RSAConference2018

San Francisco | April 16 – 20 | Moscone Center

MATTERS NOW

SESSION ID: SPO3-W04

THE SKY IS FALLING! RESPONDING RATIONALLY TO HEADLINE VULNERABILITIES

Gill Langston

Director, Product Management
Qualys, Inc.

Why are we here

- Our emergency response playbook has solved all of our problems

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Why are we here

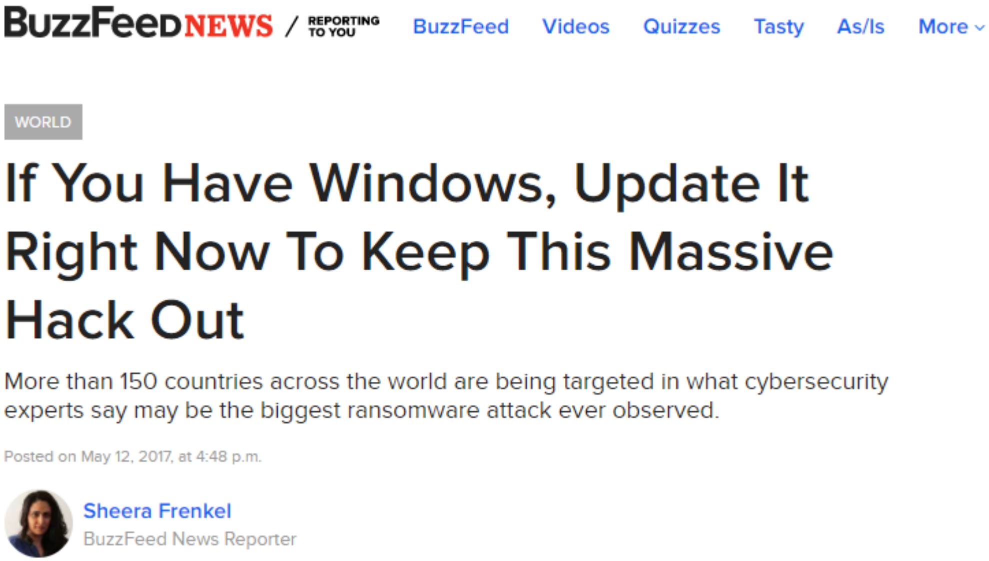
- Our emergency response playbook has solved all of our problems
- This job is pretty boring these days since we are ahead of the curve
- When a high profile vulnerability comes along, it makes my day

NO?

Today’s news cycle

- Executive visibility
- High noise level vs. what's important
- Public accountability
- Need a better plan for response

Today’s news cycle



WORLD

If You Have Windows, Update It Right Now To Keep This Massive Hack Out

More than 150 countries across the world are being targeted in what cybersecurity experts say may be the biggest ransomware attack ever observed.

Posted on May 12, 2017, at 4:48 p.m.

Sheera Frenkel
BuzzFeed News Reporter

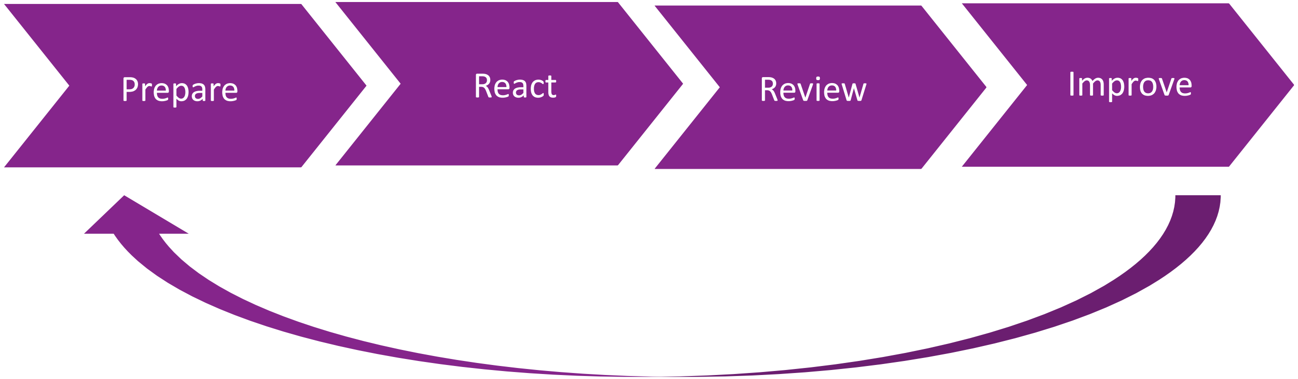
https://www.buzzfeed.com/sheerafrenkel/the-biggest-ransomeware-attack-in-history-is-hitting?utm_term=.ow9qL9Bqk#.iu8q56vqR

They don't go away on their own!

Someone else's problem

Discussion

- Review of anonymized, aggregated Qualys customer detections
- Response challenges based on patching behavior trends
- Real-world best practices based on analysis of remediation(s)



