#FIRSTCON24

A Recipe for Improving SecOps Detections

Take Three Security Controls, Add a Tablespoon of Threat Intelligence and Let it Rise

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SIEM/SecOps space since 2004

- SecOps, Threat Hunting, Detection Engineering, Threat Intelligence

Focus on content development

Build adversary emulations around APT actors

Blog - New to Google SecOps

Enjoy Alt80s “sad-timey” music

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At Inception…

Organizations often start with a set of logs/events

Good intentions to detect badness

Maybe a few use cases

Over Time, Things Change

Organizations collect more

Good intentions to detect badness

Upkeep of those initial detection use cases and existing rules

Probably want to add new detection use cases and rules

Can't We Just Keep Adding Use Cases and Rules and Move Along?

Investment from legacy tech – Detections from 5 years and perhaps 2 SIEMs ago

Do the use cases align to my tools?

Are some of those use cases and rules built based on the strengths (or weaknesses) of the previous technology?

Do those use cases still apply to my business processes and risk tolerance?

Can I Just (Buy|Download) My Use Cases/Rules?

Loads of detection rules exist in the public domain

Businesses are built around building and selling detections

Do they apply to our organization?

- Align with our tooling?
- Align with our risk posture?
- Align to the threats we face?

Use these resources as enablers

Agenda

Approaches to Emulation

Considerations When Crafting Your Emulation

Building Detections

Adversary Simulation v Emulation

Simulation

- Focus on evaluating defenses against general attack patterns & behaviors
- Identify potential vulnerabilities and weaknesses that could be exploited
- Less focused on specific adversaries

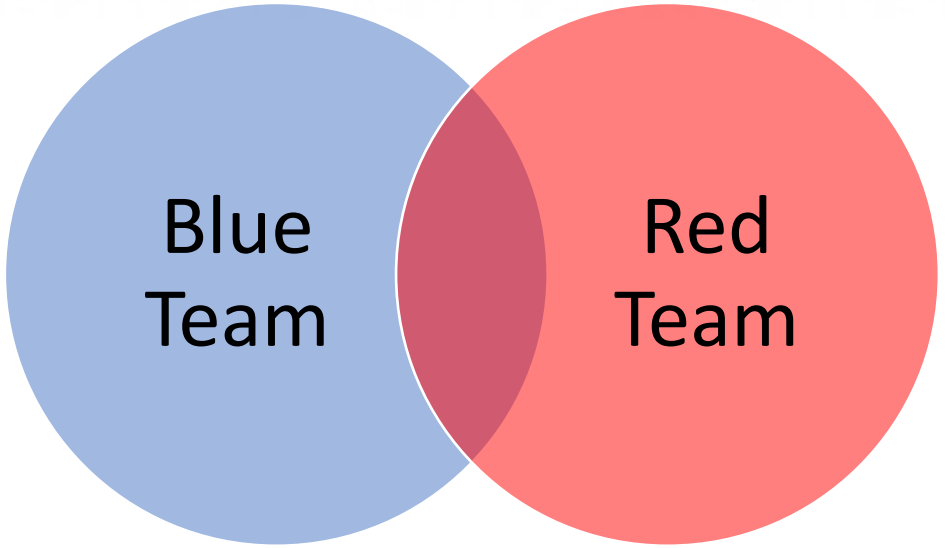
Emulation

- Mimic specific TTPs
- Attempt to replicate the attack lifecycle of an adversary

Methods to Simulate/Emulate

Purple Teams – Fusion of attackers and defenders collaborating

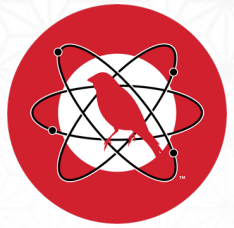
- Focus on the threats we care about
- Can be personnel intensive
- Red team component brings SME and assistance to secure the organization



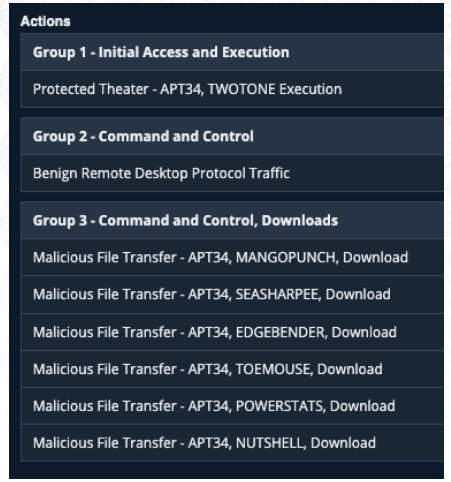
Automated Red Teams

- Automation can be good
- Do these align to the threats facing the organization?
- Do they help uplevel the defenders once they are complete?

