RANSOMWARE, PHISHING & CYBERSECURITY SERVICE PROVIDER RISKS

- **June 14, 2022**

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LEARNING OBJECTIVES

UNDERSTAND THE LATEST THREAT DEVELOPMENTS

RECOGNIZE CRITICAL DEPENDENCIES AND RISKS IN OUTSOURCED SERVICE PROVIDER RELATIONSHIPS

LEARN WHERE ORGANIZATIONS CAN FOCUS VALUABLE RISK MITIGATION RESOURCES

DEVELOP AND REFINE A FRAMEWORK OF KNOWLEDGE TO PLAN FUTURE SECURITY EFFORTS

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- Nuvodia specializes in healthcare IT, servicing hospitals, retirement communities, and ambulatory clinics with a variety of services from hosting applications, security services and 24x7 helpdesk.
- Nuvodia is part of the Inland Imaging family of companies, headquartered in Spokane, but serving clients across the United states.

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CASE STUDIES

RANSOMWARE

WHAT IS RANSOMWARE?

- Cryptolocker, Locky, WannaCry, etc.
- Encrypts all data, holds in "ransom" for $$
  - Data on local machine and on network
- Can affect non-Windows OS (e.g., Mac)

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HOW DOES RANSOMWARE GET INTO BUSINESS NETWORKS?

Insecure Internet Accessible Log-in Prompts

- Outlook Web Access (OWA)
- Citrix Gateway
- Virtual Private Network (VPN)
- Remote Desktop Protocol (RDP)

Email phishing resulting in:

- User opening an infected attachment.
- User downloading malicious payload from a website.

Unpatched systems or mobile devices running outside of organization's firewall.

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RANSOMWARE IN THE NEWS

JBS Foods

- Paid $11 million
- Shutdown operations at beef plants for several days.
- Supply chain disruption.

Colonial Pipeline

- Paid $4.5 million.
- Shutdown operation for several days.
- Caused consumers panic buying gas.

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HOW DO WE MITIGATE?

- Risk assess, classify, and inventory systems
- Perform IT audit/cybersecurity assessments including internal network penetration testing and external network penetration testing – at least annually AND after significant changes
- Review and assess risks related to privileged user accounts (i.e. administrator access)
- Harden network technology and applications against attack
- Continue to enhance and tune network, system and application monitoring and alerting
- Train and test employees frequently (Human Factor)
- Develop a cyber resilience plan and test frequently

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USER EDUCATION AND PHISHING AWARENESS

- Malware typically needs a helper to do its job.
- Educate users on phishing scenarios and consider internal phishing "tests" to gauge employee readiness.
- Tests should familiarize employees with common phishing scenarios as well as teach employees how to identify masked links and spoofed sender addresses.

STRONG USER CONTROLS AND DATA BACKUPS

- Staff should not have local admin rights to their workstations.
- No email, browsing, or general computer use when using admin credentials.
- Network and domain admins should be required to have two sets of credentials.
- Administrators should NOT log into workstations with domain admin rights.
- Attackers are getting smarter and deleting or encrypting online backups; so, organizations should ensure that they have off-line copies of backup and restore files available.
- Backup and restore files should be saved in well secured location.
- Perform a thorough review of file permissions for network file shares.
- Test the restoration of your data

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CASE STUDIES

MICROSOFT EXCHANGE

MICROSOFT EXCHANGE

- Exchange
  - Installed on-premise
  - Installed on corporate servers
  - Exchange servers have privileged access in network
- Exchange Online
  - Hosted by Microsoft in Microsoft's cloud
  - Organizations don't have to manage server, only application

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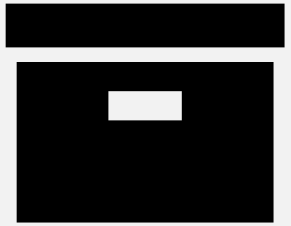
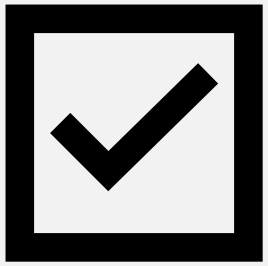
WHY TARGET EXCHANGE

Conversations



Files



Authorization

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EXCHANGE VULNERABILITY HISTORY

PrivExchange (2019)

Static ViewState Key (2020)

ProxyLogon/Hafnium (2021)

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HAFNIUM (ACCORDING TO MICROSOFT)

