What's new with Sysmon v 15

Leveraging System Monitor in Incident Investigations

IR PROACTIVE

Gerard Johansen

Principal Readiness Engineer

@irproactive

10+ Years of Incident Response, Digital Forensics and Threat Intelligence

BS – Justice and Law Admin, MA– Information Assurance, GCTI, GCFA, GNFA, GRID, CISSP Detective / Task Force Agent (FBI)

Rapid City, South Dakota

Windows System Monitor (Sysmon)

- “System Monitor (Sysmon) is a Windows system service and device driver that, once installed on a system, remains resident across system reboots to monitor and log system activity to the Windows event log. It provides detailed information about process creations, network connections, and changes to file creation time.”

https://learn.microsoft.com/en-us/sysinternals/downloads/sysmon

Sysmon Capabilities

- Process creation command line & current/parent processes
- SHA1 hash value for process image files
- Process & Session GUIDs – aids in event correlation
- Logs driver or DLL loading with file signatures and hash values
- DNS and Network connection logging
- Insight into malware time creation modification
- Verbosity can be tailored
- Augment additional event logs and data sources (Prefetch, MFT) to aid in analysis

What's new with System Monitor (Sysmon)

- Newly released version 15 (June 2023)
- New version includes:
  - Bug fixes (no surprise here)
  - Now runs as a PPL (Protected Process Lite)
  - New logging for `FileExecutableDetected`
  - Provides a much more targeted approach to addressing LOLBins and code that is brought into the environment

The Good and the Bad with Sysmon

The Good

- Deep visibility into endpoint behavior
- Verbose logs with additional insight
- Combine with other log entries (Security)
- Great first step in triage

The Bad

- Very loud (depending on the configuration)
- Logs lots of legitimate behavior
- Can be difficult to craft SIEM alerts

System Monitor Configuration and Setup

Setting Up Sysmon (Locally)

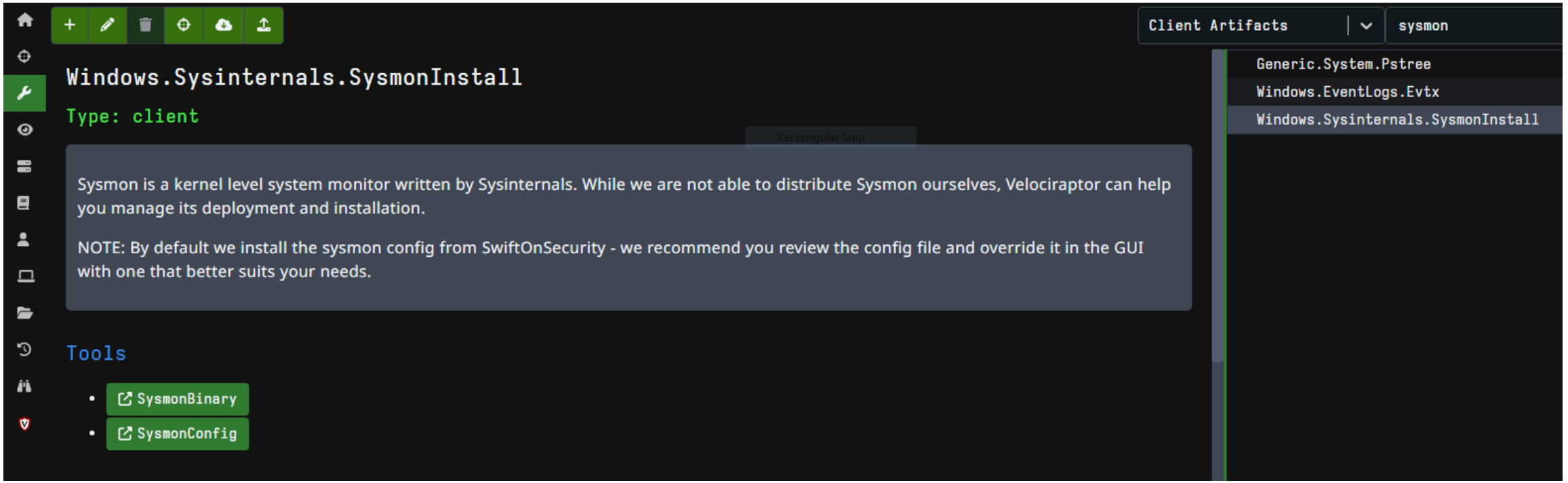
1. Download Sysmon from the Microsoft site: https://learn.microsoft.com/en-us/sysinternals/downloads/sysmon
2. Select Configuration: https://raw.githubusercontent.com/olafhartong/sysmon-modular/master/sysmonconfig-with-filedelete.xml
3. Command prompt:

```
C:\Users\ARTEvaluation\Downloads\Sysmon>Sysmon.exe -i C:\Users\ARTEvaluation\Downloads\sysmonconfig-with-filedelete.xml
-accepteula
```

