2 Next >

_time	eventtype	tag
2019-09-04 05:42:15	modnotable_results notable notable_suppression-Malicious_PowerShell_Process_-_Encoded_Command	modaction_result watchlist
2019-09-04 03:42:14	modnotable_results notable notable_suppression-Malicious_PowerShell_Process_-_Encoded_Command	modaction_result watchlist
2019-09-04 01:42:14	modnotable_results notable notable_suppression-Malicious_PowerShell_Process_-_Encoded_Command	modaction_result watchlist

Event Sequencing and Audit

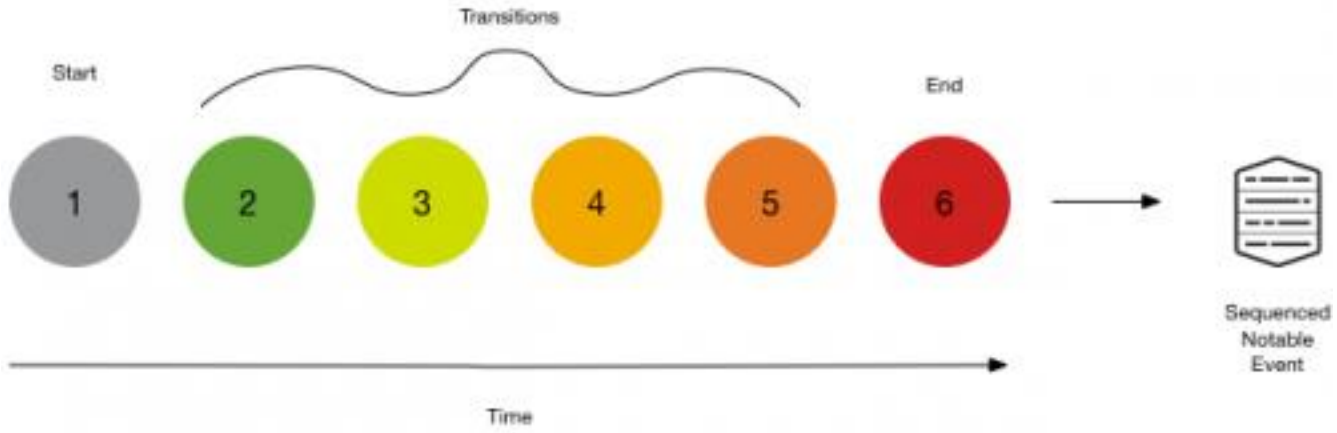
splunk> .conf19

Event Sequencing

Group correlation searches into batches of events, either in a specific sequence, by specific attributes, or both

The Event Sequencing Engine runs as a indexed real-time search and listens for incoming notable events and risk modifiers that are triggered by correlation searches

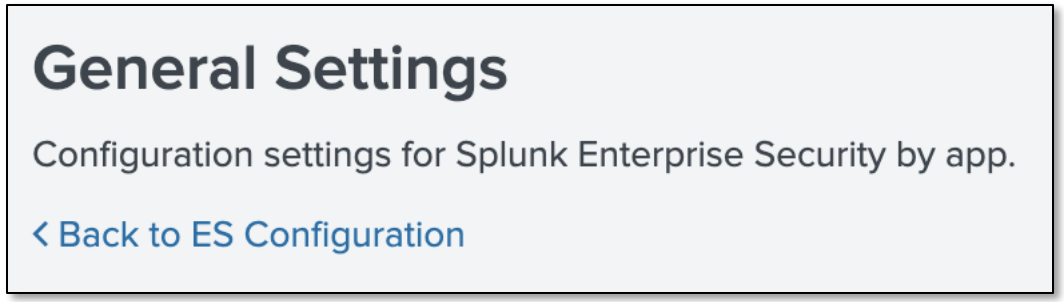
Stored in the sequence_templates.conf file

