Inside Cybercrime Groups Harvesting Active Directory for Fun and Prof…

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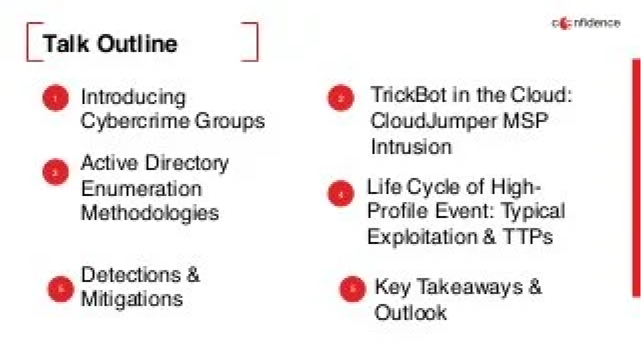

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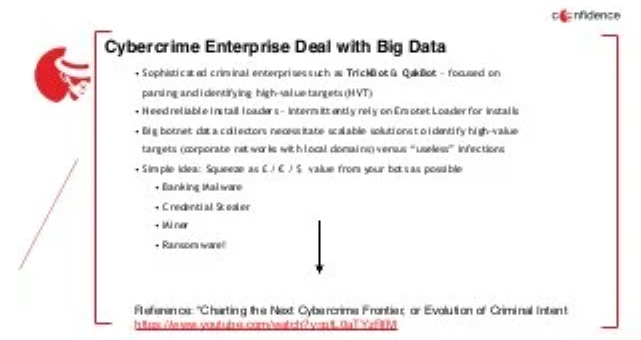
Talk Outline

1. Introducing Cybercrime Groups
2. Active Directory Enumeration Methodologies
3. TrickBot in the Cloud: CloudJumper MSP Intrusion
4. Life Cycle of High-Profile Event: Typical Exploitation & TTPs
5. Detections & Mitigations
6. Key Takeaways & Outlook



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Cybercrime Enterprise Deal with Big Data

- Sophisticated criminal enterprises such as **TrickBot & QakBot** – focused on parsing and identifying high-value targets (HVT)
- Need reliable install loaders – intermittently rely on Emotet Loader for installs
- Big botnet data collectors necessitate scalable solutions to identify high-value targets (corporate networks with local domains) versus "useless" infections
- Simple idea: Squeeze as £ / € / $ value from your bots as possible
  - Banking Malware
  - Credential Stealer
  - Miner
  - Ransomware!

Reference: "Charting the Next Cybercrime Frontier, or Evolution of Criminal Intent
https://www.youtube.com/watch?v=[illegible]

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Vitali presents malware techniques and tricks on how to reverse engineer and analyze malware families exploiting active directory. The talk dives deeper into pseudo-source code level analysis and malware developer implementation of Lightweight Directory Access Protocol (LDAP) harvesting techniques for lateral movement and persistence across corporate environment. The talks explores three prolific malware families such as TrickBot, QakBot, and IcedID (BokBot) and their coding routine and patterns that are focused on collecting LDAP. For example, TrickBot specifically grabs credential and group policy information stored in “SYSVOL” das well as searching for corporate machines for possible sensitive machines associated with possible point-of-sale terminals on domain controller. Vitali also presents detection and mitigation methods on how to detect active directory exploitation and discusses defense mechanisms surrounding most popular active methods used in the wild by the sophisticated groups.

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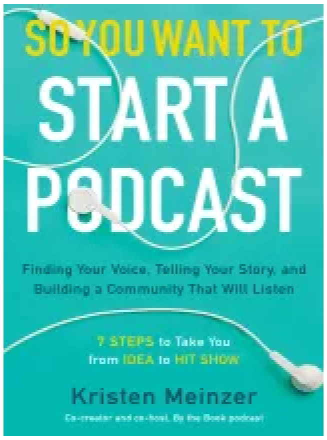
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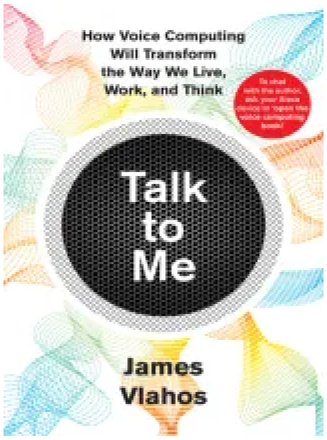
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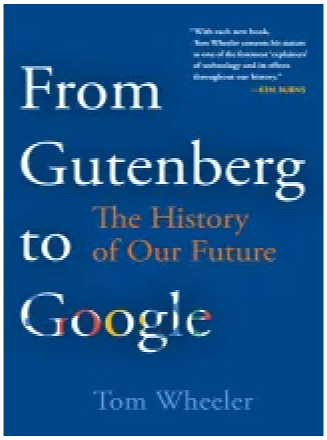

