LEADERSHIP FOR IT SECURITY & PRIVACY ACROSS HHS

HHS CYBERSECURITY PROGRAM

OFFICE OF INFORMATION SECURITY

Trickbot

01/09/2020

Report #: 202001091000

Agenda

- Overview
- Attack vectors and initial execution
- Persistence and propagation
- References
- Questions

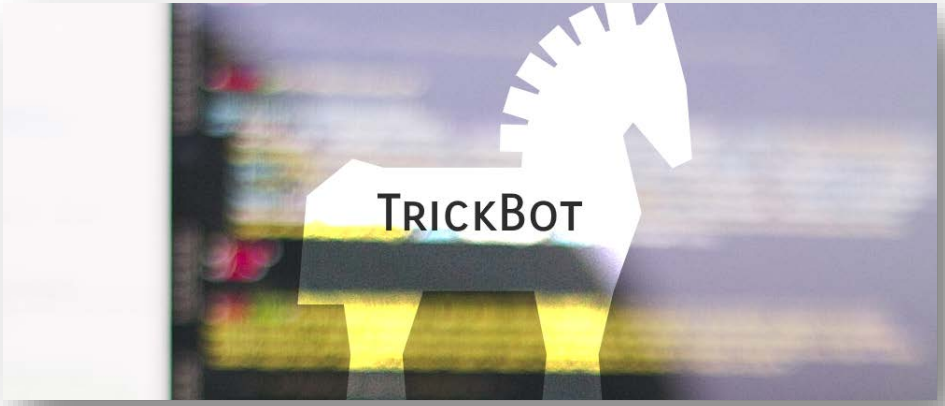


Image courtesy of ZDNet

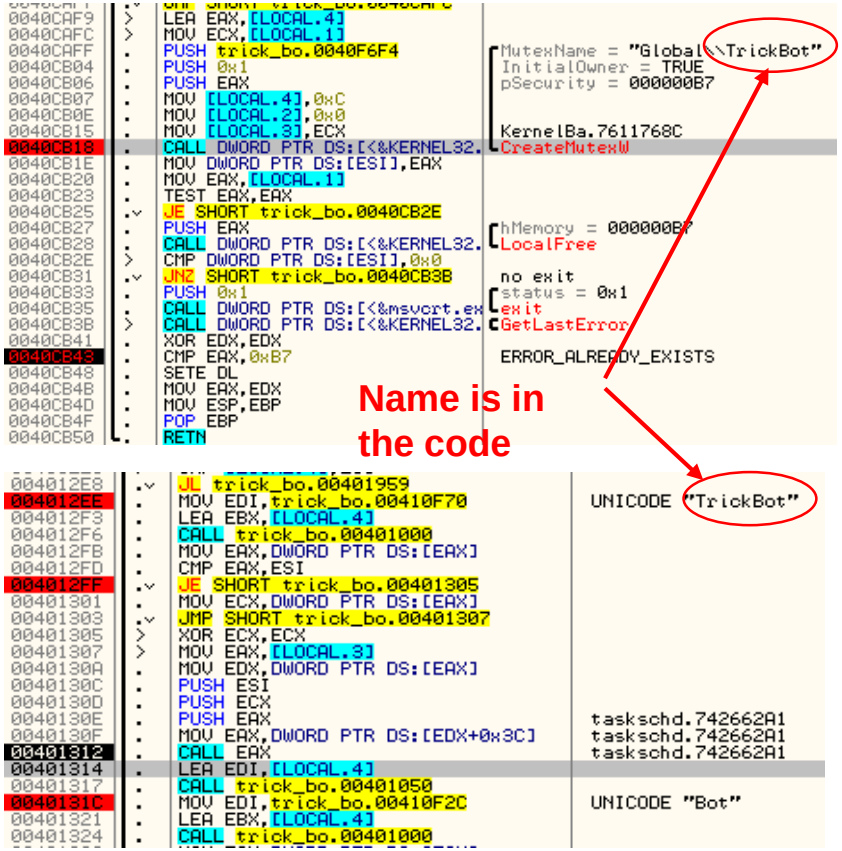
Slides Key:

Non-Technical: managerial, strategic and high-level (general audience)

Technical: Tactical / IOCs; requiring in-depth knowledge (sysadmins, IRT)