1. Increase Sysmon log file size: `wevtutil s1 Microsoft-Windows-Sysmon/Operational /ms:20971520`

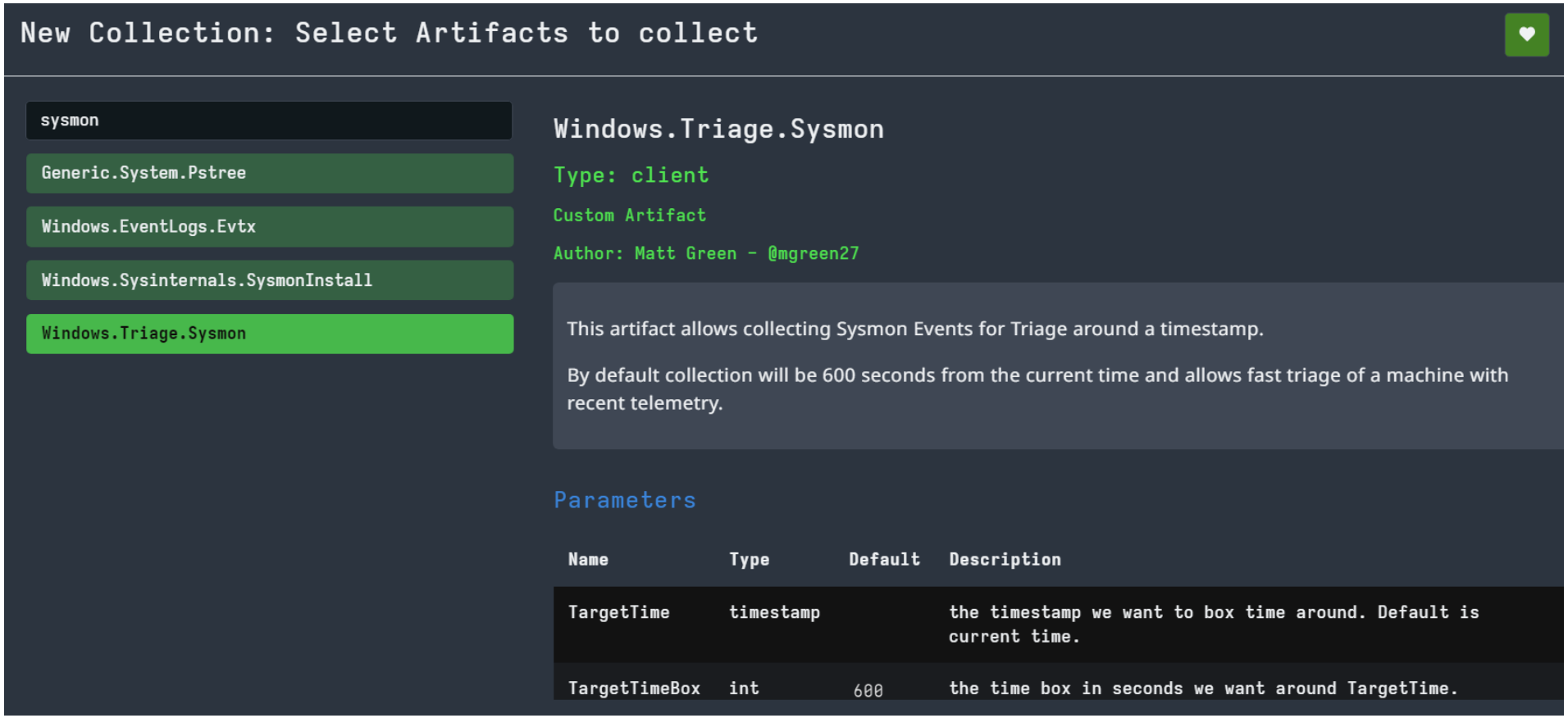
Setting Up Sysmon (Remotely)