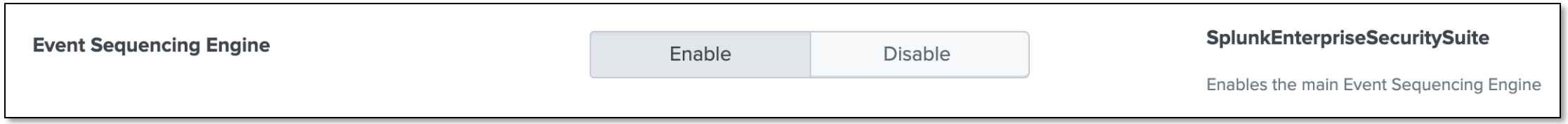


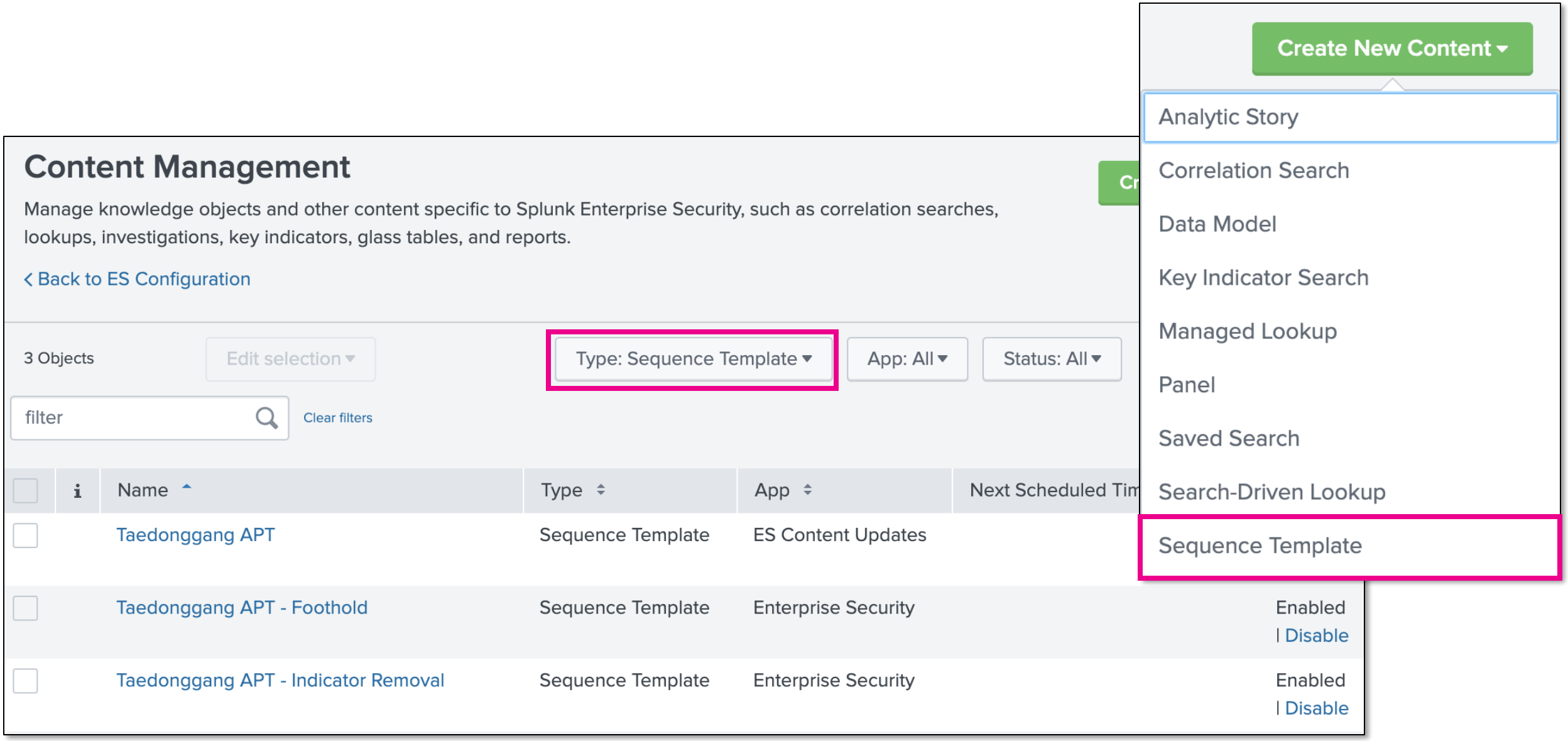
Initial Configuration

Requires the edit_sequence_template capability

- ES assigns the capability to the ess_admin role







Sequence Template

Name: Taedonggang APT - Indicator Removal

Description: The following actions have been seen previously in Frothly's environment and have been attributed to Taedonggang APT. These actions indicate evasion through removing indicators of activies within Frothly.

App: Enterprise Security

Defines the app in which the .conf entries will be created.

Start

Correlation Search: ESCU - Process Execution via WMI - Rule

Expression: 'index'="notable"

Field value should be enclosed in single quotes, and the matching value enclosed in double quotes. Ex: 'host' = "127.0.0.1"

State:

Field	Label
user	user
dest	dest
process	process

+ Add State

Transitions

Enforce Ordering

Enforces chronological order of transitions, otherwise just checks for existence. Saving state on transitions is disabled when ordering is disabled.

Aggregate Matches

Keep accumulating matched events that may occur multiple times while template is running. Accumulated events will be added to the final sequenced event.

Encoded PowerShell

Title: Encoded PowerShell

Correlation Search: ESCU - Malicious PowerShell Process - Encoded Command - Rule

Expression: 'dest'="$dest$"

Field value should be enclosed in single quotes, and the matching value enclosed in double quotes.
Ex: 'host' = "127.0.0.1"

Utilization of wevtutil.exe

Title: Utilization of wevtutil.exe

Correlation Search: ESCU - Suspicious wevtutil Usage - Rule

Expression: 'dest'="$dest$"

Field value should be enclosed in single quotes, and the matching value enclosed in double quotes.
Ex: 'host' = "127.0.0.1"

+ Add Transition

End

Correlation Search: ESCU - Windows Event Log Cleared - Rule

Expression: 'dest'="$dest$"

Field value should be enclosed in single quotes, and the matching value enclosed in double quotes. Ex: 'host' = "127.0.0.1"

Time Limit: 2 hour(s)

Actions

Sequenced Event

Event Title: Strong Indication of Taedonggang APT TTPs to Remove Indicators on $dest_ip$

Supports state token substitution.

Event Description: This is a known set of TTPs indicative of Taedonggang APT removing indicators from

Supports state token substitution.

Urgency: Critical

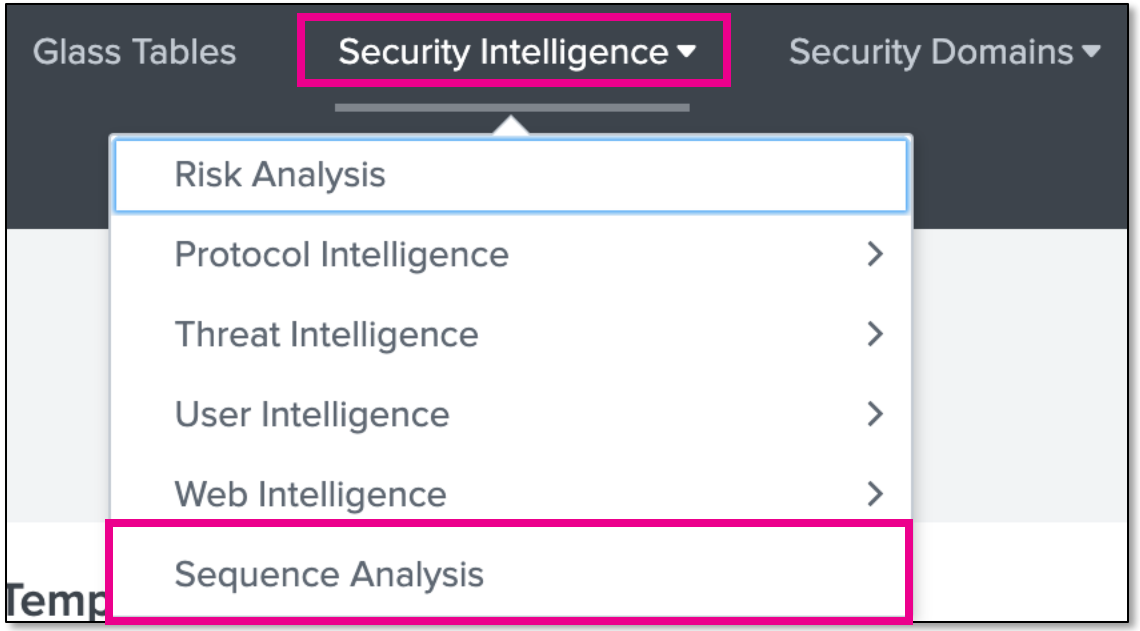
Security Domain: Endpoint

Output Fields

user	$user$
dest	$dest$
process	$process$

+ Add Field

The value field can be populated with either static values or saved state tokens from transitions.



Sequence Analysis

View the running list of attack templates.

< Back to Content Management

50 Objects | Showing: All | Showing: Last 24 Hours | < Prev 1 2 3 4 5 Next >

Attack Template	Start Time	Last Activity Time	Status	Actions
Taedonggang APT - Foothold	Mon Sep 02 2019 13:33:09 GMT-0400 (Eastern Daylight Time)	6 hours ago	expired	Edit sequence
Taedonggang APT - Indicator Removal	Mon Sep 02 2019 18:34:20 GMT-0400 (Eastern Daylight Time)	6 hours ago	expired	Edit sequence
Taedonggang APT	Mon Sep 02 2019 18:33:09 GMT-0400 (Eastern Daylight Time)	6 hours ago	expired	Edit sequence
Taedonggang APT	Mon Sep 02 2019 23:33:09 GMT-0400 (Eastern Daylight Time)	6 hours ago	expired	Edit sequence
Taedonggang APT - Indicator Removal	Tue Sep 03 2019 03:34:27 GMT-0400 (Eastern Daylight Time)	7 hours ago	running	Edit sequence

State Data

user ..... FROTHLY\service3
dest ..... venus.frothly.local
dest_dns ..... dest_ip ..... dest_nt_host .....

Transitions

Title	Time	State
start	Tue Sep 03 2019 13:33:19 GMT-0400 (Eastern Daylight Time)	Matched
Encoded PowerShell	Tue Sep 03 2019 13:42:12 GMT-0400 (Eastern Daylight Time)	Matched
Utilization of wevtutil.exe		Awaiting Matches
end		Awaiting Matches

State Data

dest_dns ..... user ..... FROTHLY\billy.tun
dest_nt_host ..... dest_ip .....