Hacking group based out of China

Targets US companies

Operates using Virtual Private Servers (VPS) in US

https://blogs.microsoft.com/on-the-issues/2021/03/02/new-nation-state-cyberattacks/

TIMELINE

- Jan 5 – Security firm (DEVCORE) notifies Microsoft of vulnerability
- Jan 6 – Security firm (Volexity) notifies Microsoft that it sees hackers exploiting Exchange, going back to as early as Jan 3
- Jan 8 – Microsoft confirms vulnerability
- Jan 27 – Another security firm (Dubex) notifies Microsoft of organizations being hacked by "unknown" Exchange vulnerability

https://krebsonsecurity.com/2021/03/a-basic-timeline-of-the-exchange-mass-hack/

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TIMELINE (CONT.)

Microsoft notifies security firm that patches will be released on March's patch Tuesday (March 9)

Microsoft releases Exchange patches early

26 Feb.

18 Feb.

2 Mar.

Mass exploitation of Exchange vulnerability around the world

https://krebsonsecurity.com/2021/03/a-basic-timeline-of-the-exchange-mass-hack/

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PROXYLOGON VULNERABILITIES

- Four (4) separate vulnerabilities
  - **CVE-2021-26855: Server-Side Request Forgery (SSRF)**
  - CVE-2021-26857: Insecure Deserialization
  - CVE-2021-26858: Arbitrary File Write
  - **CVE-2021-27065: Arbitrary File Write**

MITIGATING CONTROLS

LOGGING AND MONITORING

EGRESS FILTERING

INSTALL PUBLIC-FACING SERVICES IN DMZ

ANTIVIRUS/ENDPOINT CONTROLS

MULTI-FACTOR AUTHENTICATION FOR EMAIL AND REMOTE CONNECTIONS

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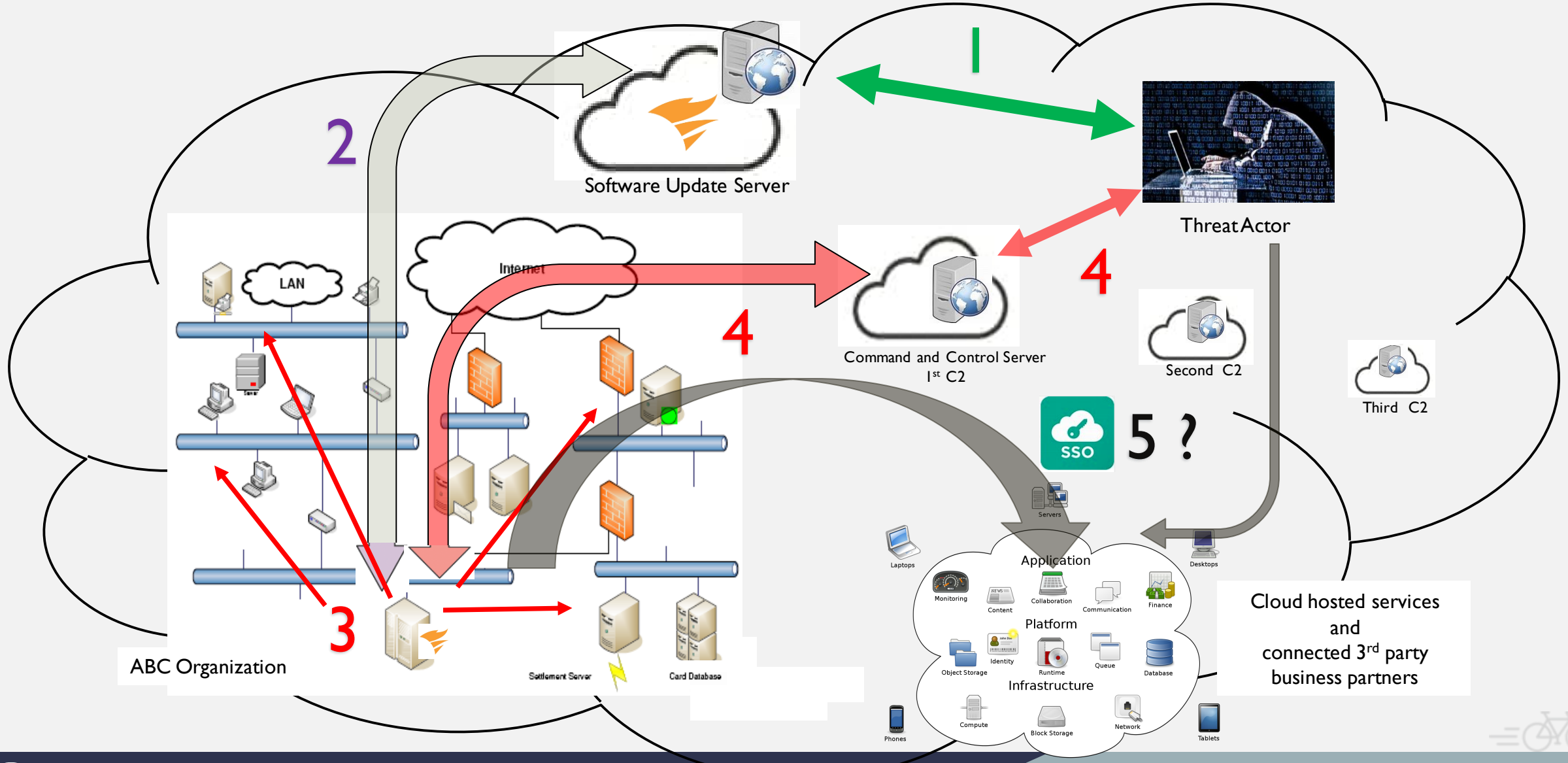
CASE STUDIES