What Are We Trying To Accomplish?



Atomic Detections



Action -> Atomic detection

- Relatively easy to setup and execute
- Specific detection for a specific concern

Sequence/ Unit Tests

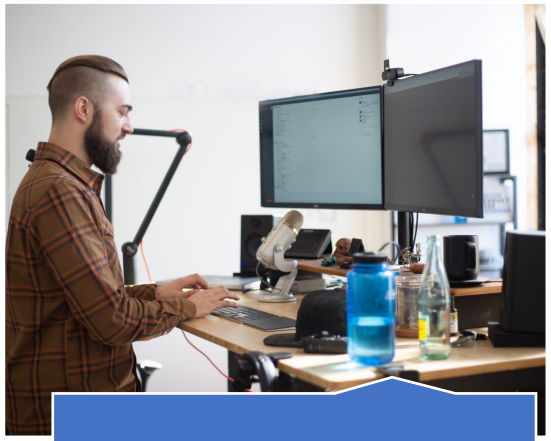
End to End Scenario

- Can get complex
- Lots to build and test depending on scope
- Loads of potential to better understand a specific adversary
- Detections can be across a broad continuum versus atomic detections
    - Chaining detection X with Z is consequential but not with Y
    - Helpful for analysts to understand threats more broadly

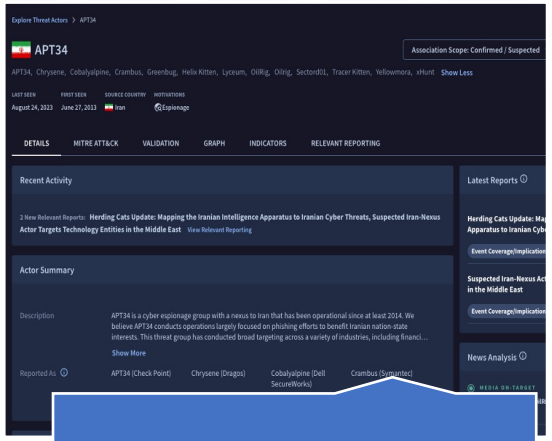
End to End Scenario

If You Decide To Build End to End…

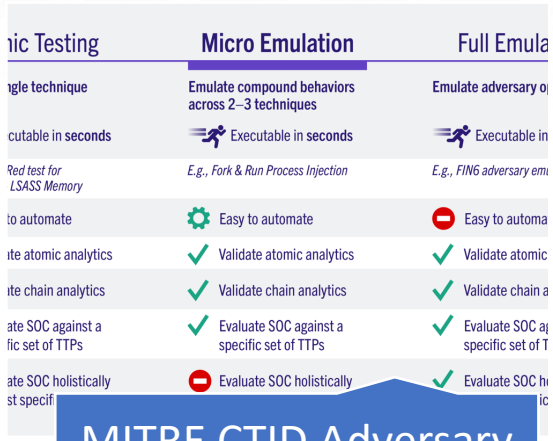
Imagination



Experience



Threat Intelligence



MITRE CTID Adversary Emulation Plans

Prioritizing What We Need To Detect

Who is targeting us?

What (platforms | applications | services) are we using that align with things that adversary has exploited previously?

Where do we perceive our detection gaps?

What needs to be defended?

What are our crown jewels?

- Systems/Data
- Users – Executives/R&D/IT?

Data Generation

Should we generate our data directly in production?

- Accurate depiction of security controls and configs
- How do we ensure that analysts are aware of emulations and any associated detections?
- Malware?

Does our development environment align to production?

