Catching the Guerrilla: PowerShell Counterinsurgency

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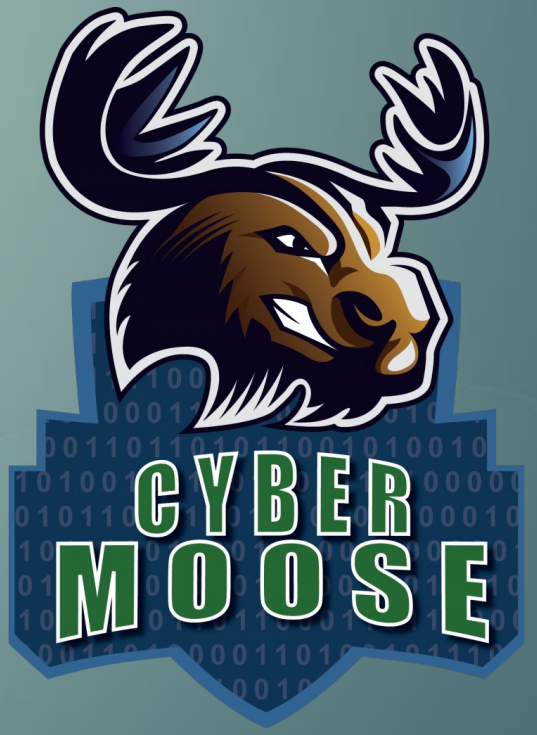
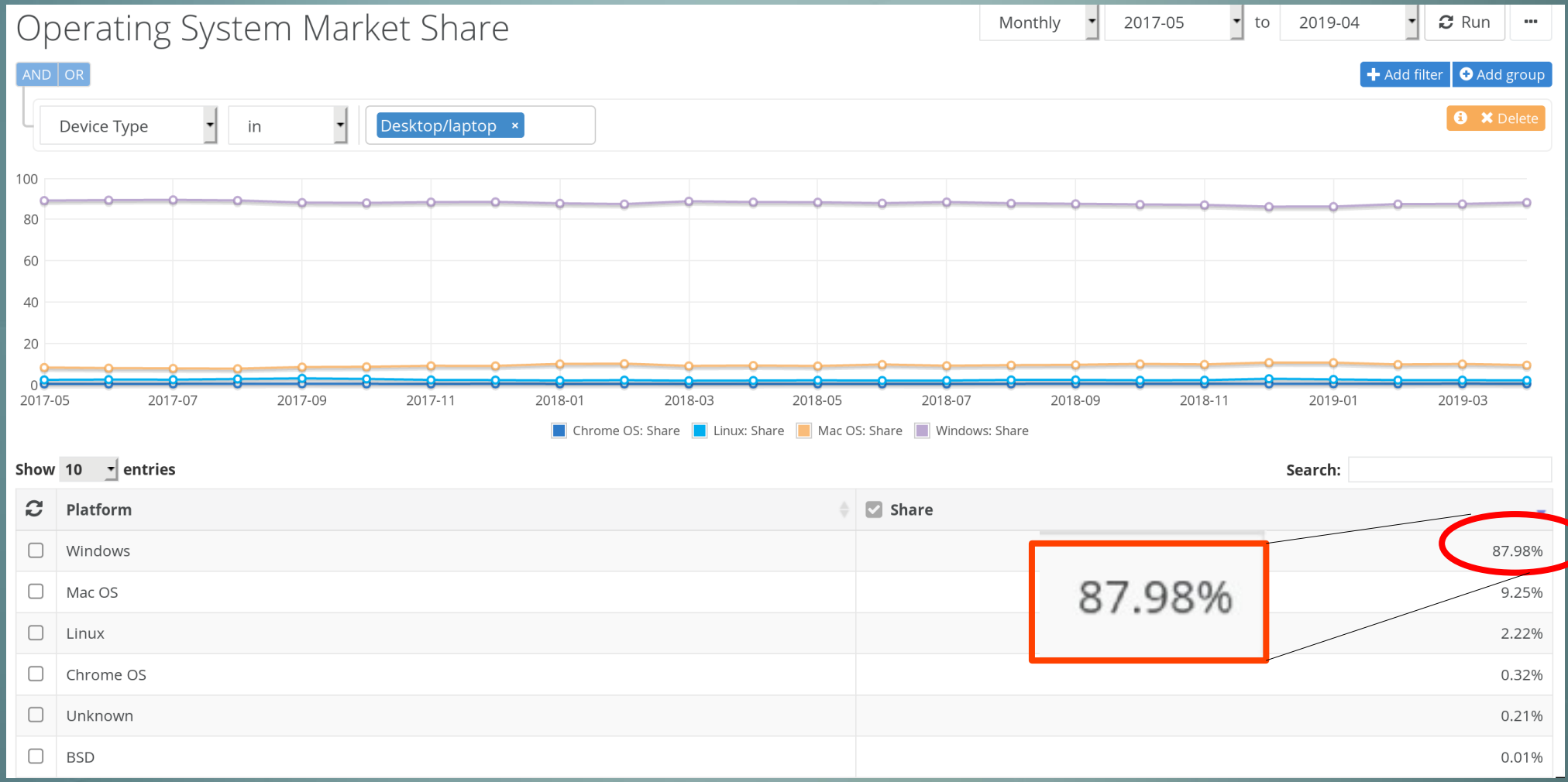