Prepare

React

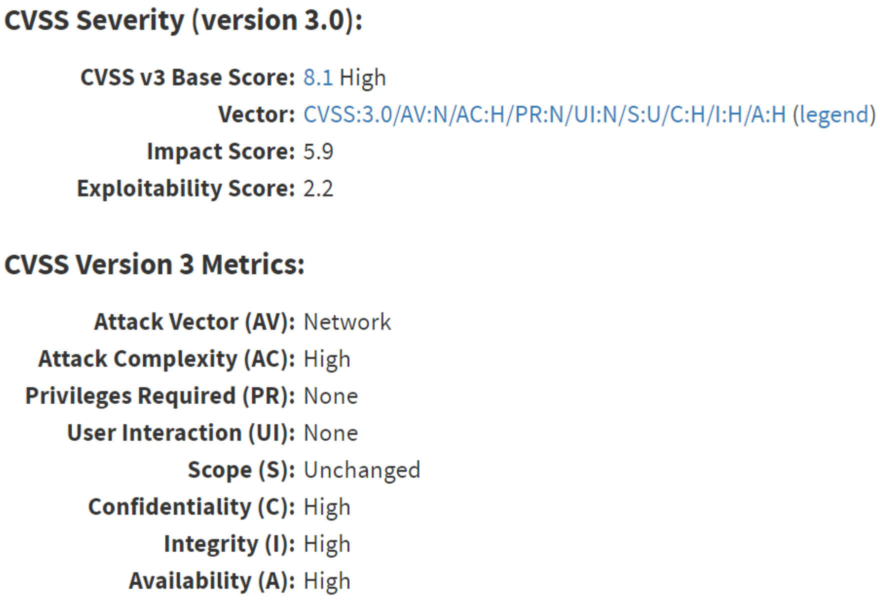
Review

Improve

REVIEW OF HIGH PROFILE VULNERABILITIES

WannaCry – notable info

- High risk issue
- Highly publicized (NSA/Shadow Brokers hack)
- Mitigations – Risky



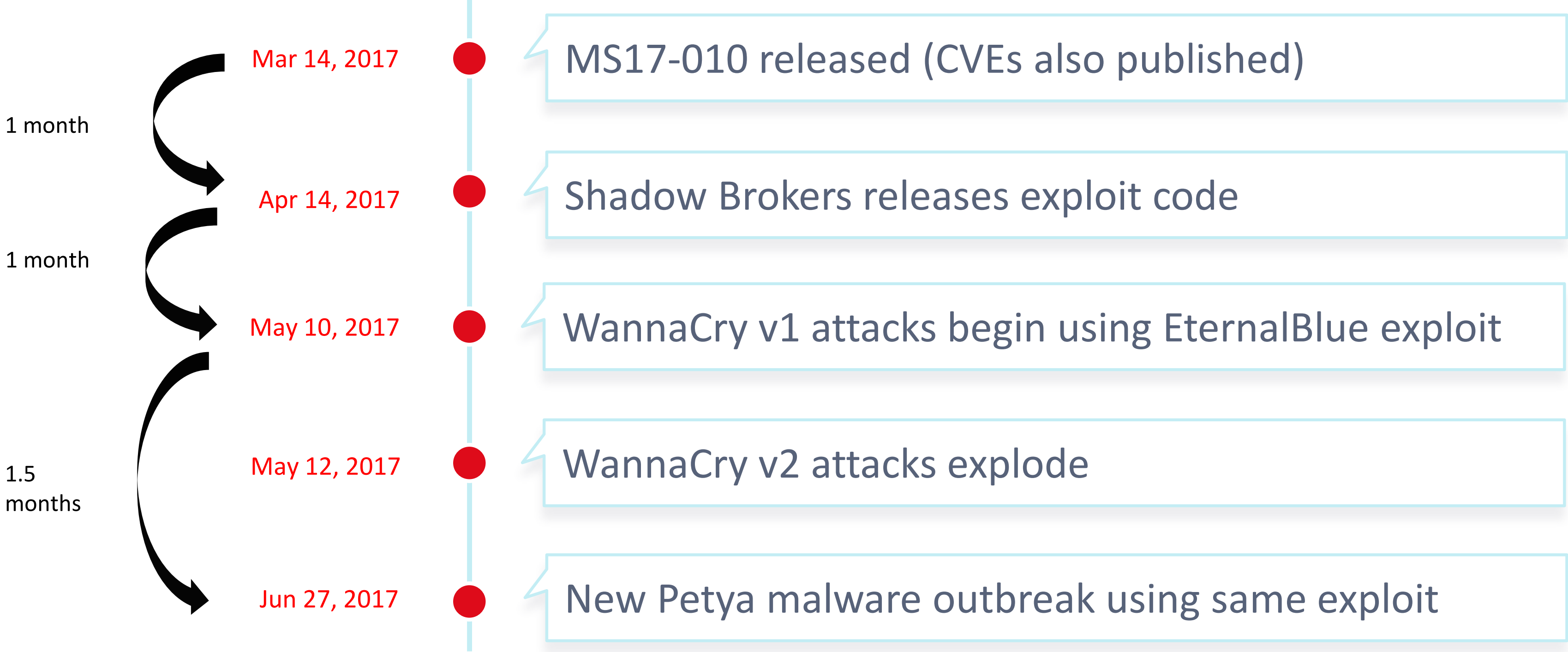
CVSS Severity (version 3.0):

CVSS v3 Base Score: 8.1 High
Vector: CVSS:3.0/AV:N/AC:H/PR:N/UI:N/S:U/C:H/I:H/A:H (legend)
Impact Score: 5.9
Exploitability Score: 2.2

CVSS Version 3 Metrics:

Attack Vector (AV): Network
Attack Complexity (AC): High
Privileges Required (PR): None
User Interaction (UI): None
Scope (S): Unchanged
Confidentiality (C): High
Integrity (I): High
Availability (A): High

WannaCry timeline



1 month

1 month

1.5 months

Mar 14, 2017 — MS17-010 released (CVEs also published)