- EDR/NDR policies will need to align with reality
- System configurations (Patched in the lab, but not for two years in prod)
- Are the users & systems representative of production?
    - Applications
    - Cloud Policies

How Threat Intelligence Fits

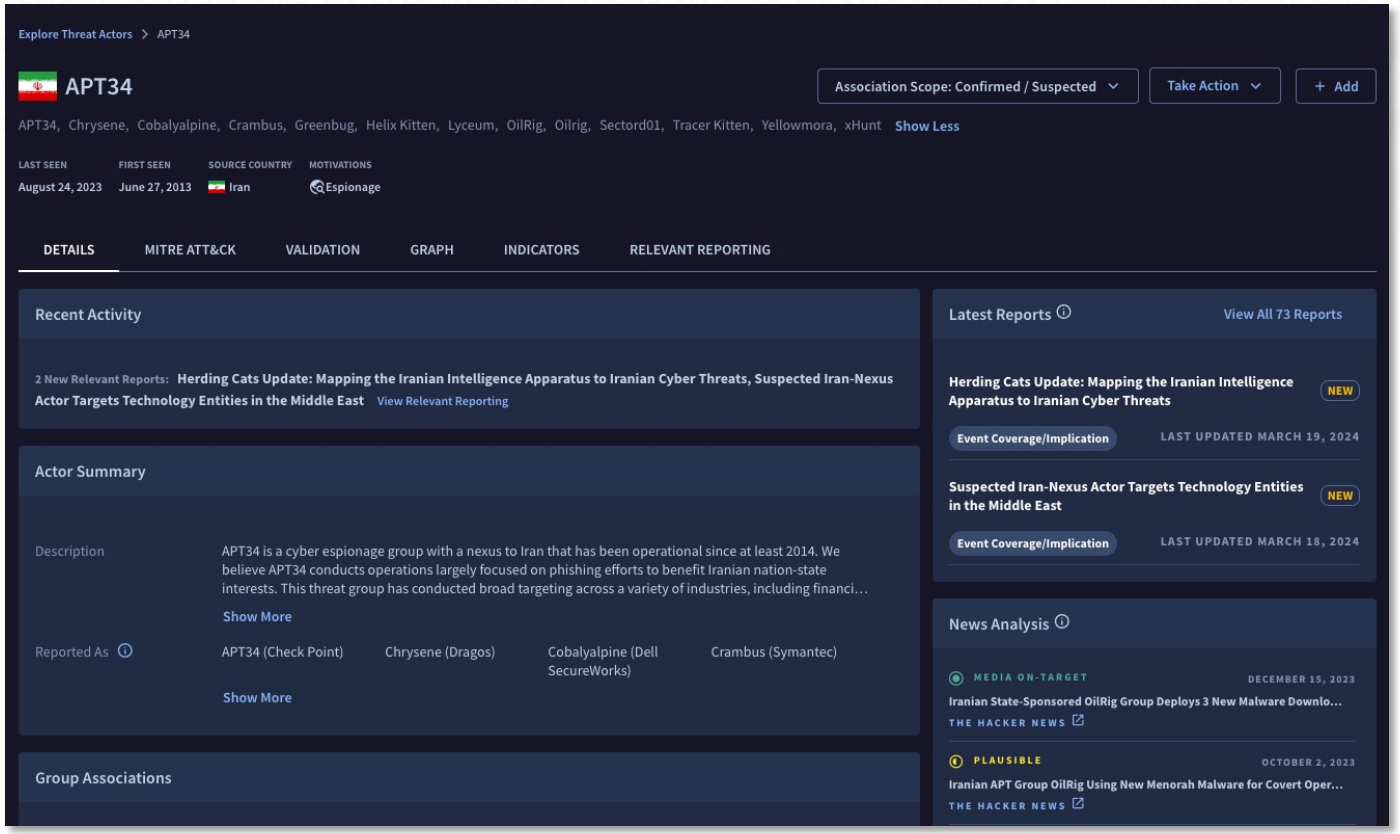
Prioritization

Focus on adversaries & techniques we care about

Fodder for detection ideas

IOCs

- Be careful not to over rotate

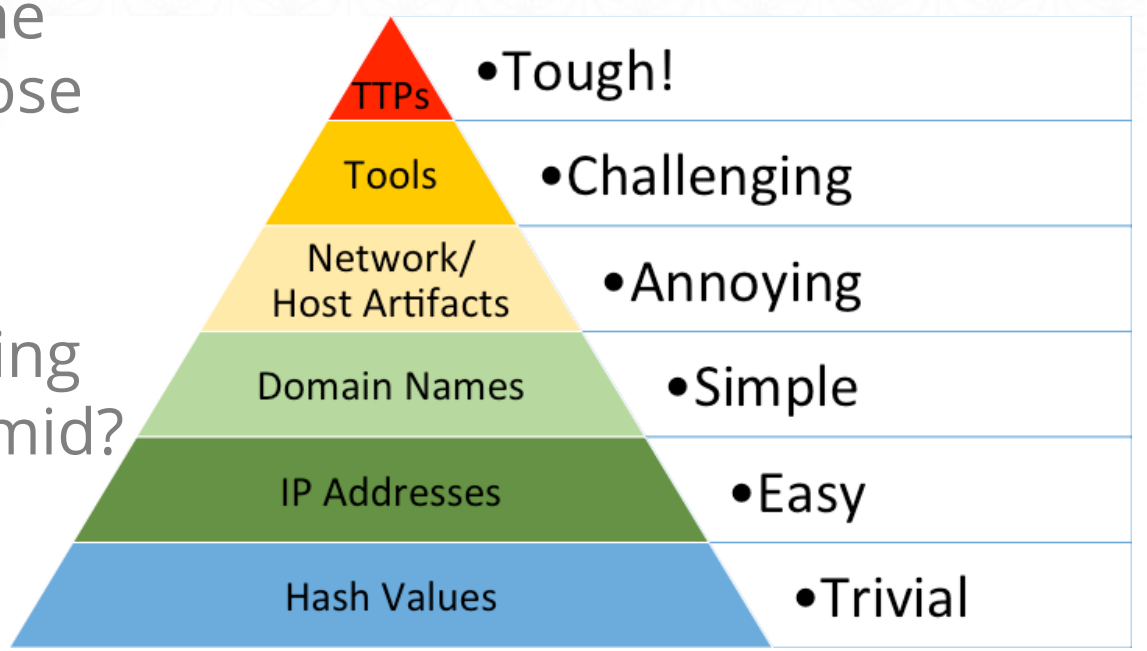


Threat Intelligence IOCs

Detecting against IOCs is important, but the process around what is done based on those detections is more important

Are we taking those IP and hashes and doing something with them to work up the pyramid?

Detection focus should be the upper end of the pyramid



