The Pyramid of TTP Pain

@SecurePeacock

SCYTHE

Chris Peacock – Adversary Emulation Detection Engineer

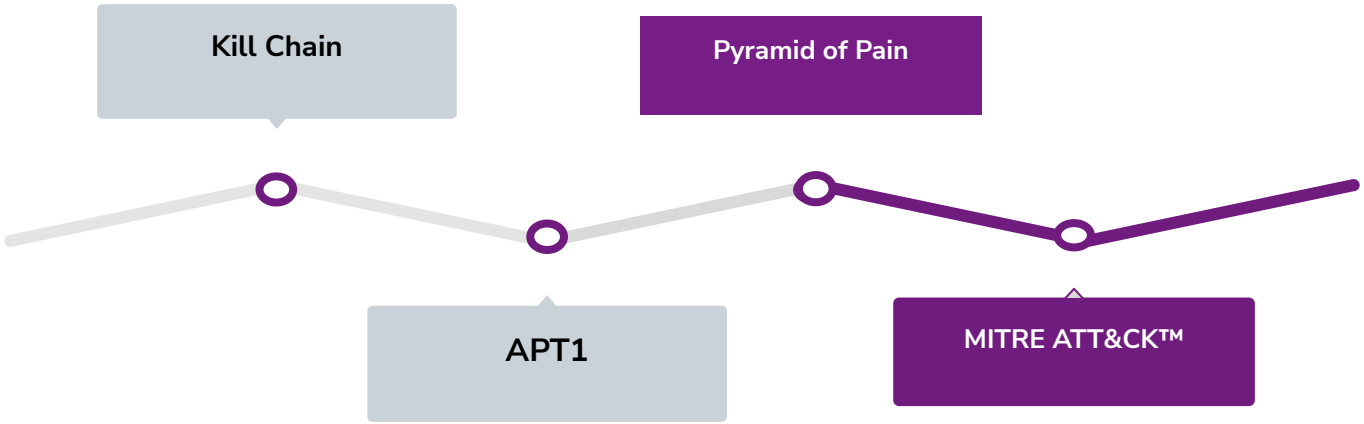
SCYTHE

Raytheon Intelligence & Space

GENERAL DYNAMICS
Ordnance and Tactical Systems

ALPHA

Intelligence Timeline



APT 1 Report

- Focused on the human element
  - There’s an organization of people behind it
  - Organizations have approved:
    - Actions
    - Tooling
    - Training
    - Manuals

APT 1 Report

- Reported Procedures

Internal Reconnaissance

In the Internal Reconnaissance stage, the intruder collects information about the victim environment. Like most APT (and non-APT) intruders, APT1 primarily uses built-in operating system commands to explore a compromised system and its networked environment. Although they usually simply type these commands into a command shell, sometimes intruders may use batch scripts to speed up the process. Figure 18 below shows the contents of a batch script that APT1 used on at least four victim networks.

```
@echo off
ipconfig /all>>"C:\WINNT\Debug\1.txt"
net start>>"C:\WINNT\Debug\1.txt"
tasklist /v>>"C:\WINNT\Debug\1.txt"
net user >>"C:\WINNT\Debug\1.txt"
net localgroup administrators>>"C:\WINNT\Debug\1.txt"
netstat -ano>>"C:\WINNT\Debug\1.txt"
net use>>"C:\WINNT\Debug\1.txt"
net view>>"C:\WINNT\Debug\1.txt"
net view /domain>>"C:\WINNT\Debug\1.txt"
net group /domain>>"C:\WINNT\Debug\1.txt"
net group "domain users" /domain>>"C:\WINNT\Debug\1.txt"
net group "domain admins" /domain>>"C:\WINNT\Debug\1.txt"
net group "domain controllers" /domain>>"C:\WINNT\Debug\1.txt"
net group "exchange domain servers" /domain>>"C:\WINNT\Debug\1.txt"
net group "exchange servers" /domain>>"C:\WINNT\Debug\1.txt"
net group "domain computers" /domain>>"C:\WINNT\Debug\1.txt"
```

