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SEC1128: Automate Phishing Response with ES, Phantom, and ML

.conf19

splunk>

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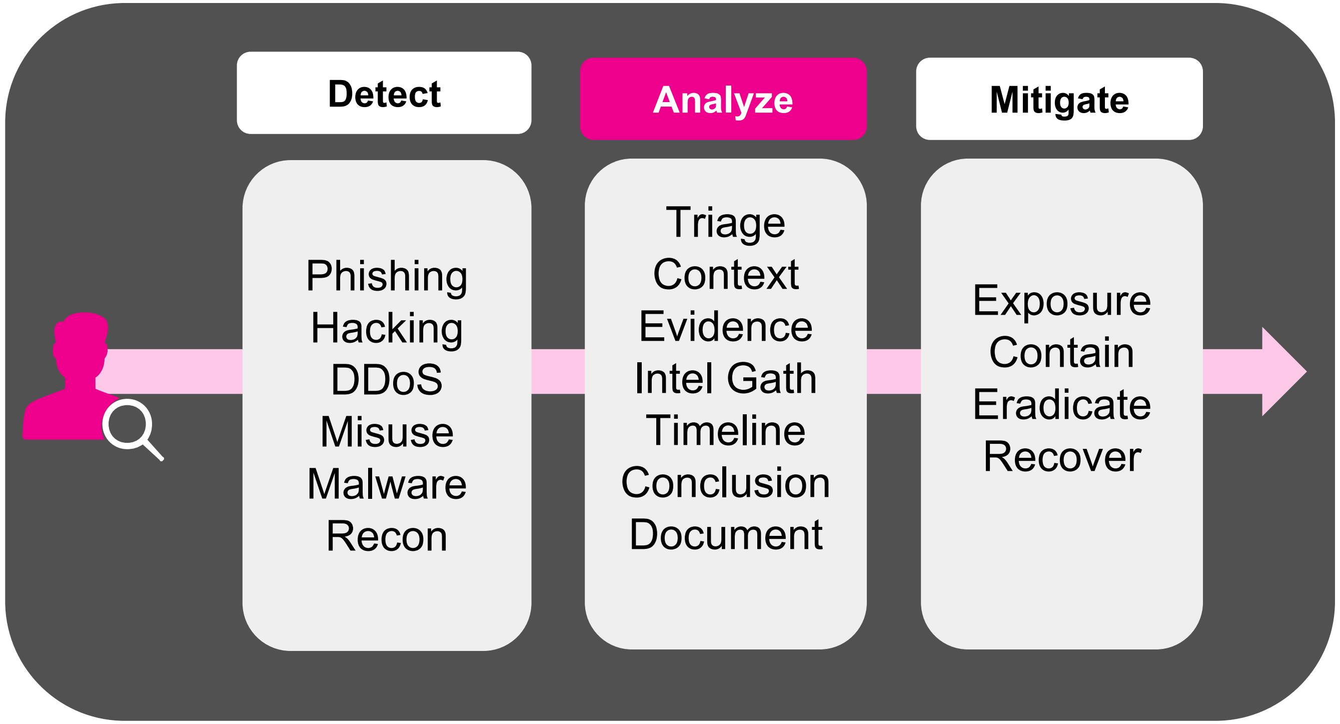
SOC Automation – Acceptable Use Cases

Overview

- Understand the alerts your SOC receives
- Prioritize by dwell time and mitigation importance
- Do analysts follow a standard analytical process?
- Do alerts have high true positive rate?
- Prioritize most repetitive and least amount of logical reasoning
- What are the common type(s) of threats are your analysts investigating?
- Can you easily remove noise/volume with correct tagging/classifications?



