Re-writing the CSIRT Playbook

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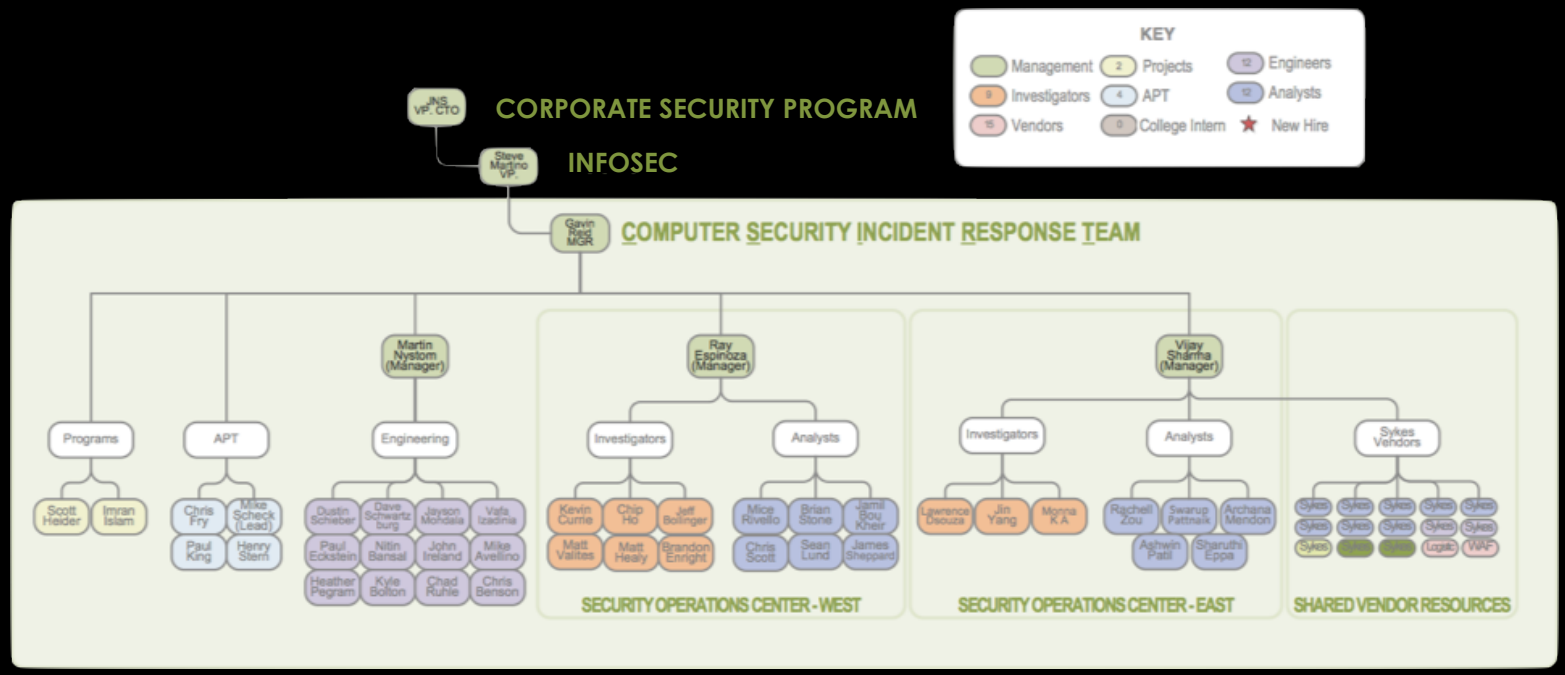


