Ransomware:
Protecting your Money and Assets

Partner Firms:

VIPRE Security
David Corlette
Director, Product Management

Arcserve
Christophe Bertrand
VP of Product Marketing

VLP Law Group LLP
Melissa Krasnow
Partner

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- Speakers, I will be giving out the secret words at randomly selected times. I may have to break into your presentation briefly to read the secret word. Pardon the interruption.

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Sponsors:

VIPRE delivers the best protection at the best price. It is the top-rated, award-winning endpoint security product for small and medium businesses, and home users. VIPRE is powered by next-generation advanced machine learning, one of the world's largest threat intelligence clouds and real-time behavior monitoring to protect millions of users from ransomware, zero-day attacks, phishing, exploit kits, mobile threats and other malware that easily evade traditional signature-based antivirus. Easy to use, simple to license and available at the best price, VIPRE provides the proactive advanced threat defense all users need to protect their data, and all VIPRE customers receive free U.S.-based technical support. To learn more, visit www.VIPREAntivirus.com.

Arcserve is a leading provider of data protection and recovery software that gives organizations the assurance that they can recover their data and applications when needed. Launched in 1990, Arcserve provides a comprehensive solution for cloud, virtual and physical environments, on premise or in the cloud, backed up by unsurpassed support and expertise. Arcserve Unified Data Protection (UDP), available on Arcserve's appliance or your hardware, drives a full range of highly efficient and integrated data protection capabilities through a simple, web-based user console. Arcserve has a customer base of 45,000 end users in more than 150 countries and partners with over 7,500 distributors, resellers and service providers around the world. Arcserve is headquartered in Minneapolis, Minnesota. Visit www.arcserve.com.

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Partner Firm:

VLP LAW GROUP LLP

Founded in 2008, VLP is a business and transactional law firm that delivers top quality legal services from experienced attorneys through an efficient platform. VLP's broad practice includes high tech, life sciences, clean tech, retail, consumer products, edtech, and real estate. VLP's clients range from individual executives and early-stage startups to Fortune 500 companies, including public and private corporations, venture capital investors, private equity funds, educational institutions and companies, nonprofits and individuals. VLP provides general corporate, licensing, contract, intellectual property protection and counseling, securities regulation, financing, merger and acquisition, real estate, commercial lending, tax, employment and other legal services.

Ransomware:
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Brief Speaker Bios:

VIPRE Security
David Corlette
Director, Product Management

David Corlette is the Director of Product Management for VIPRE, a top-rated, award-winning internet security product for channel partners and businesses worldwide. For the past decade, David has worked with customers and partners to design and build best-of-breed IT security using innovative threat detection and response solutions. He has broad experience in advanced threat, SIEM, networking, cloud services, security standardization, open source, agile development and technology policy. He chaired the Distributed Management Task Force, a computer software trade group which works to simplify the manageability of network-accessible technologies and holds an A.B. in Electrical Engineering from Harvard University.

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Ransomware:
Protecting your Money and Assets

Organizations like yours are concerned about ransomware. Technology leaders Arcserve and VIPRE joined forces to help you defeat those ransomware hoodlums lurking in the dark cyberspace. From preventative measures with VIPRE, to remediation strategies with Arcserve, plus legal and regulatory guidance about ransomware from VLP, you will:

- Watch as we dissect common variants like Locky, Petya, TeslaCrypt and Cerber
- Learn how to stop ransomware attacks before they happen
- Get practical advice on how to get back on your feet if an attacker does get through
- Discover what others have done – without opening their wallets – to defeat the threat

Find out how to fend off and remediate ransomware attacks.

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VIPRE Security

SEGMENT 2:
Christophe Bertrand
VP of Product Marketing
Arcserve

SEGMENT 3:
Melissa Krasnow
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VLP Law Group LLP

► *For more information about the speakers, you can visit:* https://theknowledgegroup.org/event-homepage/?event_id=2218

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SEGMENT 1:
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Ransomware on the Rise

Criminal hackers now target hospitals, police stations, and schools

Los Angeles Times

World reels from massive cyberattack that hit nearly 100 countries

CNN

Ransomware Hackers Blackmail U.S. Police Departments

NBC NEWS

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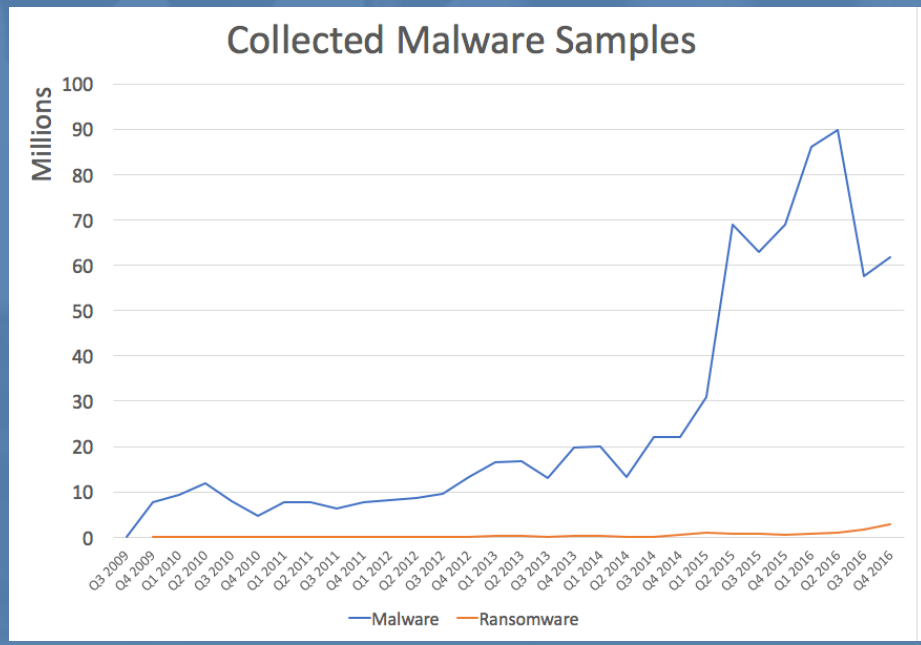
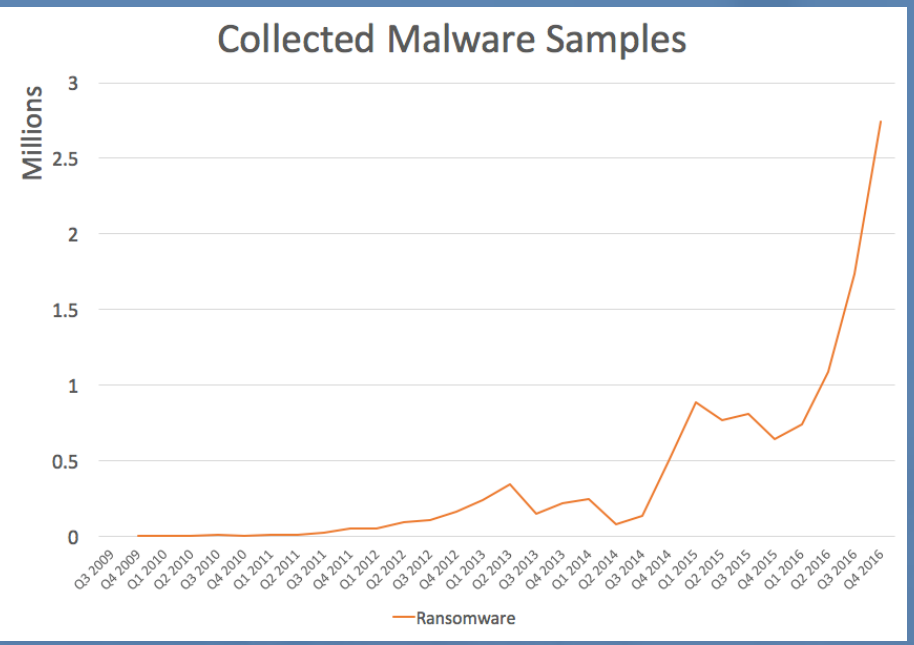
David Corlette
Director, Product Management
VIPRE Security