- Velociraptor Remote Install



Velociraptor Sysmon Triage Demo

Windows.Triage.Sysmon



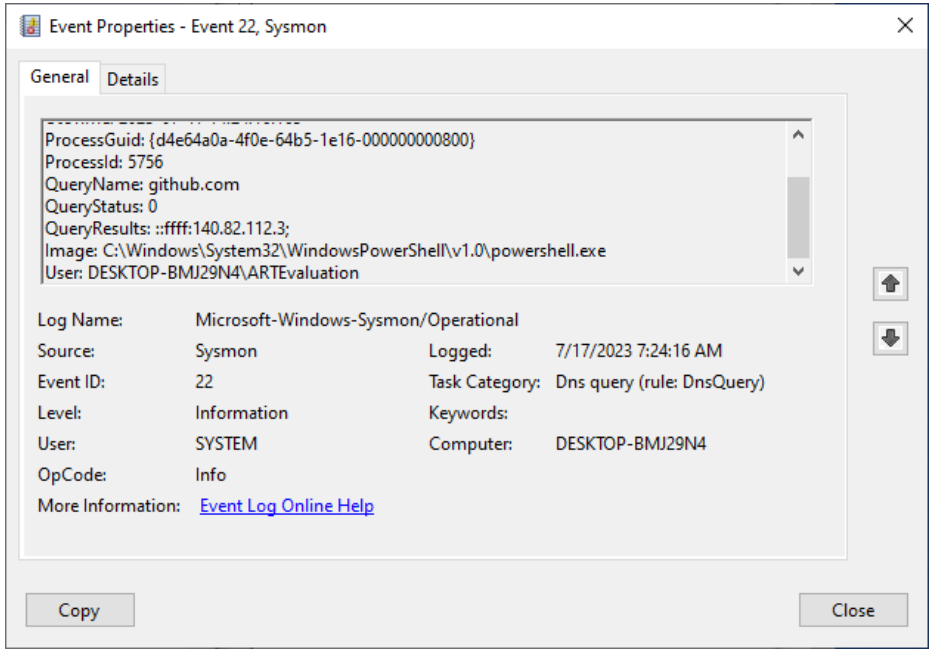
Velociraptor Sysmon Collection Demo

Manual Sysmon Triage Demo

Analyzing Sysmon Log Files

Initial Access

- T1566.001 Spear Phishing Attachment
- Event ID: 22 DNS Event (Query)

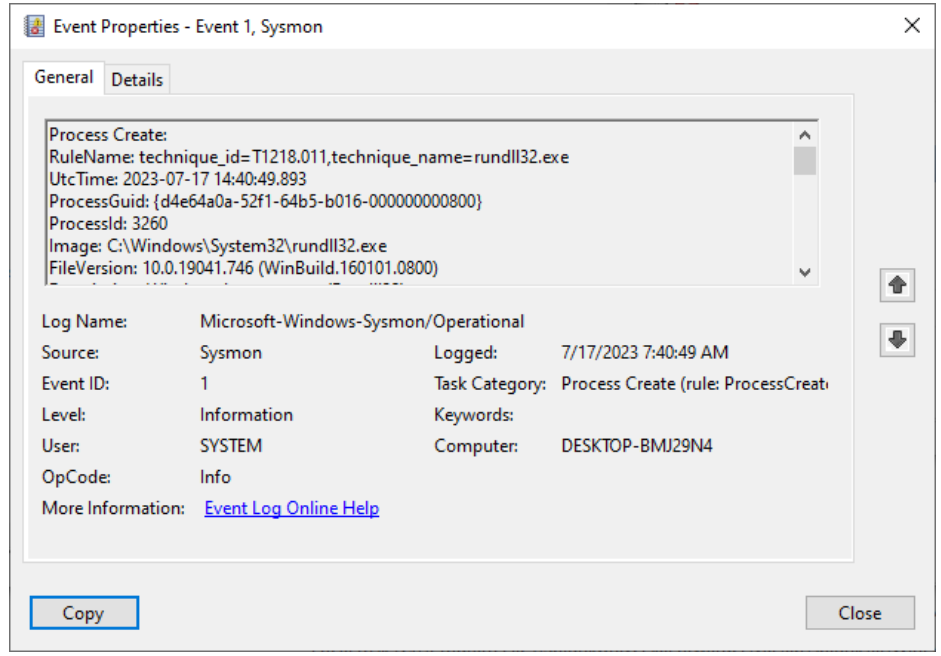



```
ProcessGuid: {d4e64a0a-4f0e-64b5-1e16-000000000800}
ProcessId: 5756
QueryName: github.com
QueryStatus: 0
QueryResults: ::ffff:140.82.112.3;
Image:
C:\Windows\System32\WindowsPowerShell\v1.0\powershell
.exe
```