Transitions

Title	Time	State
start	Mon Sep 02 2019 13:33:21 GMT-0400 (Eastern Daylight Time)	Matched
Encoded PowerShell		No match found
Utilization of wevtutil.exe		No match found
end		No match found

Expiration Date

This sequence instance expired at Mon Sep 02 2019 21:33:21 GMT-0400 (Eastern Daylight Time)

9/4/19 10:07:05.000 AM | Endpoint | Strong Indication of Taedonggang APT TTPs to Remove Indicators on 10.0.2.109 | Critical

Sequenced Event Description:

This is a known set of TTPs indicative of Taedonggang APT removing indicators from a compromised system. These TTPs have previously been used to targeted Froth.ly. Escalate this to Alice upon immediate alert.

Template Title:

Taedonggang APT - Indicator Removal

Template Description:

The following actions have been seen previously in Frothly's environment and have been attributed to Taedonggang APT. These actions indicate evasion through removing indicators of activies within Frothly.

View events

History:

No History

Adaptive Responses:

No Adaptive Responses found

Transitions:

Stage	Time	Match
start	Sep 4, 2019 9:33 AM	Process launched via WMI on wrk-klagerf.frothly.local View original events
Encoded PowerShell	Sep 4, 2019 9:42 AM	PowerShell process with an encoded command detected on wrk-klagerf.frothly.local View original events
Utilization of wevtutil.exe	Sep 4, 2019 10:02 AM	Suspicious wevtutil Usage View original events
end	Sep 4, 2019 10:06 AM	Windows Event Log Cleared on OD-FM-NA-i-00d3cc13d300ce9d5.amazonaws.com View original events

Additional Fields	Value
Destination	wrk-klagerf.frothly.local 40
Destination Category	workstation windows
Destination City	San Francisco
Destination Country	US
Destination DNS	wrk-klagerf.frothly.local
Destination IP Address	10.0.2.109
Destination MAC Address	00:0c:29:f5:5e:8e
Destination NT Hostname	wrk-klagerf
Destination Owner	Kevin Lagerfield
End Time	Sep 4, 2019 2:33 PM
Process	C:\Windows\System32\WindowsPowershell\v1.0\powershell -noP -sta -w 1 -enc WwBSAGUARgBdAC4AQQBTAHMARQBNAGIATABZAC4ARwBlAFQAVABZAHAAZQAoACcAUwB5AHMAdABlAG0ALgBNA
Start Time	Sep 4, 2019 12:33 PM
User	FROTHLY\service3

2019-09-04 03:42:14	ESCU - Malicious PowerShell Process - Encoded Command - Rule	wrk-klagerf.frothly.local	modnotable_results notable notable_suppression-Malicious_PowerShell_Process_-_Encoded_Command

Transitions:

Stage	Time	Match
start	Sep 4, 2019 2:33 AM	Process launched via WMI on wrk-klagerf.frothly.local View original events
Encoded PowerShell	Sep 4, 2019 3:42 AM	PowerShell process with an encoded command detected on wrk-klagerf.frothly.local View original events
Utilization of wevtutil.exe	Sep 4, 2019 3:02 AM	Suspicious wevtutil Usage View original events
end	Sep 4, 2019 4:06 AM	Windows Event Log Cleared on OD-FM-NA-i-00d3cc13d300ce9d5.amazonaws.com View original events

Additional Fields	Value
Destination	wrk-klagerf.frothly.local 40

2019-09-04 03:02:29	ESCU - Suspicious wevtutil Usage - Rule	wrk-klagerf.frothly.local	modnotable_results notable notable_suppression-Suspicious_wevtutil_Usage

Testing Your Event Templates

`execute_sequence_template(*template_name*, false)`

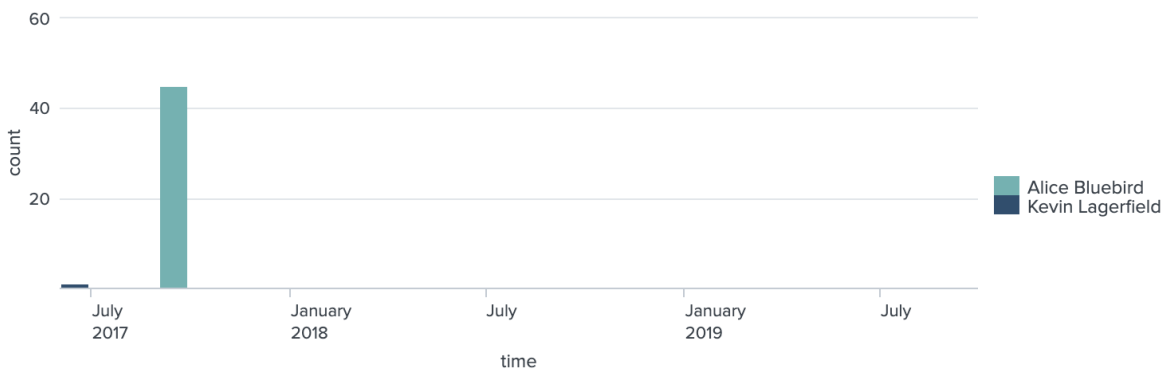

```
{ [-]
   dest: wrk-klagerf.frothly.local
   end_time: 1567690399
   events_spl: earliest=1567683199.0 latest=1567685164.0 `event_seq_events` | search event_id="C8A9AB2D-487E-49CB-99D8-A570A
   orig_rid: 0f7b2bab-4c82-4798-966c-4453a824f4df
   orig_sid: 1567690579.3925
   process: C:\Windows\System32\WindowsPowershell\v1.0\powershell -noP -sta -w 1 -enc
WwBSAGUARgBdAC4AQQBTAHMARQBNAGIATABZAC4ARwBlAFQAVABZAHAAZQAoACcAUwB5AHMAdABlAG0ALgBNAGEAbgBhAGcAZQBtAGUAbgB0AC4AQQB1AHQAbwBt
   rid: 0f7b2bab-4c82-4798-966c-4453a824f4df
   rule_description: This is a known set of TTPs indicative of Taedonggang APT removing indicators from a compromised system
   rule_title: Strong Indication of Taedonggang APT TTPs to Remove Indicators on $dest_ip$
   security_domain: endpoint
   start_time: 1567683199
   template_description: The following actions have been seen previously in Frothly's environment and have been attributed t
   template_name: Taedonggang APT - Indicator Removal
   transition_matches: [{"stage": "start", "matches": [{"event_time": 1567683199.0, "reason": "start_match", "event_title":
   urgency: critical
   user: FROTHLY\service3
}
```

Incident Review Audit

Incident Review Audit

Edit | Export | ...