https://detect-respond.blogspot.com/2013/03/the-pyramid-of-pain.html

Attacking/Defending the Cloud

Can you emulate an attack in your cloud infrastructure?

https://aws.amazon.com/security/penetration-testing/
https://support.google.com/cloud/answer/6262505
https://www.microsoft.com/en-us/msrc/pentest-rules-of-engagement

Do your homework before you conduct an emulation within the cloud

Links above are not exhaustive

MITRE CTID Emulation Plan – Nation State Actor

Based on Windows only environment

- Exchange, SQL, Active Directory, Workstation

General Flow

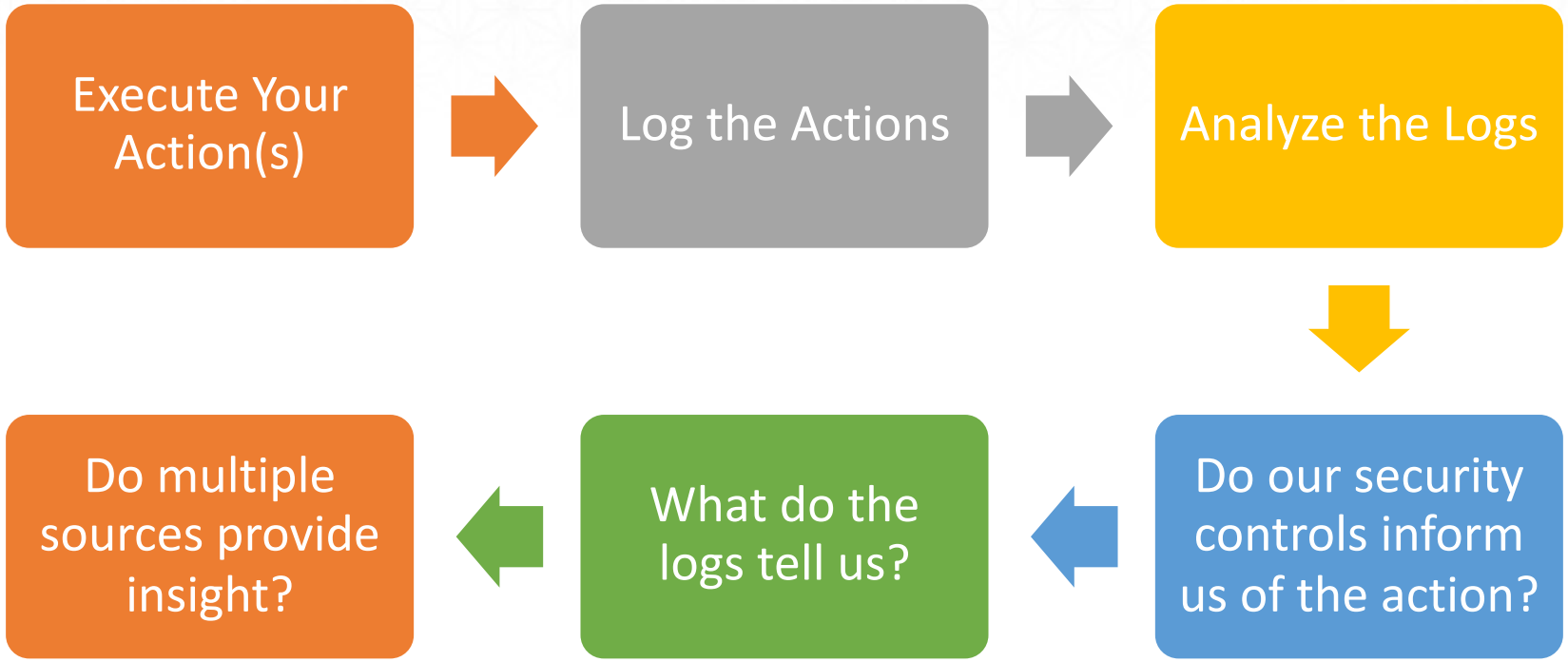
- Workstation compromise leads to a webshell being used on the Exchange server to dump credentials and stage tools followed by lateral movement to the SQL server