Detect

Phishing
Hacking
DDoS
Misuse
Malware
Recon

Analyze

Triage
Context
Evidence
Intel Gath
Timeline
Conclusion
Document

Mitigate

Exposure
Contain
Eradicate
Recover

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Automate Phishing Response

Our Use Case

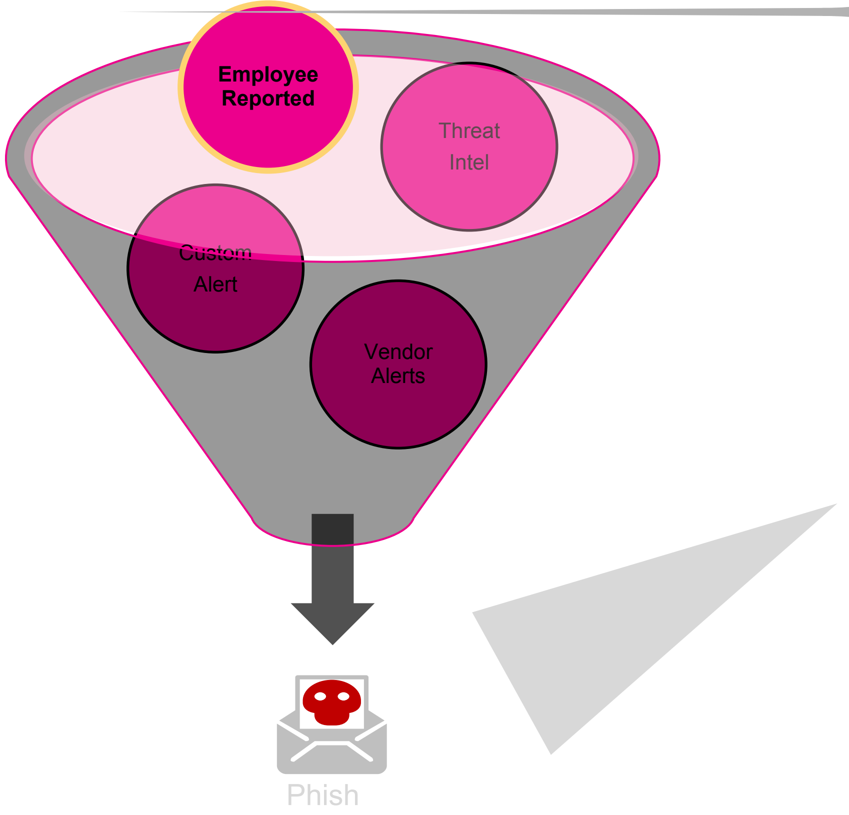
Email is a top attack vector

Dwell time risk from detection to mitigation

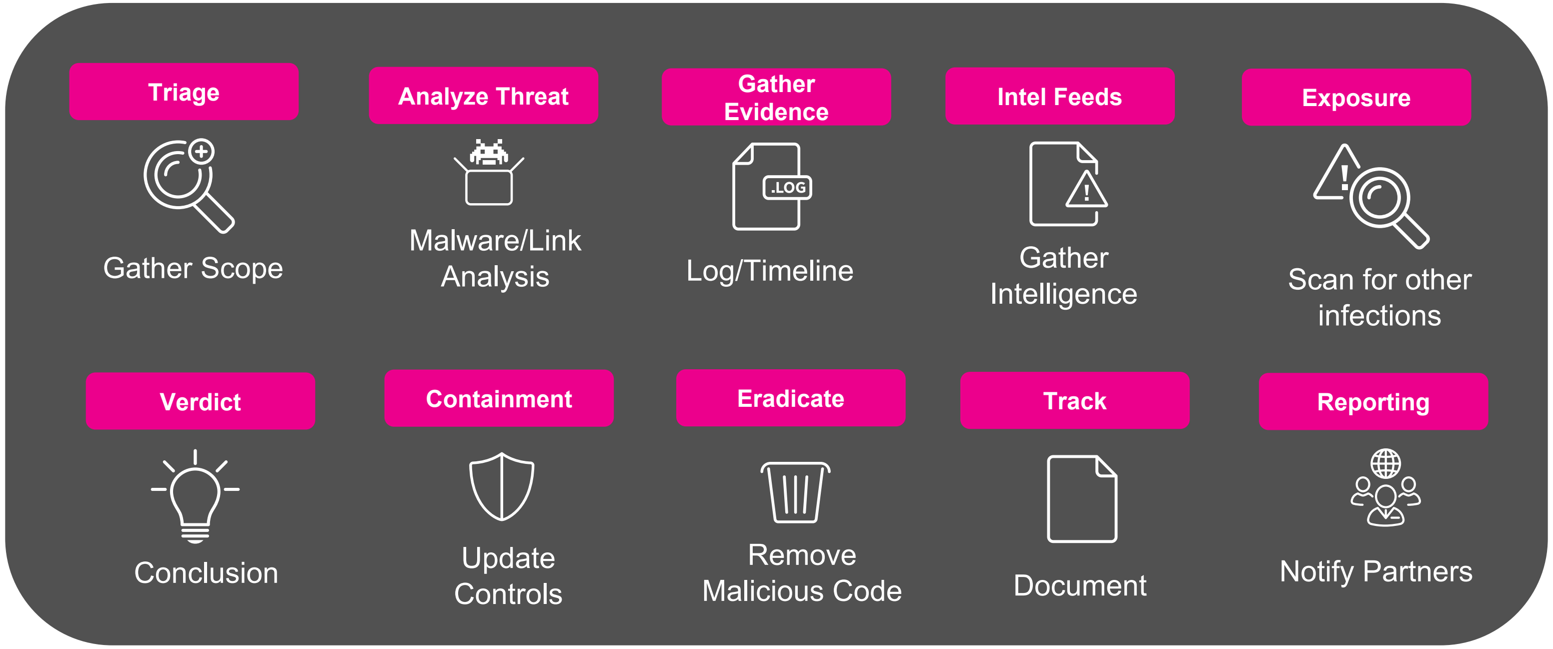
Employees not satisfied with responses

Employees report 30K emails per month on average

Mailbox triage was subjective & manual



Cyber Ops Analysis Steps



Triage: Gather Scope

Analyze Threat: Malware/Link Analysis

Gather Evidence: Log/Timeline

Intel Feeds: Gather Intelligence

Exposure: Scan for other infections

Verdict: Conclusion

Containment: Update Controls

Eradicate: Remove Malicious Code

Track: Document

Reporting: Notify Partners

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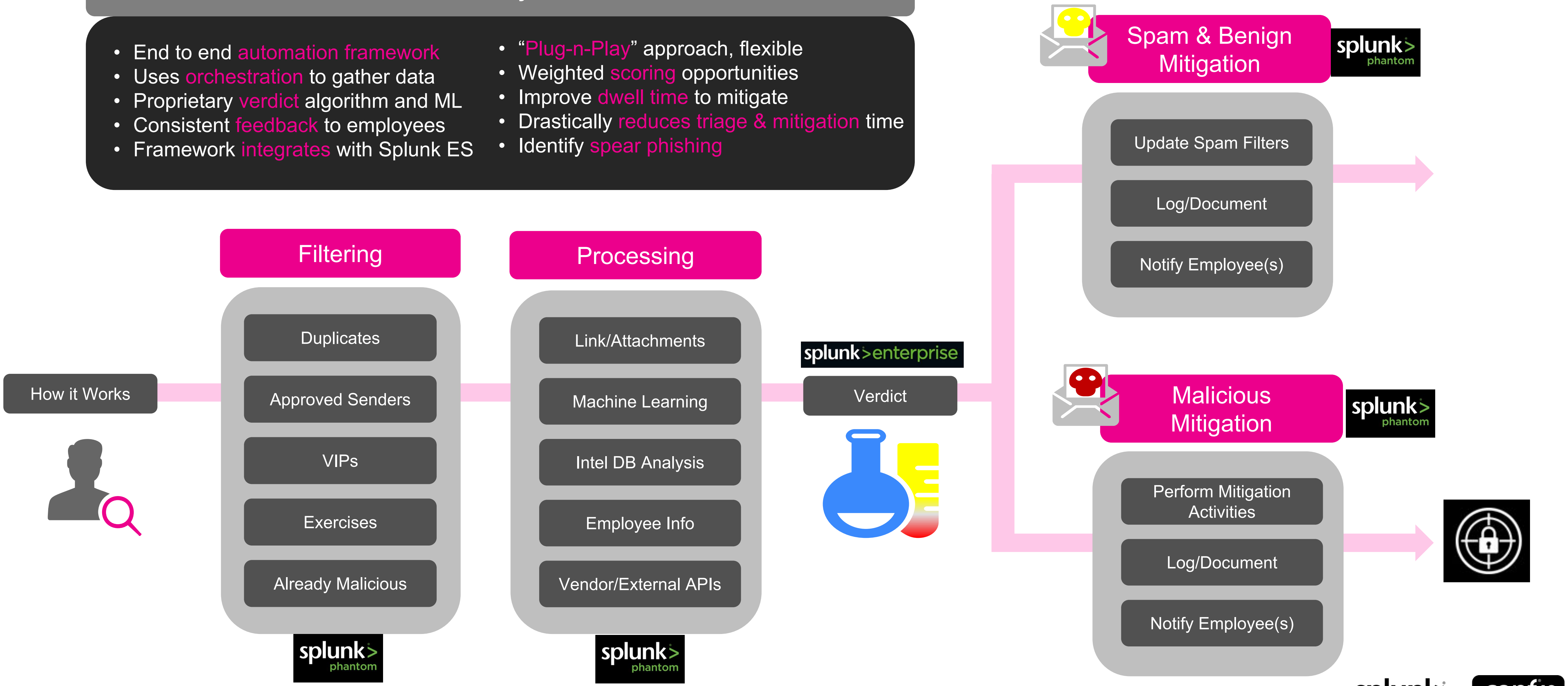
Analysis Framework

Solution & Key Benefits

- End to end automation framework
- Uses orchestration to gather data
- Proprietary verdict algorithm and ML
- Consistent feedback to employees
- Framework integrates with Splunk ES
- “Plug-n-Play” approach, flexible
- Weighted scoring opportunities
- Improve dwell time to mitigate
