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Cylance Webinar Series//
Presented:
May 16, 2018

CYLANCE

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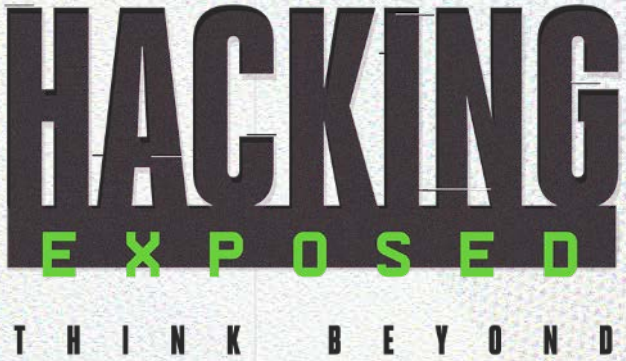

[redacted] **Presented By //**

Stuart McClure, CEO Cylance, CNE, CCSE, [redacted]

Paul Mehta, Chief Architect [redacted]

[redacted] Brian Robison, Sr. Dir. of Security Technology

HOUSEKEEPING

- Audio will sound best streamed through your computer
- Please submit questions via the Q&A box
- We will post additional resources in the chat box
- Your feedback is essential, please the polling questions at the end of the webinar
- Links to the recording and presentation will be sent to you in the next few days
- Need help? Contact us at: webinars@Cylance.com

HACKING EXPOSED
THINK BEYOND

SPEAKERS

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HACKING EXPOSED

THINK BEYOND

Why “Think Beyond”?

Questioning the status quo…

THINK BEYOND

- *Apple and Steve Jobs' "Think Different"*
- More layers <> security
- Compliance <> security
- Predictive Prevention is possible
- Reimagine your endpoint, stack, architecture
- Don't "outsource" your decision making
- Threat centric prevention, before detect and respond

AGENDA

- **Network Hack**
  - EternalBlue->Doublepulsar
  - Password dumping the Server
    - Update->dump->extract->retrieve
- **Drive-by Upload: Spectre and Meltdown**
  - Spectre (User) – Demo on Windows
    - Dump memory from a scripting language (without reading memory)
  - Meltdown (Kernel) – Demo on Linux
- **Spearphish: Operation Shaheen**
  - Email->DOC->Crypto attack (with an unusual twist)
- **One more thing…**

Hands On

Hands on examples of techniques and Cylance prevention.

HACKING EXPOSED

THINK BEYOND

Server over network hack

eternelblue->doublepulsar

ETERNALBLUE AND DOUBLEPULSAR

- An exploit developed by the U.S. National Security Agency (NSA)
- Leaked by The Shadow Brokers in early 2017
- Exploits a vulnerability in Microsoft's implementation of the Server Message Block (SMB) protocol.
- Weaponized in WannaCry (just had 1 year anniversary)
- Further developed in Not-Petya

- DoublePulsar is a backdoor implant tool developed by the U.S. National Security Agency's (NSA)
- Runs in kernel mode

SERVER OVER NETWORK HACK

- Windows 7 x64 server
- Vulnerable SMBv1 running
- EternalBlue (the exploit) delivering Doublepulsar (the payload)
- Controlled by fb.py, FuzzBunch, an NSA Tool for exploits and implants
- Upload files as part of a campaign

- GOAL: Obtain credentials from system and drop attacks as part of a campaign

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DEMO

Server over network hack

SERVER OVER NETWORK HACK – WHAT CAN WE DO?

- Patching is the only way to resolve the issue
- CylancePROTECT – prevented multiple phases of this hack

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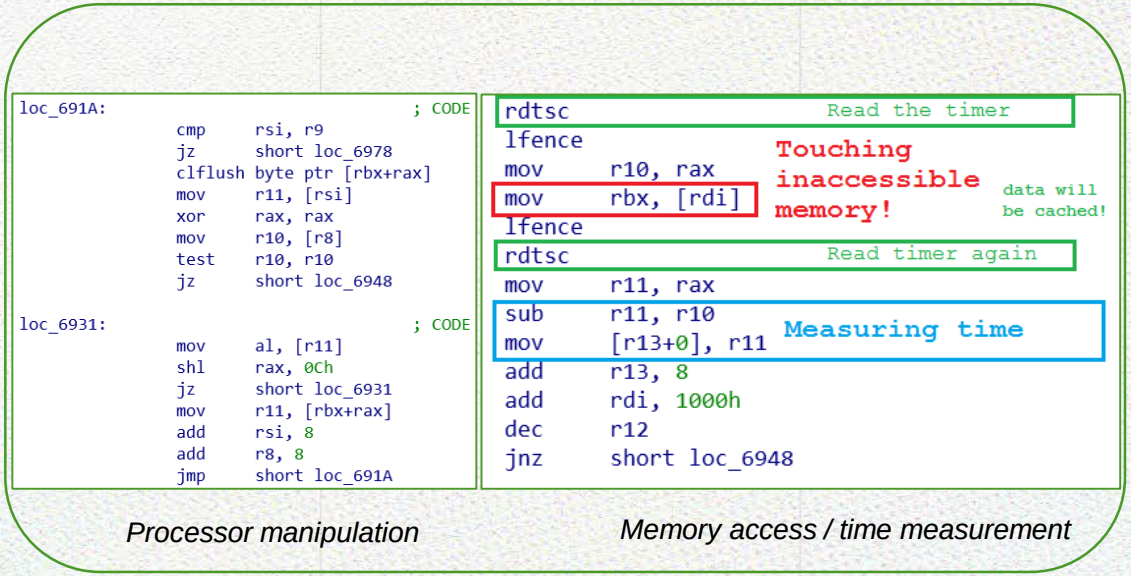
Drive-By Upload