Malware/Ransomware Samples per Quarter





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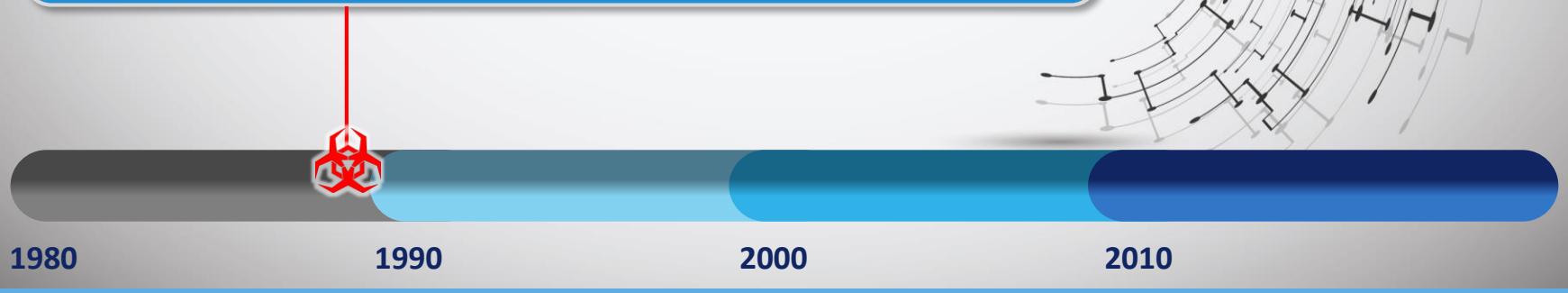
Director, Product Management
VIPRE Security

The Timeline

First known ransomware program "PS Cyborg (1989)" was created in this period

- Created by disturbed biologist Joseph L. Popp
- Manually distributed by floppy to WHO AIDS conference participants
- Triggered after 90 reboots
- Hid directories and files
- User was supposed to send $189 to a P.O. Box in Panama
- Popp was caught and ransomware was relatively easy to circumvent



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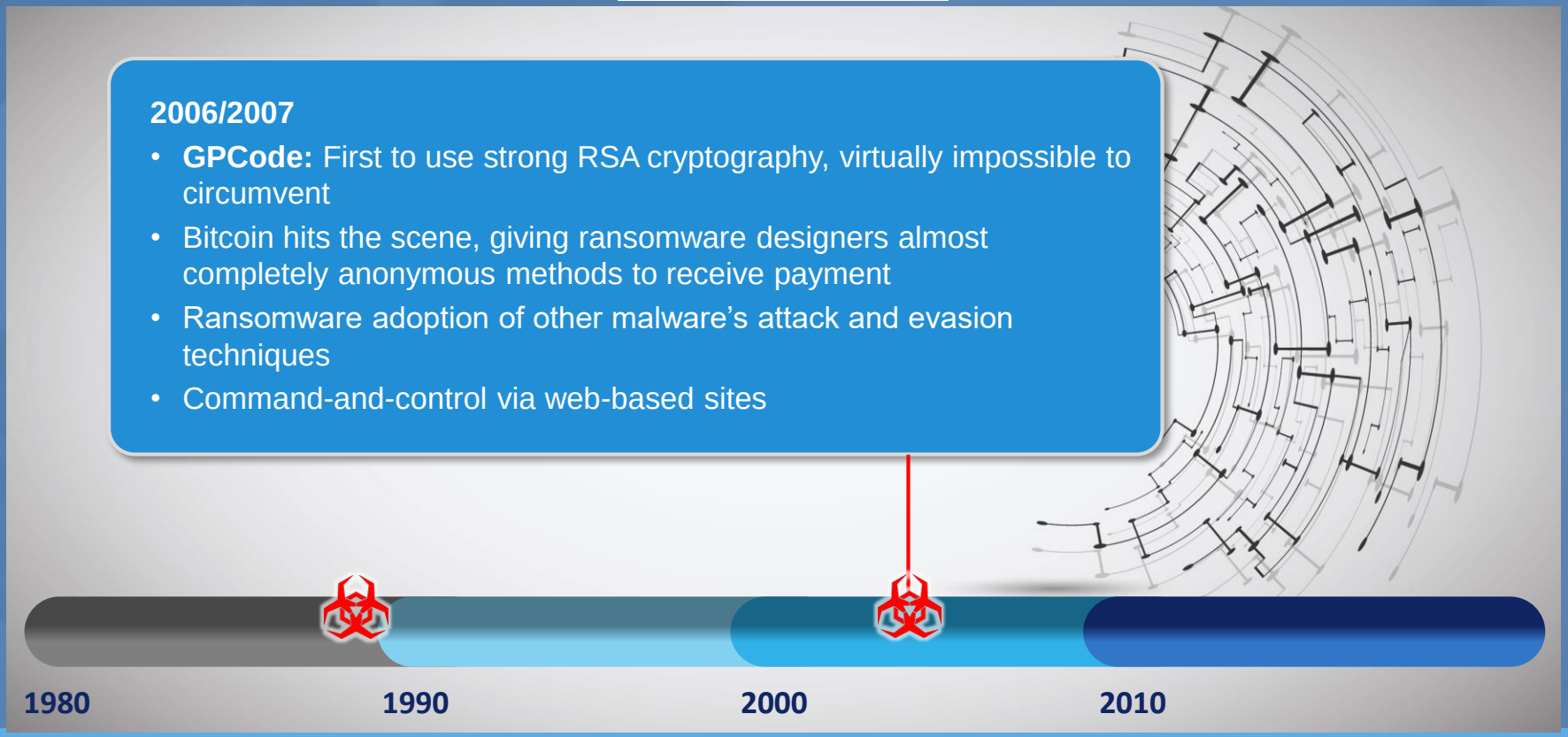
Introduction

2006/2007

- **GPCode:** First to use strong RSA cryptography, virtually impossible to circumvent
- Bitcoin hits the scene, giving ransomware designers almost completely anonymous methods to receive payment
- Ransomware adoption of other malware's attack and evasion techniques
- Command-and-control via web-based sites