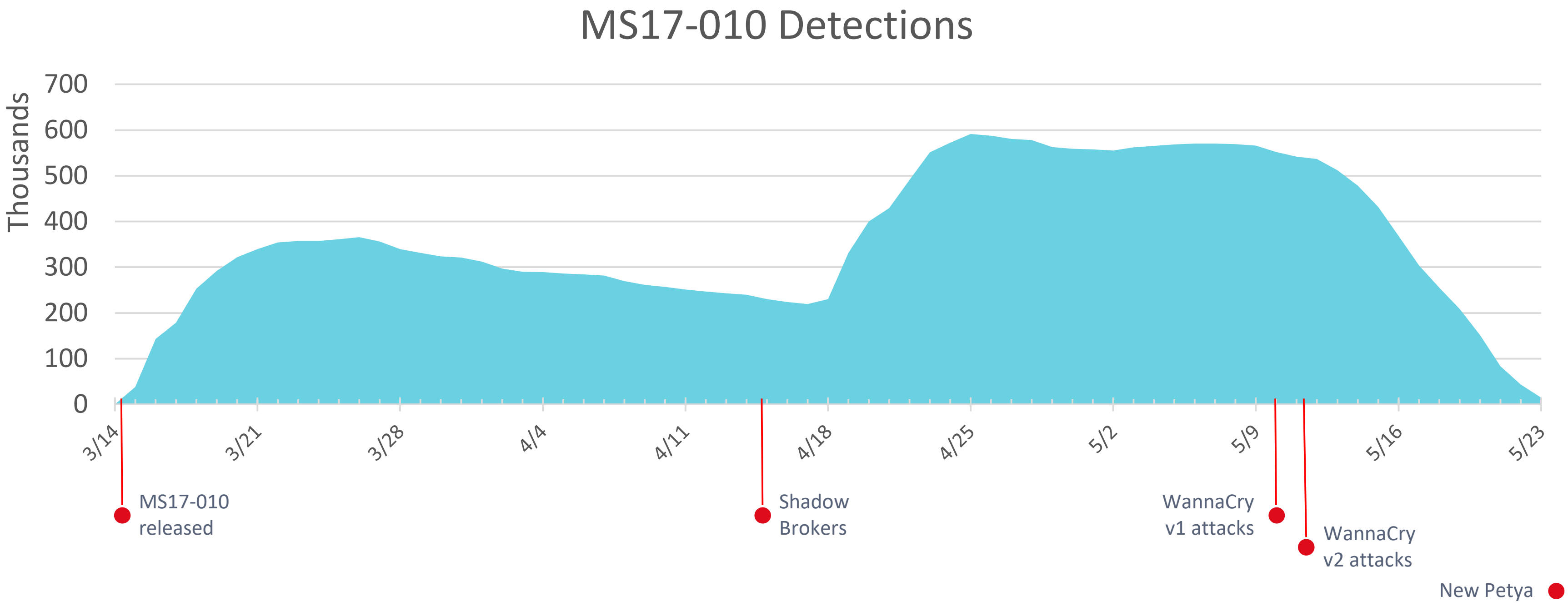
Apr 14, 2017 — Shadow Brokers releases exploit code

May 10, 2017 — WannaCry v1 attacks begin using EternalBlue exploit

May 12, 2017 — WannaCry v2 attacks explode

Jun 27, 2017 — New Petya malware outbreak using same exploit

WannaCry detections



WannaCry takeaways – why we struggled

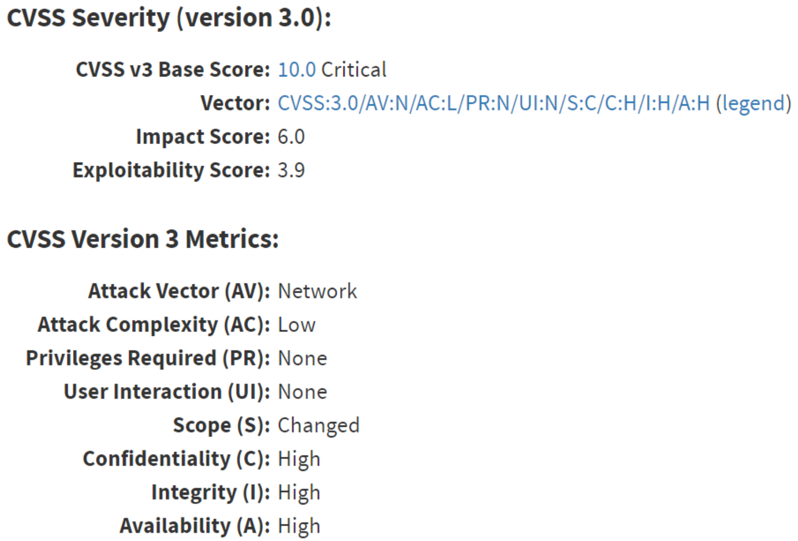
- Identification of all at-risk assets was slow
- All issues sometimes treated the same by ITOps teams
- Widespread user participation requirement created delays in remediation
  - If they don’t know its critical, complacency sets in

WannaCry Impact

- Large Organizations infected
  - Stayed present in news cycle
- Panic to resolve issue from top-down
  - Identify vulnerable assets
  - Determine fixes
  - Complete patching cycle
- Reinforced need to improve patching cycles

Struts – notable info

- High risk
- Easy to exploit



CVSS Severity (version 3.0):