Execution - Proxy

- T1218.011: Signed Binary Proxy Execution: Rundll32
- Event ID: 1 Process Creation

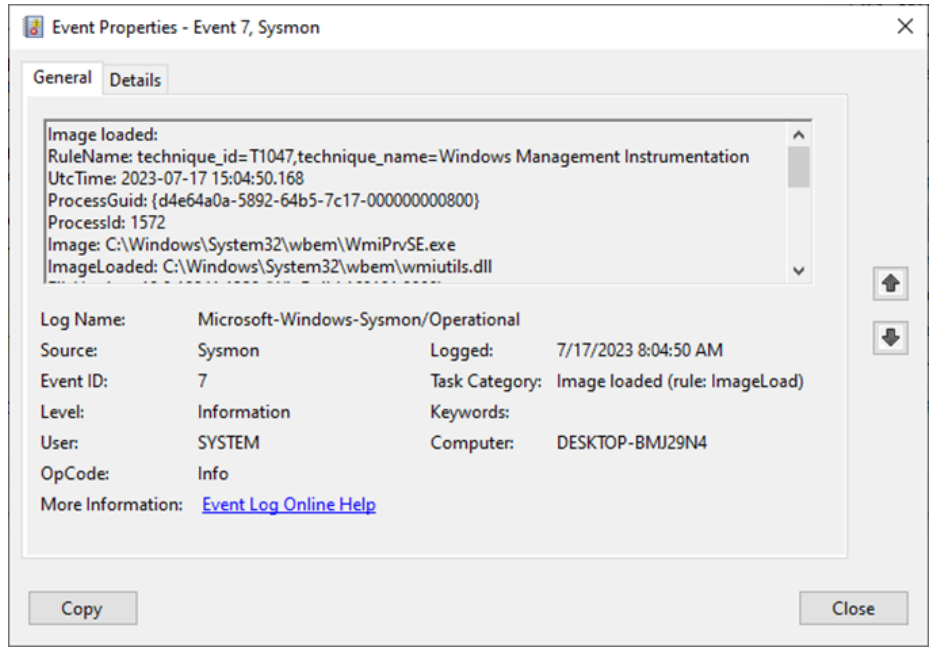
```
OriginalFileName: RUNDLL32.EXE
CommandLine: rundll32  vbscript:"\..\mshtml,#135
"+String(CreateObject("WScript.Shell").Run("calc.exe")
,0)
```