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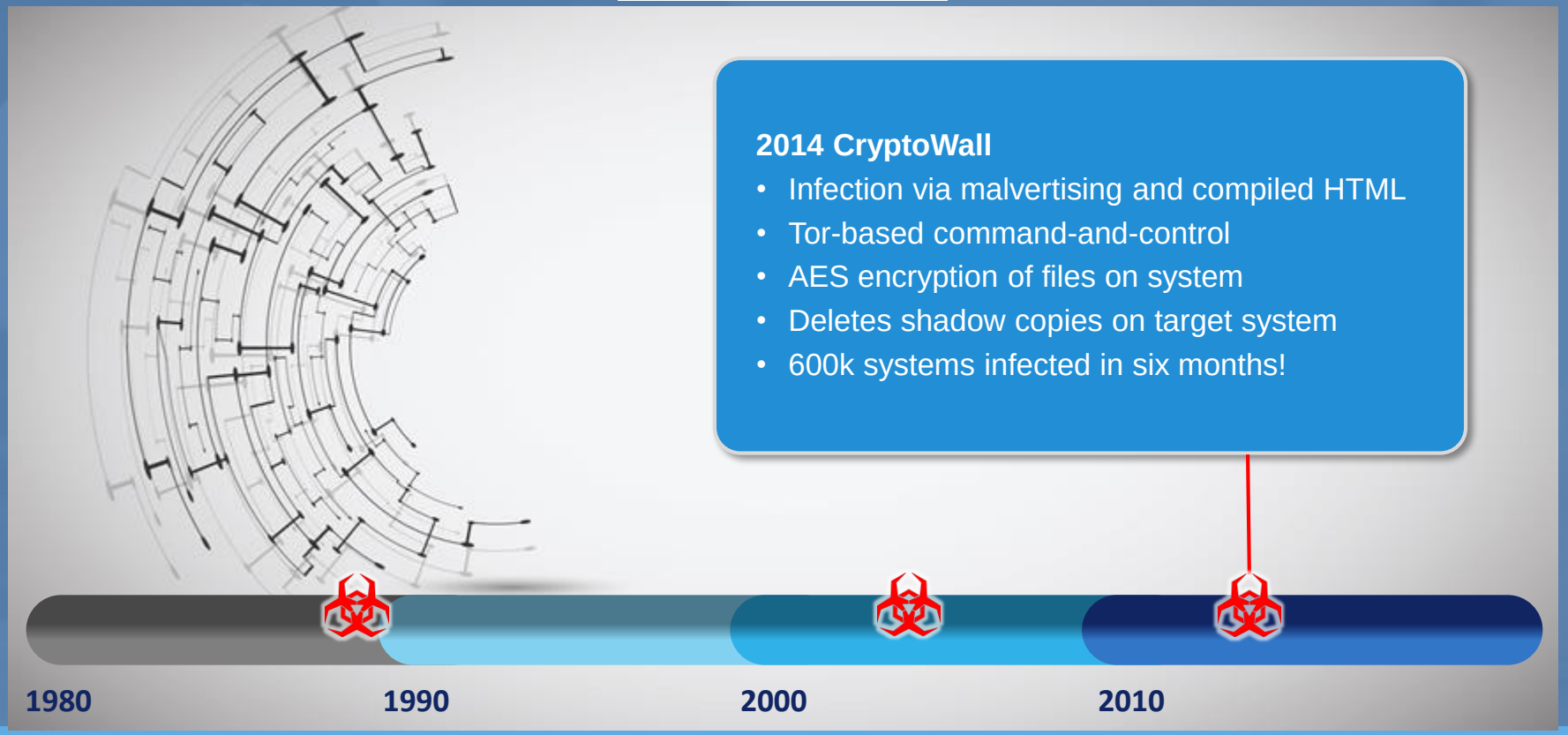

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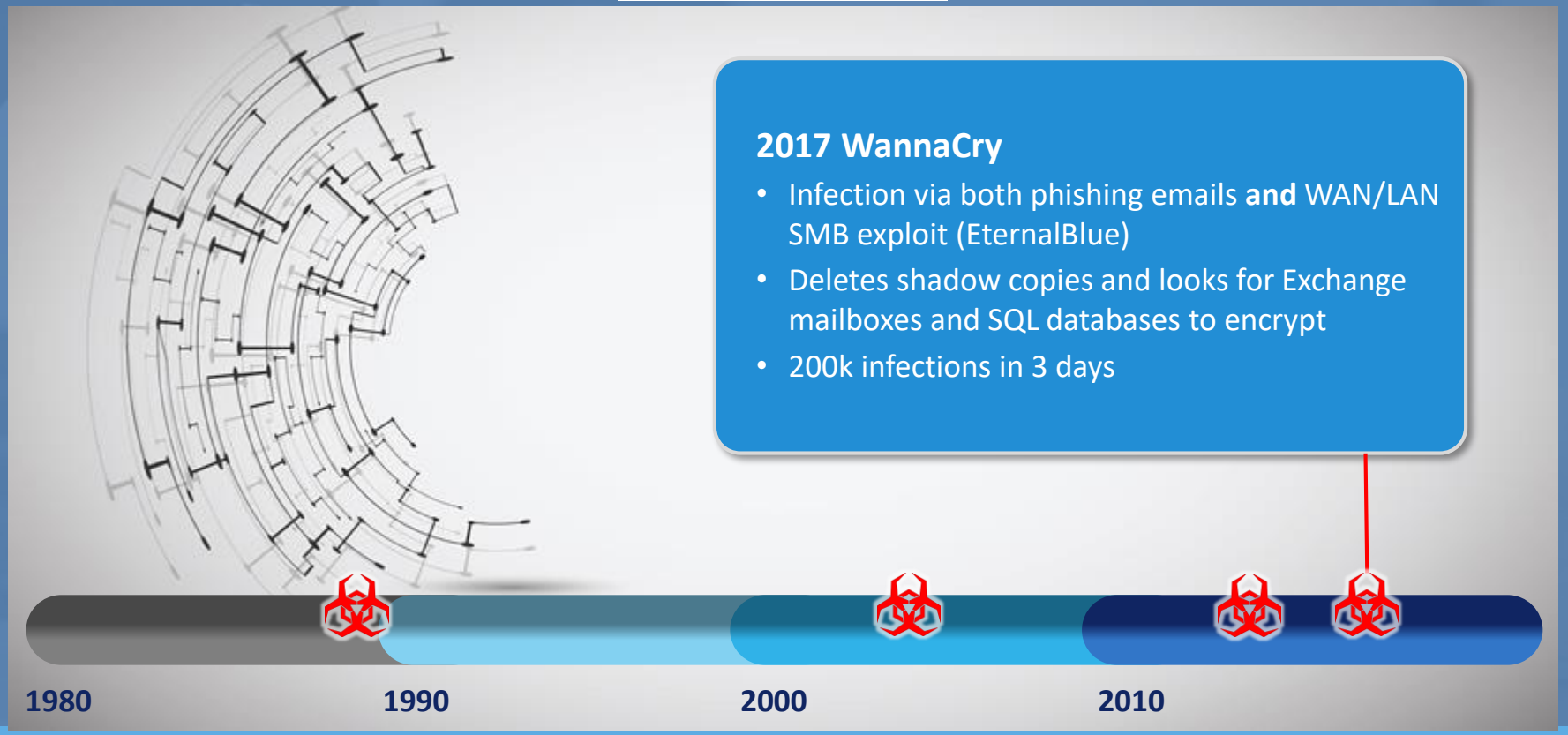

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Antivirus on the Decline?

Antivirus is dead, says maker of Norton Antivirus — PCWorld FROM IDG

Antivirus Fails to Stop Ransomware 100% of the Time — infosecurity GROUP

Symantec admits anti-virus software is no longer effective at stopping virus attacks — dotTech

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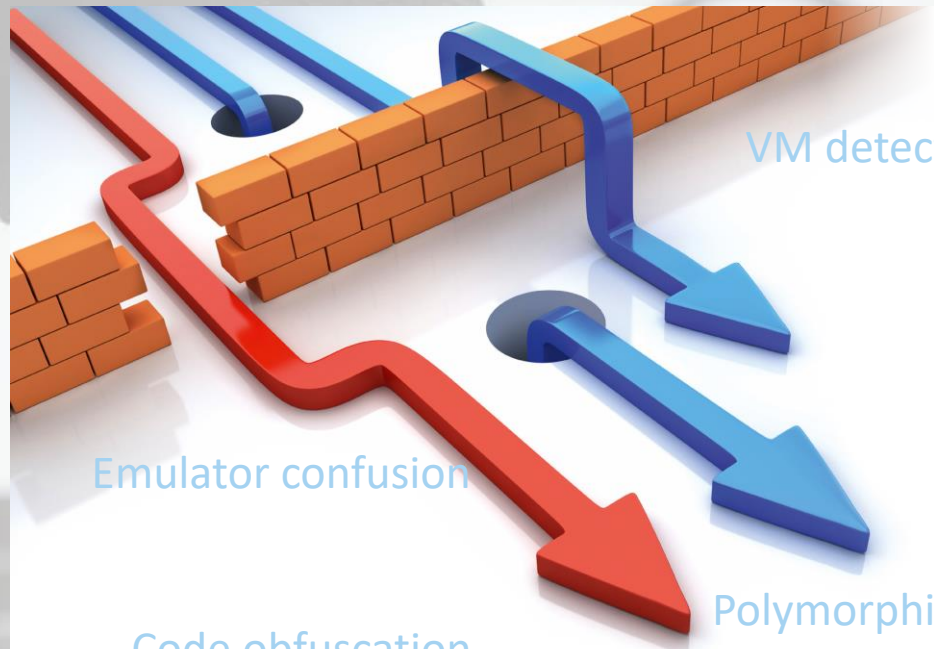