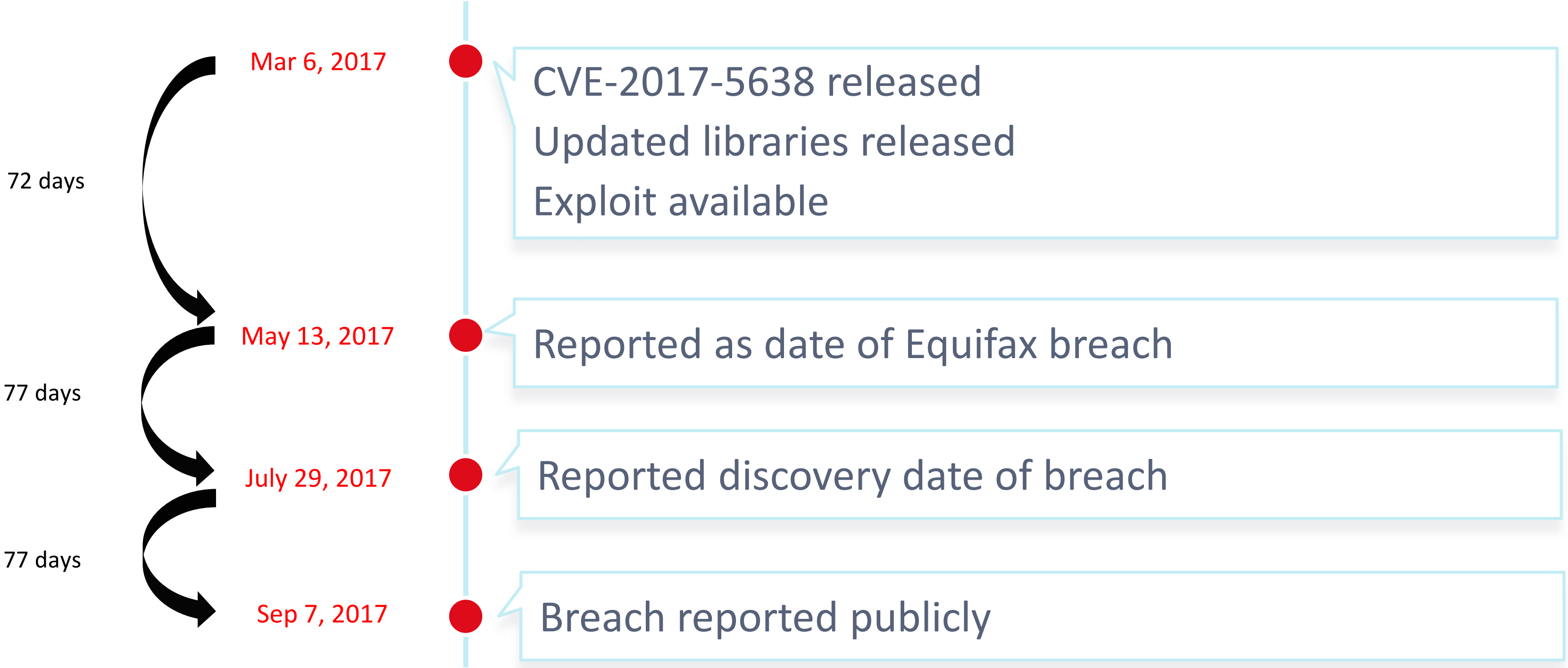
CVSS v3 Base Score: 10.0 Critical
Vector: CVSS:3.0/AV:N/AC:L/PR:N/UI:N/S:C/C:H/I:H/A:H (legend)
Impact Score: 6.0
Exploitability Score: 3.9

CVSS Version 3 Metrics:

Attack Vector (AV): Network
Attack Complexity (AC): Low
Privileges Required (PR): None
User Interaction (UI): None
Scope (S): Changed
Confidentiality (C): High
Integrity (I): High
Availability (A): High

https://nvd.nist.gov/vuln/detail/CVE-2017-5638

Struts timeline



Mar 6, 2017

CVE-2017-5638 released
Updated libraries released
Exploit available

72 days

May 13, 2017

Reported as date of Equifax breach

77 days

July 29, 2017

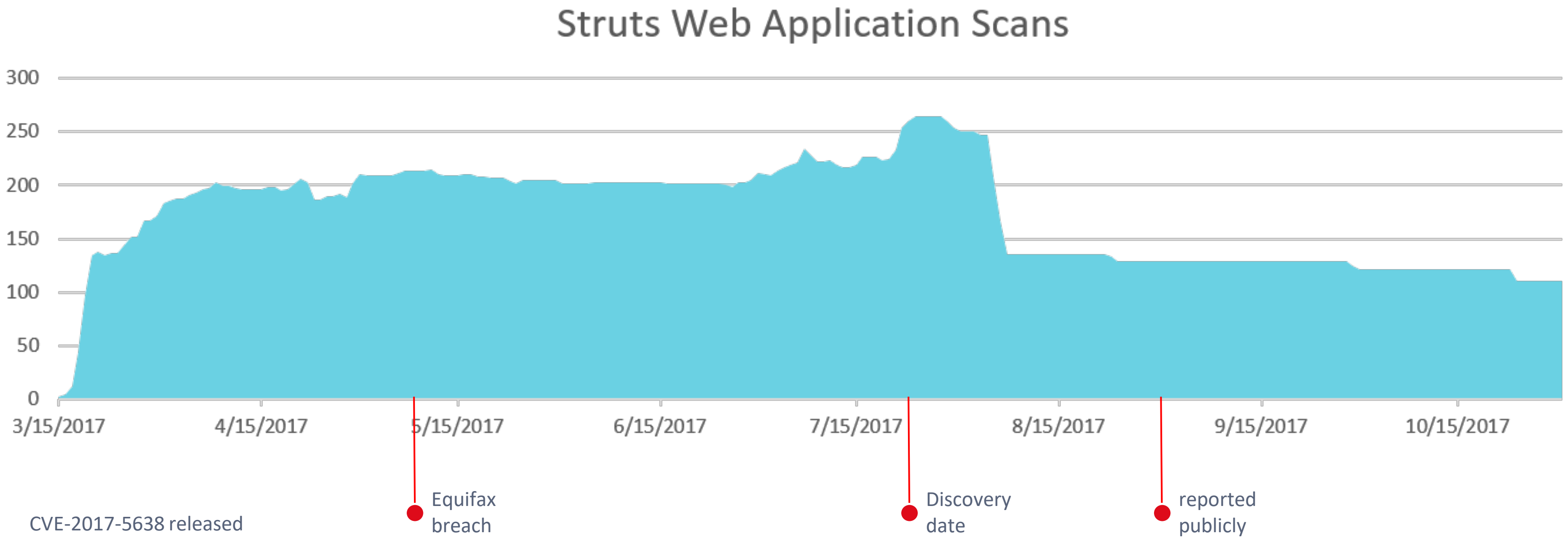
Reported discovery date of breach

77 days

Sep 7, 2017

Breach reported publicly

Struts Vulnerability



CVE-2017-5638 released

● Updated libraries released

Exploit available

Struts takeaways – why we struggled

- Long delays in remediating web applications

- Not easily fixed
  - Not always as simple as pushing a patch
  - Application rebuild
  - Testing cycles