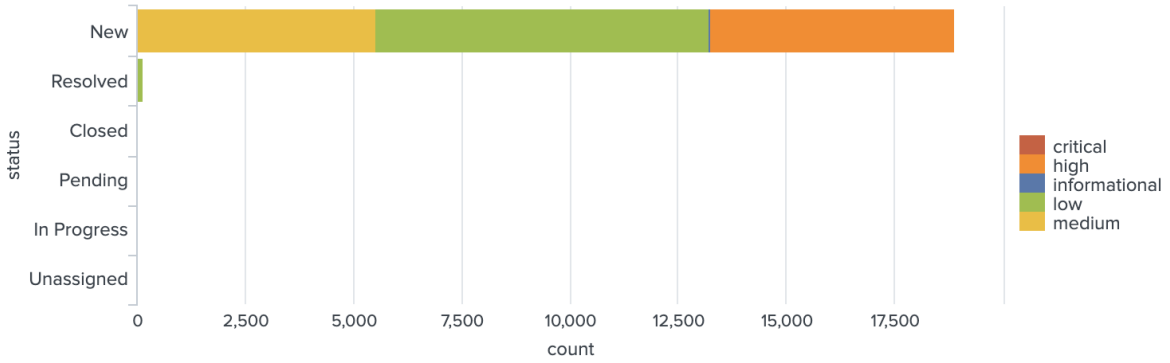
Review Activity By Reviewer



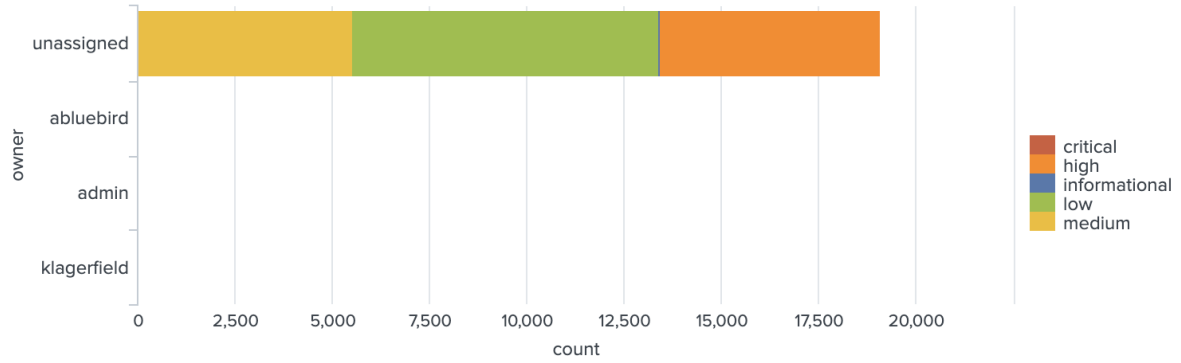
Top Reviewers

reviewer_realname	sparkline	count	firstTime	lastTime
Alice Bluebird		45	09/01/2017 11:37:45	09/01/2017 11:47:17
Kevin Lagerfield		1	06/21/2017 08:37:09	06/21/2017 08:37:09

Notable Events By Status - Last 48 Hours



Notable Events By Owner - Last 48 Hours



Mean Time To Triage - Last 14 days

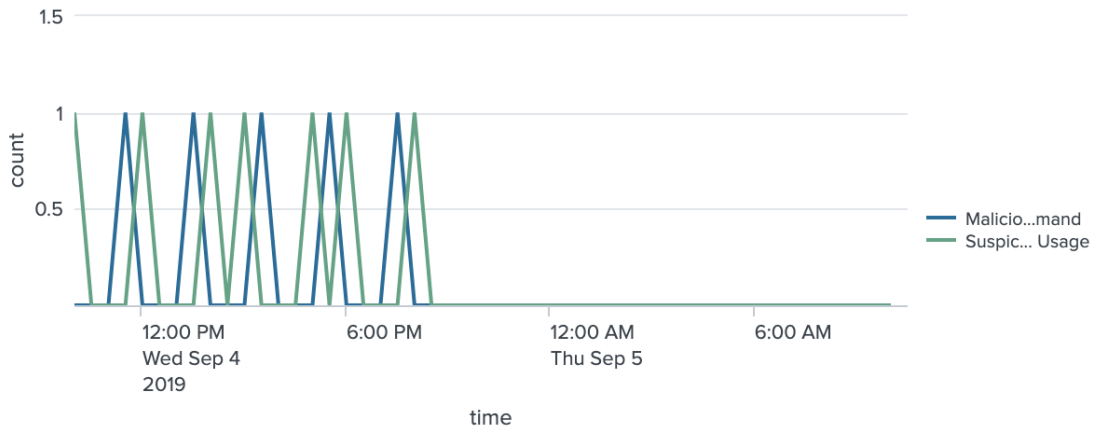
Mean Time To Closure - Last 60 days

Suppression Audit

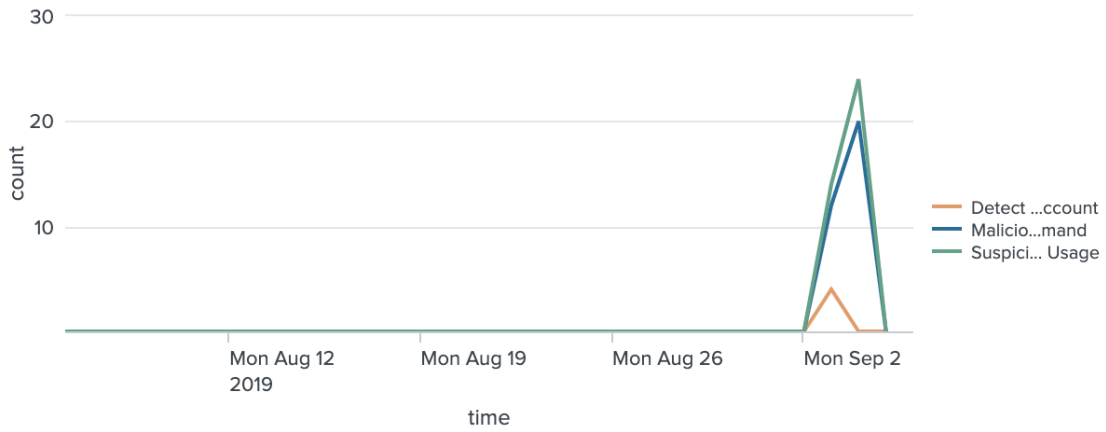
Suppression Audit

Edit | Export | ...