FIGURE 18: An APT1 batch script that automates reconnaissance

https://www.mandiant.com/sites/default/files/2021-09/mandiant-apt1-report.pdf

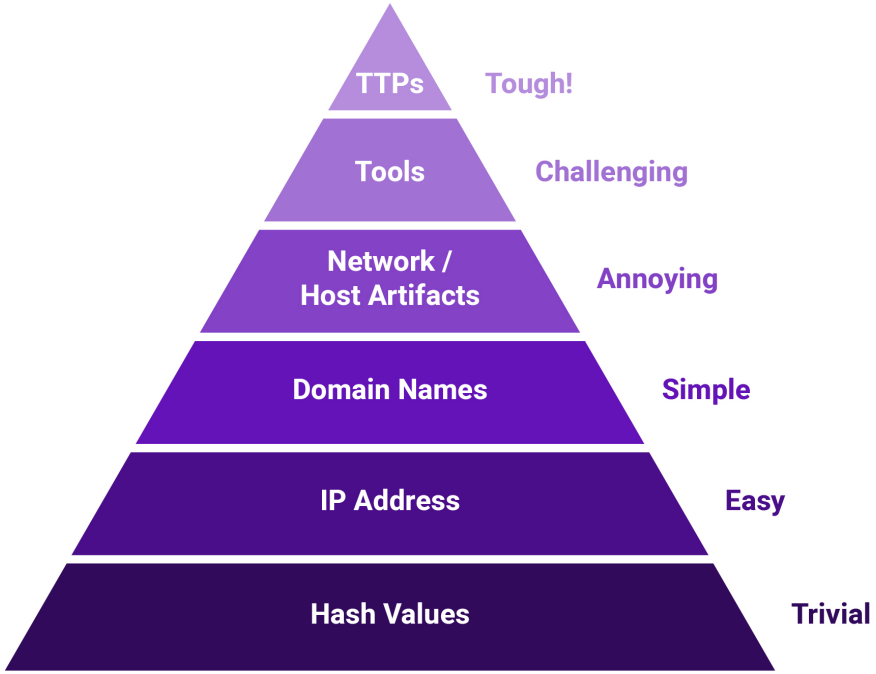
Conti Playbook Note: Net Usage

1.5 . 2 . **net domain_ controllers** < ===== this command will show the ip addresses of domain controllers
1.6 . **shell net localgroup administrators** <===== local administrators
1.7 . **shell net group / domain "Domain Admins"** <===== domain administrators
1.8 . **shell net group "Enterprise Admins" / domain** <===== enterprise administrators
1.9 . **the shell net group "the Domain Computers has" / domain** <===== total number - in the PC in the domain
1.10 . **net computers** < ===== ping all hosts with the output of ip addresses.

https://github.com/scythe-io/community-threats/blob/master/Conti/Conti_Playbook_Translated.pdf

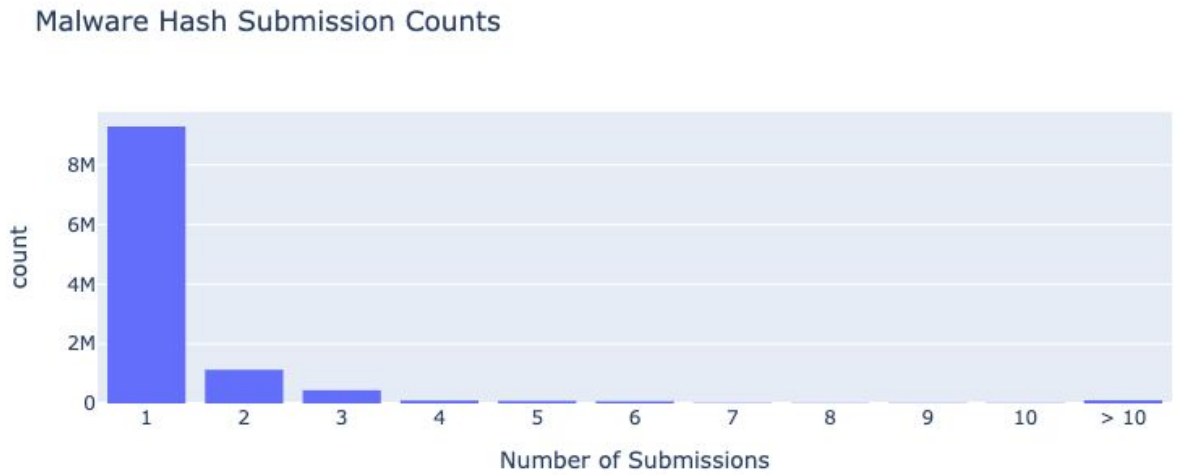
Pyramid of Pain

David Bianco: http://detect-respond.blogspot.com/2013/03/the-pyramid-of-pain.html



Atomic Indicators: Hashes

“(91.81%) were submitted from only a single source. There were also a substantial number of files submitted by exactly two (5.74%) or three (1.02%) sources. Together those three categories account for 98.57% percent of all malicious files.” -David Bianco

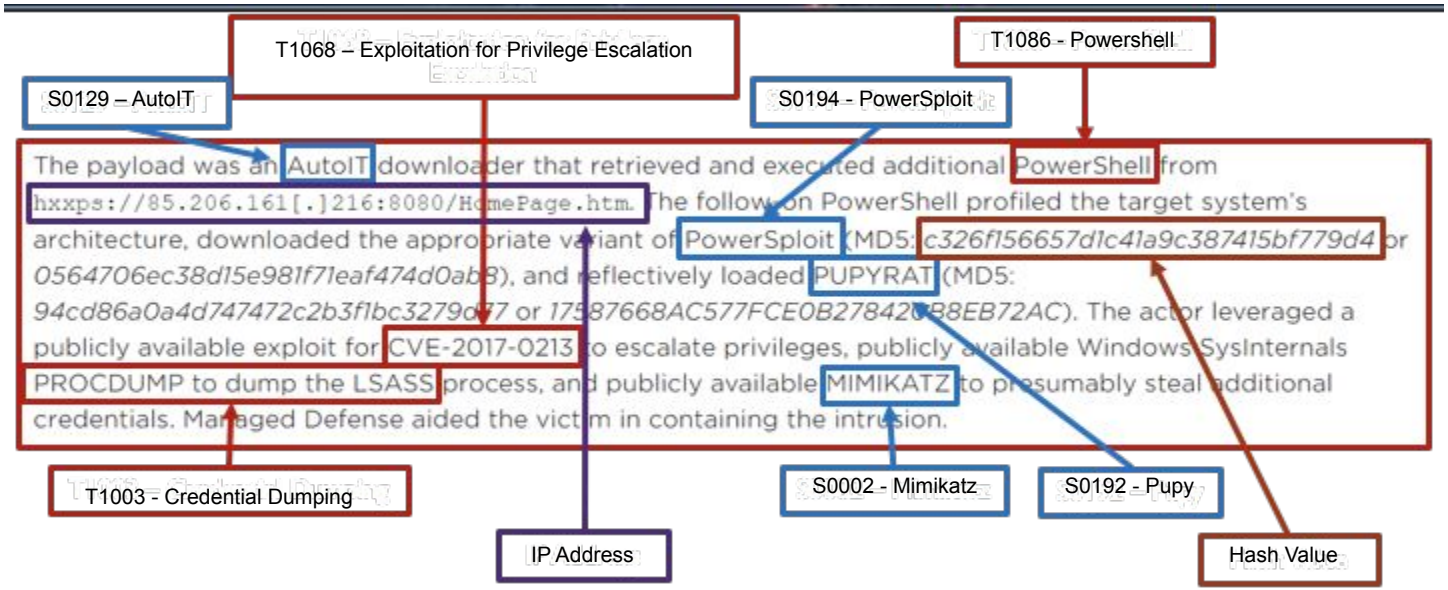


http://detect-respond.blogspot.com/2022/04/stop-using-hashes-for-detection-and.html