Struts Impact

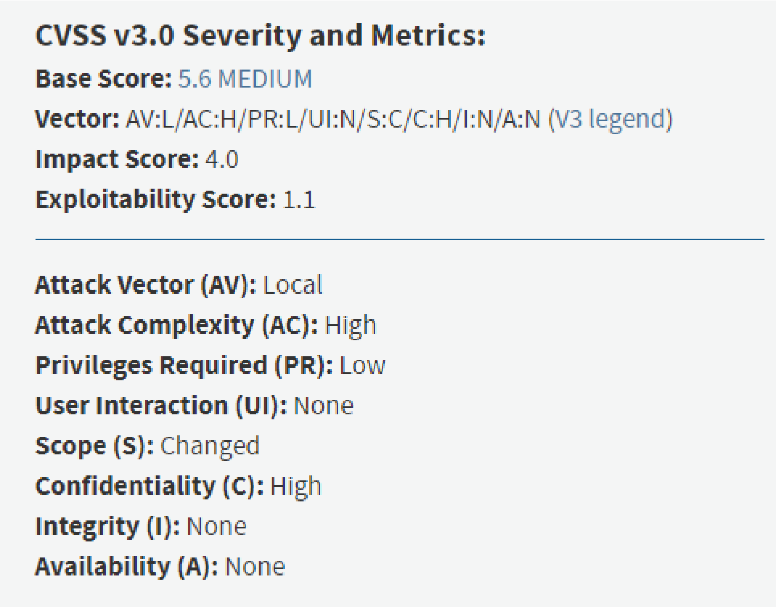
- Highly public data breach
  - Delay in updating web application was the cause

- Reinforces need for mitigations (Web Application Firewall, filtering rules)

Meltdown/Spectre– notable info

- Requires access to machine
  - *Could* be delivered via multi-stage attack
  - Few-to-no exploits available

- Mitigation – Patch *was* a mitigation
  - Also ensure layered security is up-to-date



CVSS v3.0 Severity and Metrics:

Base Score: 5.6 MEDIUM

Vector: AV:L/AC:H/PR:L/UI:N/S:C/C:H/I:N/A:N (V3 legend)