Suppressed Events Over Time - Last 24 Hours



Suppression History Over Time - Last 30 Days

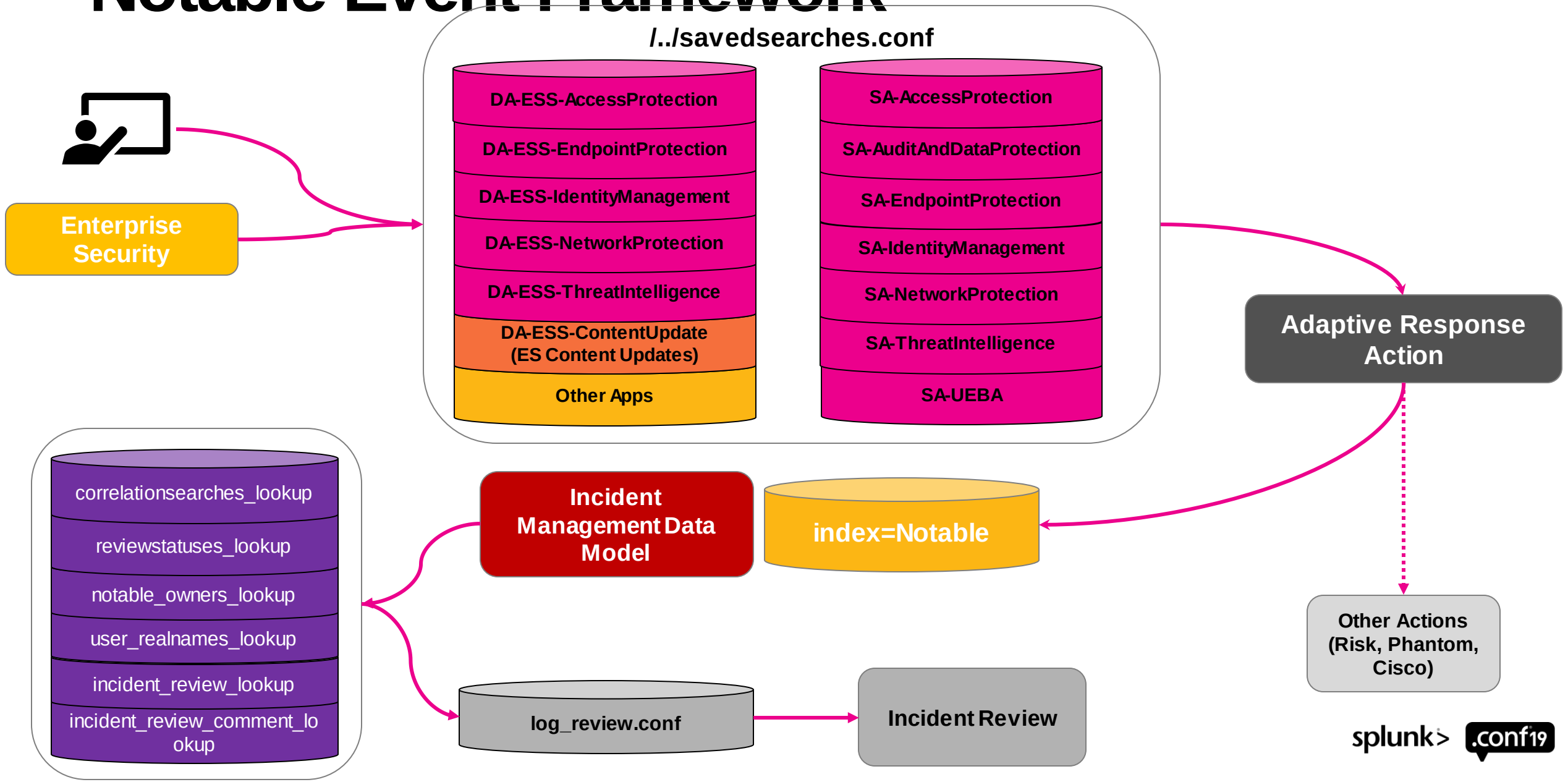


Suppression Management Activity

_time	suppression	action	status	user
2019-09-05 10:08:25.386	Detect_New_Local_Admin_account	disable	success	admin
2019-09-03 16:22:09.275	Detect_New_Local_Admin_account	create	success	admin
2019-09-03 16:20:20.943	Suspicious_wevtutil_Usage	create	success	admin
2019-09-03 16:19:32.487	Malicious_PowerShell_Process_-_Encoded_Command	create	success	admin

Expired Suppressions

Notable Event Framework



splunk> .conf19

Helpful Links

Splunk Security Essentials – More Ideas for Correlation Searches
- https://splunkbase.splunk.com/app/3435/

ES Content Update
- https://splunkbase.splunk.com/app/3449/

Tutorial – Create a Correlation Search
- https://docs.splunk.com/Documentation/ES/5.3.1/Tutorials/CorrelationSearch

Incident Management/Notable Event Framework
- http://dev.splunk.com/view/enterprise-security/SP-CAAAFA9

Enhancing Incident Review
- http://www.georgestarcher.com/splunk-enterprise-security-enhancing-incident-review/

Upgrades after 4.5 – Saved Search v Correlation Search
- https://docs.splunk.com/Documentation/ES/5.3.1/Admin/Upgradecorrelationsearches

Modifying the Incident Review Page
- https://www.splunk.com/blog/2019/02/15/modifying-the-incident-review-page.html

Closing Thoughts

1. Incident Management Framework drives Notable Events
2. Good Deal of Flexibility to Handle How You Deal with Different Notables and What The Analyst Sees
3. Ensure your notables are high fidelity before leveraging event sequencing
4. Suppression provides a trackable method to handle noisy notables but action is required!

.conf19

splunk>

Thank You!

Go to the .conf19 mobile app to

RATE THIS SESSION

Appendix

Correlation Search Mapping to .conf file

Correlation Search

Search Name *
Detect New Local Admin account

App *
ES Content Updates

UI Dispatch Context *
Enterprise Security

Set an app to use for links such as the drill-down search in a notable event or links in an email adaptive response action. If None, uses the Application Context.

Description
This search looks for newly created accounts that have been elevated to local administrators.

Describes what kind of issues this search is intended to detect.

Mode
Guided | Manual

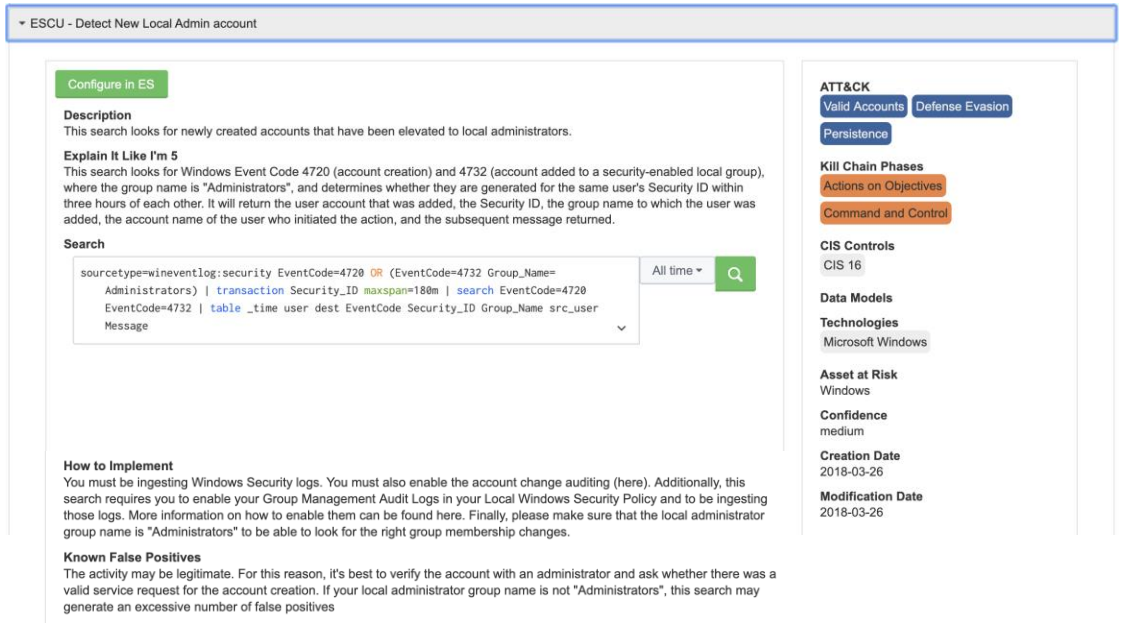
Search *
```
sourcetype=wineventlog:security EventCode=4720 OR (EventCode=4732 Group_Name=Administrators) | transaction Security_ID maxspan=180m | search EventCode=4720 EventCode=4732 | table _time user dest EventCode Security_ID Group_Name src_user Message
```