ATT&CK™

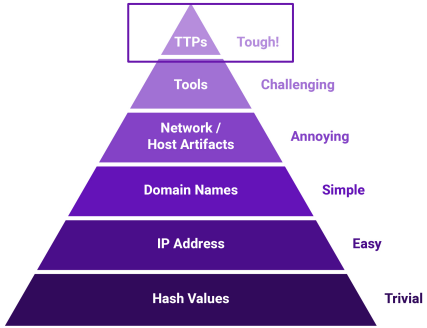
- Two years after APT 1 Report and Pyramid of Pain
- Developed as a way to categorize actor activity
  - One way function
    - Procedures and observations -> Techniques

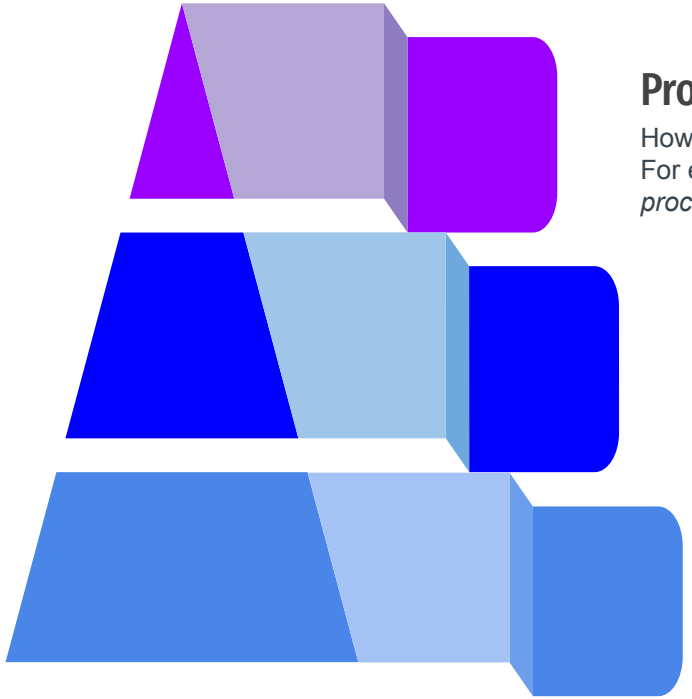
Direction: Extract TTPs



[ATT&CKing the Status Quo: Threat-Based Adversary Emulation with MITRE ATT&CK](#) - Katie Nickels and Cody Thomas

Breaking Out TTPs





Procedures

How the technique was carried out.
For example, the attacker used *procdump -ma lsass.exe lsass_dump*

Techniques

Techniques represent the tactical goal of the procedure. For example, T1003.001 - OS Credential Dumping: LSASS Memory.

Tactics

Tactics represent the strategic goal of the adversary. For example, TA006 - Credential Access

Tactics

- “Tactics represent the ‘why’ of an ATT&CK technique or sub-technique. It is the adversary's tactical goal: the reason for performing an action. For example, an adversary may want to achieve credential access.” - MITRE ATT&CK
  - This level isn’t granular enough to make actionable defense
  - Helps categorize techniques into buckets

Techniques

- Current level of most intelligence sharing
  - In this example it doesn't specify how the actor conducts the technique

Techniques

Techniques represent the tactical goal of the procedure. For example, T1003.001 - OS Credential Dumping: LSASS Memory.