Benefit

- Created the ability to exercise controls without being focused on standing up adversary tooling
- Opportunities exist to customize the emulation plan or use it as is

Unit testing of components are required

Event Creation & Data Review



Event Creation & Data Review


```
# OilRig has run ipconfig /all on a victim.

Jan 25 20:33:26 Win 4624/4688/4672 Sysmon 1/10

curl --http1.1 --ntlm -u 'lunarstiiiness\dan.cooper:blue-manatee-2' -k -X
POST --data "pro=cmd.exe" --data "cmd=ipconfig /all"
https://23.251.154.146/ews/contact.aspx
```

Event Creation & Data Review

TIMESTAMP	EVENT	METADAT...	PRINCIPAL.HOST...	PRINCIPAL.PROCESS.COMMAND_LINE	PRINCIPAL.PROCESS.FILE....	TARGET.PROCESS.COMMAN...
2024-01-25T20:33:26.259	PROCESS_LAUNCH cmd.exe launched by w3wp.exe	1	win-helium.lunarstiiiness.com	c:\windows\system32\inetsrv\w3wp.exe -ap "MSExchangeServicesAppPool" -v "v4.0" -c "C:\Program Files\Microsoft\Exchange Server\V15\bin\GenericAppPoolConfigWithGCServerEnabledFalse.config" -a \\.\pipe\iisipm7df805f7-e790-4266-9aad-3063fc9e1d21 -h "C:\inetpub\temp\apppools\MSExchangeServicesAppPool\MSExchangeServicesAppPool.config" -w "" -m 0	C:\Windows\System32\inetsrv\w3wp.exe	"cmd.exe" /c ipconfig /all
2024-01-25T20:33:26.257	NETWORK_CONNEC win-helium to win-adfs	dce_rpc	win-helium	[Unknown]	[Unknown]	[Unknown]
2024-01-25T20:33:26.153	NETWORK_CONNEC 34.118.170.49 to win-helium	ssl	[Unknown]	[Unknown]	[Unknown]	[Unknown]
2024-01-25T20:33:26.117	NETWORK_CONNEC 34.118.170.49 to win-helium	conn	[Unknown]	[Unknown]	[Unknown]	[Unknown]
2024-01-25T20:33:26.000	PROCESS_LAUNCH cmd.exe launched by w3wp.exe	4688	win-helium.lunarstiiiness.com	[Unknown]	C:\Windows\System32\inetsrv\w3wp.exe	"cmd.exe" /c ipconfig /all

Do multiple sources provide insight?

What do the logs tell us?

Do our security controls inform us of the action?

How Many Of These Are Detection Opportunities?