- Drastically reduces triage & mitigation time
- Identify spear phishing



How it Works

Filtering

- Duplicates
- Approved Senders
- VIPs
- Exercises
- Already Malicious

Processing

- Link/Attachments
- Machine Learning
- Intel DB Analysis
- Employee Info
- Vendor/External APIs

splunk>enterprise

Verdict

Spam & Benign Mitigation

- Update Spam Filters
- Log/Document
- Notify Employee(s)

Malicious Mitigation

- Perform Mitigation Activities
- Log/Document
- Notify Employee(s)

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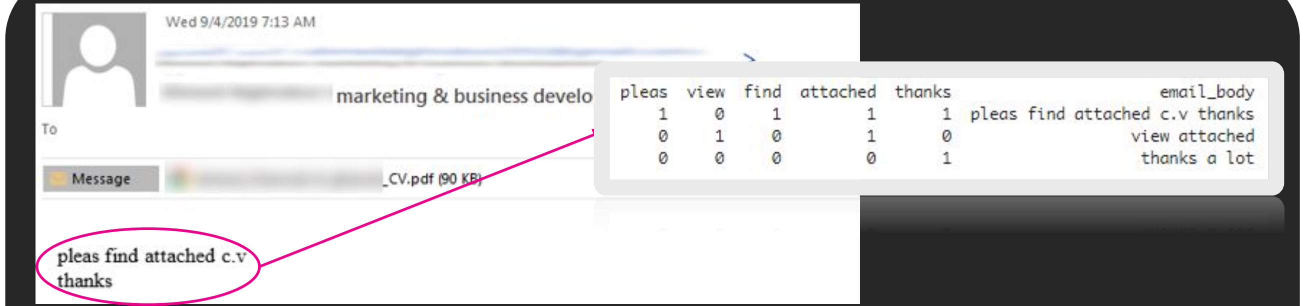
Machine Learning

Overview & Objectives

- **Objective:** Build a model that is capable of recognizing whether a reported email is benign, phishing or spam.
- Email body is extracted from each data example and text is preprocessed and tokenized to be used as the main contributing features to build the model.
- Dataset is randomly split into 80/20 proportion with 80% (~5600) used as training and 20% (~1400) used as test/evaluation set.
- Model is trained using Naïve Bayes algorithm, with an training accuracy score of 81%.
- ML is just one action out of many others that are used in making the final verdict. Final verdicts are always calculated based on the responses from every action.