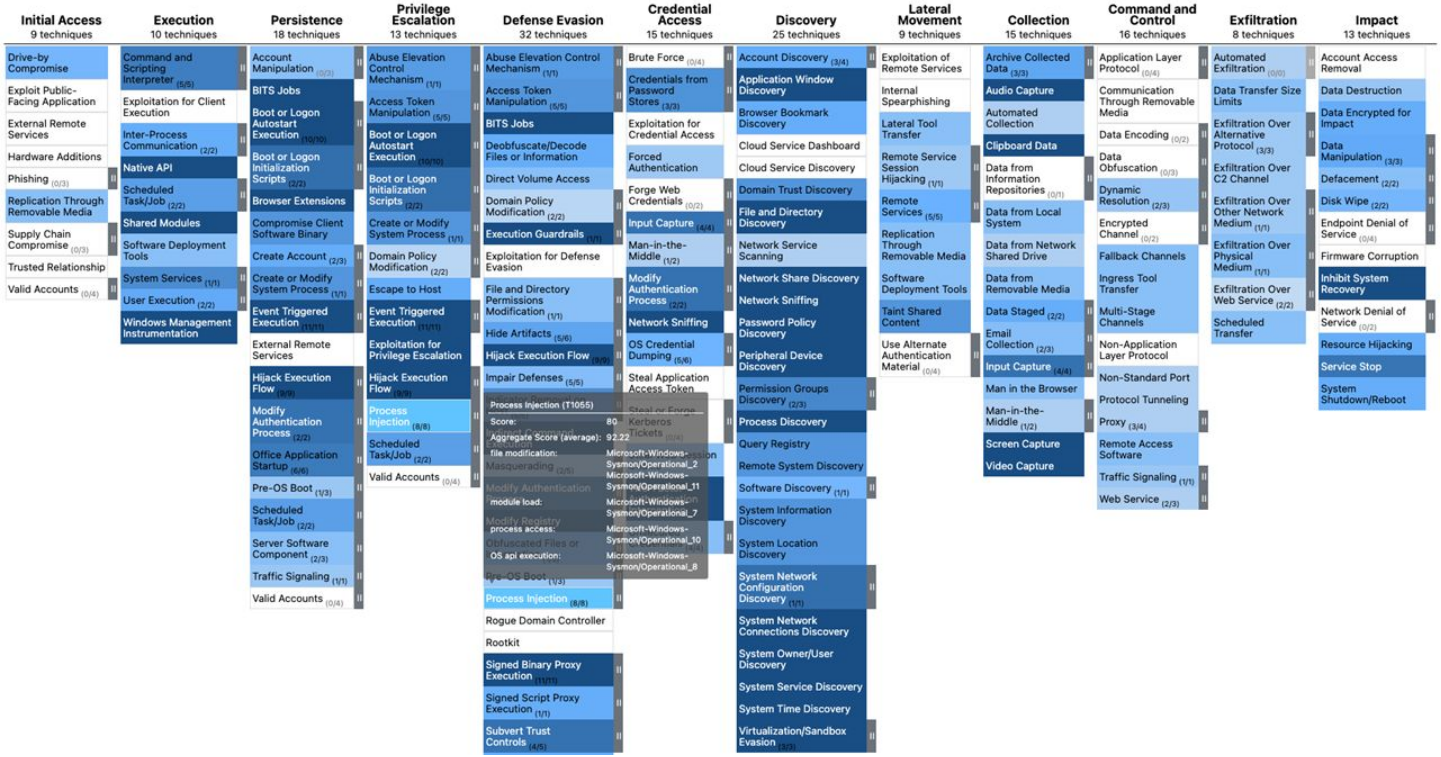
Tactics

Tactics represent the strategic goal of the adversary. For example, TA006 - Credential Access

ATT&CK™ Techniques

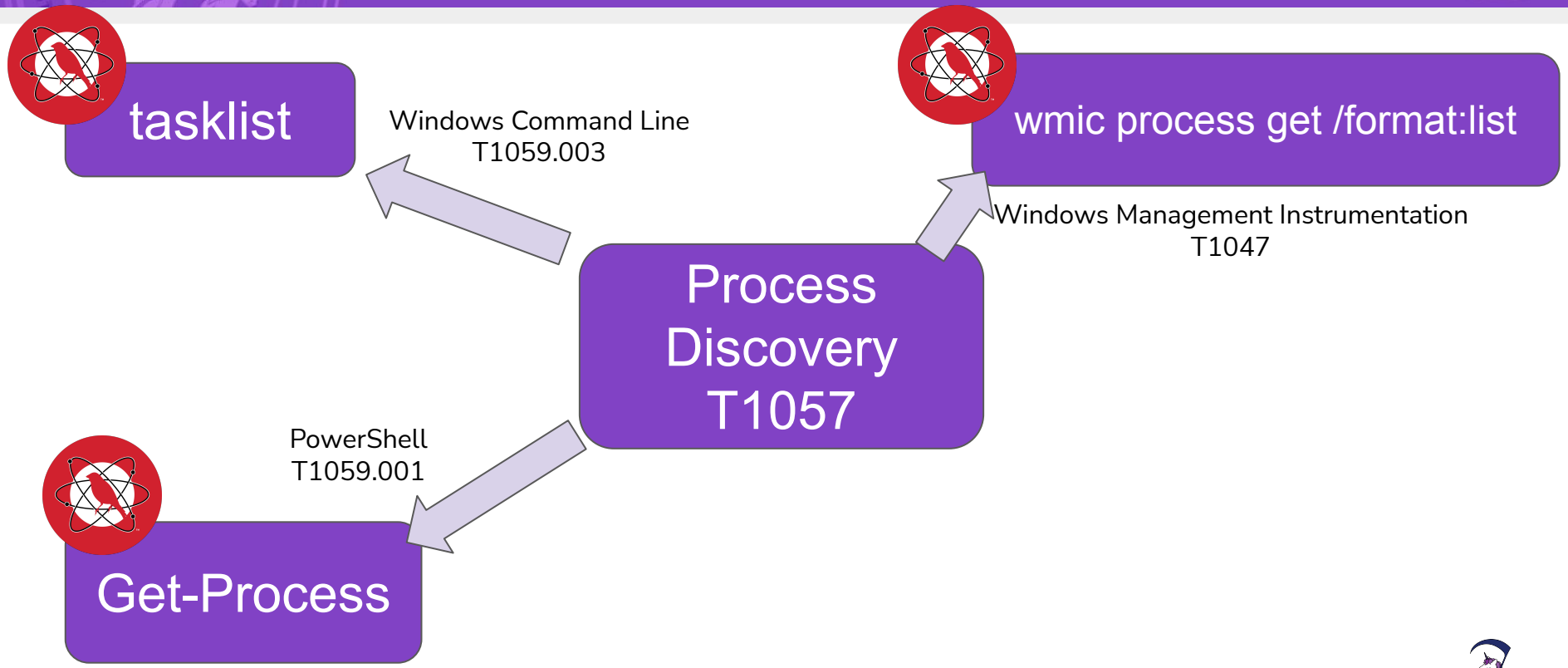
Jamie Williams @jamieantisocial

ATT&CK™ Check Box Fallacy



https://medium.com/falconforce/sysmon-vs-microsoft-defender-for-endpoint-mde-internals-0x01-1e5663b10347