54 CSIRT members

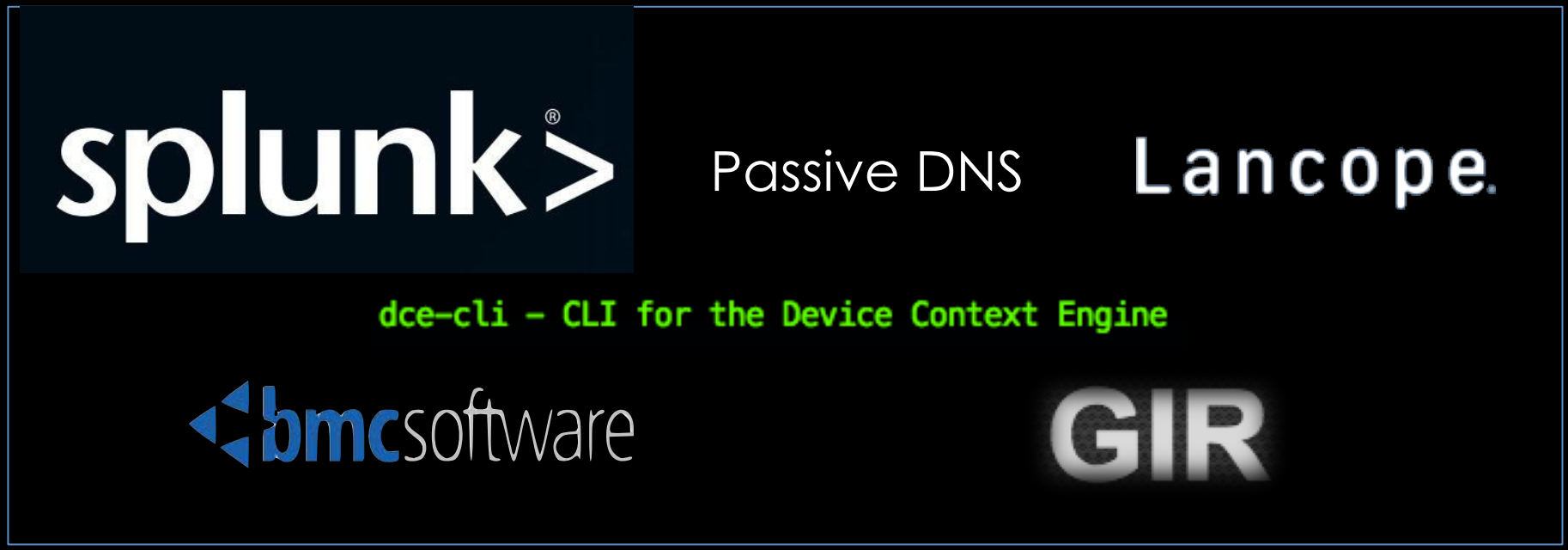
19 Data Sources

splunk > 1TB Data Indexed / Day

NetFlow: 15.6 Billion flows / day

```
;; QUESTION SECTION:
;first.org.                     IN      A
```

2.5 Trillion DNS lookups / Day



Multiple Data Repositories

Our Mission

Mission:

- Protect Cisco by developing security monitoring architecture and strategy
- Respond to security threats using ad-hoc and **prescribed methods** of incident detection and response

How did we get here?

Effective CIRTs **must** evolve with changes in the cyber threat landscape to remain relevant.

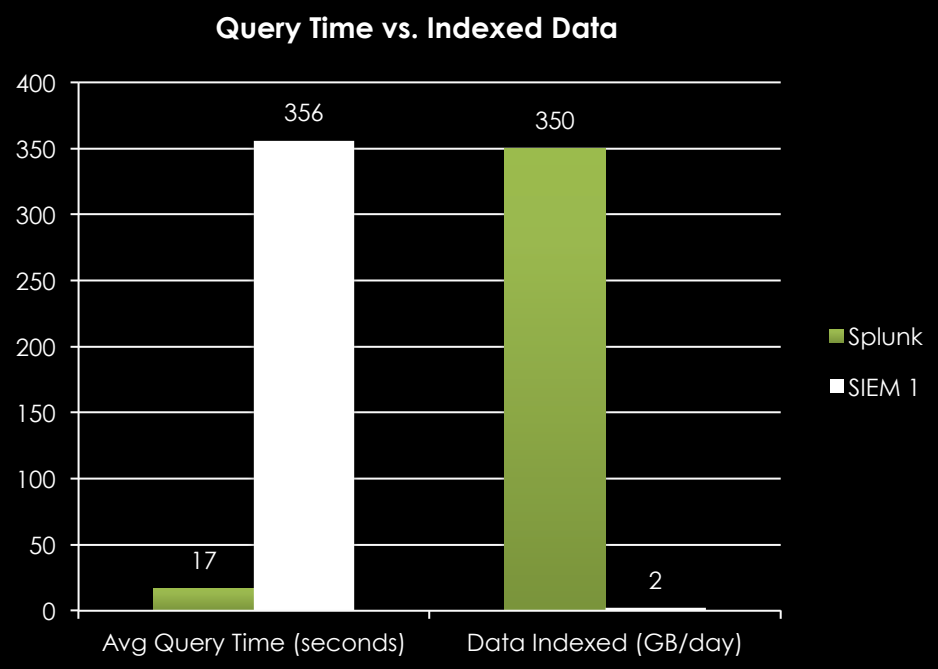
Over the last 11 years:

- Organic evolution
- Team growth
- Dramatic increase in value and scope of service offering

More information, more problems

My Data is Bigger

Index	Total Count (24 hours)
syslog	2,196,902,891
ad	1,054,349,972
wsa	426,229,009
acns	228,283,446
esa	49,836,291
dhcp	20,734,821
vpn	17,340,902
acs	15,785,442
ids	2,907,842
csa	682,527
edcs	549,044
sinkhole	282,399
dns	168,460
epo	42,775
fireeye	4,797
altiris	349

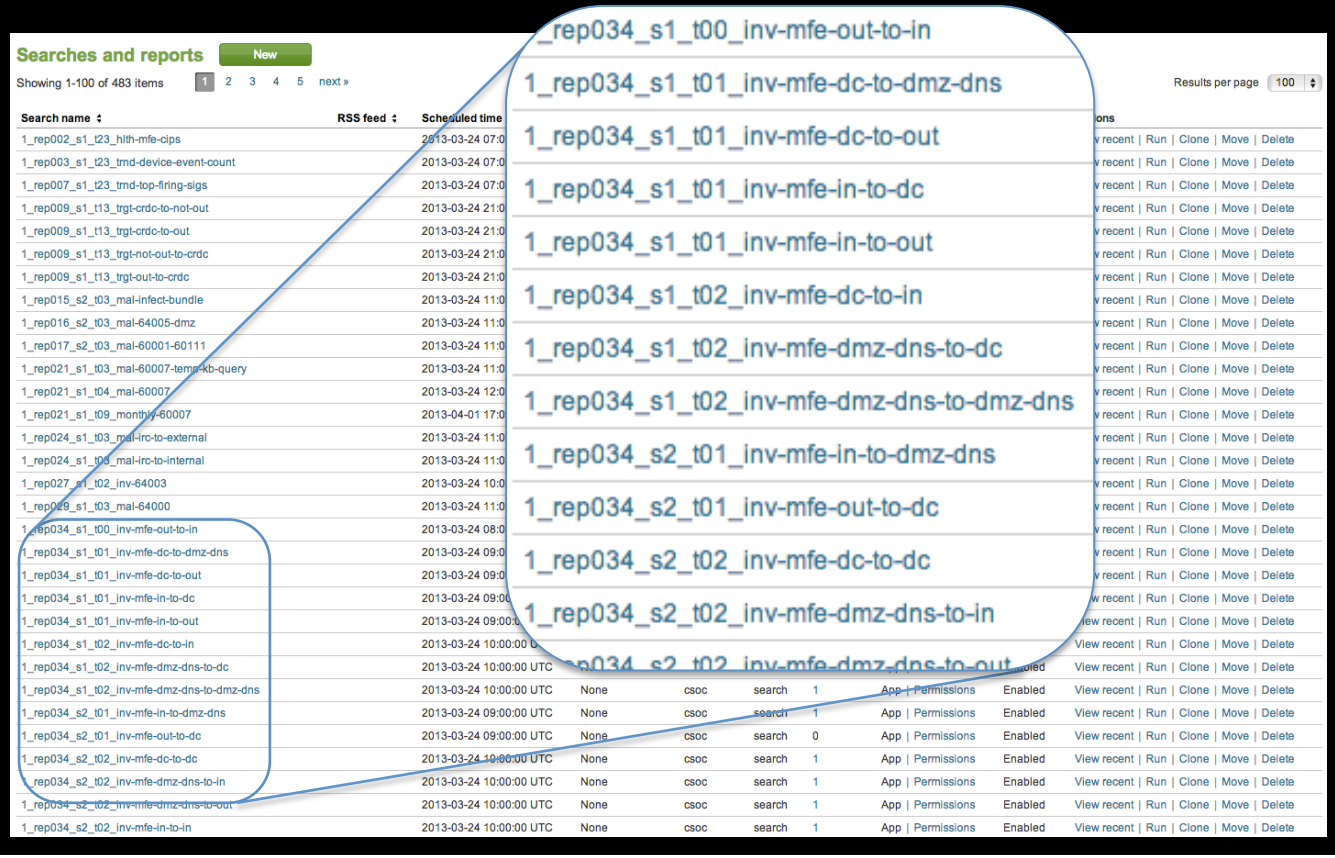


My Data is Bigger

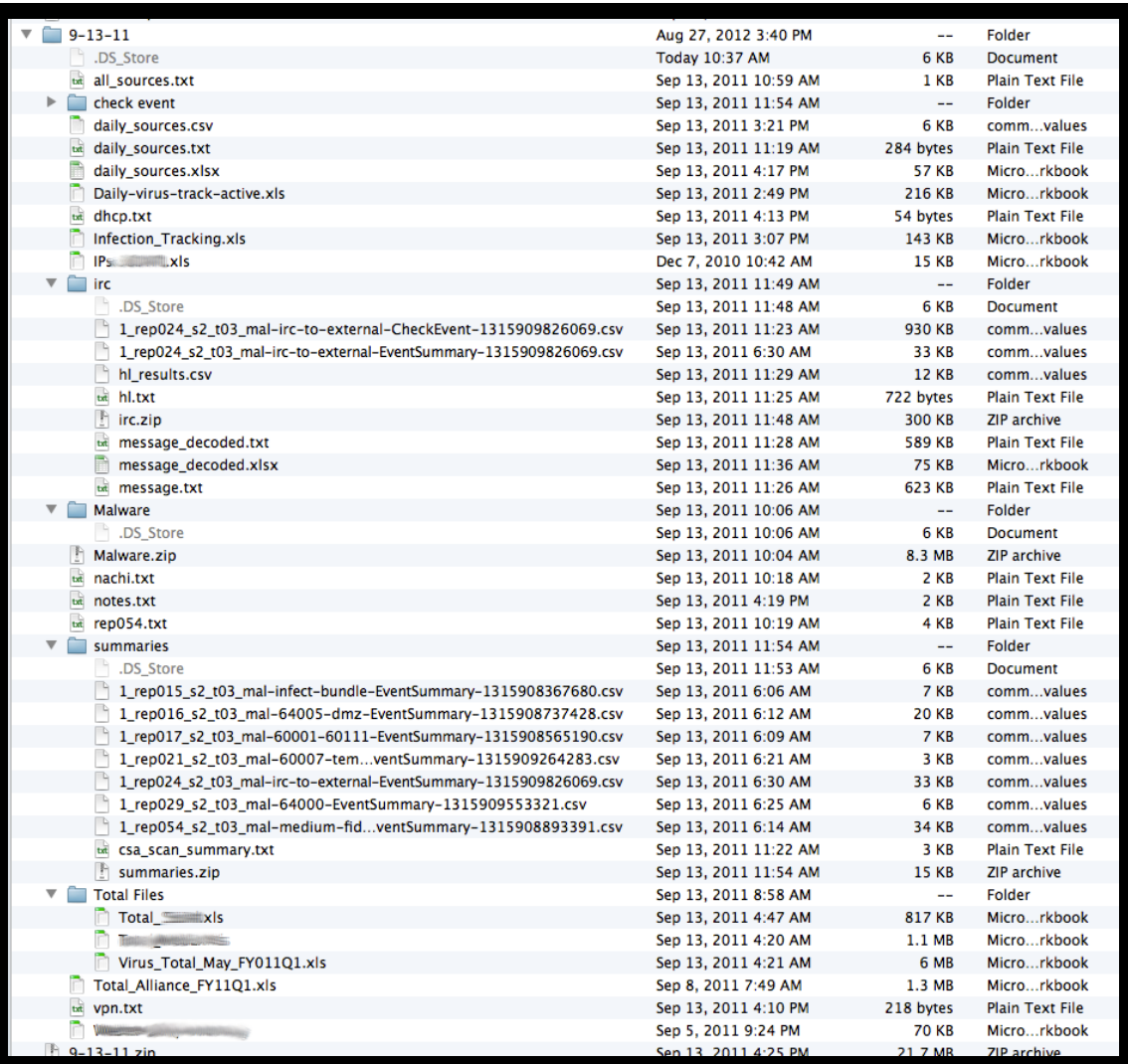
The old way:

- Buy and trust a SIEM to run canned reports
- Wait for updates from the vendor

Scaling Problems



- SEIM unable to process reports during an analyst's shift
- Reports broken into multiple smaller 'directional based reports'
- Inefficient way to process data
- Led to inefficiency



9-13-11	Aug 27, 2012 3:40 PM	--	Folder
.DS_Store	Today 10:37 AM	6 KB	Document
all_sources.txt	Sep 13, 2011 10:59 AM	1 KB	Plain Text File
check event	Sep 13, 2011 11:54 AM	--	Folder
daily_sources.csv	Sep 13, 2011 3:21 PM	6 KB	comm...values
daily_sources.txt	Sep 13, 2011 11:19 AM	284 bytes	Plain Text File
daily_sources.xlsx	Sep 13, 2011 4:17 PM	57 KB	Micro...rkbook
Daily-virus-track-active.xls	Sep 13, 2011 2:49 PM	216 KB	Micro...rkbook
dhcp.txt	Sep 13, 2011 4:13 PM	54 bytes	Plain Text File
Infection_Tracking.xls	Sep 13, 2011 3:07 PM	143 KB	Micro...rkbook
IP[redacted].xls	Dec 7, 2010 10:42 AM	15 KB	Micro...rkbook
irc	Sep 13, 2011 11:49 AM	--	Folder
.DS_Store	Sep 13, 2011 11:48 AM	6 KB	Document
1_rep024_s2_t03_mal-irc-to-external-CheckEvent-1315909826069.csv	Sep 13, 2011 11:23 AM	930 KB	comm...values
1_rep024_s2_t03_mal-irc-to-external-EventSummary-1315909826069.csv	Sep 13, 2011 6:30 AM	33 KB	comm...values
hl_results.csv	Sep 13, 2011 11:29 AM	12 KB	comm...values
hl.txt	Sep 13, 2011 11:25 AM	722 bytes	Plain Text File
irc.zip	Sep 13, 2011 11:48 AM	300 KB	ZIP archive
message_decoded.txt	Sep 13, 2011 11:28 AM	589 KB	Plain Text File
message_decoded.xlsx	Sep 13, 2011 11:36 AM	75 KB	Micro...rkbook
message.txt	Sep 13, 2011 11:26 AM	623 KB	Plain Text File
Malware	Sep 13, 2011 10:06 AM	--	Folder
.DS_Store	Sep 13, 2011 10:06 AM	6 KB	Document
Malware.zip	Sep 13, 2011 10:04 AM	8.3 MB	ZIP archive
nachi.txt	Sep 13, 2011 10:18 AM	2 KB	Plain Text File
notes.txt	Sep 13, 2011 4:19 PM	2 KB	Plain Text File
rep054.txt	Sep 13, 2011 10:19 AM	4 KB	Plain Text File
summaries	Sep 13, 2011 11:54 AM	--	Folder
.DS_Store	Sep 13, 2011 11:53 AM	6 KB	Document
1_rep015_s2_t03_mal-infect-bundle-EventSummary-1315908367680.csv	Sep 13, 2011 6:06 AM	7 KB	comm...values
1_rep016_s2_t03_mal-64005-dmz-EventSummary-1315908737428.csv	Sep 13, 2011 6:12 AM	20 KB	comm...values
1_rep017_s2_t03_mal-60001-60111-EventSummary-1315908565190.csv	Sep 13, 2011 6:09 AM	7 KB	comm...values
1_rep021_s2_t03_mal-60007-tem...ventSummary-1315909264283.csv	Sep 13, 2011 6:21 AM	3 KB	comm...values
1_rep024_s2_t03_mal-irc-to-external-EventSummary-1315909826069.csv	Sep 13, 2011 6:30 AM	33 KB	comm...values
1_rep029_s2_t03_mal-64000-EventSummary-1315909553321.csv	Sep 13, 2011 6:25 AM	6 KB	comm...values
1_rep054_s2_t03_mal-medium-fid...ventSummary-1315908893391.csv	Sep 13, 2011 6:14 AM	34 KB	comm...values
csa_scan_summary.txt	Sep 13, 2011 11:22 AM	3 KB	Plain Text File
summaries.zip	Sep 13, 2011 11:54 AM	15 KB	ZIP archive
Total Files	Sep 13, 2011 8:58 AM	--	Folder
Total_[redacted].xls	Sep 13, 2011 4:47 AM	817 KB	Micro...rkbook
[redacted]	Sep 13, 2011 4:20 AM	1.1 MB	Micro...rkbook
Virus_Total_May_FY011Q1.xls	Sep 13, 2011 4:21 AM	6 MB	Micro...rkbook
Total_Alliance_FY11Q1.xls	Sep 8, 2011 7:49 AM	1.3 MB	Micro...rkbook
vpn.txt	Sep 13, 2011 4:10 PM	218 bytes	Plain Text File
[redacted]	Sep 5, 2011 9:24 PM	70 KB	Micro...rkbook
9-13-11.zip	Sep 13, 2011 4:25 PM	21.7 MB	ZIP archive