Overview

- AKA Trickster, TrickLoader and TheTrick
- Modular malware, described as a banking trojan
- Similar to Dyreza, an old credential-stealer
  - Probably operated and maintained by the same group - code similarities and circumstances
- Used by: Wizard Spider (likely Russian cybercriminals)
- What separates TrickBot from the crowd?
  - Constantly evolving (and increasingly powerful)
  - Frequently used to target a variety of organizations
  - Nothing that TrickBot does is unique
    - Aggregate capabilities make it a powerful tool
- Offered as Access-as-a-Service
- Frequently used to target healthcare organizations and providers
  - Often utilized in combination with other malware in multi-staged attacks



Images courtesy of Malwarebytes

Attack vectors and initial execution

- TrickBot uses standard attack vectors for infection:
  - Malvertising – The use of advertising – legitimate or fake – to surreptitiously deliver TrickBot to victim system
  - SpearPhishing – E-mails with malicious links or attachments that specifically target organizational leadership
  - Network vulnerabilities – SMB (Server Message Block) and RDP (Remote Desktop Protocol) are common
  - Secondary payload – Sometimes dropped by other malware (second stage), often Emotet
- Execution – multiple layers
  - First layer contains encrypted payload
    - Attempts to conceal TrickBot from detection
    - Uses AES or ECC encryption
  - Second layer is the main bot loader
    - Will deploy either 32-bit or 64-bit payload

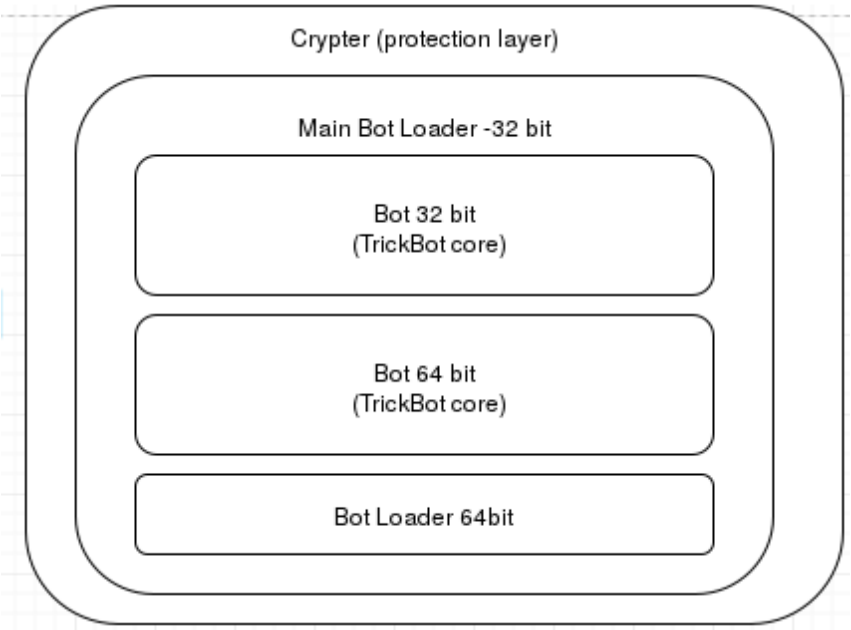


Image courtesy of Malwarebytes

Persistence and propagation

- TrickBot maintains access via the creation of a scheduled task
- Further spreading/lateral movement:
  - EternalBlue exploit
  - DLLs
  - PowerShell Empire
  - Vulnerable network shares