Mouse movement detection

VM detection

Execute attack on 5th start

Wait for N reboots

Emulator confusion

Polymorphism

Code obfuscation

Code encryption

Packing

Return-oriented programming

Sleeps and waits

Wait for Tuesday

Malware Evasive Techniques

- Polymorphism and obfuscation
- Timing-based evasion
- Environmental detection and hiding
- Behavioral unpredictability

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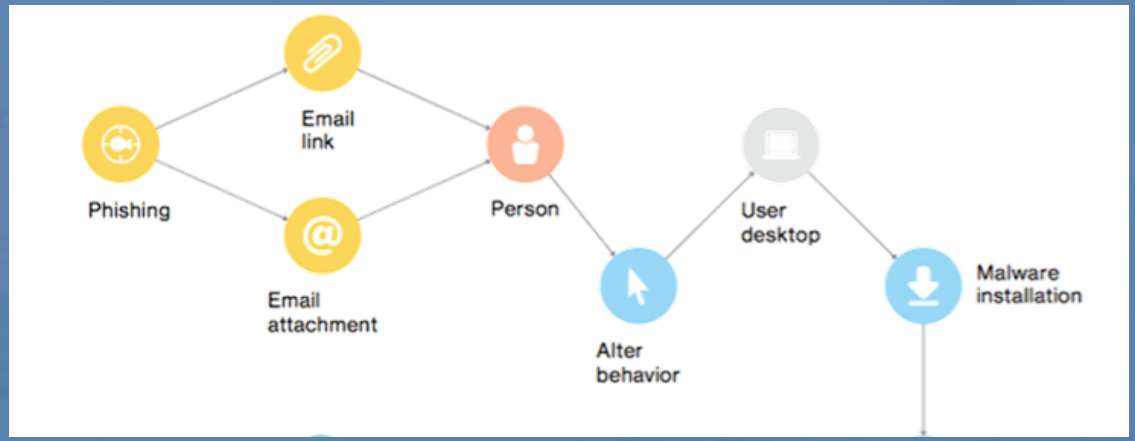
VIPRE Security

The "Kill Chain"

- Verizon Data Breach Investigations Report (DBIR) published a diagram of the "common threat actions."
- Initial beachhead is usually a dropper that then fetches additional modules – a multi-stage attack
- Ransomware may also attempt to spread on internal networks



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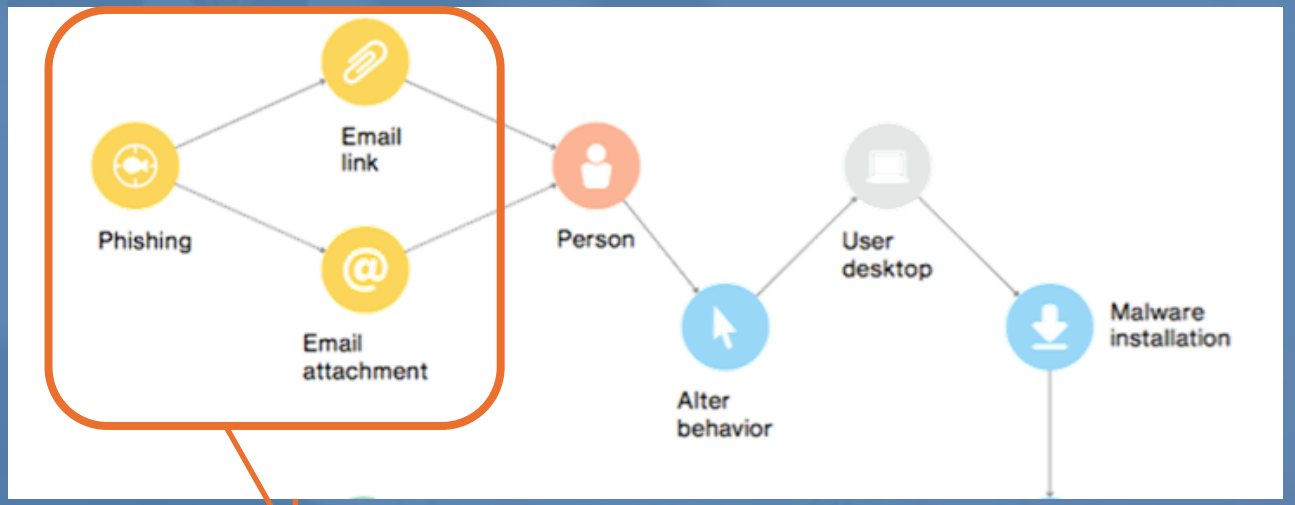
Breaking the "Kill Chain"



- Anti-phishing
- IDS/IPS
- Email/Network payload analysis

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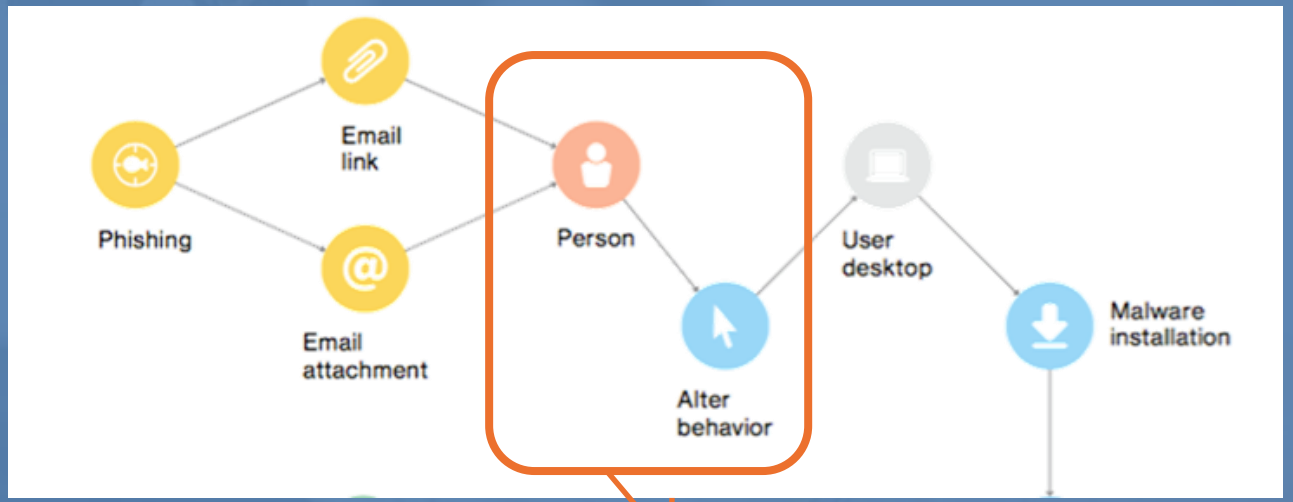
Breaking the "Kill Chain"