- Static and inflexible
- Performance
- Expensive
- Limited
- Compatibility
- Retention

My Data is Bigger

The new way:

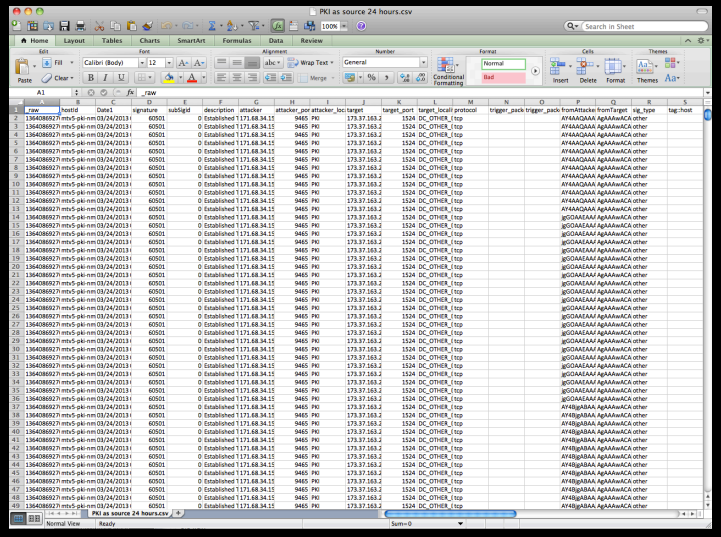
- Build your own collection infrastructure
- Build your own reports
- Research your own intelligence
- Operationalize and optimize

Dependencies

- Requires good architecture and a plan
- Requires smart people
- Scale and efficacy
- Data management