action.correlationsearch.label

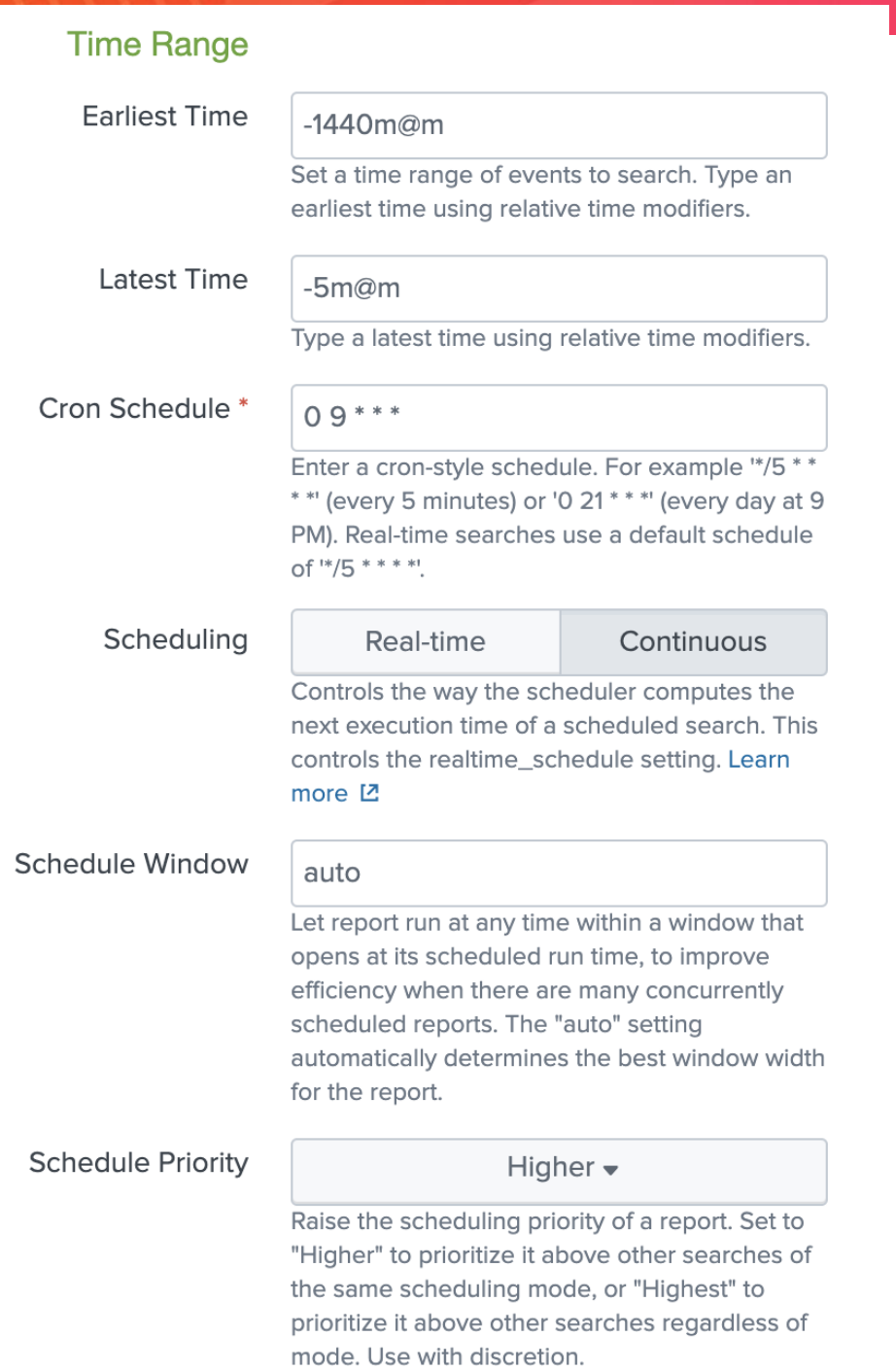
request.ui_dispatch_app

description

search



action.escu = 0
action.escu.enabled = 1
action.escu.creation_date = 2018-03-26
action.escu.modification_date = 2018-03-26
action.escu.asset_at_risk = Windows
action.escu.channel = ESCU
action.escu.confidence = medium
action.escu.eli5 = This search looks for Windows Event Code 4720 (account creation) and 4732 (account added to a security-enabled <snip>
action.escu.how_to_implement = You must be ingesting Windows Security logs. You must also enable the account change auditing <snip>
action.escu.full_search_name = ESCU - Detect New Local Admin account
action.escu.mappings = {"mitre_attack": ["Valid Accounts", "Defense Evasion", "Persistence"], "kill_chain_phases": ["Actions on Object ives", "Command and Control"], "cis20": ["CIS 16"], "nist": ["PR.AC", "DE.CM"]}
action.escu.known_false_positives = The activity may be legitimate. <snip>
action.escu.search_type = detection
action.escu.providing_technologies = ["Microsoft Windows"]
action.escu.analytic_story = ["DHS Report TA18-074A"]



dispatch.earliest_time = -1440m@m

dispatch.latest_time = -5m@m

cron_schedule = 0 9 * * *

schedule_window = auto

schedule_priority = higher

splunk> .conf19

Trigger Conditions

Trigger alert when: Number of Results

is greater than 0

counttype = number of events
relation = greater than
quantity = 0

Throttling

Window duration: 1 day(s)

How much time to ignore other events that match the field values specified in Fields to group by.