Impact Score: 4.0

Exploitability Score: 1.1

Attack Vector (AV): Local

Attack Complexity (AC): High

Privileges Required (PR): Low

User Interaction (UI): None

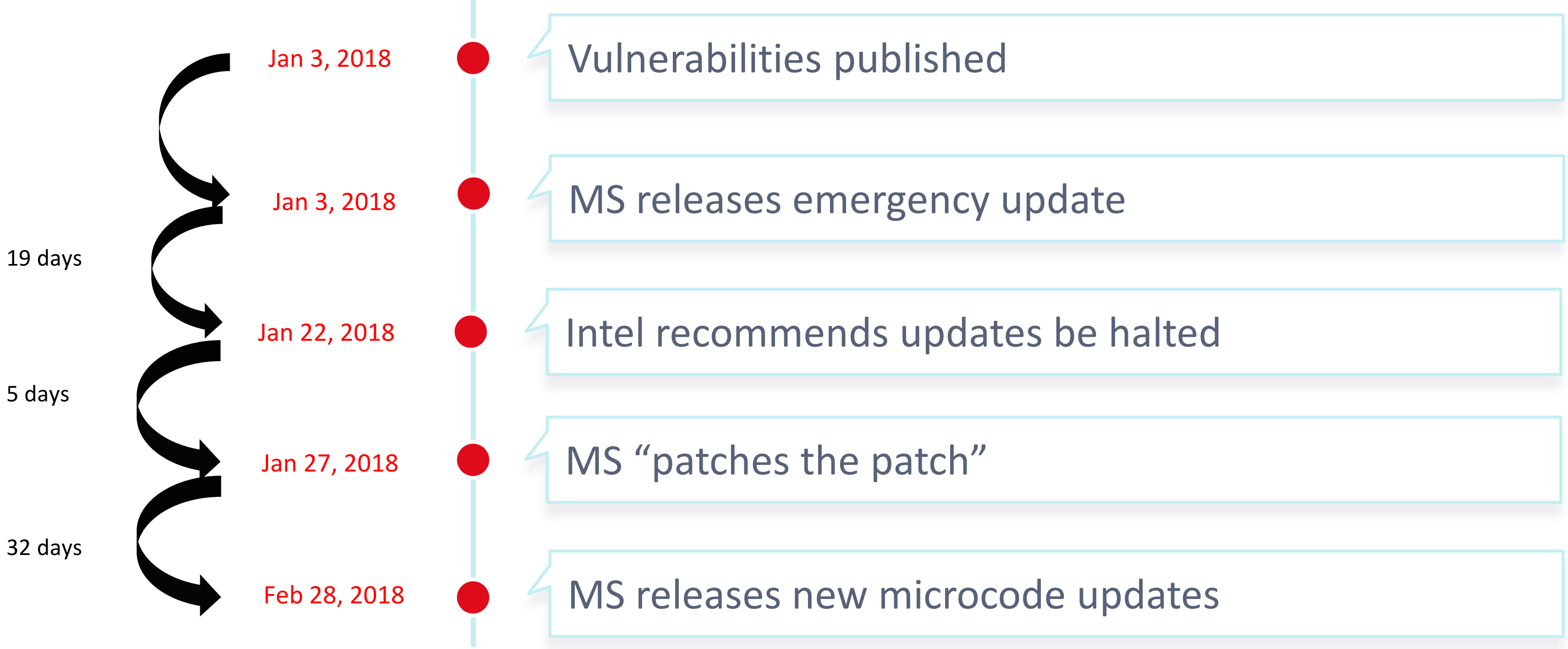
Scope (S): Changed

Confidentiality (C): High

Integrity (I): None

Availability (A): None

Meltdown/Spectre timeline



Jan 3, 2018 – Vulnerabilities published

Jan 3, 2018 – MS releases emergency update

19 days

Jan 22, 2018 – Intel recommends updates be halted

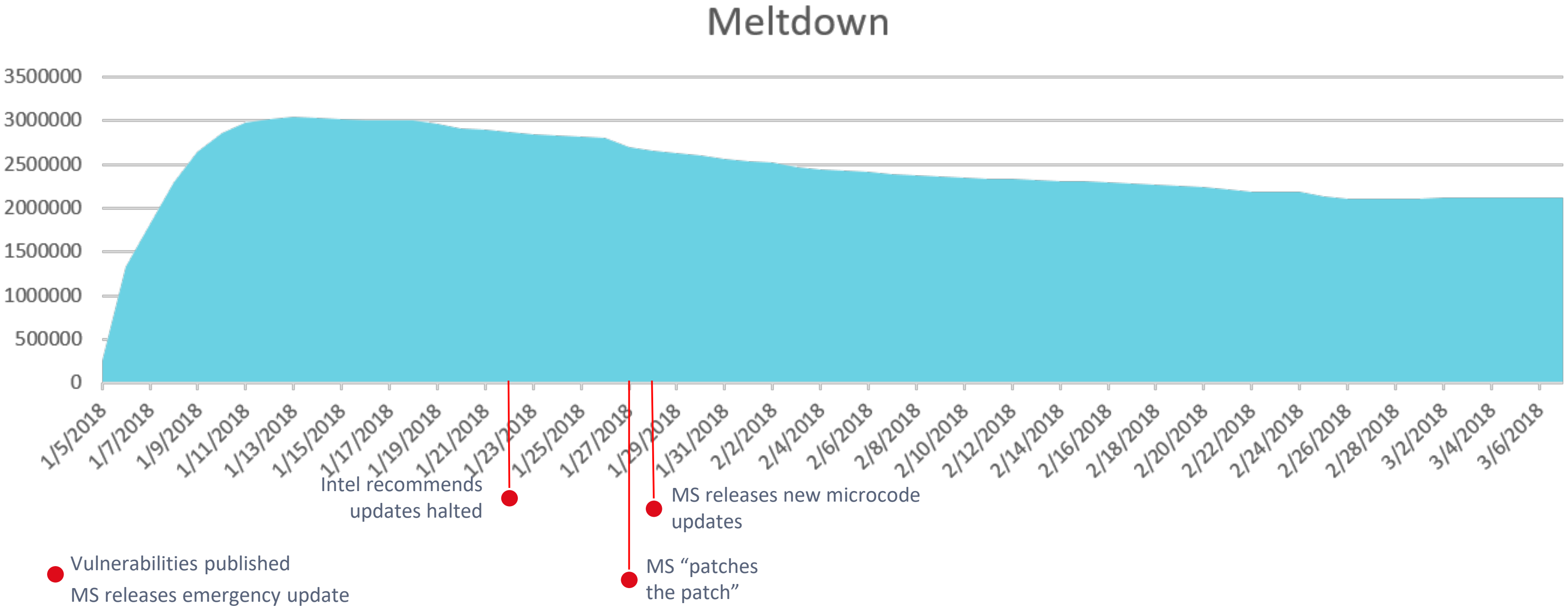
5 days

Jan 27, 2018 – MS “patches the patch”

32 days

Feb 28, 2018 – MS releases new microcode updates

Meltdown Detections



Intel recommends updates halted ●

● MS releases new microcode updates

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● MS “patches the patch”

Qualys. Continuous Security

RSAConference2018

Meltdown/Spectre takeaways – why we struggled

- No fixes, only mitigation patches

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- Affected handling of memory

Meltdown/Spectre takeaways – why we struggled

- No fixes, only mitigation patches
- Every OS patch had a downside
- Affected handling of memory
- Tons of caveats and risk

Meltdown/Spectre Impact

- Panic – so many systems affected

- Fix caused major issues
  - Generated a lot of churn in IT orgs

- Reinforces need to….wait?

Overall takeaways

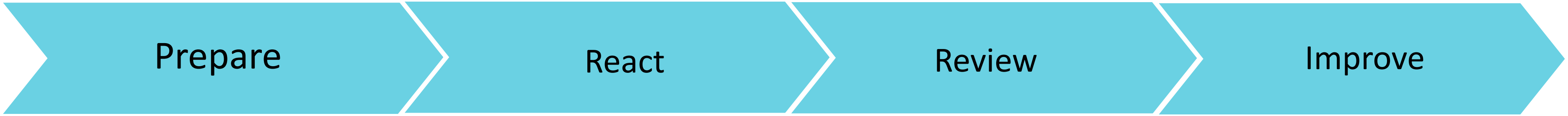
- Leaving high profile vulnerabilities to the current cycle doesn’t work
- Not all newsworthy vulnerabilities mean the same to you
- Sometimes the fix can be worse than waiting!
- Things can change quickly
- Lacking a thorough response plan can generate chaos
  - Internal pressure
  - External requests (is my data protected? Will business proceed normally?)