SOLARWINDS

PICTURE IN YOUR MIND SOLARWINDS ORION COMPROMISE



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SUMMARY OF SOLARWINDS

1. **SolarWinds (SW) development/update process is compromised**
   - Malware added to plug in component
2. **Customers download and install SW update with back door malware**
   - Legitimate appearing malware installed
3. **Sophisticated malware "scans" location**
   - Gathers information ("where am I")
   - Attacks/disables security tools
4. **Malware "phones home"**
   - Connects to Command and Control Server (C2)
   - Provides recon information and accepts instructions
5. **Some organizations are subject to additional attack activity**
   - Lateral movement/pivoting
   - Privilege escalation
   - Creation of additional/secondary persistence mechanisms

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MICROSOFT TIMELINE

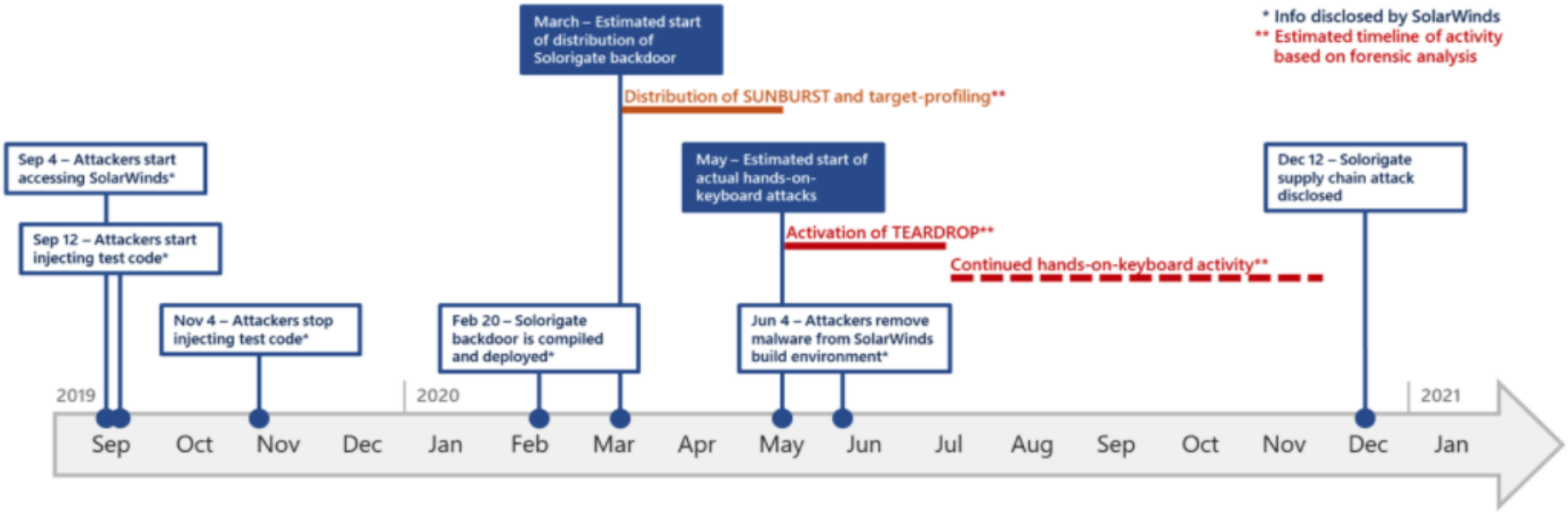

Figure 1. Timeline of the protracted Solorigate attack

https://www.microsoft.com/security/blog/2021/01/20/deep-dive-into-the-solorigate-second-stage-activation-from-sunburst-to-teardrop-and-raindrop/