How it Works



Wed 9/4/2019 7:13 AM

[redacted]

[redacted] marketing & business develo

To

Message [redacted]_CV.pdf (90 KB)

pleas find attached c.v
thanks

```
pleas  view  find  attached  thanks                   email_body
    1     0     1         1       1  pleas find attached c.v thanks
    0     1     0         1       0                    view attached
    0     0     0         0       1                    thanks a lot
```

By the Numbers…

Emails Processed

270,000+

Emails Classified

90,000+

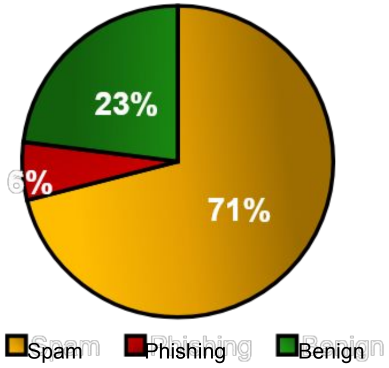
Overall Accuracy

91%

False Negatives

7%

Classification Percentages



Spam Accuracy

96%

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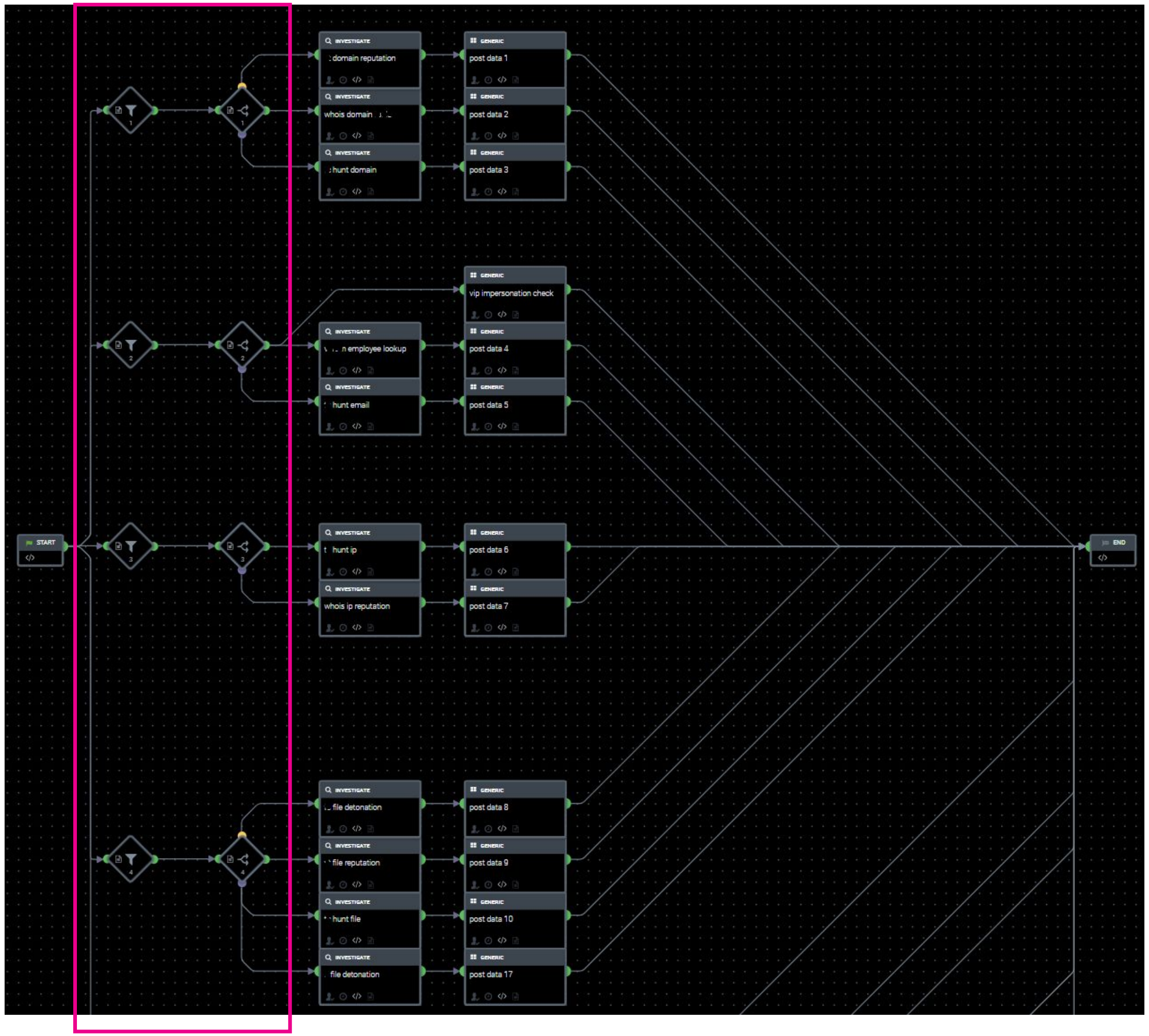
Phantom Playbooks



- Data is parsed and validated
- Data is sent to processing actions per IOC type
- Kill switches allow for certain actions to be enabled/disabled

- Each action has “Plug-n-Play” approach, flexible
- Actions are for gathering data from internal/external tools, not decision making

- Responses from actions are all logged into Splunk following a specific logging pattern
- Logs error handling
- Maps to custom Splunk data model