- Phishing
- Valid Domain Account
- Use of VB/Windows Command
- Scheduled Tasks
- System Services/Execution
- Web Shell
- File Deletion
- Masquerading
- Credential Dumping
- Account Discovery
- Pass The Hash
- Ingress Tool Transfer

https://github.com/center-for-threat-informed-defense/adversary_emulation_library/blob/master/oilrig/Intelligence_Summary/Intelligence_Summary.md

Aggregated Events for Discovery Tactics

2024-01-25 00:00:00 - 2024-01-26 00:00:00

2 Detections

EXPAND ALL | UNWRAP TEXT | COLUMNS

Search Rows

	TIMESTAMP ↑	DETECTION	EVENT_COUNT…	TARGET_PROCESS_COMMAND_LINE (OUTCOME)
>	2024-01-25T20:03:00.000	DETECTION hostname:wrk-pacman.lunarstiiiness.com	8	C:\Windows\system32\cmd.exe /c whoami & hostname & ipconfig /all & net user /domain 2>&1 & net group /domain 2>&1 & net group "domain admins" /domain 2>&1 & net group "Exchange Trusted Subsystem" /domain 2>&1 & net accounts /domain 2>&1 & net user 2>&1 & net localgroup administrators 2>&1 & netstat -an 2>&1 & tasklist 2>&1 & sc query 2>&1 & systeminfo 2>&1 & reg query "HKEY_CURRENT_USER\Software\Microsoft\Terminal Server Client\Default" 2>&1 2>&1, ipconfig /all, netstat -an, reg query "HKEY_CURRENT_USER\Software\Microsoft\Terminal Server Client\Default", sc query, systeminfo, tasklist, whoami
>	2024-01-25T20:34:30.000	DETECTION hostname:win-helium.lunarstiiiness.com	14	"C:\Windows\system32\nslookup.exe" -type=A WIN-HELIUM.lunarstiiiness.com. 10.128.0.21, "cmd.exe" /c ipconfig /all, "cmd.exe" /c netstat -an, "cmd.exe" /c whoami, ipconfig /all, netstat -an, whoami

Compound Rule – Web Shell

Looking for process launches and file creations with corresponding network traffic

- Corelight for Network Traffic
- Sysmon (EDR) for Endpoint Traffic

Without getting into filtering IP addresses and file paths, getting a good detection with both data sources got challenging

- Too much noise or too few detections

Pretty good hunting detection

Behavioral - Beacon

Similar process launches were seen so frequently

- Tough to separate signal/noise

Task Scheduler presented a method to detect based on frequency analysis

Baselining activity is another option

What kinds of activity accompanied the continual beacon?

- Process launches
- Network connections

Detection Quality

Benefit

	Executable Name	Hash Value	Command Strings
Focus on Behavior Exhibited (lsass.exe access, trailing events on port 445? additional exe run after)			
Recompile	Modify name in code	Hash will change	Obfuscate Command Strings – instead of sekurlsa::pth, why not hatch::peppers?
	Changed from mimikatz.exe to sol.exe	29efd64dd3c7fe1e2b022b7ad73a1ba5	n/a
	mimikatz.exe	29efd64dd3c7fe1e2b022b7ad73a1ba5	n/a

Malware

Numerous sources to get malware

- The burden of defanging it is on you or running it in isolation and burning down the environment after

CTID Emulation Plans provided “malware” without the mess

- Do the plans align to your adversaries?

What Is Your Focus?

- Broad use of lolbins as well as off the shelf C2 platforms

Building Out Metrics for Detection

What does our false positive rate look like?

Is the detection better suited to be a hunting rule instead?

- Web Shell

Multiple Behavior Detections

- Task Schedule -> Task & Process -> Task & Process & Network

One additional criteria can skew test results to be careful

Overfitting is real

Continual Testing & Validation

Engineering a new solution is fun

- Operations & Maintenance - not so much

Impacts to Detections

- What happens when the security controls change?
- What happens when the surrounding architecture changes?
- What happens when the logging format changes?

Goal is to remove potential blind spots due to IT lifecycle that has huge impact to SecOps

Do I Need An End to End Emulation?

Weigh the pros and cons

What resources exist?

We built our own automated tooling to ingest emulated events

- Use for gamification and instruction

Atomic and smaller unit tests are very valid and a great place to start

Additional Reading

Detection as Code – David French

https://www.googlecloudcommunity.com/gc/Community-Blog/Getting-Started-with-Detection-as-Code-and-Chronicle-Security/ba-p/702154

Practical Threat Detection Engineering – Megan Roddie

https://www.packtpub.com/product/practical-threat-detection-engineering/9781801076715

MITRE CTID Adversary Emulation Plans

https://mitre-engenuity.org/cybersecurity/center-for-threat-informed-defense/adversary-emulation-library/

Red Canary Atomic Red Team

https://github.com/redcanaryco/atomic-red-team

Thank You!

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