Procedure Assumption



Procedure Assumption

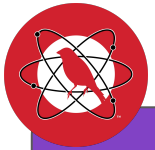
tasklist

Windows Command Line
T1059.003

wmic process get /format:list

Windows Management Instrumentation
T1047

Process Discovery T1057



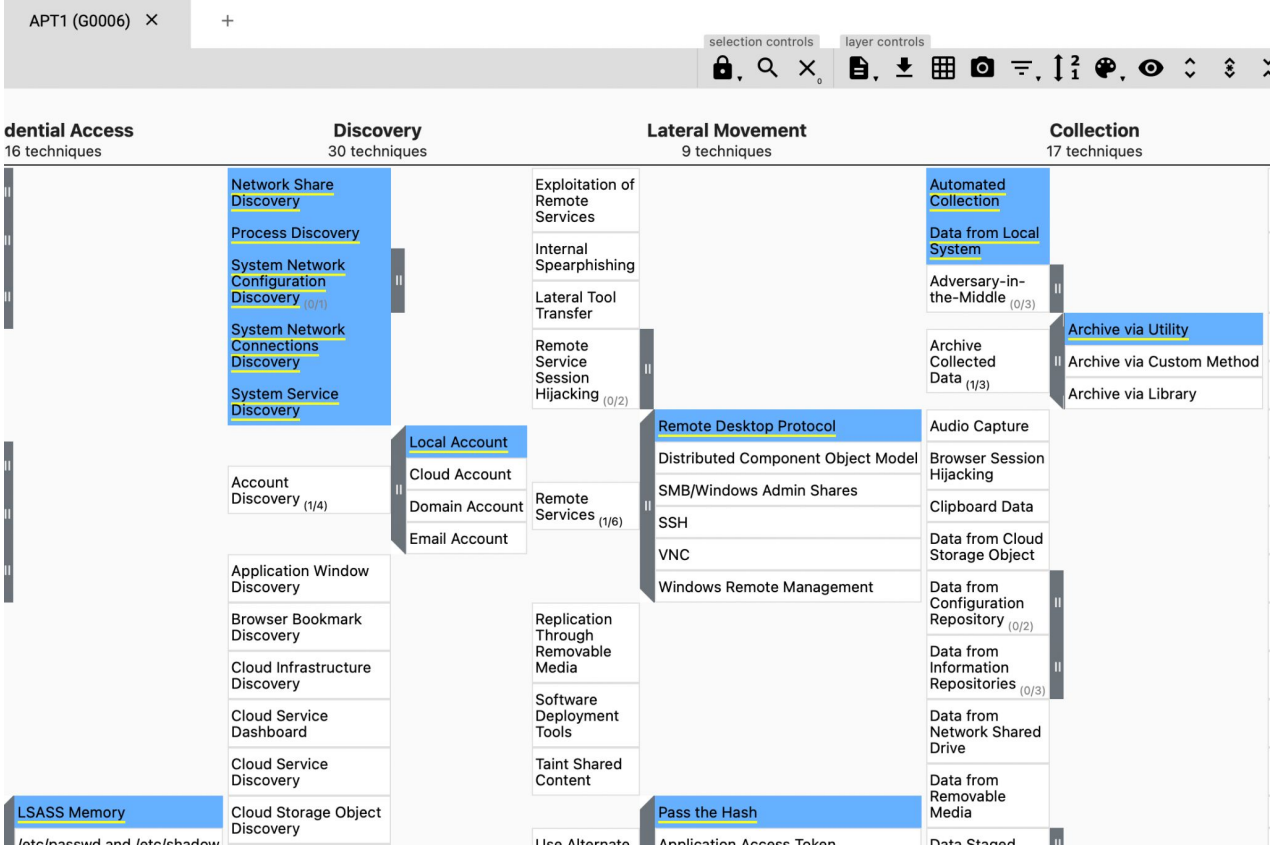
PowerShell
T1059.001

Get-Process

Native API
T1106

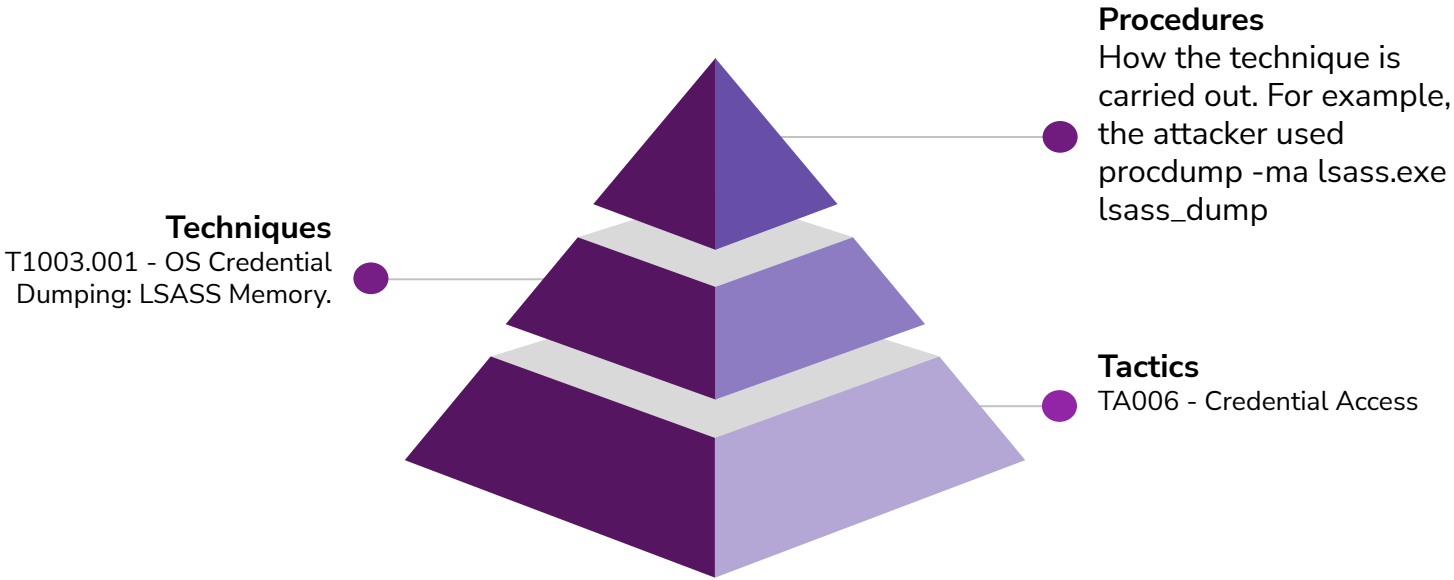
CreateToolhelp32Snapshot Function

Procedure Assumption – APT 1 Example



Procedures

- How the adversary carries out their actions
  - Best for emulation and detection validation

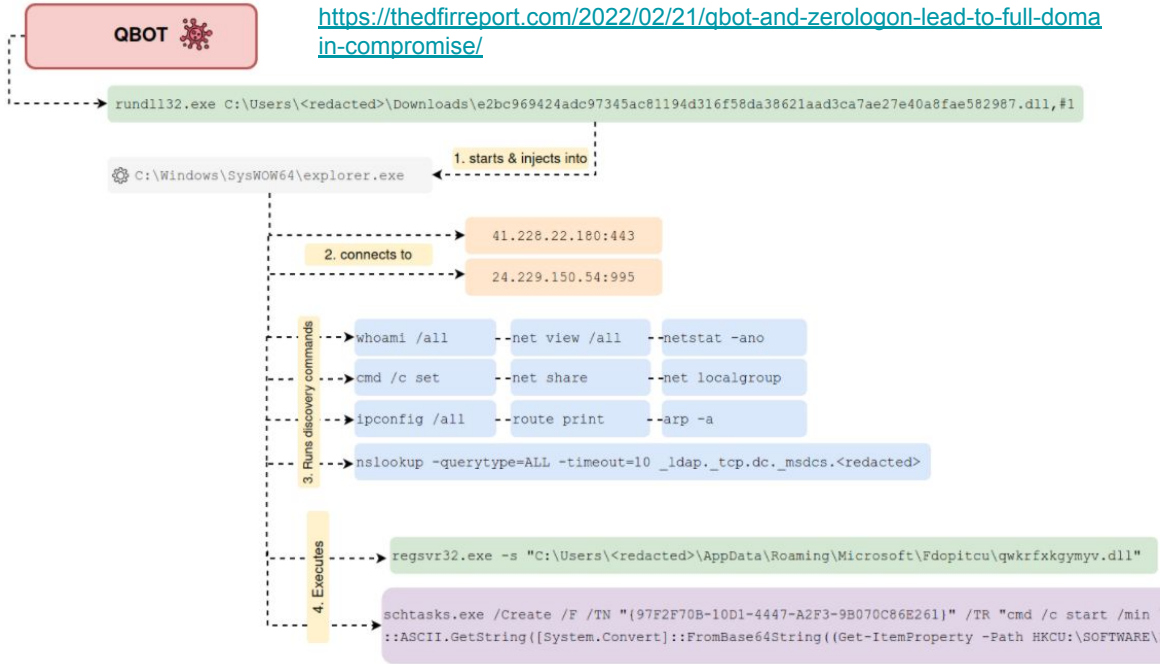


Procedure-level intel

Cyber Threat Intelligence has improved from Indicators of Compromise to ***Indicators of Behaviors*** and mapping to ***MITRE ATT&CK***. However…

- Exploitation for Privilege Escalation – T1068
- Service Execution – T1569.002
- Network Share Discovery – T1135
- Pass the Hash – T1550.002
- PowerShell – T1059.001