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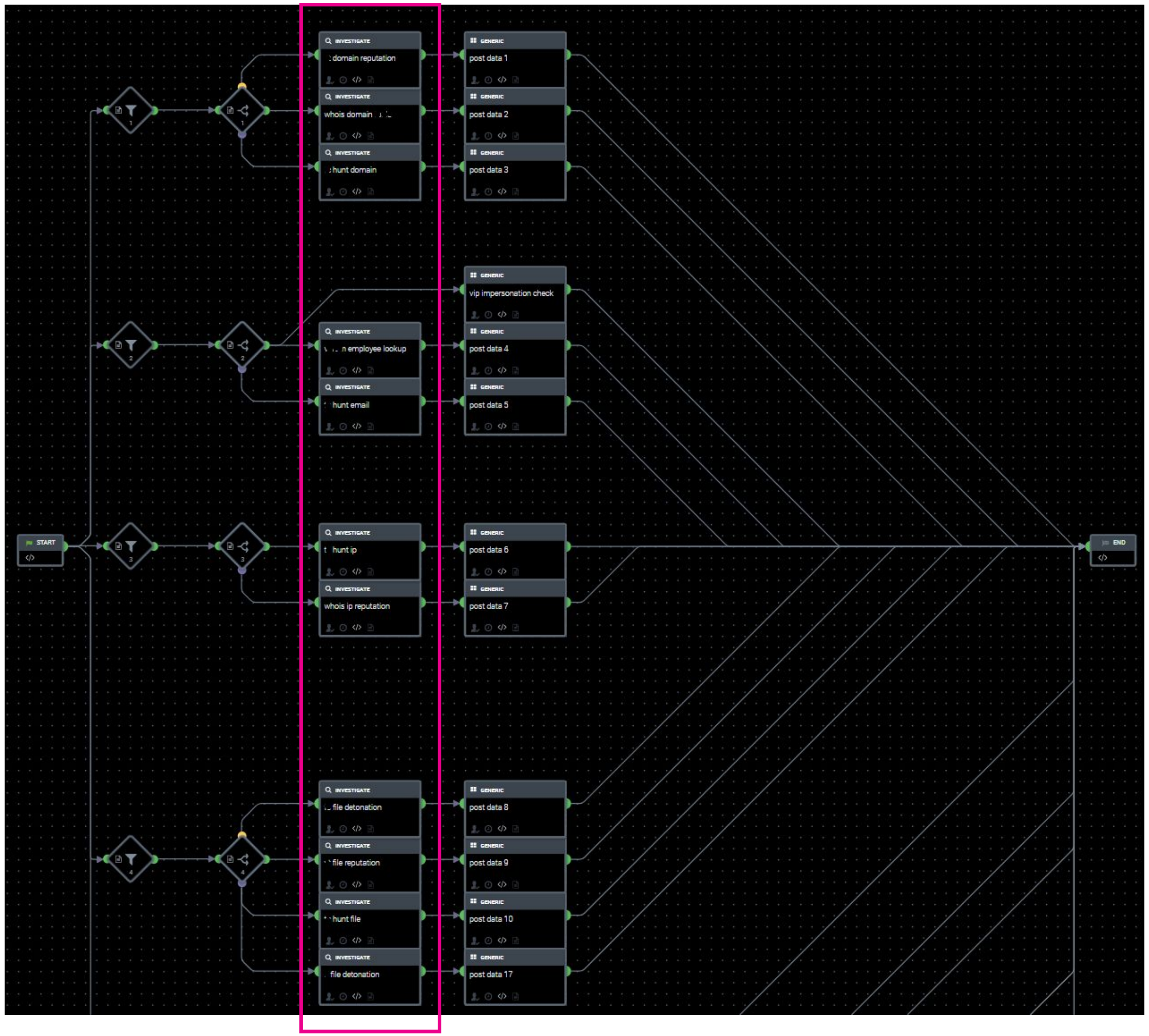
Phantom Playbooks