Spectre and Meltdown

EXPLOITING SPECULATIVE EXECUTION

- The effects of touching memory will remain in the CPU cache
- Cache hits are faster than misses
- By measuring memory access this time, an attacker can infer memory
- Repeating many times increases reliability

PUTTING IT ALL TOGETHER



M*anipulate* the processor state so speculative execution touches memory!

Observe the effects…
measure the time…

If found in the **L1 cache…**

…we can infer the contents of memory!

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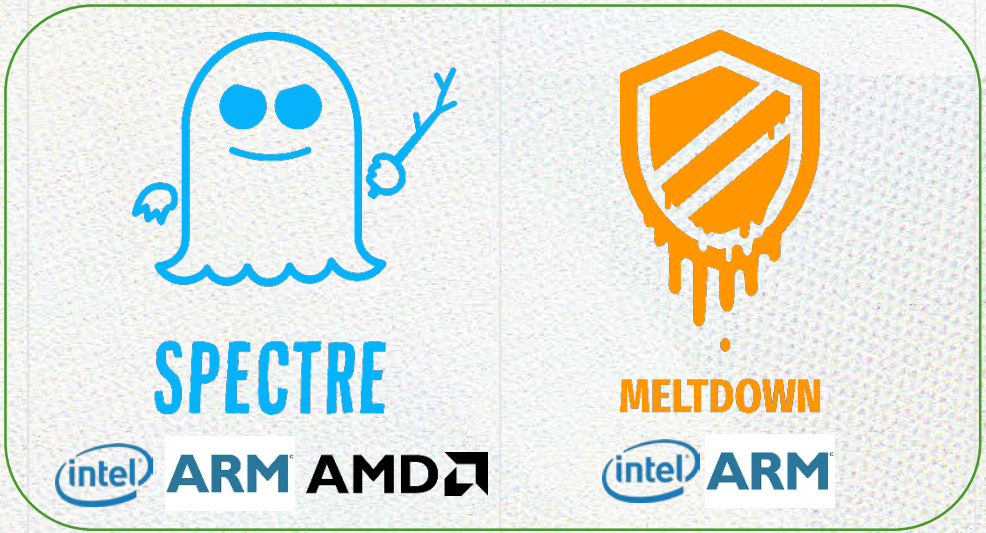
DRIVE-BY DOWNLOAD

- Windows 7 desktop
- Vulnerable Windows and Linux version running
- Meltdown on Linux
  - Show Kernel memory
- Spectre on Windows
  - Run Spectre
  - Show User memory



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DEMO

Meltdown on Linux
Spectre on Windows

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The Cure Worse Than the Disease

Meltdown patch allows full memory dump [redacted]

PREVENTION: MELTDOWN PATCH…..?????

- Microsoft released a patch for Meltdown in January
- Kb4056897 implemented “Kernel Page Table Isolation”, or KPTI to mitigate Meltdown
  - On every context switch, page tables are swapped back and forth between kernel and userland.
  - *As you know*, page tables map virtual memory to physical memory.
  - Patch does not prevent Meltdown from leaking memory so much as it prevents the memory from being present.
- This was fixed in the March patch
- CylancePROTECT

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Spearphish Shaheen

EXPLOIT DOCUMENT

- The exploit contained dl/exec shellcode which pulled a payload from the Pakistani FWO website.

Frontier Works Organization (FWO)
Active : 1966-present
Country : Pakistan
Branch : Pakistan Army

- FWO is a military engineering organization, and one of the major science and technology commands of the Pakistan Army.

DOCUMENT ATTACK

- This document was downloaded from an IP that has been linked to
- C&C domain resolution using web services and attacks against Pakistani targets.
- Which for a period of a week resolved to this IP: 1**.2**.1**.1**.
  - Resolved to a subdomain of a completely unrelated topic.