- User training

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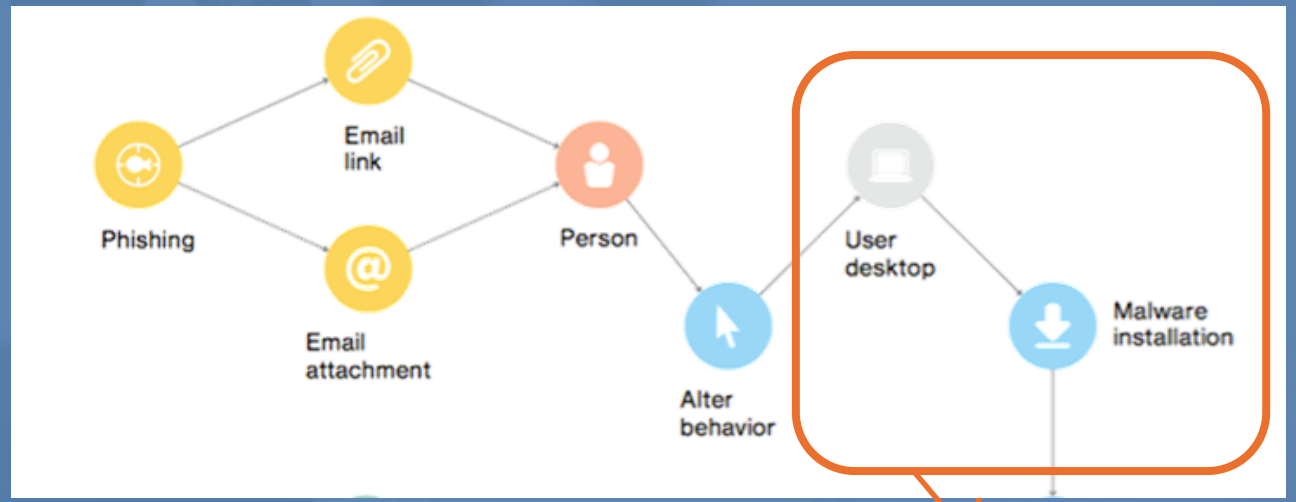

- Secure configuration/patching
- Endpoint protection
- Backups

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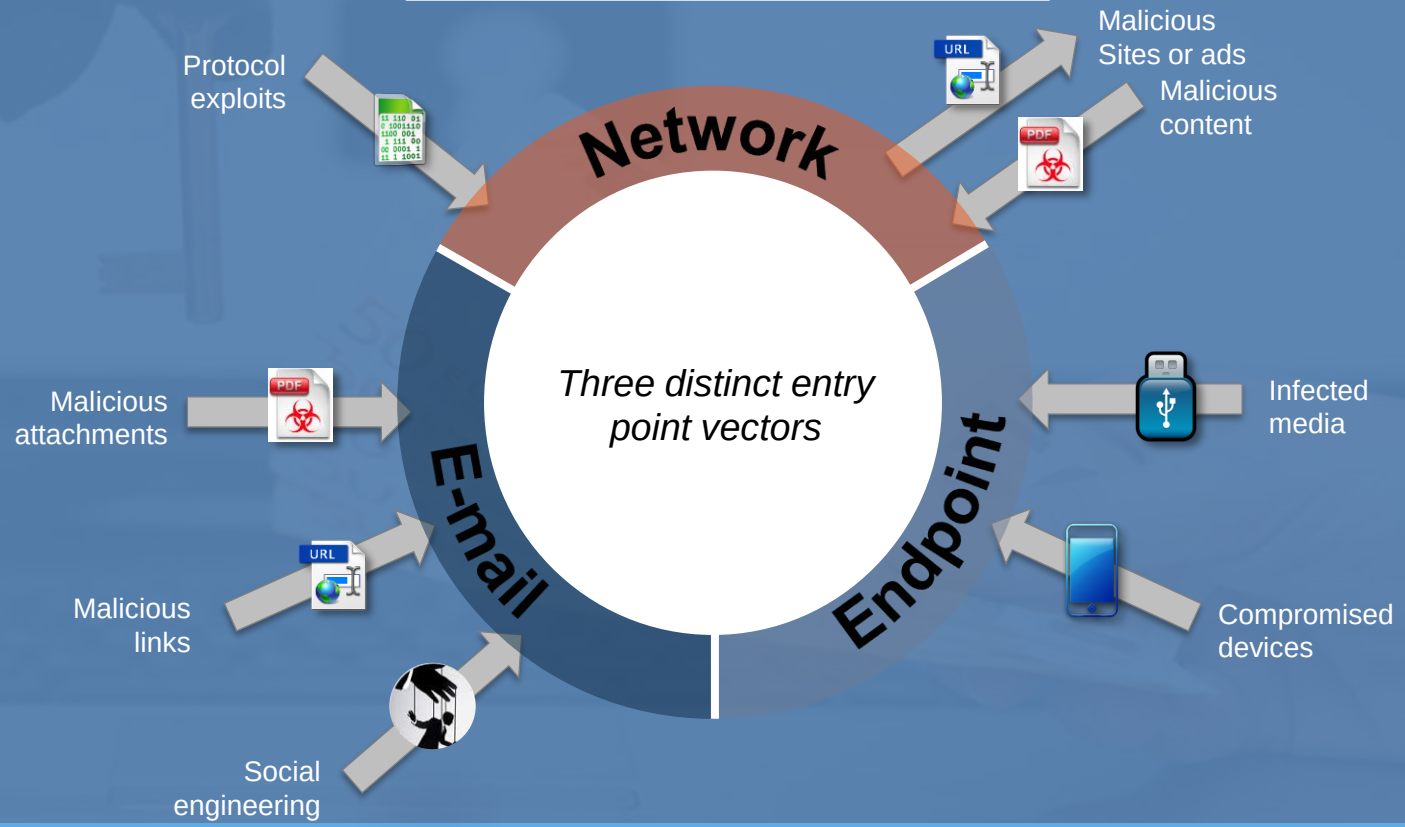
How Attackers Get In



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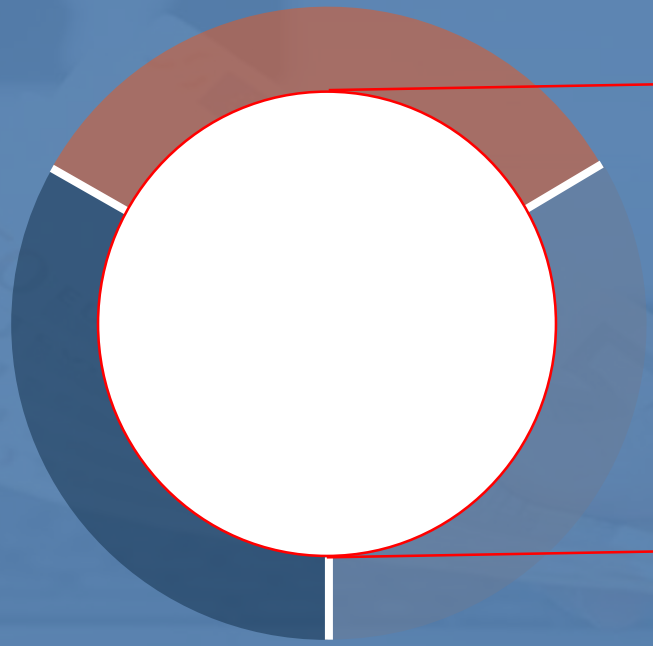
Director, Product Management
VIPRE Security

Old-school Hash/Signature Detection



Signature-based detection

- Original form of detection
- Easily defeated by today's polymorphic malware
- Hashes, however, are good Indicators of Compromise (IoCs) – e.g. for a particular infestation, see how far it has spread
- See Threat Intelligence

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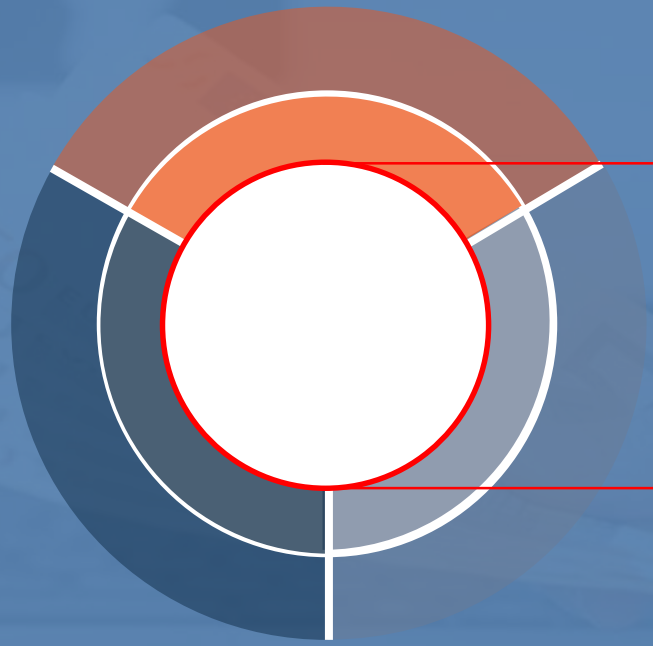