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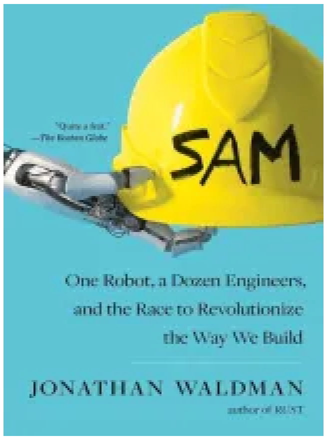

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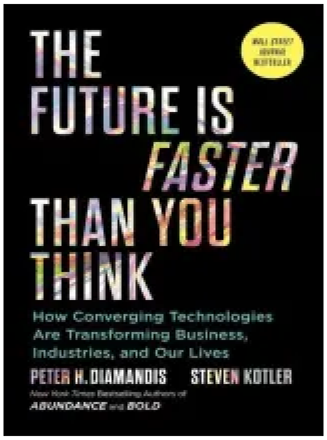

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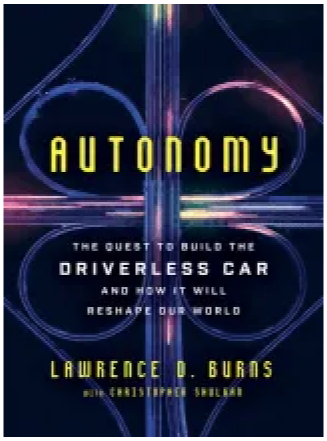

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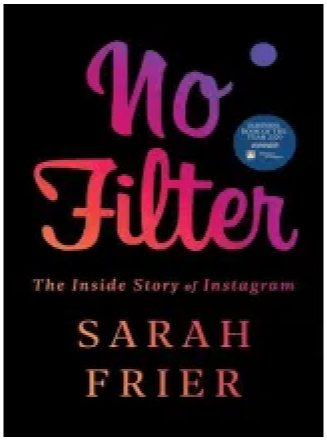

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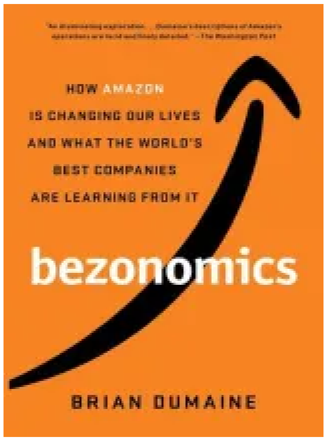

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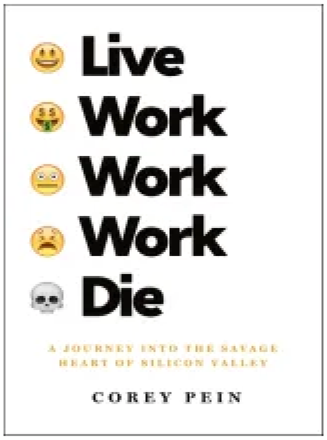

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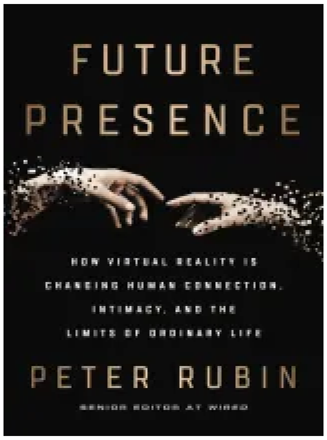
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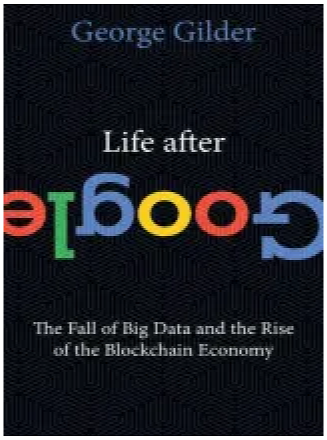