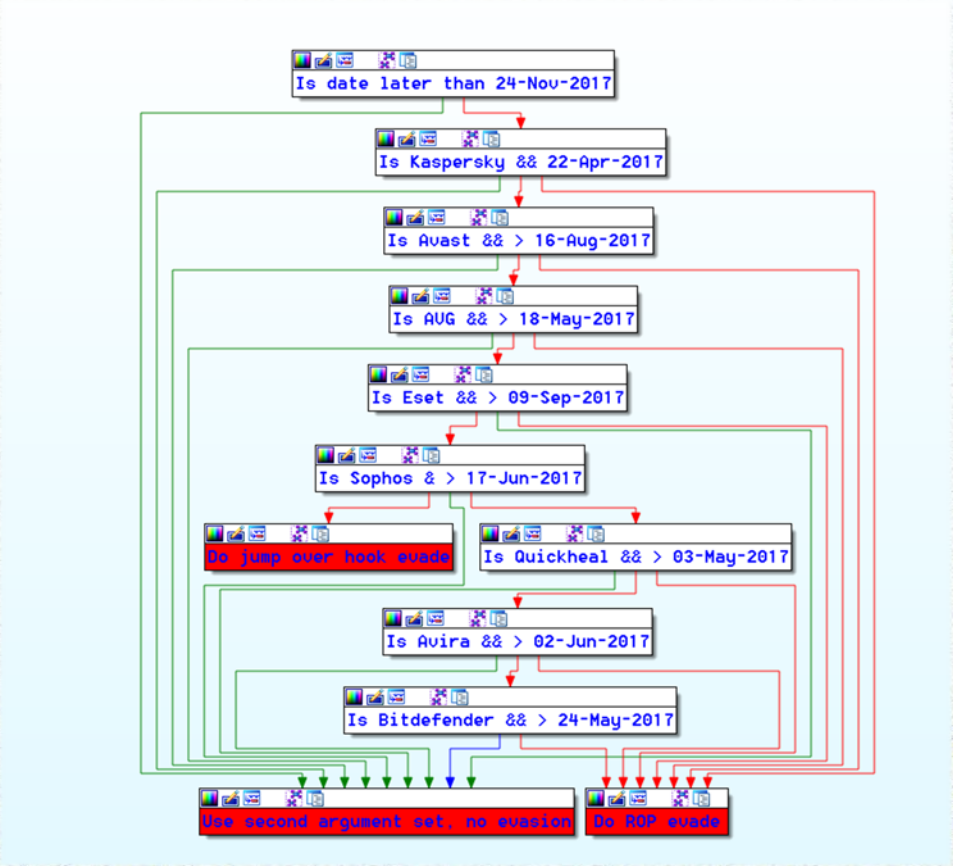
EVOLUTION

- The shellcode has evolved over time.
  - Earlier exploit docs contained basic download & execute shellcode.
  - More recent examples use multi-stage embedded payloads.
- Our samples matched based on source of the payload as well as shellcode similarities, known as code-sharing.

EVASION CAPABILITIES

- They used a relatively unique means of obfuscating function calls to evade Kaspersky.
- They went through a lot of trouble to do this among other evasions, only to stop in sync

EVASION CAPABILITIES – ANTIVIRUS???



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DEMO

Spearphish Shaheen

PREVENTION

- CylancePROTECT Script Control prevents initial vector, pre-execution engine detects and prevents dropper from executing

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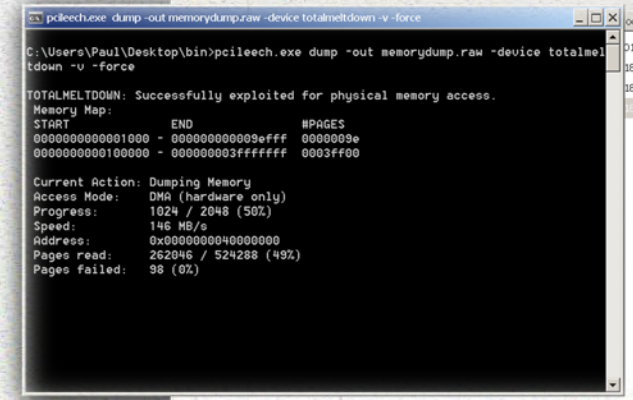
One more thing…

Meltdown patch allows full memory dump [redacted]

TOTAL MELTDOWN

- On Windows 7 x64, this patch introduced a larger security hole...
  - The user/supervisor bit was set to user
  - Allowed user-mode code access to the page tables… oops
- This means userland code can access page tables and dump kernel memory with ease at 100MB+/s



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QUESTIONS AND ANSWERS

Polling Questions

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THANK YOU

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