Execution - WMI

- T1047 Windows Management Instrumentation
- Event ID 7: Image Loaded

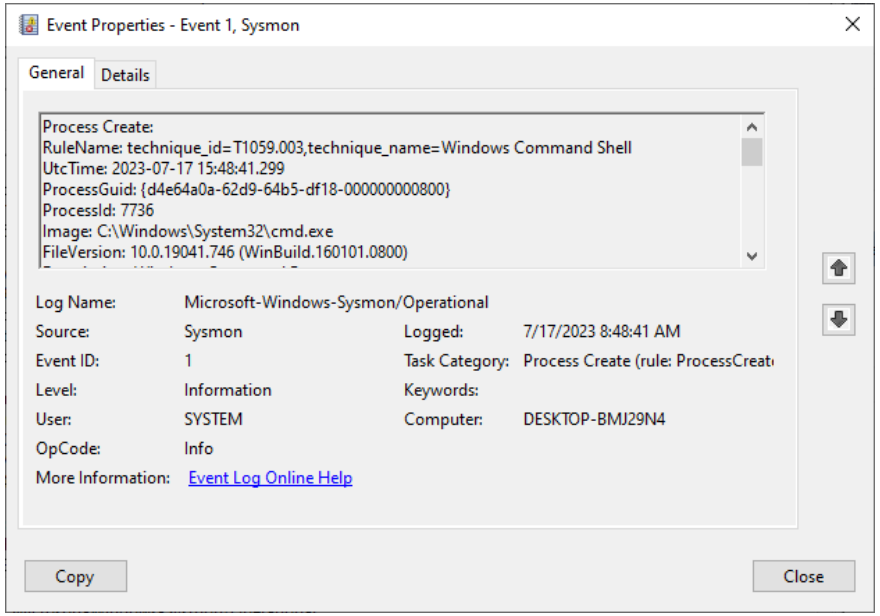
```
Image: C:\Windows\System32\wbem\WmiPrvSE.exe
ImageLoaded:
C:\Windows\System32\wbem\wmiutils.dll
FileVersion: 10.0.19041.1320
(WinBuild.160101.0800)
Description: WMI
```



Lateral Movement

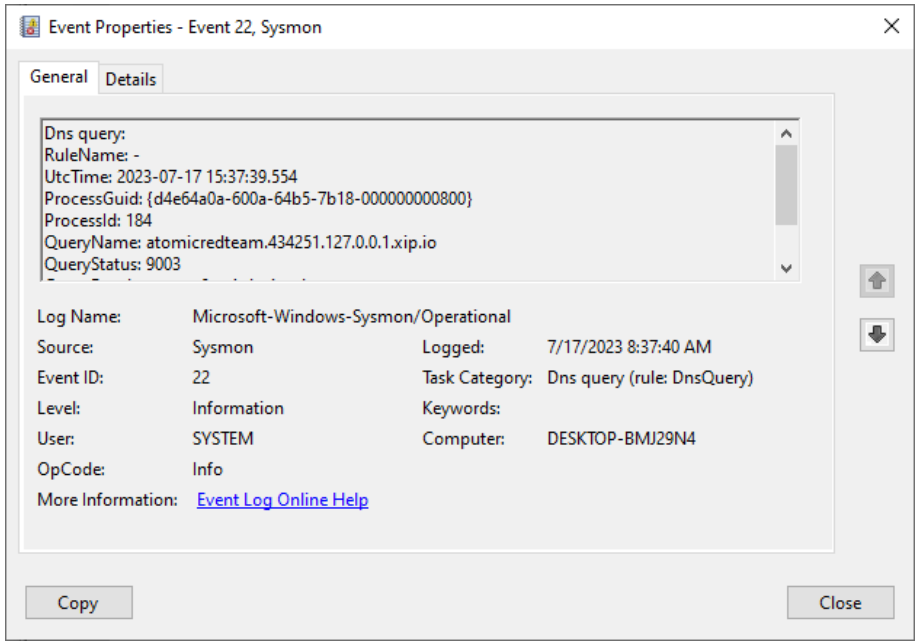
- T1021.002 Remote Services / T1059.003 Command Shell
- Event ID 1: Process Create
- LOLBIN activity

```
CommandLine: "cmd.exe" /c
"C:\AtomicRedTeam\atomics\..\ExternalPayloads\P
sExec.exe \\localhost -accepteula -c
C:\Windows\System32\cmd.exe"
```



Command and Control

- T1071.004 Application Layer Protocol
- Event ID: 22 DNS Query
- Often large number of queries