- Rule-based detection
- Expert rules crafted to detect combinations of features
- Detects known malware and simpler forms of evasive malware
- Stops casual, unmotivated attackers
- Issues with false positives
- Classic antivirus (host, e-mail, network) only goes this deep

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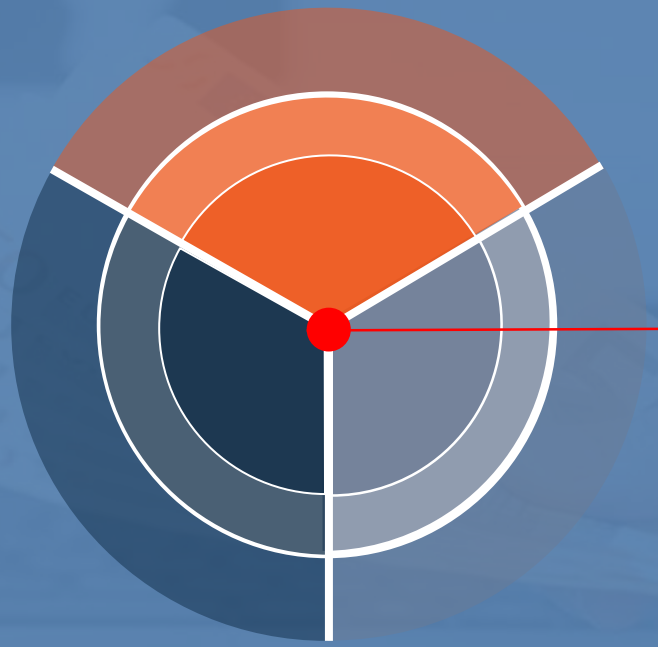
Advanced Malware Detection



Dynamic behavioral models

- Leverage **machine-learned** models of normal behavior to detect abnormal behavior
  - –Malware revealed through its **behavior**
  - –Need to actually **run** the malware – sandbox is safer!
- This is the **hard nut** to crack
- This is where the **risk** is (93% of victims had **"antivirus"** in place)

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Call To Action

- ✓ Review the solutions you have protecting your network and endpoints to ensure high-quality layered approaches are used
- ✓ Make sure your users are well-trained to spot the signs of a phishing attempt
- ✓ Ensure that you have a solid system configuration and patching program in place
- ✓ Back up any and all critical data

Ransomware:
Protecting your Money and Assets

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SEGMENT 2:
Christophe Bertrand
VP of Product Marketing
Arcserve

Introduction

Christophe Bertrand is the Vice President of Product Marketing at Arcserve. Christophe has spent most of his career in the data storage and data protection space with companies such as Legato Systems (now EMC), VERITAS (now Symantec), Maxtor, Hitachi Data Systems and most recently DataDirect Networks where he ran product, channel and vertical marketing.

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Talking Points

- Importance of backup for disaster recovery
- Service level dial (levels of protection for different applications)
- Overview of Arcserve UDP
- Ransomware success stories
- Best practices

Ransomware: Arcserve Overview

SEGMENT 2:
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VP of Product Marketing
Arcserve

Worldwide Customer Base & Sales Presence

- 45,000 customers
- >30,000 UDP customers
- 7,500 partners
- Distributed in 150 countries
- WW HQ – Minneapolis, USA
- LATAM HQ – São Paulo, Brazil
- EMEA HQ – Barcelona
- APAC HQ – Singapore
- Japan HQ – Tokyo
- Sales offices in 20+ countries

Industry Recognition

- 3 VMworld Gold Awards
- 2 CRN Channel Chief Awards
- Channel Company Top Midmarket Executive
- MSPBJ Titan of Technology
- 2 PC Pro Recommendations
- 3 IT Pro Recommendations
- DCS Storage Software Product of the Year
- CRN Woman of the Channel
- 4 Storage Awards
- Cloud Hosting DR Product of the Year
- Computer Singapore Readers' Choice Award for Networked Storage

A single, fully-integrated solution portfolio to protect across cloud, virtual and physical environments.

SOFTWARE | APPLIANCES | CLOUD (DRaaS)

Ransomware:
Ransomware in SLA Terms

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Ransomware:
Arcserve Unified Data Protection

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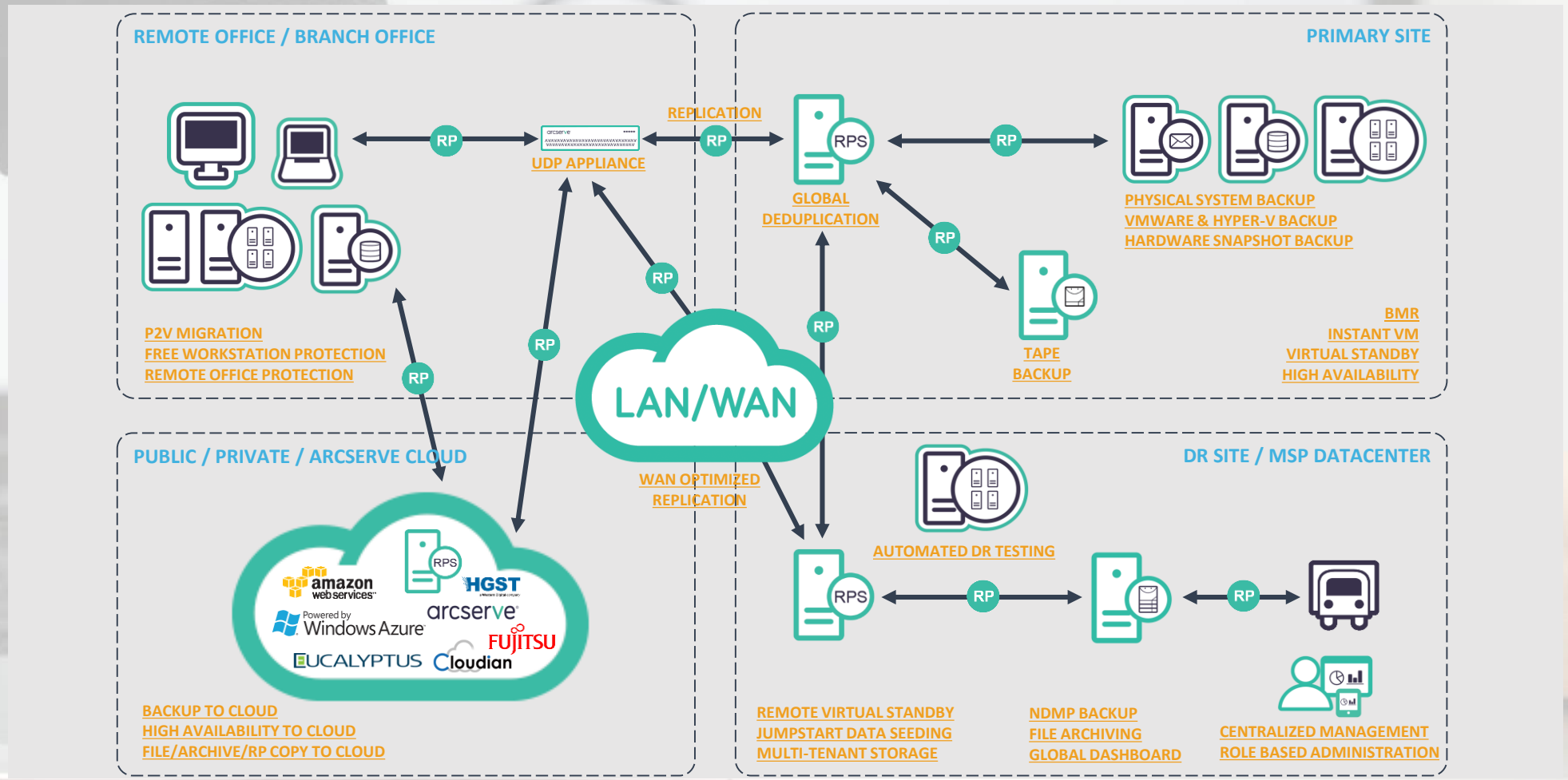