alert.suppress = 1
alert.suppress.period = 86400s

Fields to group by: user x

Type a field and press enter

Type the fields to consider for matching events for throttling. Learn more

alert.suppress.fields = user

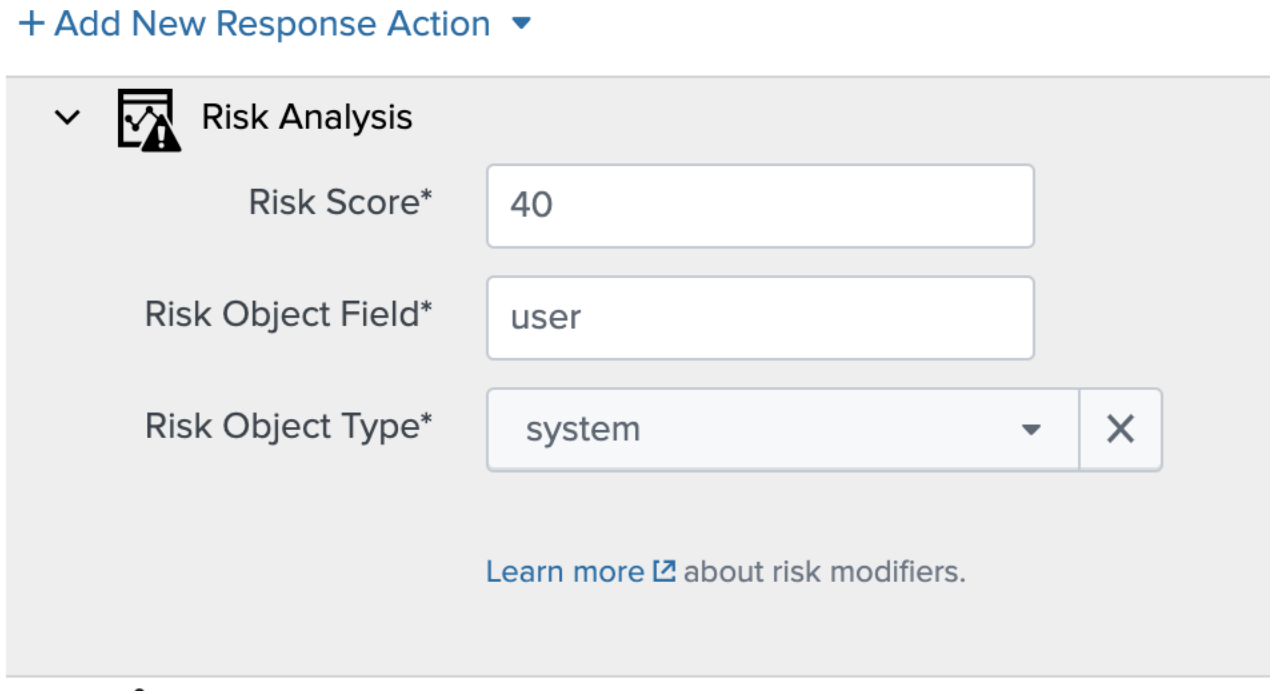
Adaptive Response Actions

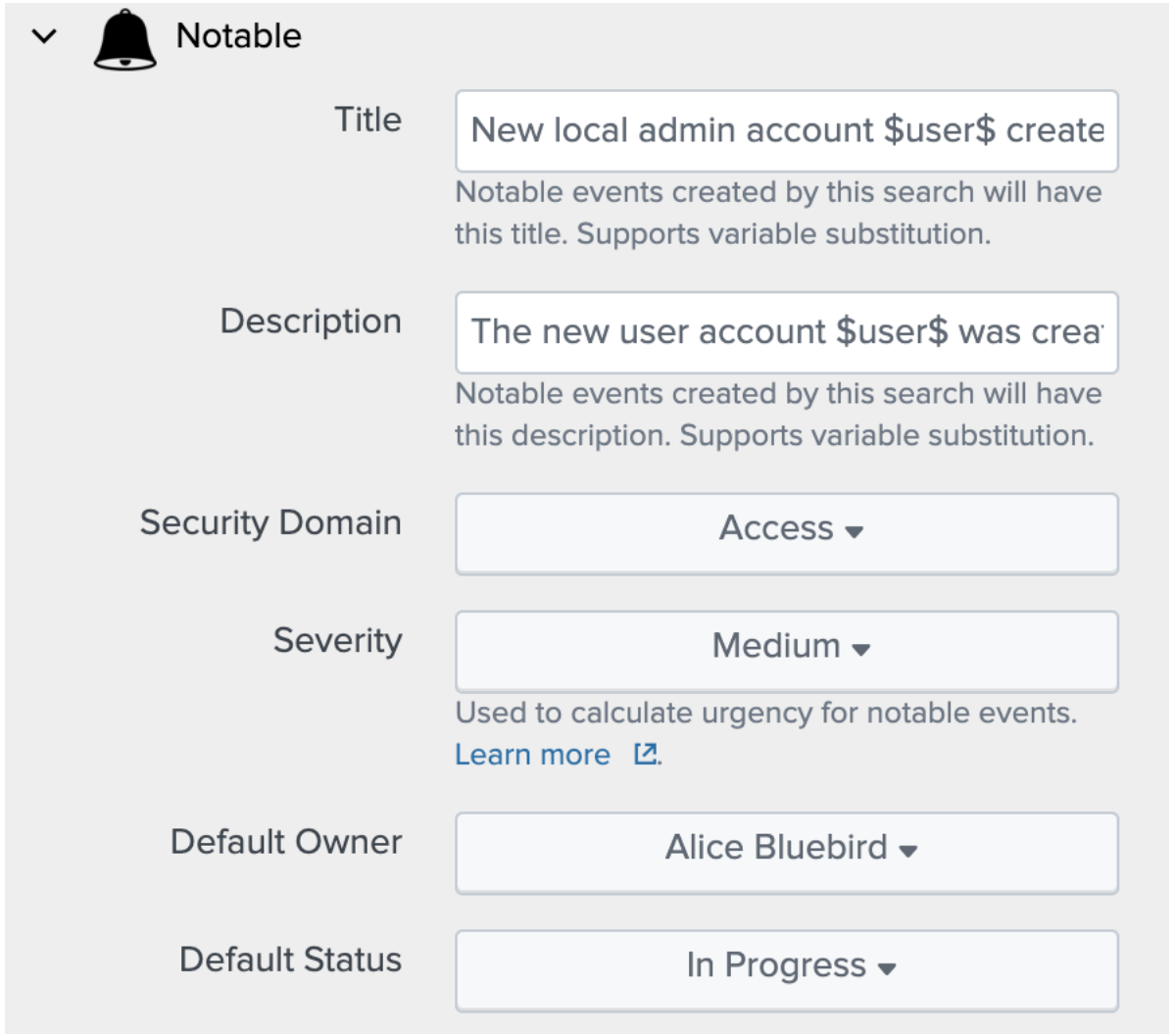
+ Add New Response Action

action.notable = 1
action.makestreams.param.verbose = 0
action.nbtstat.param.verbose = 0
action.notable.param.verbose = 0
action.nslookup.param.verbose = 0
action.ping.param.verbose = 0
action.send2uba.param.verbose = 0
action.threat_add.param.verbose = 0

Adaptive Response Actions

```
action.risk = 1
action.risk.param._risk_score = 40
action.risk.param._risk_object = user
action.risk.param._risk_object_type = system
action.risk.param.verbose = 0
```





action.notable.param.rule_title = New local admin account $user$ created by src_user.