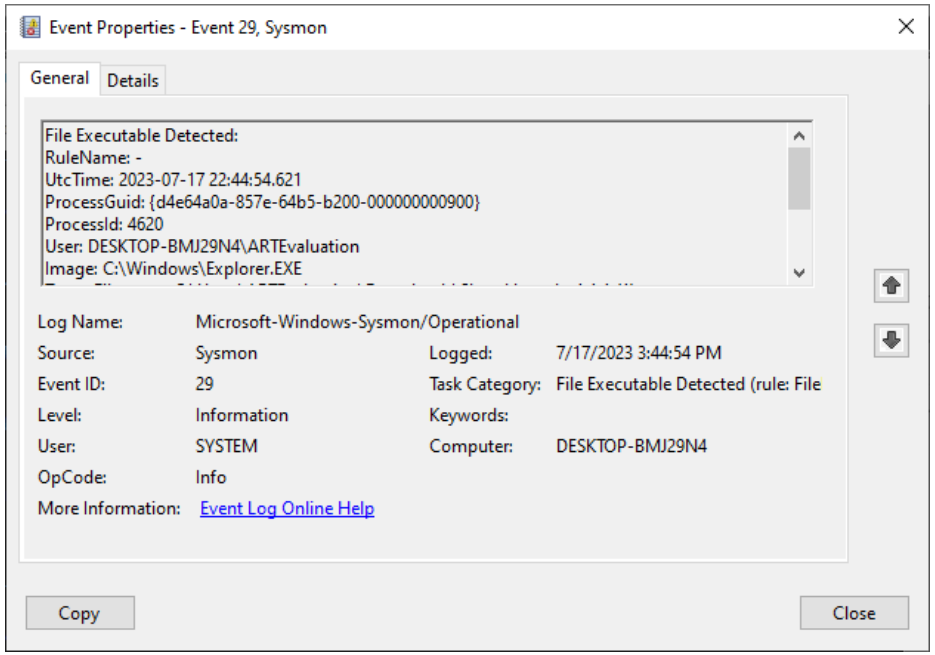



```
UtcTime: 2023-07-17 15:37:39.554
ProcessGuid: {d4e64a0a-600a-64b5-7b18-
000000000800}
ProcessId: 184
QueryName:
atomicredteam.434251.127.0.0.1.xip.io
QueryStatus: 9003
QueryResults: type:  6 ns1.dnsimple.com;
```

Command and Control

- T1105 Ingress Tool Transfer
- Event ID 29: FileExecutableDetected
- Post Exploitation tools: Sharphound, Mimikatz, Procdump

```
Image: C:\Windows\Explorer.EXE
TargetFilename:
C:\Users\ARTEvaluation\Downloads\SharpHound-
v1.1.1 (1)\System.Diagnostics.Tracing.dll
Hashes:
SHA1=5340B1FC77E793D1FDDE49B14B7B426D0E448870,
MD5=89C684EDAADCECF78C53E45DAE62E97E,SHA256=3A7
F44E3B20A03CEF6FE8B164A5C193D50BD30EE0AAB26A785
7D6B1944DA64FD,
IMPHASH=DAE02F32A21E03CE65412F6E56942DAA
```



Summary - Working with Sysmon

- Digital Forensics Analysis: Very good insight into endpoint behavior
- Combine with other evidence sources
- Start with high probability indicators
- May be difficult to use proactively for alerting across all system
- High Value Targets (HVTs) and Honeypots can provide early warning via Sysmon
- Include Acquisition and analysis into IR plans, playbooks and workflows

Thank You

For Your Time & Attention

Atomic Red Team Tests

- https://atomicredteam.io/initial-access/T1566.001/#atomic-test-2---word-spawned-a-command-shell-and-used-an-ip-address-in-the-command-line
- https://atomicredteam.io/defense-evasion/T1218.011/#atomic-test-3---rundll32-execute-vbscript-command-using-ordinal-number
- https://atomicredteam.io/execution/T1047/#atomic-test-5---wmi-execute-local-process
- https://atomicredteam.io/lateral-movement/T1021.002/#atomic-test-3---copy-and-execute-file-with-psexec

Resources

- https://learn.microsoft.com/en-us/sysinternals/downloads/sysmon
- https://www.bleepingcomputer.com/news/microsoft/microsoft-sysmon-now-detects-when-executables-files-are-created/
- https://medium.com/@olafhartong/sysmon-15-0-file-executable-detected-40fd64349f36
- https://github.com/olafhartong/sysmon-modular/tree/master
- https://github.com/MHaggis/sysmon-dfir