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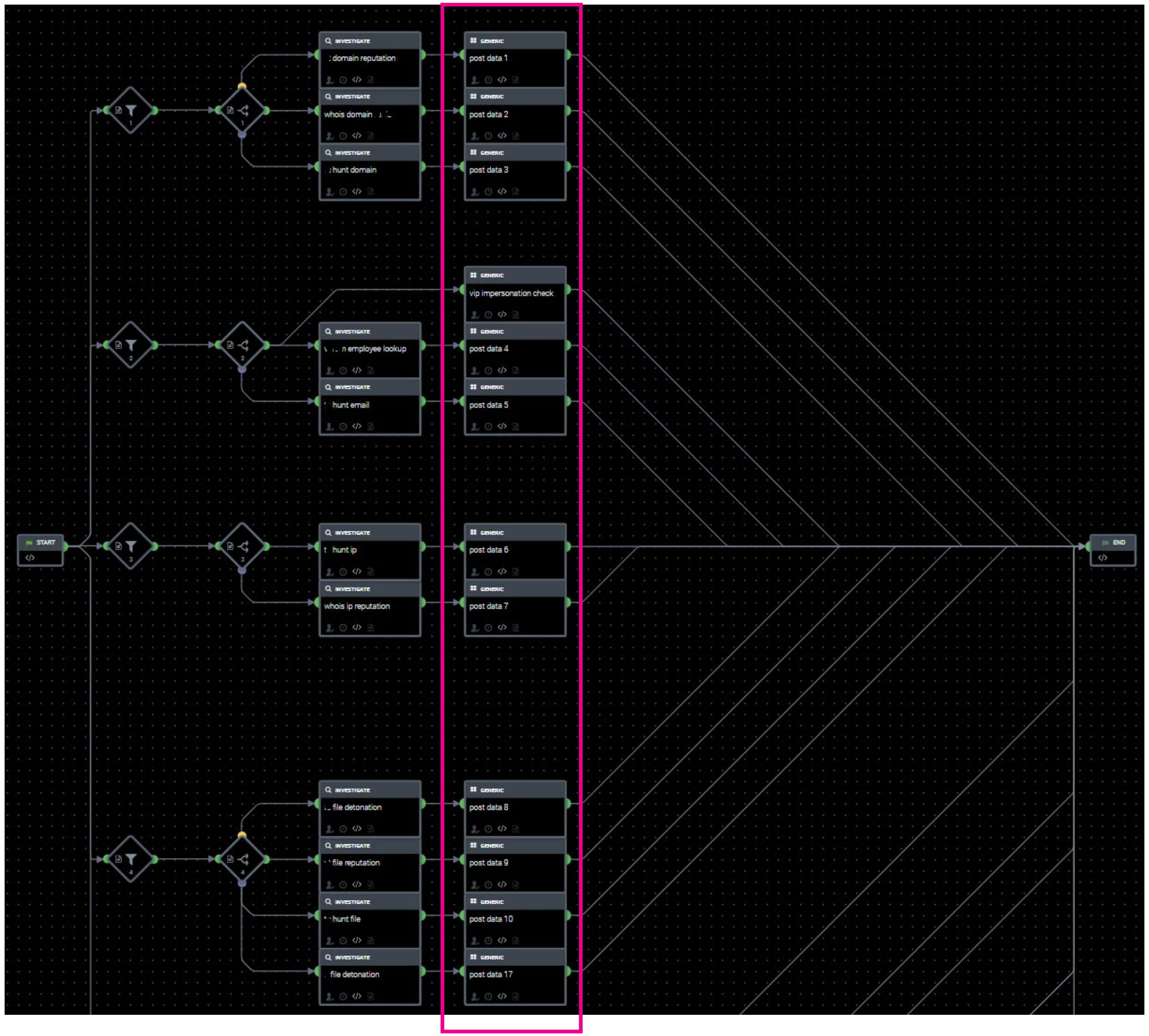

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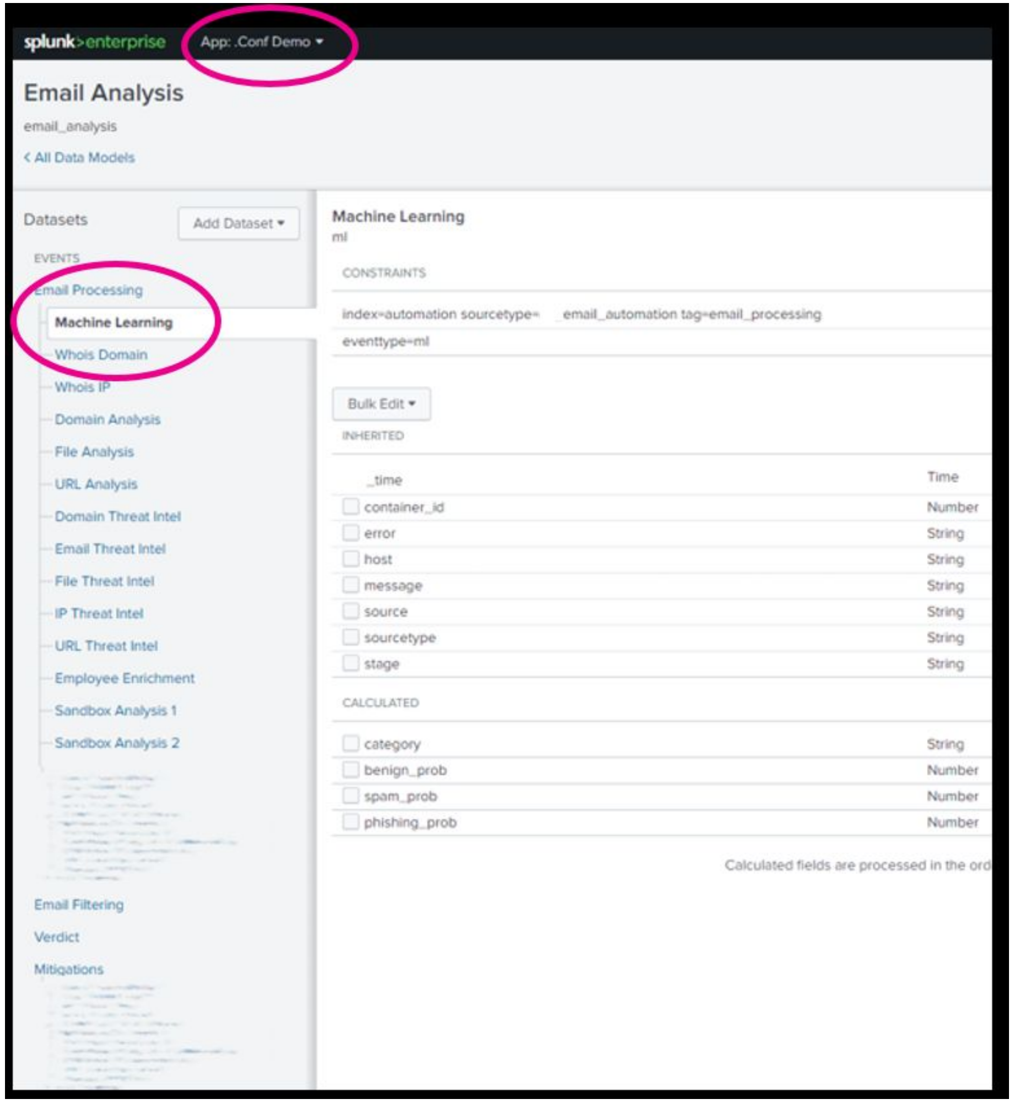
Splunk App & Data Model