- Windows Command Shell – T1059.003
- Network Share Discovery – T1135
- Obfuscated Files or Information – T1027
- Scheduled Task – T1053.005
- Process Injection – T1055
- Remote System Discovery – T1018
- Obfuscated Files or Information – T1027
- Domain Trust Discovery – T1482
- Domain Groups – T1069.002
- System Owner/User Discovery – T1033
- Network Share Discovery – T1135
- Remote Services – T1021
- Local Account – T1087.001
- Security Software Discovery – T1518.001

<



Procedure Level – Human Element

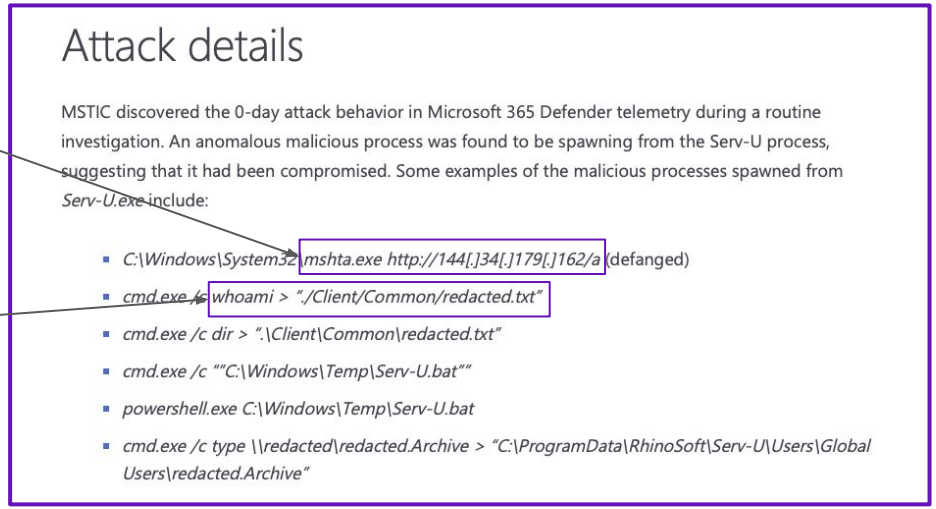
- Focus on the human element and behaviours
  - Training
  - Tools
  - Approved Actions
  - Runbooks
  - Habits
- Conti Playbook Example
  - “In one case, we observed the operator copying and pasting commands from a script, neglecting to provide the actual IPv4 addresses as the required parameter” -TheDFIRReport

```
C:\\Windows\\system32\\cmd.exe /C tasklist /s ip
```