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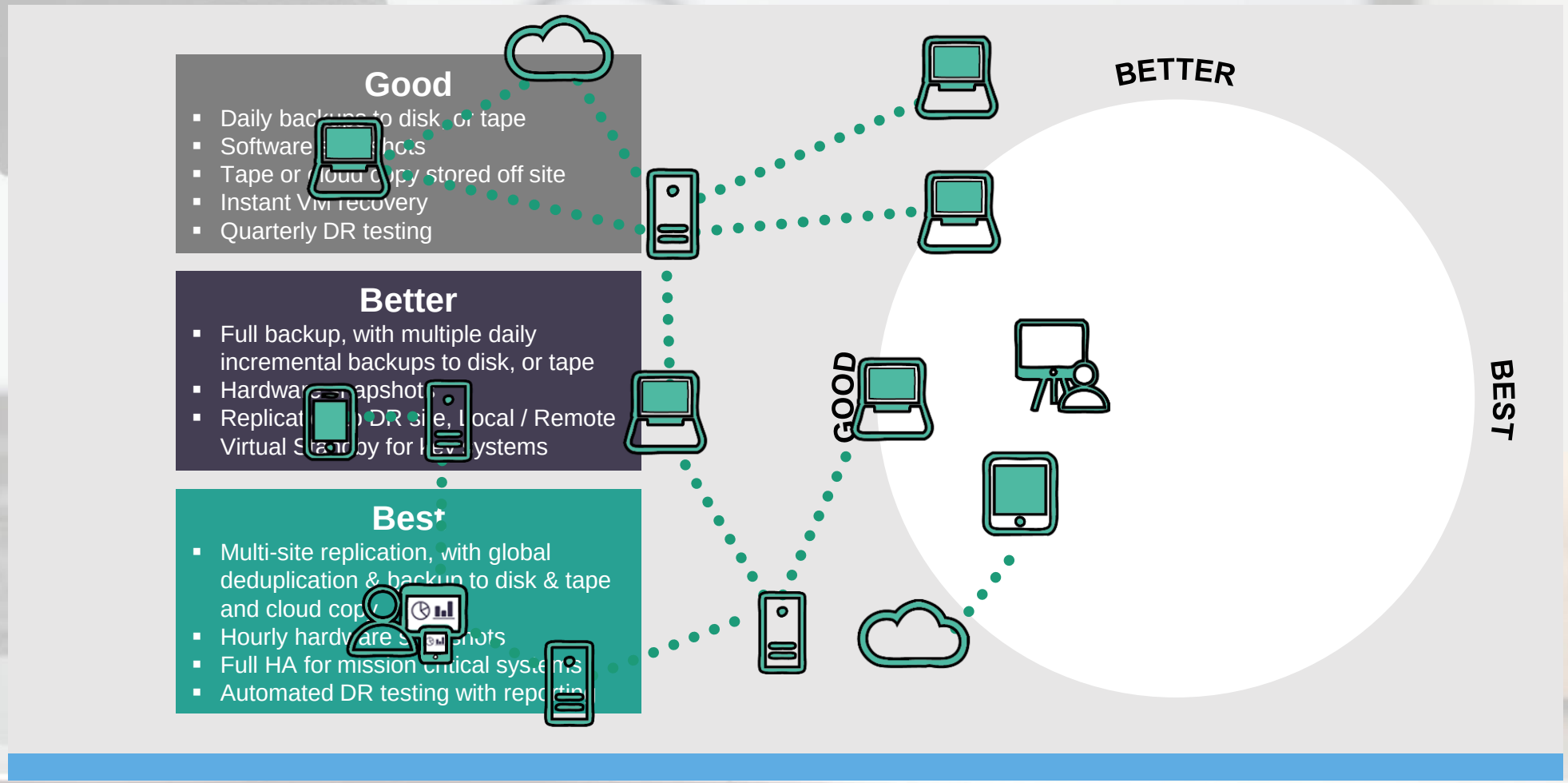

Ransomware:
Customer Example: Publishing Business

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1 Customer X supports a few hundred users at this publishing business

2 The corruption came in as an attachment titled Photos.zip with a spoofed email address – who doesn't have "click-happy" end-users?

3 Photos.zip was the infected file sent via email. It was a "bart" type virus

4 Customer X does a 7AM snapshot of his environment and keeps a near line copy of the Recovery Points as a precaution. Best backup practices paid off!!

Result

- Using Arcserve was key to his ability to thwart the attack and recover the affected systems and their data
- It took him 28 hours to determine the source, repair and reverse the damage but there was no publicly visible indication that an attack had taken place
- His ability to contain the attack and mitigate the damage earned him a letter of praise from his CEO

SUCCESS

Ransomware:
Protect The Protector

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Take precautions to prevent infection in the first place, such as training users to not click on links within emails, downloading attachments from unknown sources and updating software on a timely basis. Rigorous access control is also critical.

Perform regular backups, which may include rethinking your service level agreements to ensure critical business data is backed up more frequently.

3 2 1

Follow the 3-2-1 strategy for backup: one of the copies should be offline, and at least one of the copies should be offsite. Leverage DRaaS capabilities!

Make sure your chosen backup solution includes virtual standby for critical systems so that you can get back on your feet very quickly.

Ransomware:
Protect Source Machines

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Replicate data to offsite / cloud

If your backup server gets infected or if your backup data is on a shared network share that is accessible from an infected machine, ransomware can encrypt backup data as well. It sounds obvious, but it's important to remember!

Periodically, copy recovery points to offline media, such as USB disks. Consider leveraging tape as a backup medium for critical data (yes tape!). This oldie but goodie comes in handy to send periodic recovery points offline.

Ransomware:
THANK YOU!

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SEGMENT 2:
Christophe Bertrand
VP of Product Marketing
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Download a trial at www.arcserve.com

Call for more info: 844.639.6792

Ransomware:
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SEGMENT 3:
Melissa Krasnow
Partner
VLP Law Group LLP

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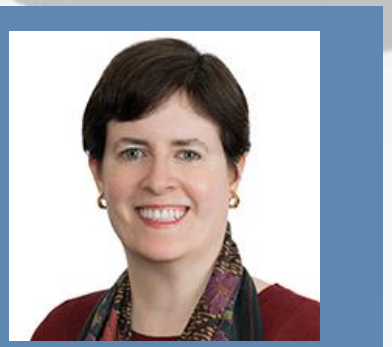

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What is Ransomware?

Ransomware is a form of malicious software that infiltrates computer systems or networks and uses tools like encryption to deny access or hold data "hostage" until the victim pays a ransom, frequently demanding payment in Bitcoin. Source: FTC Business Blog at https://www.ftc.gov/news-events/blogs/business-blog/2016/11/ransomware-closer-look

After the initial infection, the ransomware attempts to spread to shared storage drives and other accessible systems. If the demands are not met, the system or encrypted data remains unavailable, or data may be deleted. Source: FBI brochure at https://www.fbi.gov/file-repository/ransomware-prevention-and-response-for-ceos.pdf/view

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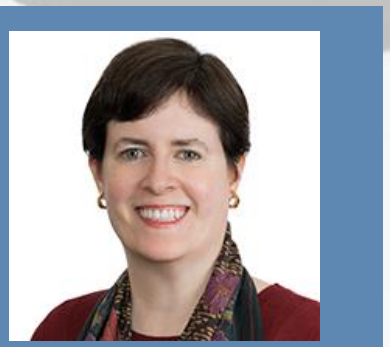

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How is Ransomware Delivered?