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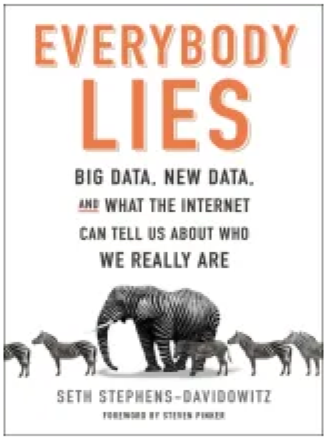
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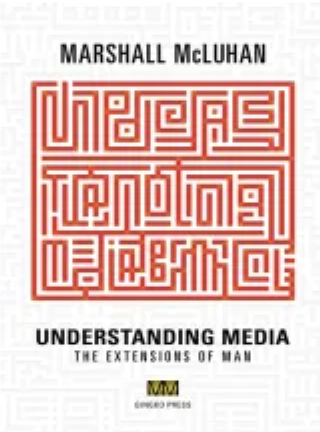

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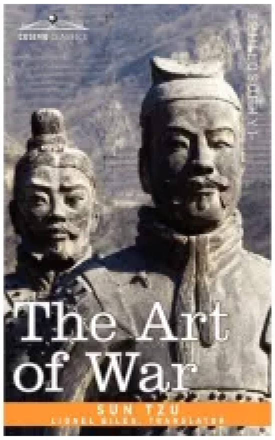

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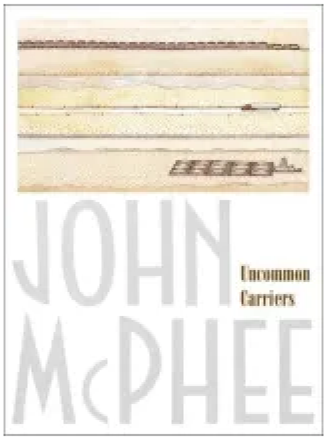

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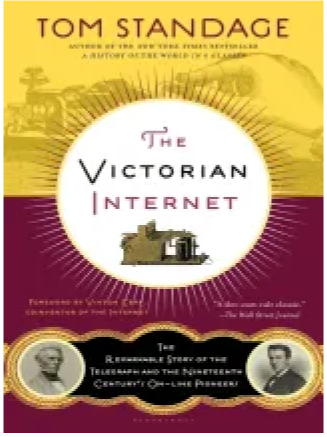
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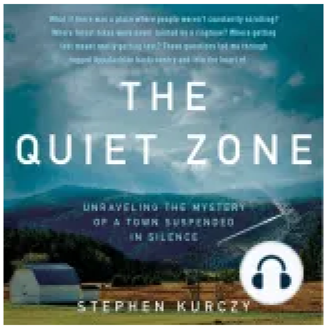

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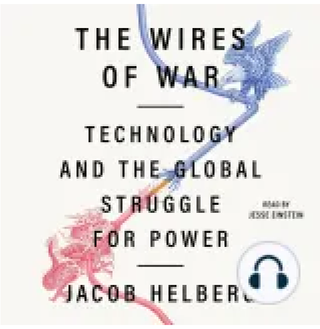

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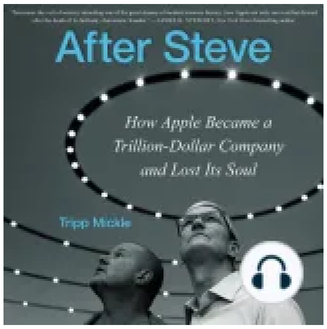

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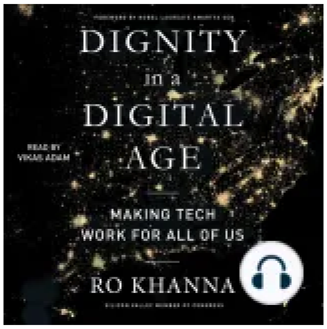