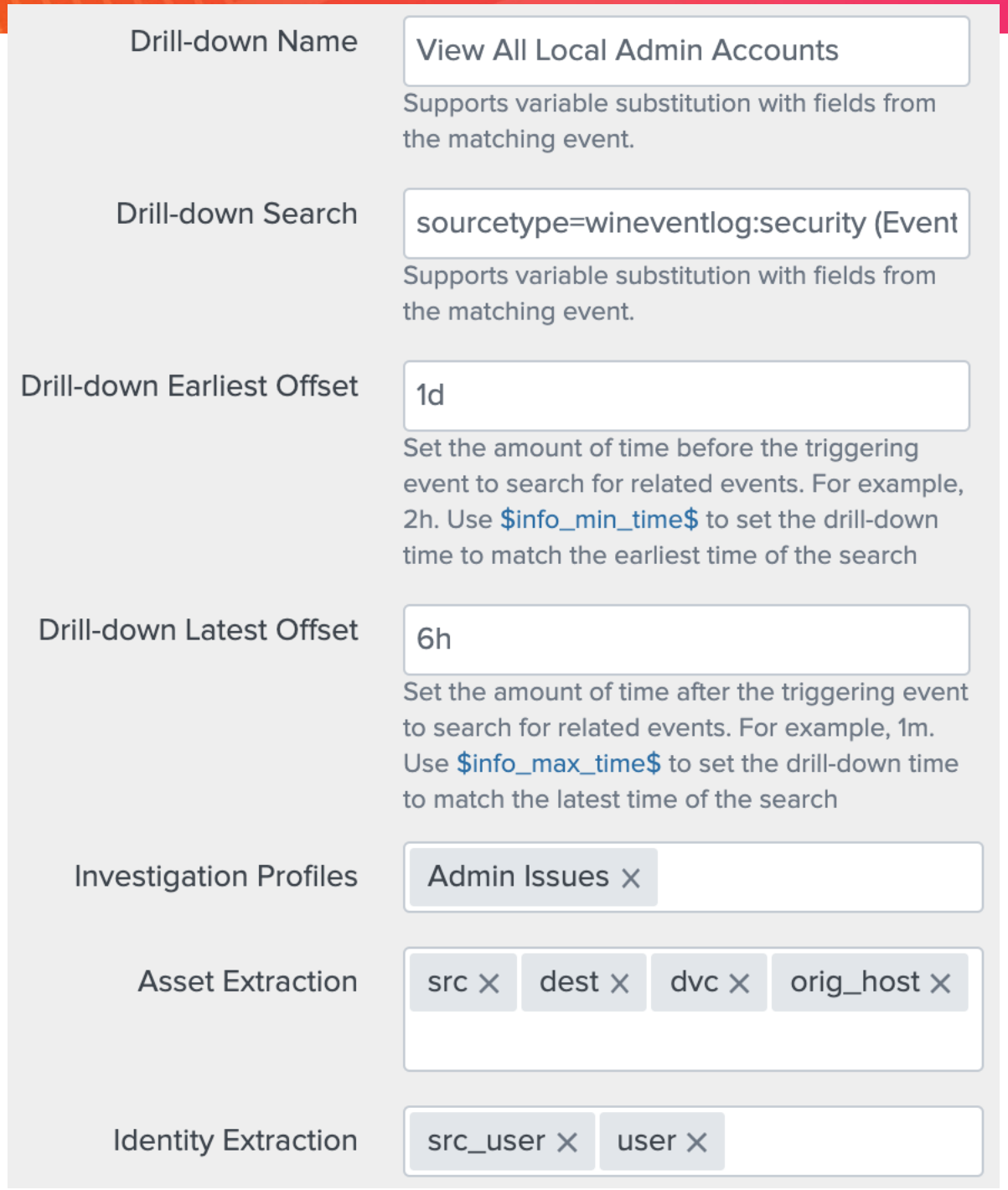
action.notable.param.rule_description = The new user account $user$ was created on $dest$ by src_user.

action.notable.param.security_domain = access

action.notable.param.severity = medium

action.notable.param.default_owner = abluebird

action.notable.param.default_status = 2



action.notable.param.drilldown_name = View All Local Admin Accounts

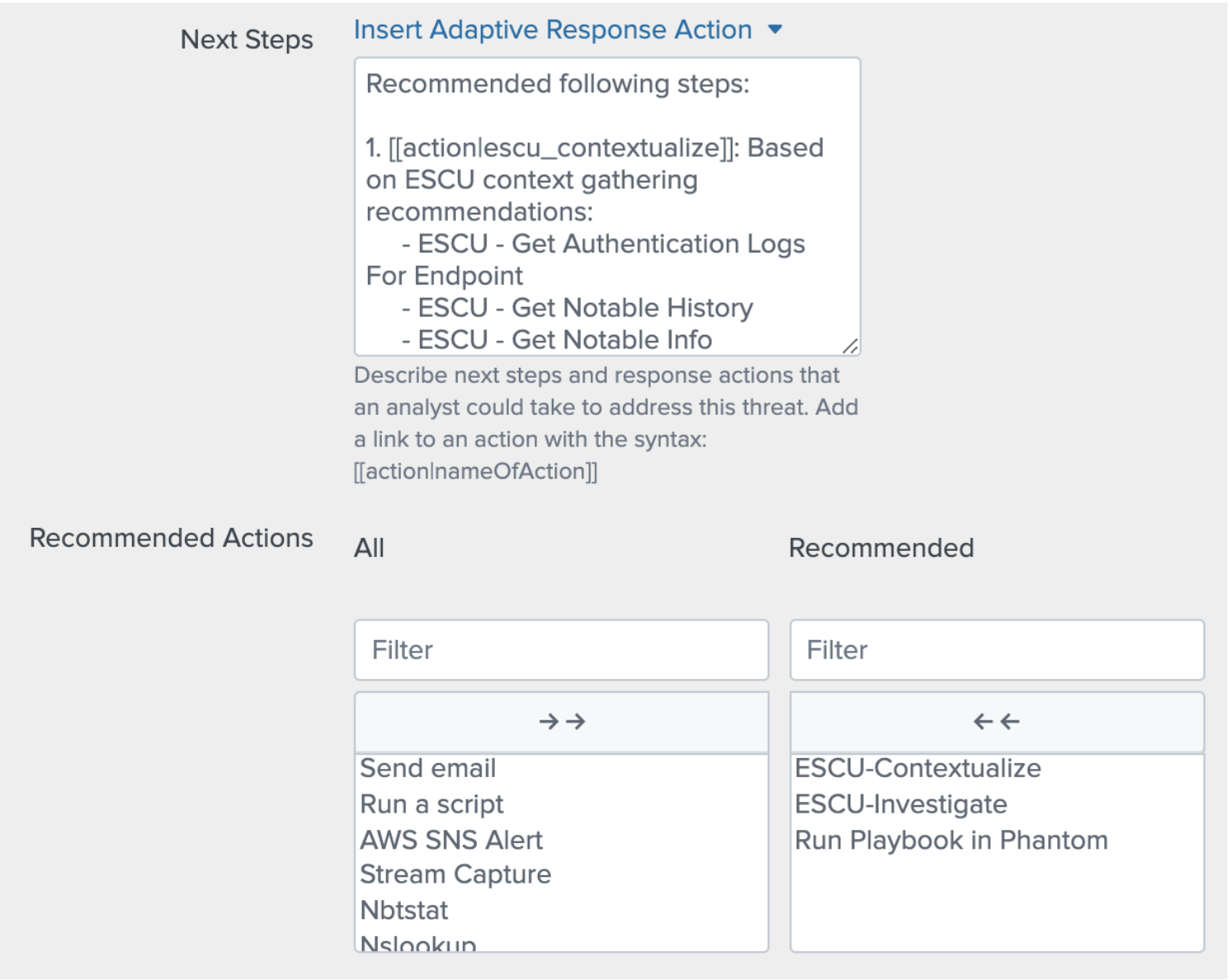
action.notable.param.drilldown_search = sourcetype=wineventlog:security (EventCode=4732 Group_Name= Administrators) | table _time user dest EventCode Security_ID Group_Name src_user Message

action.notable.param.drilldown_earliest_offset = 86400
action.notable.param.drilldown_latest_offset = 21600

action.notable.param.investigation_profiles = {"profile://Admin Issues":{}}

action.notable.param.extract_assets = ["src","dest","dvc","orig_host"]

action.notable.param.extract_identities = ["src_user","user"]



action.notable.param.next_steps = {"version":1,"data":"Recommended following steps:\n\n1. [[action|escu_contextualize]]: Based on ESCU context gathering recommendationsect:\n - ESCU - Get Authentication Logs For Endpoint\n <snip>

action.notable.param.recommended_actions = escu_contextualize,escu_investigate,runphantomplaybook

action.notable.param.next_steps = {"version":1,"data":"Recommended following steps:\n\n1. [[action|escu_contextualize]]: Based on ESCU context gathering recommendationsect:\n <snip> - ESCU - Get Risk Modifiers For User\n - ESCU - Get User Information from Identity Table\n\n2. [[action|escu_investigate]]: Based on ESCU investigate recommendations:\n - ESCU - Get Parent Process Info\n - ESCU - Get Process Info\n"}