https://thedfirreport.com/2022/03/07/2021-year-in-review/

Cyber Threat Intelligence

- Focus on collecting and sharing procedures
  - Drives Emulation and Detection Verification
  - Mshta.exe with WAN connection
  - Whoami execution
    - May scope to execution with certain command line parameters

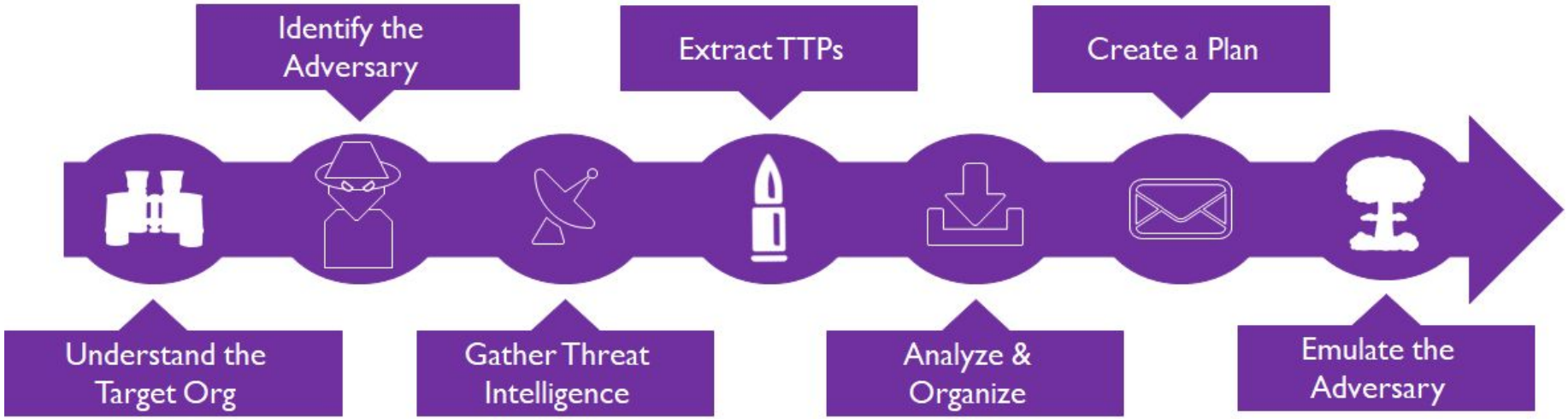


Microsoft MSTIC Blog

Cyber Threat Intelligence: Collecting

- Reports
  - Review open and closed source reports.
    - ISO -> LNK Example
- Incidents
  - Review observed incidents in the organization.
- Honey Pots
  - Analyze honey pot activity.
    - Even minimal interaction can help identify adversaries in early stages
- Sandboxing
  - Sandbox email malware samples.