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Create Opportunities

UPDATE SUMMARY AS NEW INFORMATION WAS ADDED

1. **Sunspot**
   - Malware designed to compromise software development process (at SolarWinds)
2. **Sunburst**
   - Backdoor inserted by Sunspot
3. **Teardrop**
   - Installed via Sunburst backdoor for additional follow on / focused attacks
4. **Raindrop**
   - Loader that delivers Cobalt Strike
   - NOT delivered by Sunburst
   - Usually delivered/used later in compromise and privilege escalation process
5. Some organizations are subject to additional attack activity
   - Lateral movement/pivoting
   - Privilege escalation
   - Creation of additional/secondary persistence mechanisms
6. Objectives?
   - Espionage?
   - Gather and steal information?
   - Launch point for attack into other trusted systems?
     - Office 365?
     - Other trusted applications/systems?
     - Other trusted organizations?
     - "Golden SAML"

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TAKE-AWAYS

1. Do we use SolarWinds Orion?
   - If ***NO*** → Go to 6
   - If YES → What version?
2. Is our version the affected version (see SW advisory)?
   - If ***NO*** → Go to 6
   - If YES → Continue
3. Have we created a timeline of potential exposure?
4. What logs do we have and how far back in time do they go?
5. What Indicators of Compromise (IOC's) have we searched for?
   - What resources/references have we used to identify known and potential IOC's?
   - Use 3 and 4 to search for IOC's
6. Do we have any third-party service providers with trusted access?
   - Who has remote access into our environment?
   - Who do we push our data out to?
   - Are there any persistent open connections to or from third parties?
7. Repeat 1-5 for those identified in 6

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TAKE-AWAYS

8. "Know What Normal Looks like"
   - Easy to say… challenging to execute
   - Server communication to the outside
   - DNS logs
     - Capture information about a newly-seen, unfamiliar domain in network traffic.
     - Leverage internal data sources and continuous DNS monitoring. Own-network defense is best augmented through visibility of own-network activity and traffic
     - Monitoring for new, unique, or abnormal network connections can identify C2 communication schema.
     - Proper asset classification which identifies specific hosts or host-type (e.g., "server" instead of "end-user client") can further differentiate communication to identify items of concern.
     - Similar classification can also work to identify unusual authentication activity, where servers (such as a SolarWinds Orion device) initiate logons to other clients instead of the reverse.

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https://www.domaintools.com/resources/blog/continuous-eruption-further-analysis-of-the-solarwinds-supply-incident