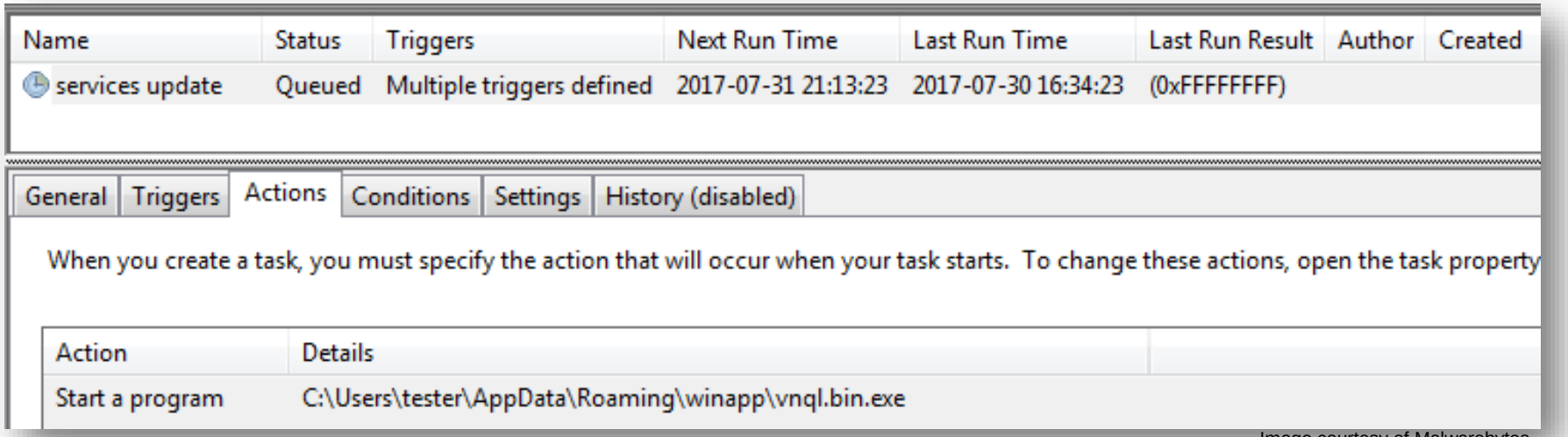
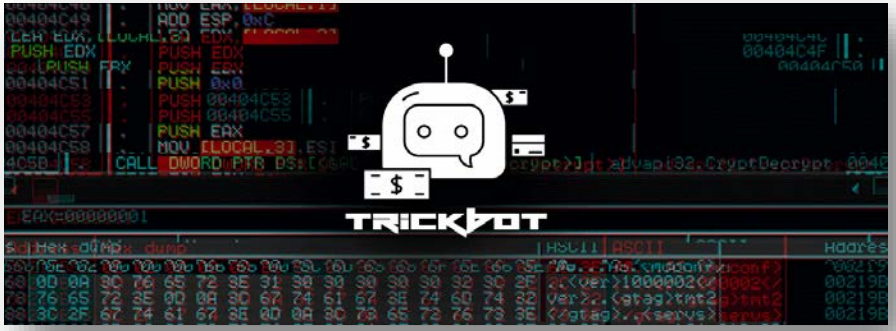


Image courtesy of Malwarebytes

TrickBot functionality overview

- Data exfiltration
  - Banking/Financial information
  - System/Network reconnaissance
  - Credential and user info harvesting
- Network propagation
- Remote control (C2)
- Dropper (Rig Expliot Kit, Ryuk)
- Persistence (scheduled task or registry key)
- Code injection
- Anti-detection/analysis
- SIM-swapping

"TrickBot was developed in 2016 as a banking malware, however, since then it has developed into something essentially different – a flexible, universal, module-based crimeware solution" – Sentinel Labs



Common TrickBot Modules

- Data exfiltration
  - TrickBot often leverages open redirections and server side injects to steal banking credentials.
    - What is an open redirect?
      - When a user-submitted link directs a web app/server to redirect the user to a malicious webpage instead.
      - https://legit_web_site.com/redirect.php?go=http://malicious_web_site.com/steal_credentials/
  - TrickBot has many modules to steal banking info
    - Dinj – File contains banking information; Uses server side web injections
    - Dpost – Most of the data exfiltrated by TrickBot is sent to the dpost IP address.
    - LoaderDll/InjectDll – Monitors for banking website activity; Leverages web injects to steal financial data.
    - Sinj – Retains information on targeted online banks; Utilizes redirection attacks (fake web injections) to exfiltrate financial data

Common TrickBot Modules (continued)

- System/Network Reconnaissance
  - Mailsearcher – Compares all files on the disk against a list of file extensions.
  - NetworkDll – Collects system information and maps networks
  - Systeminfo – Provides hackers with basic system information for reconnaissance purposes

- Credential harvesting
  - DomainDll – Uses LDAP to harvest credentials and configuration data from domain controller by accessing shared SYSVOL files.
  - ModuleDll/ImportDll – Harvests browser data – cookies and browser configs.
  - OutlookDll – Harvests saved MS Outlook credentials by querying registry keys
  - Pwgrab – Steals credentials, autofill data, history, and other information from browsers as well as several software applications
  - SqulDll – Forces WDigest authentication; Utilizes Mimikatz to scrape credentials from LSASS.exe. The worming modules use these credentials.