Email Analysis

email_analysis

< All Data Models

Datasets

EVENTS

Email Processing

- Machine Learning
- Whois Domain
- Whois IP
- Domain Analysis
- File Analysis
- URL Analysis
- Domain Threat Intel
- Email Threat Intel
- File Threat Intel
- IP Threat Intel
- URL Threat Intel
- Employee Enrichment
- Sandbox Analysis 1
- Sandbox Analysis 2

[redacted]

Email Filtering

Verdict

Mitigations

[redacted]

Machine Learning

ml

CONSTRAINTS

```
index=automation sourcetype=   email_automation tag=email_processing
eventtype=ml
```

INHERITED

_time	Time
□ container_id	Number
□ error	String
□ host	String
□ message	String
□ source	String
□ sourcetype	String
□ stage	String

CALCULATED

□ category	String
□ benign_prob	Number
□ spam_prob	Number
□ phishing_prob	Number

Calculated fields are processed in the ord

- Phantom is the orchestration portion and Splunk is the decision engine.
- All knowledge objects related to the framework are stored in its own app on Splunk Enterprise (ex. data models, alerts, dashboards, etc.).
- Each Phantom action is organized into a custom Splunk Data Model that is used to standardize logging patterns, probabilities, verdicts and mitigations.

- The container ID is the unique identifier for each email and tracks all processing, verdict, and mitigations activities.
- Each action has a calculated score that determines the probability of the results contributing to the email being spam, phishing, or benign.
- A custom verdict algorithm is used to make a final decision based on every action that returned results.

- Once the verdict is determined, alerts will trigger pre-determined mitigation playbooks and/or trigger a notable event to be triaged in Enterprise Security.
- All mitigation and processing activities for phishing events are logged and tracked in an internal case management system.

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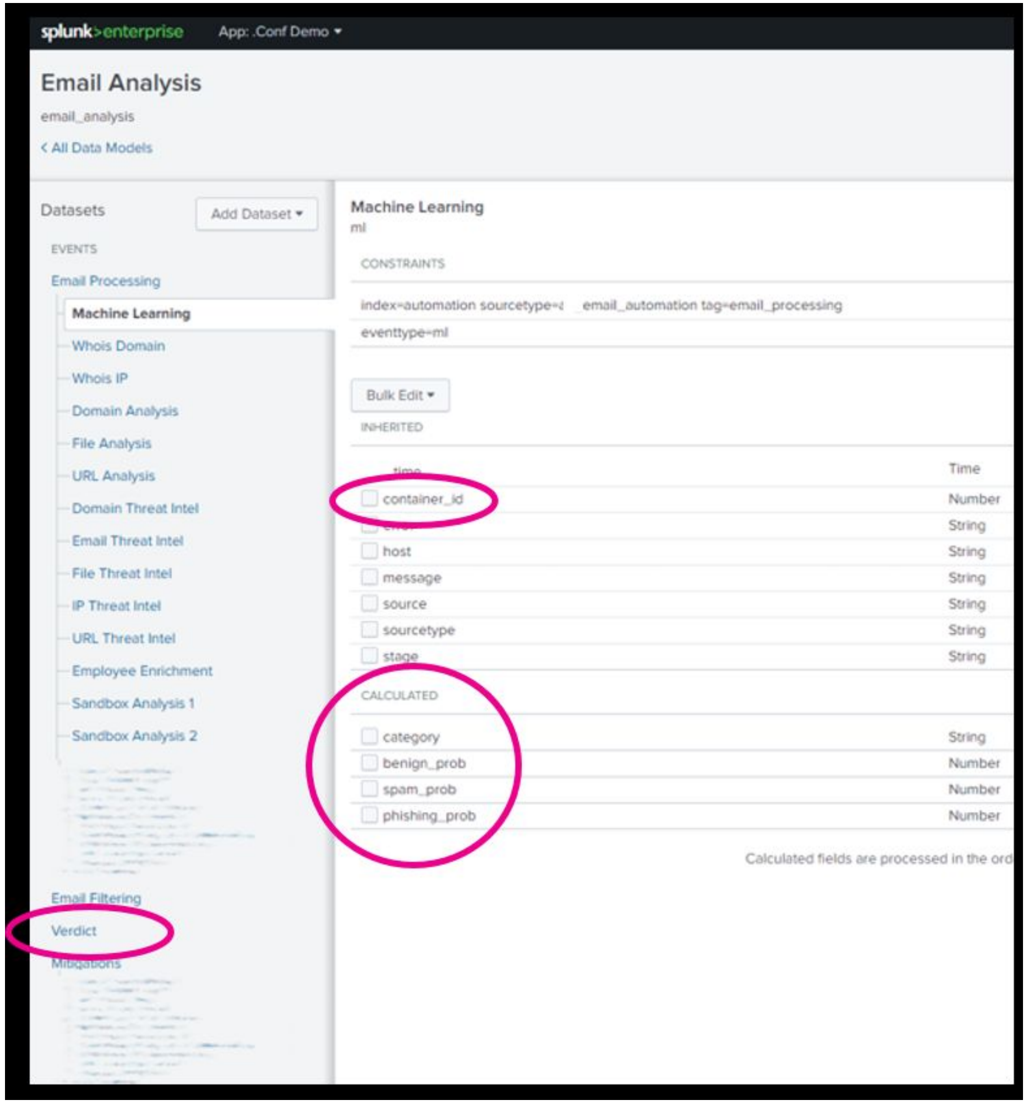