Put it all together

- Identify high-risk vulnerabilities - often
- Track the risk to your organization
- Determine best course of action (Remediate? Mitigate? Wait?)
- Decide when to communicate
- Update regularly
- Work the plan and improve

Get buy-in from teams (Executive, SecOps, DevOps, ITOps)
Build playbook together

Response plan elements



Prepare

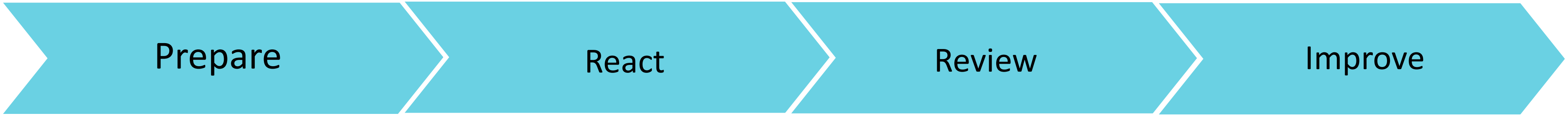
React

Review

Improve

- Ensure all assets are identified
- Document the triggers
- Build communication plan

Response plan elements



Prepare

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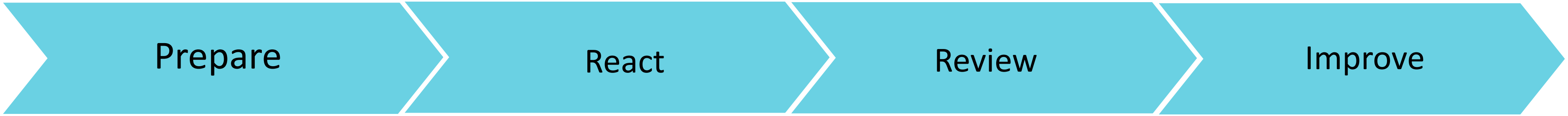
Prepare

- Ensure all assets are identified
- Document the triggers
- Build communication plan

React

- Work the playbook
- Decide on Fix/Wait/Mitigate
- Communicate with your users

Response plan elements



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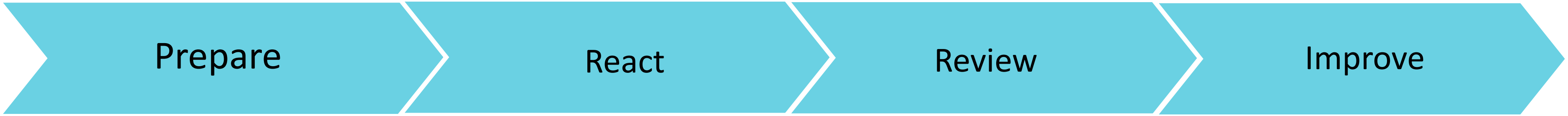
Review

- Retrospective
- Identify areas to improve
- Don’t get discouraged!

Response plan elements



Prepare

- Ensure all assets are identified
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React

- Work the playbook
- Decide on Fix/Wait/Mitigate
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Review

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Improve

- Work together to improve response
- Modify the plan based on findings
- Expand the plan to all high-severity vulnerabilities

A rational response

Threat

All Assets Identified? ○ Yes ○ No

Active Attack? ○ Yes ○ No

Vector ○ Remote
Local
○ Web

Vector Details:

Fix Available? ○ Yes ○ No

Fix Tested? ○ Yes ○ No

Risks/Issues? ○ Yes ○ No

Risk Details:

Mitigation Available? ○ Yes ○ No

Mitigation Tested? ○ Yes ○ No

Risks/Issues? ○ Yes ○ No

Risk Details:

Recommendation

Current Recommendation ○ Fix
○ Wait
○ Mitigate

Reason for Recommendation:

Trigger to Change Recommendation:

Communications

Alert Users? ○ Yes ○ No

Alert Mechanism ○ Email ○ Patching Prompts

Alert Details:

External Comm? ○ Yes ○ No

Alert Mechanism ○ Public Website
○ Social Media
○ Internal site

Alert Details:

Actions

Last Action:

Complete? ○ Yes ○ No

Next Action:

A rational response

CVE-2017-5754

Threat

All Assets Identified?	● Yes	○ No
Active Attack?	○ Yes	● No
Vector	○ Remote ● Local ○ Web	
Vector Details:	*Must have access to assets*	
Fix Available?	● Yes	○ No
Fix Tested?	● Yes	○ No
Risks/Issues?	● Yes	○ No
Risk Details:	*Performance issues, unexpected reboots.*	
Mitigation Available?	○ Yes	● No
Mitigation Tested?	○ Yes	● No
Risks/Issues?	○ Yes	● No
Risk Details:		

Recommendation

Current Recommendation ○ Fix ● Wait ○ Mitigate

Reason for Recommendation:
Patches known to cause issues. No active attacks. Ensuring antivirus, web filters, and email filtering is up to date in case of multi stage attack

Trigger to Change Recommendation:
Active attack that could be triggered by user, Confirmation that all issues with patches are resolved

Communications

Alert Users?	○ Yes	● No
Alert Mechanism	○ Email	○ Patching Prompts
Alert Details:	*None at this time*	
External Comm?	○ Yes	○ No
Alert Mechanism	○ Public Website ○ Social Media ○ Internal site	
Alert Details:		

Actions

Last Action:	*Test Meltdown patches*	
Complete?	● Yes	○ No
Next Action:	*Monitor for changes in threat landscape*	

A rational response

CVE-2017-5754

Threat

All Assets Identified? ● Yes ○ No

Active Attack? ● Yes ○ No

Vector ○ Remote ○ Local ● Web

Vector Details: *Multi-stage attack delivered via email*

Fix Available? ● Yes ○ No

Fix Tested? ● Yes ○ No

Risks/Issues? ● Yes ○ No

Risk Details: *Performance issues, unexpected reboots.*

Mitigation Available? ○ Yes ● No

Mitigation Tested? ○ Yes ● No

Risks/Issues? ○ Yes ● No

Risk Details:

Recommendation

Current Recommendation ● Fix ○ Wait ○ Mitigate

Reason for Recommendation:
Known attack using email and websites tricking users into downloading exploit. Recommending we deploy fixes for applications and browsers, and waiting on operating systems until issues are resolved.