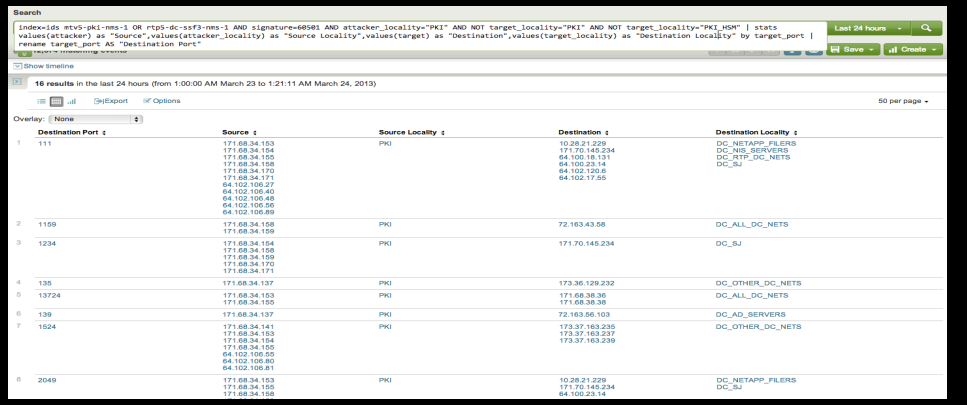
The New Way

Previously



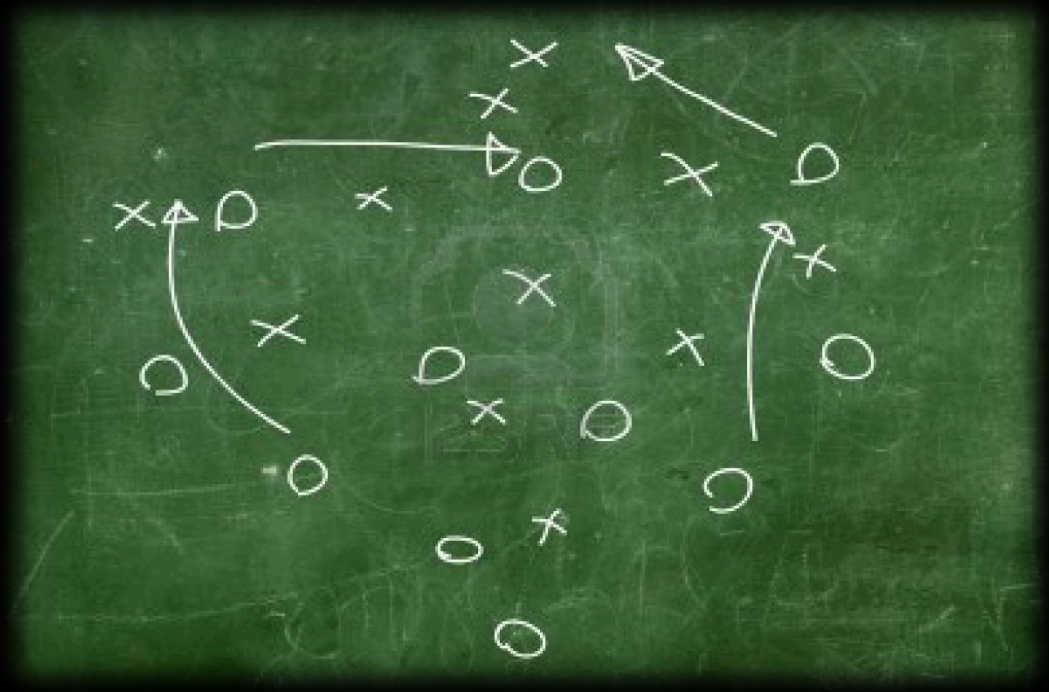
- 112,374 results
- Analyzed in Excel

Currently



- 16 results
- Analyzed in Splunk
- Formats data during search

The Playbook



What is a playbook?

playbook |ˈplāˌbŏk|
noun
A prescriptive collection of repeatable queries (reports) against security event data sources that lead to incident detection and response.

0100003-HF-IDS-MALWARE:BOT-C2

Objective:

Discover and report botnet infected hosts for remediation and enhance future detection.

Working:

*index="**ids**" earliest=-10m tag=**HF-IDS** NOT (tag=**IN_DNS** OR tag=**DC_MBOX** | stats count by host | sort -count limit=50 | rename attacker AS C2 | `csirtTable` | `makeAcaseHF` | `botSquash(C2)`*

Action:
Case generated into auto-remediation queue: **CSIRT-Analysts-HF**

Analysis: The generated report is high fidelity – if an IRC Join is detected, verify the NICK is computer generated. These events require the reimage malware remediation process. If the bot matches the Infostealer List, email client password update instructions. If a the client address matches the VIP list, those hosts must be escalated to the on-duty investigator.

Reference: wiki/10012, bugzilla:576, GIR: n/a

Where do I Begin?

- What am I trying to protect?
- What are the threats?
- How do I detect them?
- How do we respond?