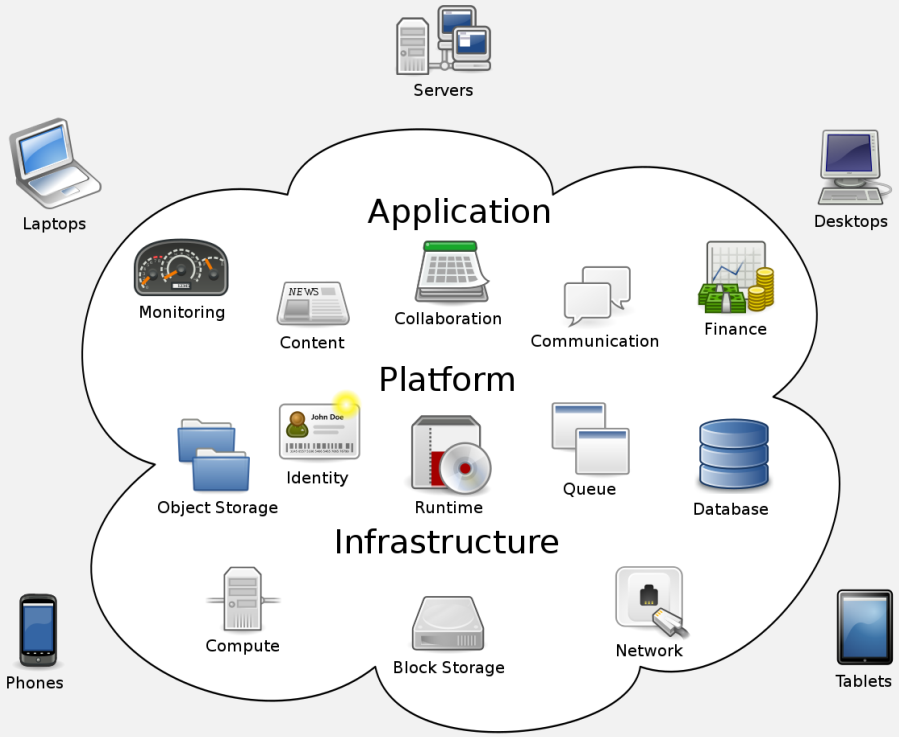
TAKE-AWAYS

9. In-house threat hunting for IOC's

10. In-house changes
    - Privileged accounts and service accounts
    - Critical files and system settings

11. Threat hunting in cloud Infrastructure
    - Mandiant Azure AD Investigator
    - CISA Sparrow
    - MS Azure Security Compass

12. New information is being released regularly…



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BROADER DISCUSSION ON VENDOR MGMT/SUPPLY CHAIN

All software products have bugs/vulnerabilities

Key questions:

What does this software application have access to?

What user account/privileges are given to it?

What is the software vendor doing to provide us a level of comfort that they have done their due diligence?

What do we need to do for our due diligence?