- Network Propogation
  - WormDll and ShareDll – Worming module that uses Server Message Block (SMB) and Lightweight Directory Access Protocol (LDAP) for lateral movement.
  - TabDll – Leverages EternalRomance exploit (CVE-2017-0147) to spread via SMBv1.

Wizard Spider

- Wizard Spider
  - Operators of TrickBot
  - Carry out wire fraud
  - Alleged to be affiliated with Russian cybercrime rings
  - Affiliated with Grim Spider, Lunar Spider and Mummy Spider
  - Some members were part of the group that operated Dyre (Dyreza)
    - Dyreza ceased operating in November 2015 after Russian law enforcement raided the entertainment company believed to be behind it
    - No Dyreza activity for a little over a year
    - October, 2016 - TrickBot identified in the wild for the first time with noted similarities to Dyreza; The operation was immediately successful and grew
- Secure Works identifies the same group as GOLD BLACKBURN

Image courtesy of ThreatPost

TrickBot vs. Healthcare

- TrickBot – multi-stage attacks
  - Malware can drop TrickBot
    - Emotet
  - TrickBot can drop other malware
    - Ransomware
  - Dwell time means you shouldn't assume all attacks are single-step
- Ransomware, which ravages the healthcare community, is often dropped
- A frequent combination:

Image courtesy of Dark Reading

- Emotet: Initial compromise; Often delivered via spam/phishing or RDP exploitation; Delivers TrickBot
- TrickBot: Payload of Emotet; Used to conduct reconnaissance; Delivers Ryuk
- Ryuk executes it's ransomware functionality
- TrickBot is also commonly used to deploy Mimikatz