IR Fundamentals

- Develop requirements on frequency, priority, and scope
- Ensure basic requirements:
    - Solid systems of record
    - Complete traffic inspection coverage
    - Proper communication channels
    - Ensure proper remediation controls
    - Enforceable policies
- If you can build a good query, you can find malware, infected systems, and dedicated attackers
- If you can't automate, investigate

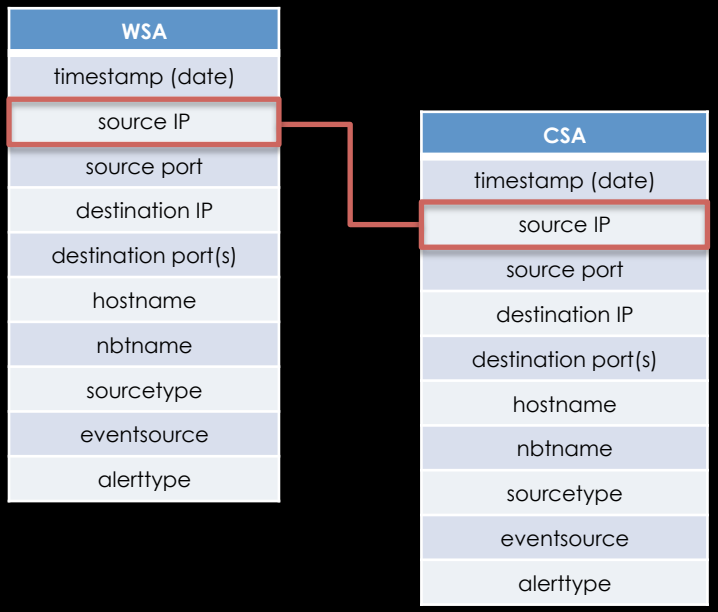
The Playbook MUST:

- Detect malware infected machines
- Detect suspicious network activity
- Detect anomalous authentication attempts
- Describe and understand inbound AND outbound traffic
- Provide custom views into certain environments

Additionally:

- Provide summary information including trends, statistics, counts
- Provide usable and quick access to statistics and metrics
- Correlate events across all relevant data sources

Correlation



Why?
- Attribution
- Confirmation
- Temporal correlation
- Concurrent multi-index search ("sub-search")

How?
- Union
- Join

0800001-INV-MULTI-MALWARE:WSA validation of attempted CSA network connections

Objective:

Searches HIDS for outgoing tcp/80 connections and uses those IPs to find corresponding WSA logs to determine if the HIDS detected connection was malicious or not.

Working:

```
index="wsa" x_wbrs_threat_type="*" (NOT (cs_referer="*")) [search
index="csa" "attempted to initiate a connection as a client on TCP port 80" "allowed" |
  rex "on TCP port 80 to (?<csa_dst_ip>\d+\.\d+\.\d+\.\d+) using" |
  dedup csa_dst_ip |
  rename csa_dst_ip AS s_ip |
  fields s_ip] |
rex field=cs_url "http:\/\/(?<domain>[^\/]+)" |
rex field=cs_url "\/(?<script_name>[^\/\?]+)(?=$|\?)" |
dedup script_name |
dedup domain |
dedup c_ip |
dedup cs_url
```

Action:
Manual investigation. Analysis may result in submitting a host for remediation.

Analysis: Investigate whether HIDS detected connections may be a sign of an infected host by reviewing the WSA SIO data and any additional event indicators.

Reference: wiki/10103, bugzilla:6742, GIR: n/a

How do we know you're working?

METRICS!

- Top events fired per event source
- Top malicious domain
- Total infected hosts
- Top malware type/family
- Highest areas of infection (lab, DC, DMZ, etc.)
- Infections by theatre
- Infection by role/org (sales, engineering, marketing, etc.)
- Event rates and collection stats (total volume of alarms, then alarms by source, index/filesize avg/day)
- Unique user counts avg/day
- Total attacks blocked by CSIRT
- Top infections by event source (event source detection ranking)

Yeah, but how **exactly** do we do it?

Malware/Advanced Detection
e.g. Phishing URLs in email

Anomaly Detection
e.g. Two VPN logins from a single user

Policy-driven monitoring:
e.g. Flows from datacenter to Internet

Operational intelligence:
e.g. Malware analysis for indicator discovery

You can help!

- FIRST standard
- Information sharing – how do **YOU** detect threats?
- Strategy sessions (network agnostic)

Q/A

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