Email Analysis

email_analysis

< All Data Models

Datasets · Add Dataset ▾

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  - Whois IP
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  - File Analysis
  - URL Analysis
  - Domain Threat Intel
  - Email Threat Intel
  - File Threat Intel
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  - Employee Enrichment
  - Sandbox Analysis 1
  - Sandbox Analysis 2
  - [redacted]
- Email Filtering
- Verdict
- Mitigations
  - [redacted]

Machine Learning

ml

CONSTRAINTS

index=automation sourcetype=[illegible] email_automation tag=email_processing

eventtype=ml

Bulk Edit ▾

INHERITED

_time	Time
□ container_id	Number
□ [illegible]	String
□ host	String
□ message	String
□ source	String
□ sourcetype	String
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CALCULATED

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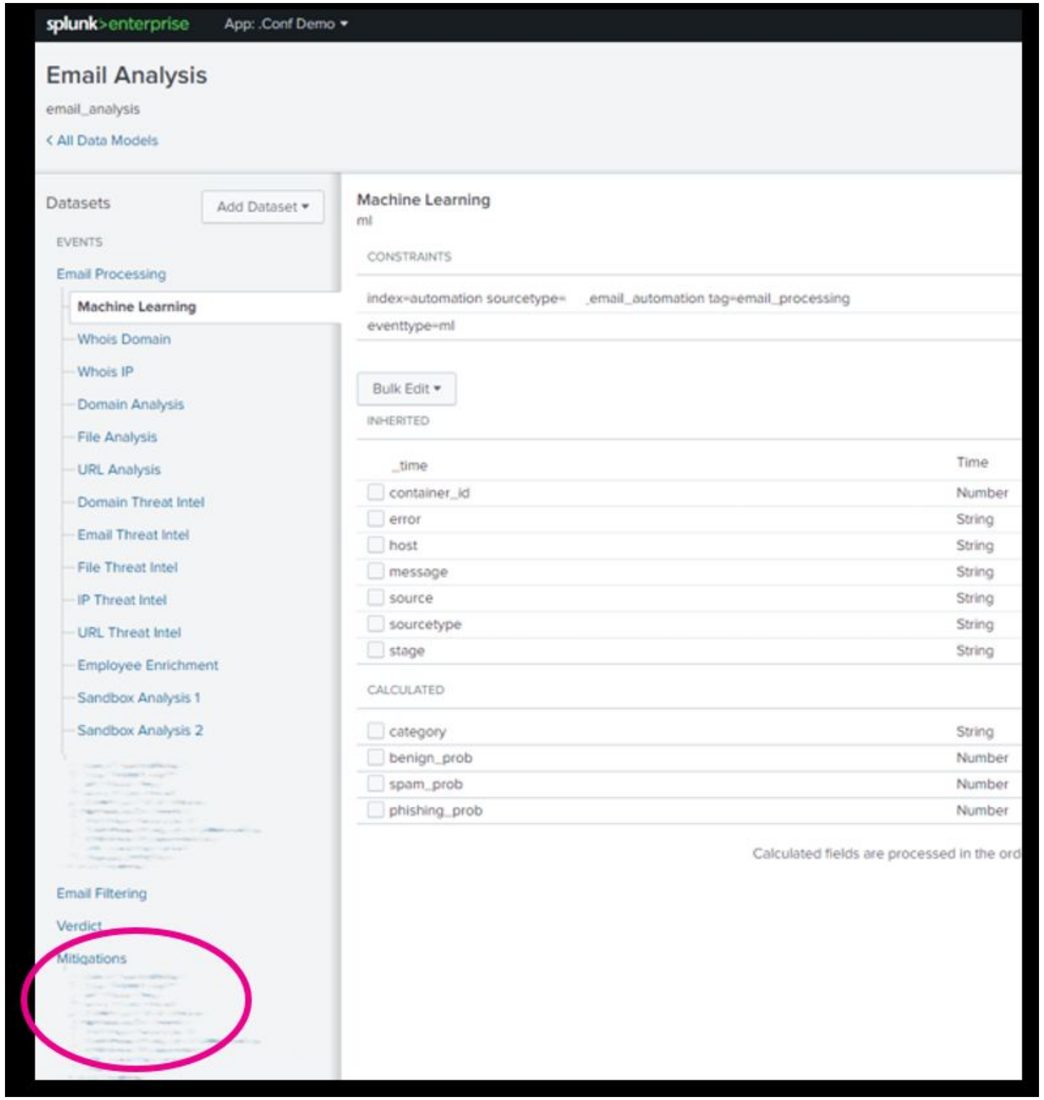

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email_analysis

‹ All Data Models

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Machine Learning

ml

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eventtype=ml

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DEMO

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