The Problem

- Most of the Attack Surface Consists of Windows
- Only Two Options For Defenders: Watch or Kill

Windows Market Share



Large Number of Vulnerability Classes

- SMB/NetBIOS
  - EternalBlue (MS17-010)
    - EternalBlue + Mimikatz = NotPetya
  - Cornficker (MS08-067)
  - NetBIOS DoS (CVE-2017-0174)
  - Auxiliary Vulnerabilities (CVE-2018-7445)

Large Number of Vulnerability Classes

- TrueType Fonts
  - ATMFD.dll

    Patched in Windows 10 1607

    CVE-2017-8483 shows that ATMFD.dll can still be fuzzed

- Old Protocols, new tricks...

CVE-2019-0708 | Remote Desktop Services Remote Code Execution Vulnerability

Security Vulnerability

Published: 05/14/2019
MITRE CVE-2019-0708

A remote code execution vulnerability exists in Remote Desktop Services – formerly known as Terminal Services – when an unauthenticated attacker connects to the target system using RDP and sends specially crafted requests. This vulnerability is pre-authentication and requires no user interaction. An attacker who successfully exploited this vulnerability could execute arbitrary code on the target system. An attacker could then install programs; view, change, or delete data; or create new accounts with full user rights.

To exploit this vulnerability, an attacker would need to send a specially crafted request to the target systems Remote Desktop Service via RDP.

The update addresses the vulnerability by correcting how Remote Desktop Services handles connection requests.

Security Update Guide > Details

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On this page

Why Not Switch?

- Switching over legacy software
- Training employees on new systems
- Windows is here to stay

New PowerShell Stuff

- Unix Philosophy
- Larger Framework
- Here’s a small taste...

PRACTICAL DEMO

Why so short?

- Written with the UNIX philosophy
  - Simple
  - Short
  - Clear
  - Modular
  - Extensible
- This produces a tool that’s easy to customize

Malware Detected!

Program is acting ‘weird’

Containment Options:

- Kill it
  - What if it’s on a production server?
  - What if it’s an accounting tool? (SEC compliance)
- Watch it
  - “the time from first action in an event chain to initial compromise of an asset is most often measured in seconds or minutes.”[1]

PS-Suspend

- PS-Suspend can do this, but:
- Requires local installation of PSExec Utils on every target system
- Thousands of instances in some cases...