Ransomware often arrives through e-mail phishing campaigns, which typically require the user to take an action such as clicking on a link or downloading a malicious attachment. Other campaigns use drive-by downloads, where a user visits a malicious website or a site that has been compromised, and the act of loading the site causes the ransomware to automatically download onto the user's computer. In addition, ransomware is delivered through "malvertising" campaigns, where malicious code is hidden in an online ad that infects the user's computer….Attackers also have exploited server-side vulnerabilities to deliver ransomware payloads by searching for networks that had failed to patch known vulnerabilities. Source: FTC Business Blog at https://www.ftc.gov/news-events/blogs/business-blog/2016/11/ransomware-closer-look

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Federal Trade Commission's Recommended Steps Regarding WannaCry

- Keep software up-to-date - download security updates as soon as they are available – no matter what operating system.
- Back up important files routinely.
- Think twice before clicking on links or downloading attachments and apps. Source: FTC Business Blog at https://www.ftc.gov/news-events/blogs/business-blog/2017/05/wannacry-worries-update-now

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Federal Trade Commission Remarks About Ransomware

A company's unreasonable failure to patch vulnerabilities known to be exploited by ransomware might violate the FTC Act….businesses play a critical role in ensuring that they adequately protect consumers' information, particularly as security threats like ransomware escalate.
Source: Opening Remarks of FTC Chairwoman Edith Ramirez Fall Technology Series: Ransomware at https://www.ftc.gov/system/files/documents/public_s

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Department of Health and Human Services Guidance

When electronic protected health information (ePHI) is encrypted as the result of a ransomware attack, a breach has occurred because the ePHI encrypted by the ransomware was acquired (i.e., unauthorized individuals have taken possession or control of the information), and thus is a "disclosure" not permitted under the HIPAA Privacy Rule. Source: FACT SHEET: Ransomware and HIPAA at https://www.hhs.gov/sites/default/files/RansomwareFactSheet.pdf

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Department of Homeland Security US-CERT Alert Regarding WannaCry

Recommended steps for prevention.

Recommendations for network protection.

Recommended steps for remediation.

Defending against ransomware generally. Source: US-CERT Alert (TA17-132A) at https://www.us-cert.gov/ncas/alerts/TA17-132A; note that this Alert is referenced in https://www.sec.gov/files/risk-alert-cybersecurity-ransomware-alert.pdf

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What Steps Does the FBI Recommend Taking?

Isolate the infected computer immediately, and remove infected systems from the network as soon as possible to prevent ransomware from attacking network or share drives.

Isolate or power off affected devices that have not yet been completely corrupted.

Immediately secure backup data or systems by taking them offline, and ensure backups are free of malware.

Contact law enforcement immediately.

Collect and secure partial portions of the ransomed data that might exist if available.

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What Steps Does the FBI Recommend Taking? (con't)

Change all online account passwords and network passwords after removing the system from the network if possible, and change all system passwords once the malware is removed from the system.

Delete registry values and files to stop the program from loading.

Implement security incident response and business continuity plans.

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What Steps Does the FBI Recommend Taking? (con't)

Conduct a post incident review of the response to the incident, and assess the strengths and weaknesses of the incident response plan. Source: FBI brochure at https://www.fbi.gov/file-repository/ransomware-prevention-and-response-for-cisos.pdf/view

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Reaching Out to the FBI / Filing a Complaint

The FBI requests that victims reach out to their local FBI office and/or file a complaint with the Internet Crime Complaint Center at https://www.ic3.gov/default.aspx
Source: FBI public service announcement at https://www.ic3.gov/media/2016/160915.aspx

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Should the Ransom be Paid?

The FBI does not support paying a ransom to the adversary because it does not guarantee the victim will regain access to their data. In fact, some individuals or organizations are never provided with decryption keys after paying a ransom. Paying a ransom emboldens the adversary to target other victims for profit and could provide an incentive for other criminals to engage in similar illicit activities for financial gain. Although the FBI does not support paying a ransom, it recognizes that executives, when faced with inoperability issues, will evaluate all options to protect their shareholders, employees, and customers. Source: FBI public service announcement at https://www.ic3.gov/media/2016/160915.aspx

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FBI on Prevention and Continuity Measures

Regularly back up data and verify the integrity of those backups.

Secure your backups and ensure backups are not connected to the computers and networks they are backing up.

Scrutinize links contained in e-mails and do not open attachments included in unsolicited e-mails.

Only download software – especially free software – from sites you know and trust. When possible, verify the integrity of the software through a digital signature prior to execution.

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FBI on Prevention and Continuity Measures (con't)

Ensure application patches for the operating system, software, and firmware are up to date.

Ensure anti-virus and anti-malware solutions are set to automatically update and regular scans are conducted.

Disable macro scripts from files transmitted via e-mail.

Implement software restrictions or other controls to prevent the execution of programs in common ransomware locations, such as temporary folders supporting popular Internet browsers, or compression/decompression programs, including those located in the AppData/LocalAppData folder.

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FBI on Prevention and Continuity Measures (con't)

Enable strong spam filters to prevent phishing e-mails from reaching the end users, and authenticate inbound e-mail using technologies like Sender Policy Framework, Domain Message Authentication Reporting and Conformance, and DomainKeys Identified Mail to prevent e-mail spoofing.

Scan all incoming and outgoing e-mails to detect threats, and filter executable files from reaching end users.

Configure firewalls to block access to known malicious IP addresses.

Consider disabling Remote Desktop Protocol if it is not being used.

Conduct an annual penetration test and vulnerability assessment. Source: FBI brochure, Ransomware Prevention and Response for CISOs, at https://www.fbi.gov/file-repository/ransomware-prevention-and-response-for-cisos.pdf/view

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FBI on Prevention and Continuity Measures (con't)

Focus on awareness and training.

Patch all endpoint device operating systems, software, and firmware as vulnerabilities are discovered.

Manage the use of privileged accounts by implementing the principle of least privilege.

Configure access controls with least privilege in mind.

Use virtualized environments to execute operating system environments or specific programs.

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FBI on Prevention and Continuity Measures (con't)

Categorize data based on organizational value, and implement physical/logical separation of networks and data for different organizational units.

Require user interaction for end user applications communicating with Web sites uncategorized by the network proxy or firewall.

Implement application whitelisting. Only allow systems to execute programs known and permitted by security policy. Source: FBI public service announcement at https://www.ic3.gov/media/2016/160915.aspx

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Additional Considerations

Organizations also should conduct a cyber-security risk analysis of the organization and have and test an incident response plan. FBI brochure at https://www.fbi.gov/file-repository/ransomware-prevention-and-response-for-ceos.pdf/view

Take into account insurance coverage, namely cyber-liability/cyber-extortion coverage.

See article on kidnap insurance and ransomware at http://www.reuters.com/article/us-cyber-attack-insurance-idUSKCN18F1LU

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Additional Considerations (con't)

After….[the]….devastating global ransomware attack, now known as WannaCry, directors will once again be questioning management teams to make sure the company is protected. The challenge is that most directors do not know what questions they should be asking.

If I were sitting on a board, this attack would prompt me to ask questions about the following three areas: End of Life (EOL) software; patching; and disaster recovery. Source: https://blog.nacdonline.org/2017/05/questions-to-ask-after-the-wannacry-attack/

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Cybersecurity Event Recovery

The National Institute of Standards and Technology Guide for Cybersecurity Event Recovery at http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-184.pdf includes an example of a recovery plan in the form of a playbook for a ransomware attack. While the guide applies to US federal agencies, it should be useful to any organization.

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Resources

Ransomware Guidance at https://www.irmi.com/articles/expert-commentary/guidance-on-ransomware

Cyber-Security Event Recovery Plans at https://www.irmi.com/articles/expert-commentary/cyber-security-event-recovery-plans

Directors and Cybersecurity at http://www.vlplawgroup.com/wp-content/uploads/2017/01/M.Krasnow-Bloomberg-Article-1-2017.pdf

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► *Questions will be answered in the order they are received.*

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