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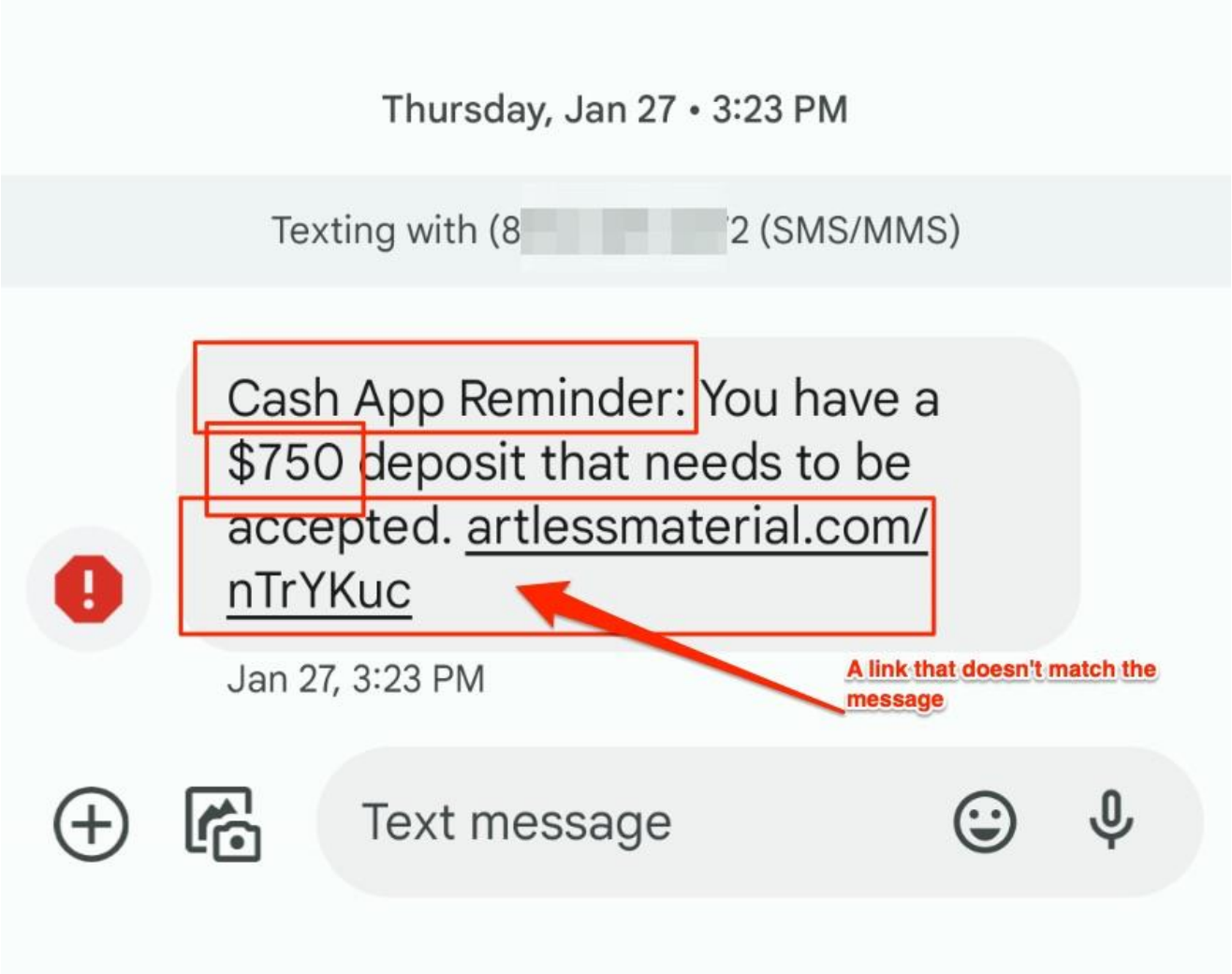
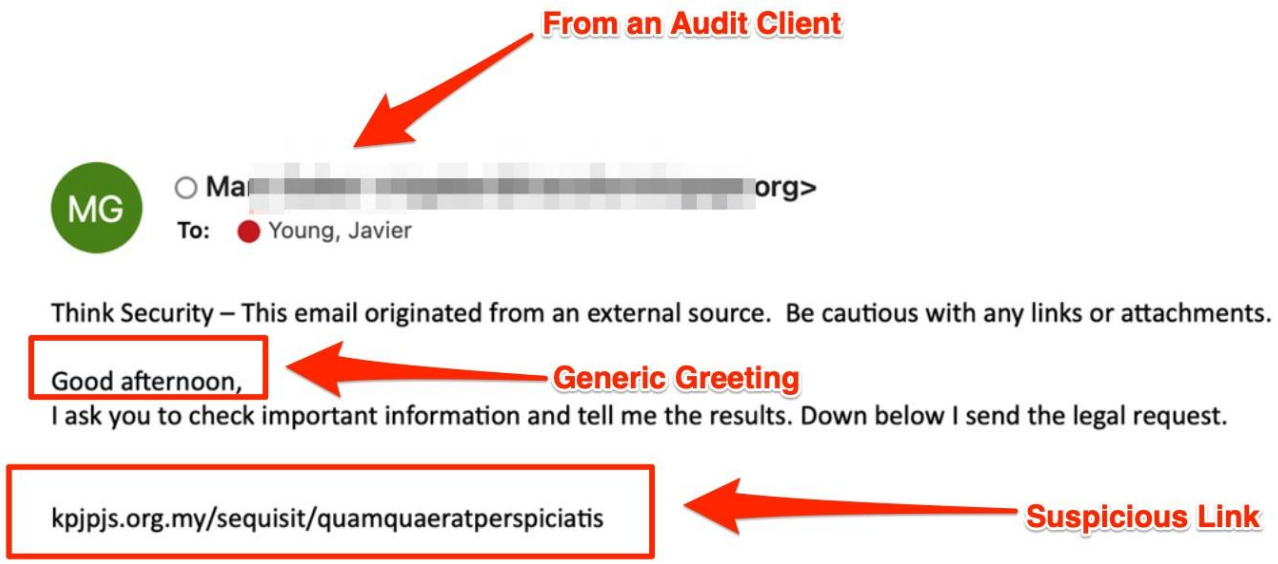
LET'S TALK MORE PHISHING

SOCIAL ENGINEERING

SMS EXAMPLE


Thursday, Jan 27 • 3:23 PM
Texting with (8 2 (SMS/MMS)
Cash App Reminder: You have a $750 deposit that needs to be accepted. artlessmaterial.com/nTrYKuc
Jan 27, 3:23 PM
A link that doesn't match the message
Text message

COMPROMISED EMAIL EXAMPLE



"ACCIDENTAL" EMAIL EXAMPLE

Employee Compensation Adjustment List 1 message

From: [redacted] Dawn

To: [redacted]

November 5, 2020 9:53 AM

Sent to EVERYONE in the company

BJ,

Below is the modified list of employees scheduled to receive out-of-cycle compensation adjustments as we previously discussed. Royce and I discussed and made a few updates.

Employee-Comp-Adjustments-2020-11-05.docx

Please let me know if you have any questions or want to discuss further. These adjustments will start on November 9th.

Regards,

Dawn