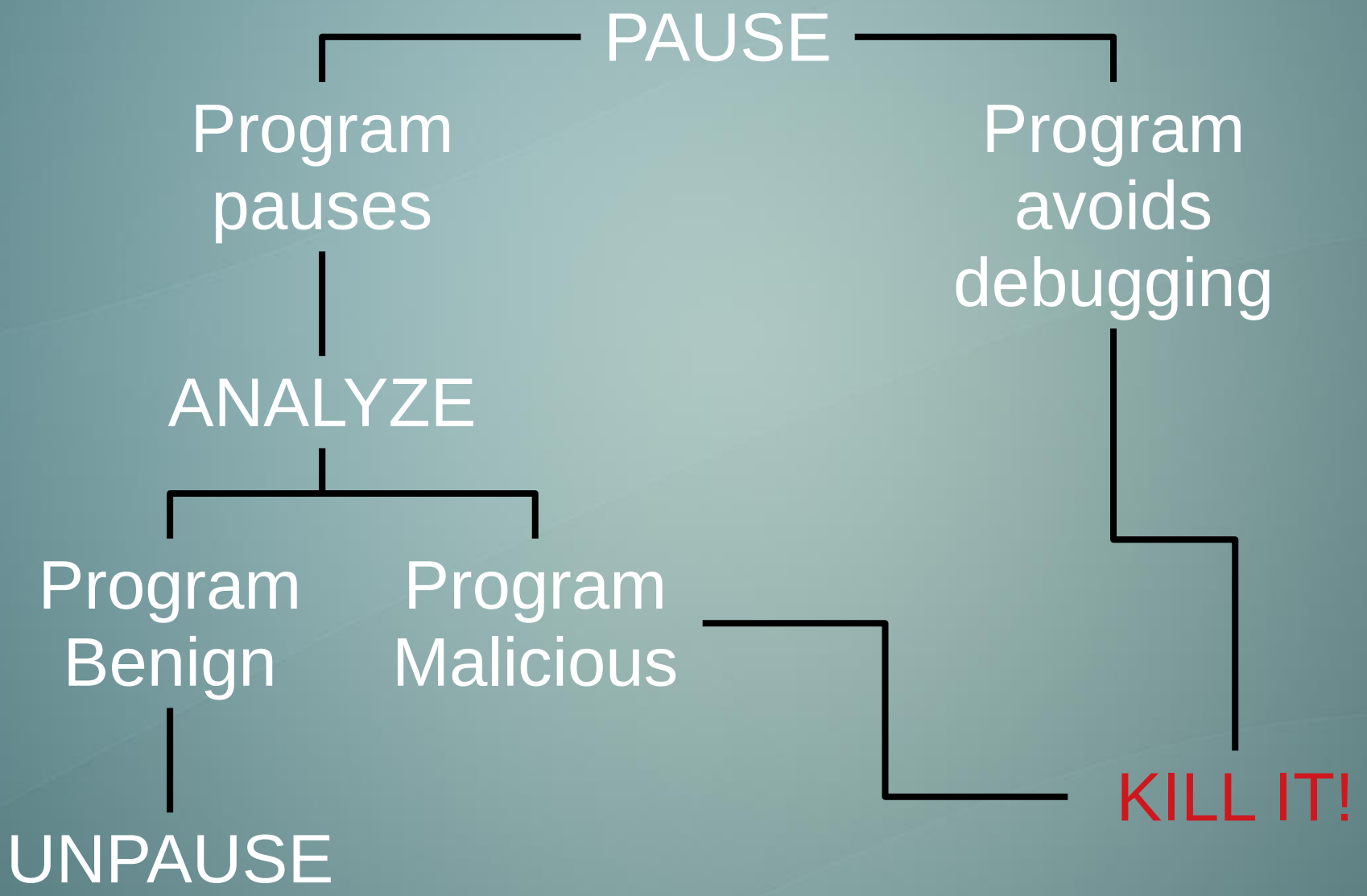
Pause-Process

- Accepts a PID as input
- “Pauses” that process by sending it to a debugger
- Works out of the box with no install on target system

Why?

- Pausing stops malicious activity
- If PID isn’t malicious, program can be unpaused
  - No harm done!

Why?


PAUSE
Program pauses
Program avoids debugging
ANALYZE
Program Benign
Program Malicious
KILL IT!
UNPAUSE

Larger Scope

- Can be deployed using WinRM/WMI triggering
- Behavioral signatures can be mapped to WQL
- Results can be cross-checked to a whitelist before automatic pausing

Use Case

- “Select all processes on a network where CPU consumption is higher than 95% for more than 3 seconds”
- Compare results to a whitelist
- Automatically pause and alert SOC analyst

Advantage of Pause-Process

- Signature matches crypto-miners
- Also matches rendering processes and compilers
- Killing would destroy someone’s work
- Pausing is Safer

Caveats

- Not good for time-sensitive processes
  - HFT
  - Manufacturing
- Currently requires a dedicated thread for each paused job

The Future of Pause-Process

- Spawn local background jobs for each paused thread
  - Eliminate SIEM overhead
- Debugging thread redirection
  - Reverse-Engineer Utility (i.e. GHIDRA)
- Slow process instead of pausing

Timed Out?

This talk is dedicated to my amazing wife.

Questions?

GitHub.com/CrashingStatic/Pause-Process

References

[1] Operating System Market Share. Net MarketShare. (Accessed May 30, 2019). https://www.netmarketshare.com/operating-system-market-share.aspx?options=%7B%22filter%22%3A%7B%22%24and%22%3A%5B%7B%22deviceType%22%3A%7B%22%24in%22%3A%5B%22Desktop%2Flaptop%22%5D%7D%7D%5D%7D%2C%22dateLabel%22%3A%22Trend%22%2C%22attributes%22%3A%22share%22%2C%22group%22%3A%22platform%22%2C%22sort%22%3A%7B%22share%22%3A-1%7D%2C%22id%22%3A%22platformsDesktop%22%2C%22dateInterval%22%3A%22Monthly%22%2C%22dateStart%22%3A%222018-05%22%2C%22dateEnd%22%3A%222019-04%22%2C%22segments%22%3A%22-1000%22%7D

[2] Verizon Data Breach Investigations Report (2018). pg 10. https://enterprise.verizon.com/resources/reports/DBIR_2018_Report.pdf

[3] CVE-2019-0708. Microsoft CVE Announcement. 14 May 2019. https://portal.msrc.microsoft.com/en-US/security-guidance/advisory/CVE-2019-0708

[4] Jealous CVEs. "2600 | The Hacker Quarterly" Facebook Page. https://www.facebook.com/groups/majordomo