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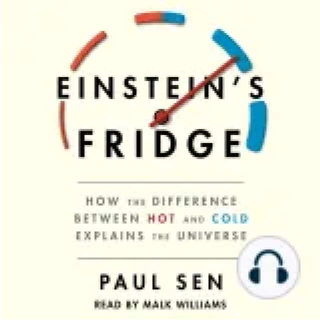

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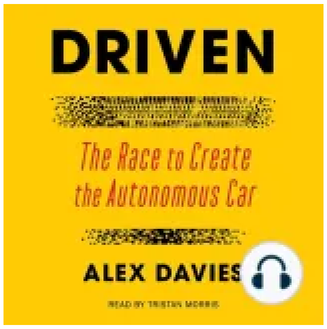

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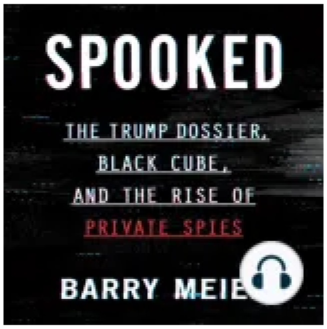
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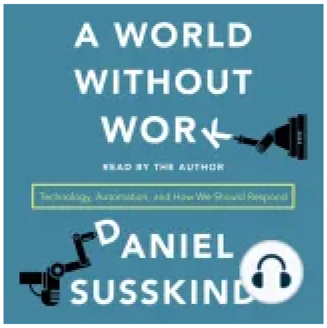

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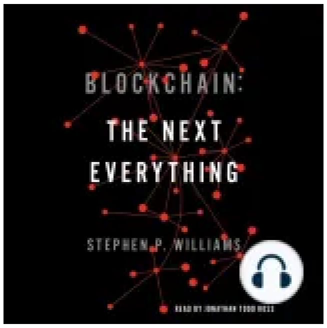

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2. 2. Introducing Cybercrime Groups Talk Outline 1 3 TrickBot in the Cloud: CloudJumper MSP Intrusion Active Directory Enumeration Methodologies 2 4 Life Cycle of High-Profile Event: Typical Exploitation & TTPs 5 Detections & Mitigations 5 Key Takeaways & Outlook
3. 3. Cybercrime Enterprise Deal with Big Data • Sophisticated criminal enterprises such as TrickBot & QakBot - focused on parsing and identifying high-value targets (HVT) • Need reliable install loaders - intermittently rely on Emotet Loader for installs • Big botnet data collectors necessitate scalable solutions to identify high-value targets (corporate networks with local domains) versus "useless" infections • Simple idea: Squeeze as £ / € / $ value from your bots as possible • Banking Malware • Credential Stealer • Miner • Ransomware! Reference: "Charting the Next Cybercrime Frontier, or Evolution of Criminal Intent https://www.youtube.com/watch?v=ptL0aTYzRfM
4. 4. Cybercrime Enterprise Deal with Big Data Reference: "Charting the Next Cybercrime Frontier, or Evolution of Criminal Intent https://www.youtube.com/watch?v=ptL0aTYzRfM
5. 5. Emotet (Loader for Installs) -> TrickBot -> Ryuk Ransomware (via PowerShell Empire/Cobalt Strike) Reference: "Charting the Next Cybercrime Frontier, or Evolution of Criminal Intent https://www.youtube.com/watch?v=ptL0aTYzRfM Credit: Ryuk image (https://nogiartshop.com/products/ryuk) …Network & Active Directory Parsing!…. Automated Malware + Interactive Human Exploitation Operator
6. 6. Scope of TrickBot Installs: How Big is the Problem?
7. 7. Newer Cybercrime Frontier: TrickBot Makes Headlines with Ryuk Install via Active Directory
8. 8. TrickBot in the Cloud: CloudJumper MSP Intrusion: $5 Billion Extortion Amount in Total (!) Reference: https://twitter.com/barton_paul/status/1127088679132987394
9. 9. TrickBot Makes Headlines with Ryuk Install via Active Directory: CloudJumper MSP Breached MSP Victim —> Gateway to Other Organization Cloud Infrastructure
10. 10. LDAP Exploitation Methodologies Credit: Rahmat Nurfauzi (https://github.com/infosecn1nja/AD-Attack-Defense/blob/master/README.md)
11. 11. Active Directory Enumeration & Exploitations
12. 12. • "domainDll32," compiled via 'GCC: (Rev1, Built by MSYS2 project) 7.2.0,' allows TrickBot operators to collect domain controller information once they are already on the compromised machine. • This module is internally called "DomainGrabber" and accepts command "getdata" in order to start harvest domain information. • domainDll appears to be aimed at exploiting networks with unsecured domain controllers. domainDll (32|64) Reference: https://www.vkremez.com/2017/12/lets-learn-introducing-new-trickbot.html Active Directory Enumeration Methodologies
13. 13. domainDll (32|64) (decoded) (1e2791877da0249998dea79515a89ca) Active Directory Enumeration Methodologies
14. 14. domainDll (32|64) Active Directory Enumeration Methodologies