Cyber Threat Intelligence

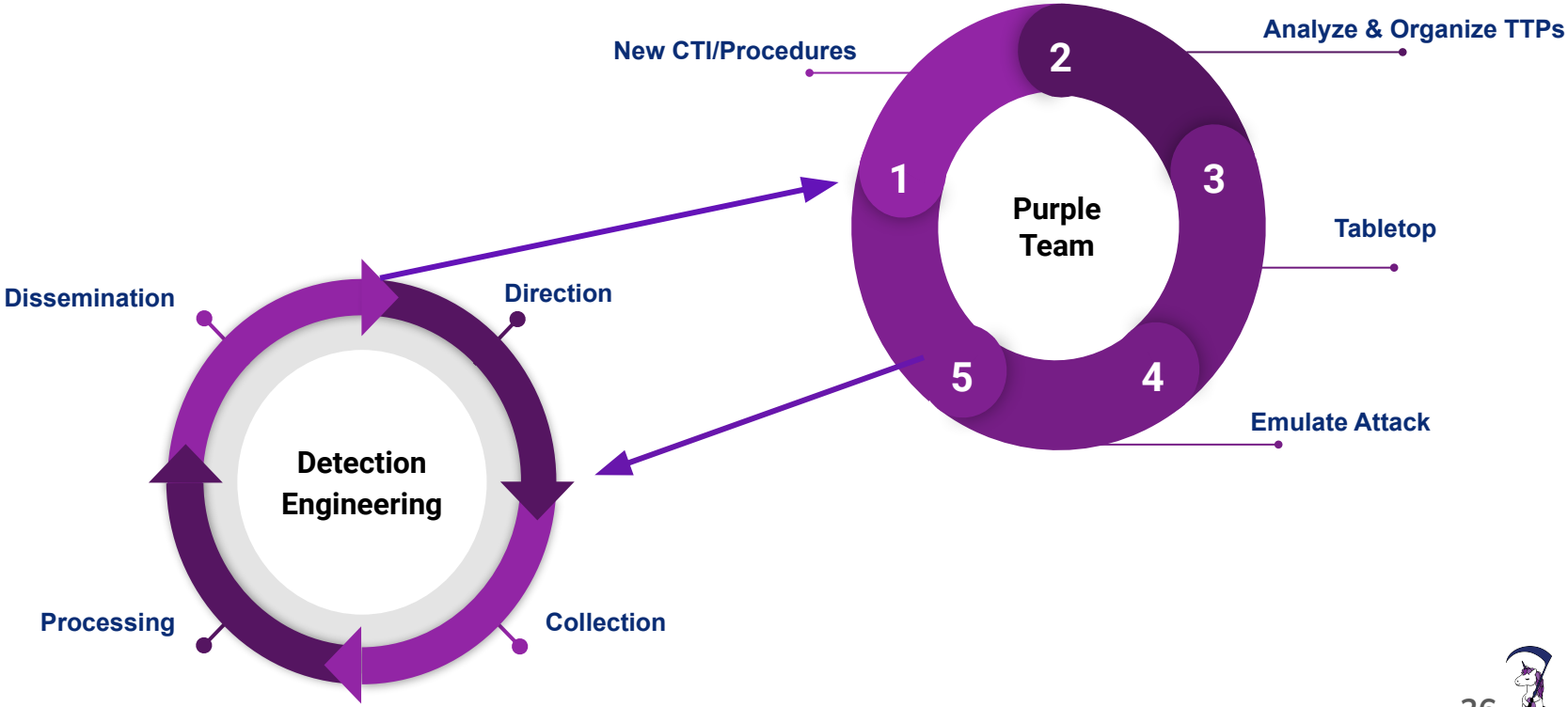


ATT&CKing the Status Quo: Threat-Based Adversary Emulation with MITRE ATT&CK - Katie Nickels and Cody Thomas

Red Team Emulations

- Emulate observed procedures
  - Test known procedures first to verify controls
- Adapt procedures
  - ISO -> LNK -> Substitute Rundll32
- Hypothesis and test variations to break detection
  - Work with Blue Team

Operationalized Purple Team



Logging

- ATT&CK™ Pivot
  - Procedure -> Technique -> Logs

Detection

ID	Data Source	Data Component
DS0017	Command	Command Execution
DS0011	Module	Module Load
DS0009	Process	Process Creation
DS0012	Script	Script Execution

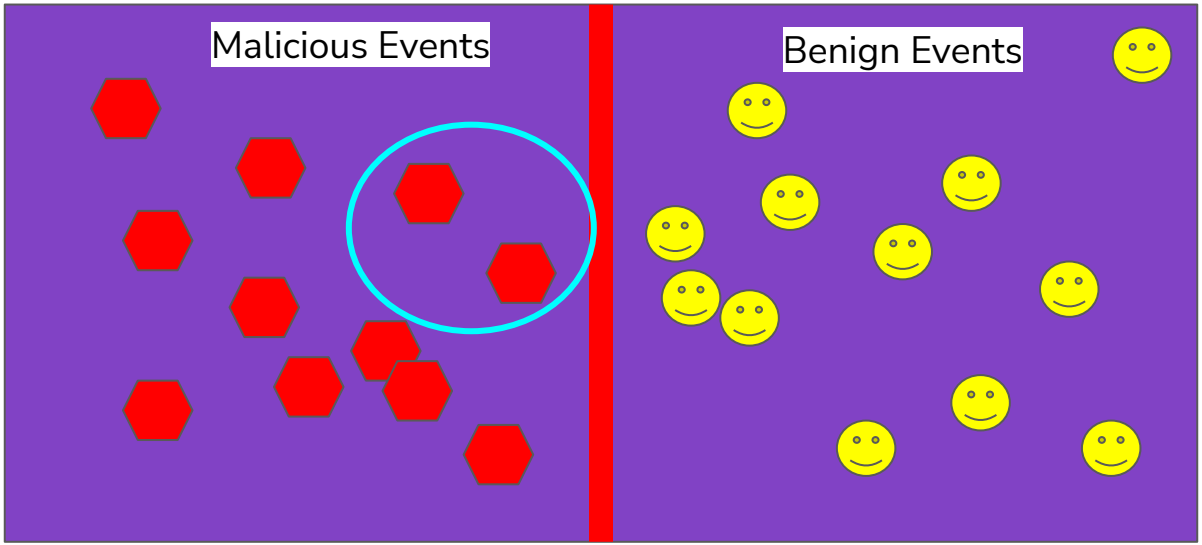
https://attack.mitre.org/techniques/T1059/001/

Alert

A	B	E	F
Step	Procedure	Logging Outcome	Alert(s)
Example	run net group /domain "Domain Admins"	Alerted	Suspicious net usage
3	run ipconfig /all		
4	run systeminfo		
5	run whomai /groups	Alerted	Whoami Process Activity
6	run net config workstation		
7	run net use		
8	run cmd /c echo %userdomain%		
10	run nltest /domain_trusts		
11	run nltest /domain_trusts /all_trusts		
12	run net view /all /domain	Alerted	Windows Network Enumeration
13	run net view /all		Windows Network Enumeration

Detection Engineering

- Leverage Red Team to test, verify, and augment
  - Don’t focus too granular



Monitoring and Response

- Understand threat landscape and attacker playbooks
  - Example: If you don't know PowerShell is used in malicious activity, you won't try to detect it.
  - Practice
- Focus on Procedures
  - Not Technique Level
  - IOC Feeds does not equal threat understanding
- Verify Response
  - Mimikatz on domain controller example

Purple Team Exercise Framework (v2)

Available at https://scythe.io/ptef

Happy Procedure Level Purple Teaming!

SCYTHE