Trigger to Change Recommendation:
none at this time

Communications

Alert Users? ● Yes ○ No

Alert Mechanism ● Email ○ Patching Prompts

Alert Details: *Inform users of known threats and reinforce user training*

External Comm? ● Yes ○ No

Alert Mechanism ○ Public Website ○ Social Media ● Internal site

Alert Details: *Internal site with company response for copy/paste*

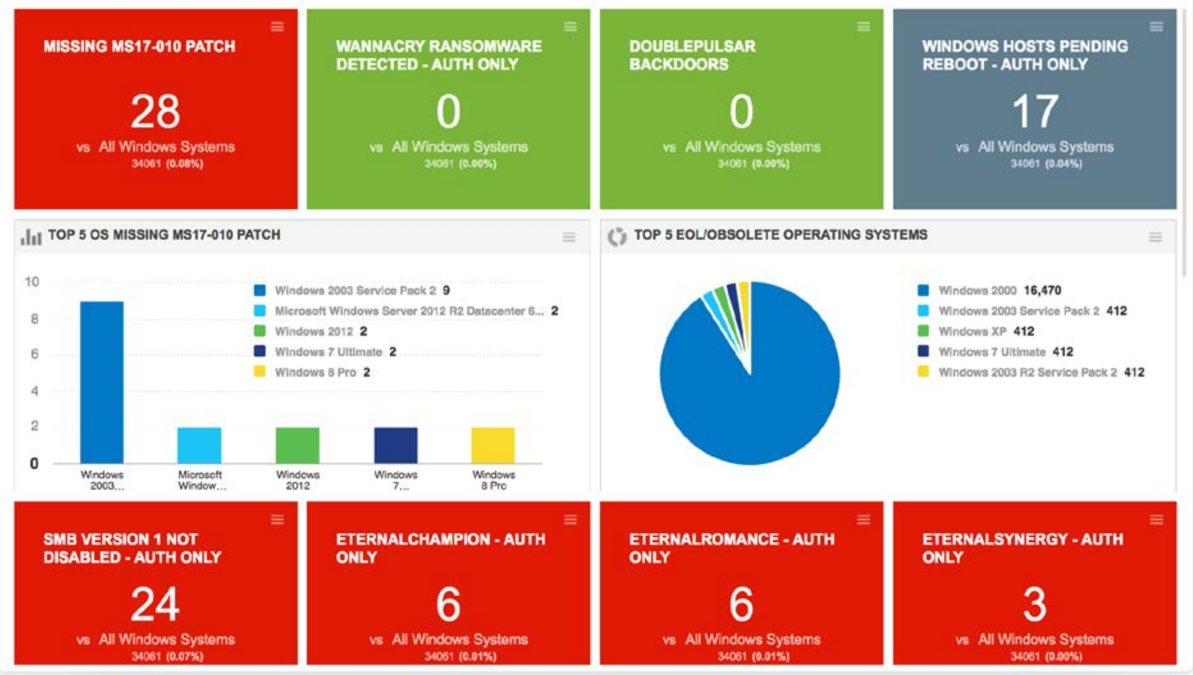
Actions

Last Action: *Deployed patch to test group*

Complete? ● Yes ○ No

Next Action: *Roll out patches to affected machines*

A rational response



MISSING MS17-010 PATCH
28
vs All Windows Systems
34061 (0.08%)

WANNACRY RANSOMWARE DETECTED - AUTH ONLY
0
vs All Windows Systems
34061 (0.00%)

DOUBLEPULSAR BACKDOORS
0
vs All Windows Systems
34061 (0.00%)

WINDOWS HOSTS PENDING REBOOT - AUTH ONLY
17
vs All Windows Systems
34061 (0.04%)

TOP 5 OS MISSING MS17-010 PATCH

🟦 Windows 2003 Service Pack 2	9
🟦 Microsoft Windows Server 2012 R2 Datacenter 6...	2
🟩 Windows 2012	2
🟦 Windows 7 Ultimate	2
🟨 Windows 8 Pro	2

TOP 5 EOL/OBSOLETE OPERATING SYSTEMS

🟦 Windows 2000	16,470
🟦 Windows 2003 Service Pack 2	412
🟩 Windows XP	412
🟦 Windows 7 Ultimate	412
🟨 Windows 2003 R2 Service Pack 2	412

SMB VERSION 1 NOT DISABLED - AUTH ONLY
24
vs All Windows Systems
34061 (0.07%)

ETERNALCHAMPION - AUTH ONLY
6
vs All Windows Systems
34061 (0.01%)

ETERNALROMANCE - AUTH ONLY
6
vs All Windows Systems
34061 (0.01%)

ETERNALSYNERGY - AUTH ONLY
3
vs All Windows Systems
34061 (0.00%)

Apply

Next Week

- Identify the stakeholders (SecOps, ITOps, Dev, Exec Team)
- Decide how you would document and share:
  - Business impact if you do nothing (Wait to see changes in landscape)
  - Business impact if you do something (Apply Fix OR Mitigation)
  - Triggers - monitor threat feeds for changes
- Decide on the KPIs – how would you measure success?

Next Quarter (or next event)

- Work the playbook
- Daily 'stand-up' during event
- Review with team and decide together
- Document each step of action plan

Next 6 months

- Measure success
- Identify where to improve
- Don't get discouraged by early failures or delays
  - This is a process!
- Repeat

A rational response

- High-profile vulnerabilities are not going away
  - Relying on other teams to handle just won’t work
- More executive visibility = panic mode for teams
  - Help be the stabilizing force in reaction
- Methodical approach leads to rational response

THANK YOU!

Gill Langston - Director, Product Management

Qualys, Inc.