15. 15. Active Directory Enumeration Methodologies • “networkDll” module is a single harvester of all possible network victim information from running commands such as "ipconfig /all" and "nltest /domain_trusts /all_trusts" to WMI Query Language (WQL) queries such as "SELECT * FROM Win32_OperatingSystem" to lightweight directory access protocol (LDAP) queries. • Notably, the group leverages "nltest" commands to establish trust relationship between between a compromised workstation and its possible domain before querying LDAP. networkDll (32|64) Reference: https://www.vkremez.com/2018/04/lets-learn-trickbot-implements-network.html
16. 16. networkDll (32|64) (decoded) (aeb08b0651bc8a13dcf5e5f6c0d482f8) Active Directory Enumeration Methodologies
17. 17. networkDll (32|64) Active Directory Enumeration Methodologies
18. 18. • “psfin32” is a point-of-sale finder reconnaissance module hunts for point of sale related services, software, and machines in Lightweight Directory Access Protocol (LDAP) • The module itself does not steal any point-of-sale data but rather used to profile corporate machines of interest with possible point-of-sale devices. • This module arrived just in time for the holiday shopping season highlighting the group interest in exploring possible point-of-sale breaches. psfinDll (32|64) Reference: https://www.vkremez.com/2018/11/lets-learn-introducing-latest-trickbot.html Active Directory Enumeration Methodologies
19. 19. psfinDll (32|64): Typical Point-of-Sale Network Layout Credit: https://www.smart-acc.com/?page=size-options/multiple-outlets/retail Active Directory Enumeration Methodologies
20. 20. psfinDll (32|64) (4fce2da754c9a1ac06ad11a46d215d23) Active Directory Enumeration Methodologies
21. 21. psfinDll (32|64) Active Directory Enumeration Methodologies
22. 22. Life Cycle of High-Profile Event: Typical Exploitation Chain & Tactics, Techniques & Procedures Credit: Brad Duncan (https://www.malware-traffic-analysis.net/2018/10/08/index.html)
23. 23. Life Cycle of High-Profile Event: Victim Domain Parser
24. 24. Life Cycle of High-Profile Event: “No system is safe”
25. 25. Detections & Mitigations • Identify who has AD admin rights (domain/forest) • Identify who can logon to Domain Controllers (& admin rights to virtual environment hosting virtual DCs) • XML Permissions • Place a new xml file in SYSVOL & set Everyone:Deny • Audit Access Denied errors. • Scan Active Directory Domains, OUs, AdminSDHolder, & GPOs for inappropriate custom permissions Credit: Rahmat Nurfauzi (https://github.com/infosecn1nja/AD-Attack-Defense/blob/master/README.md#defense-evasion) Sean Metcalf (https://adsecurity.org/?p=2288)

26. 26. Key Takeaways & Outlook • Automated Malware + Interactive Human Exploitation Operator -> New Cybercrime Frontier • Active Directory & Network Enumeration are the key to identify high-value corporate and multi-tenancy targets for additional monetization (e.g., Ryuk ransomware) • Cloud MSP are the desired targets as they are gateways to their customer environments (e.g., CloudJumper) Credit: CloudJumper image (https://www.drawingtutorials101.com/how-to-draw-cloudjumper-from-how-to-train- your-dragon-2)
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