TrickBot Defense/Infection Prevention

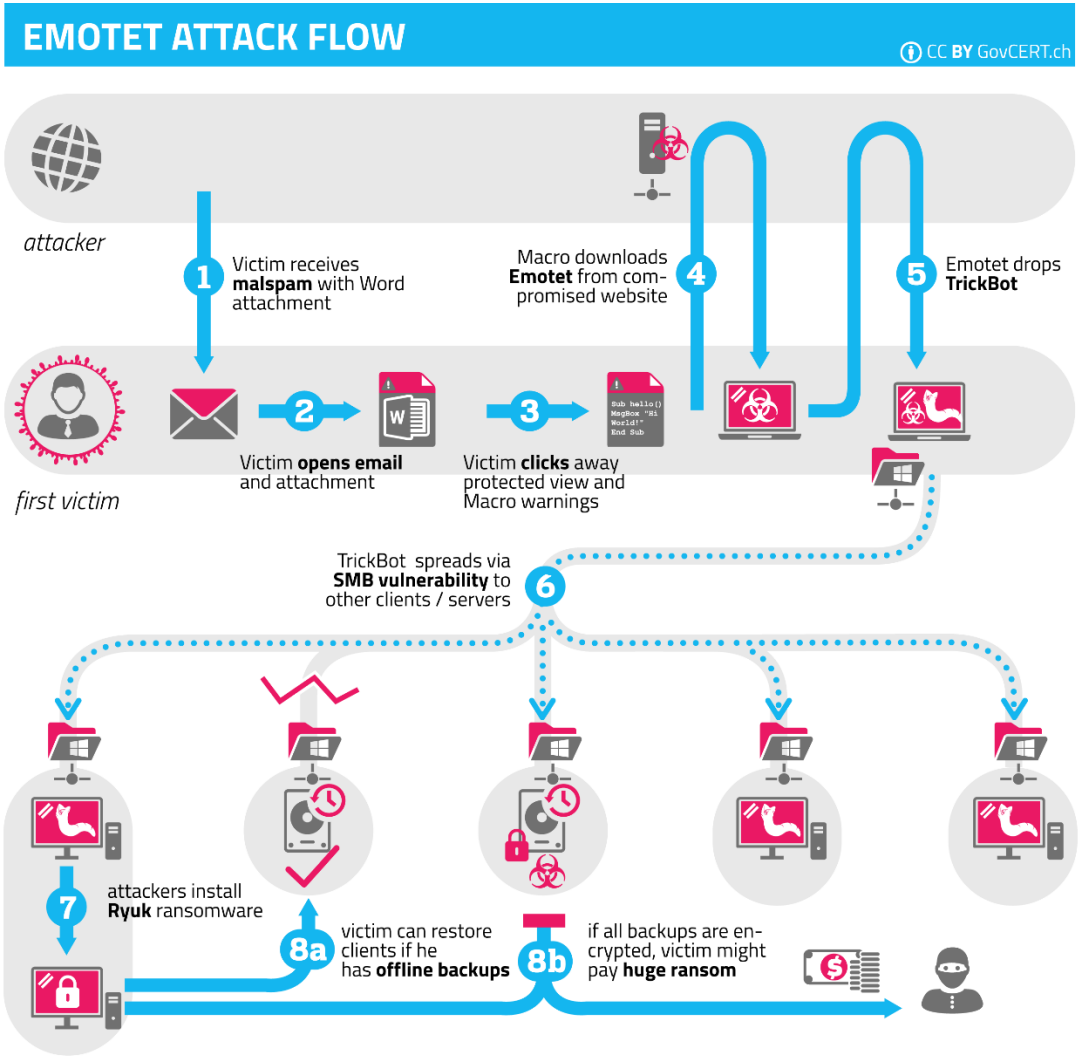


Image courtesy of Swiss Government Computer Emergency Response Team

TrickBot Defense/Infection Prevention

- Provide social engineering and phishing training to employees. **[10.S.A], [1.M.D]**
- Develop and maintain policy on suspicious e-mails for end users; Ensure suspicious e-mails are reported **[10.S.A], [10.M.A]**
- Ensure emails originating from outside the organization are automatically marked before received **[1.S.A], [1.M.A]**
- Apply applicable patches and updates immediately after testing; Develop and maintain patching program if necessary. **[7.S.A], [7.M.D]**
- Implement Intrusion Detection System (IDS). **[6.S.C], [6.M.C], [6.L.C]**
- Implement spam filters at the email gateways. **[1.S.A], [1.M.A]**
- Block suspicious IP addresses at the firewall. **[6.S.A], [6.M.A], [6.L.E]**
- Implement whitelisting technology on appropriate assets to ensure that only authorized software is allowed to execute. **[2.S.A], [2.M.A], [2.L.E]**
- Implement access control based on the principal of least privilege. **[3.S.A], [3.M.A], [3.L.C]**
- Implement and maintain anti-malware solution. **[2.S.A], [2.M.A], [2.L.D]**
- Conduct system hardening to ensure proper configurations. **[7.S.A], [7.M.D]**
- Disable the use of SMBv1 (and all other vulnerable services and protocols) and require at least SMBv2. **[7.S.A], [7.M.D]**
- **Yara Rules**: https://malpedia.caad.fkie.fraunhofer.de/details/win.TrickBot

Indicators of Compromise

Hashes
4be3286c57630fb81e079c1aa3bf3203
fe2d9595a96046e441e43f72deac8cb0
5a137c1dd4a55c06531bdbfeaf15c894
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Hashes
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Indicators of Compromise

IPs
103.198.130.148
103.58.144.249
115.186.139.104
138.186.22.2
168.194.80.70
176.121.213.31
177.104.69.130
177.231.253.158
177.87.233.4
184.160.113.13
185.158.175.95
185.27.219.173
185.47.136.111
185.8.0.182
186.208.102.185
186.208.106.234
186.208.111.188
188.255.156.67
188.255.249.27
190.2.235.246
196.11.84.62
200.116.206.58
217.31.110.43
36.66.107.162
37.61.239.216

IPs
49.156.45.139
5.172.33.237
5.172.34.138
82.146.94.150
82.146.94.86
84.42.159.138
95.104.2.225
96.9.69.131
190.138.249.45
200.119.236.86
36.66.107.162
221.179.156.39
80.51.120.132
203.92.62.46
84.42.159.138
190.138.249.45

Hashes
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fdf5bae149683eff434f734295693723dd83b3769b63e5317e137c4ac4aff6ae

NOTE: There exists a very large quantity of IOCs associated with TrickBot. This presentation contains only a small sample. Furthermore, due to the aggressive and constant development of the tool, new IOCs are frequently released. Therefore, we strongly advice any organization that wishes to adequately protect itself from TrickBot continually maintain situational awareness regarding the latest releases.

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Questions

Questions

Upcoming Briefs

- Botnet Threats to the healthcare industry
- Zeppelin Ransomware

Product Evaluations

Recipients of this and other Healthcare Sector Cybersecurity Coordination Center (HC3) Threat Intelligence products are highly encouraged to provide feedback to **HC3@HHS.GOV**.

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About Us

HC3 works with private and public sector partners to improve cybersecurity throughout the Healthcare and Public Health (HPH) Sector

Products

Sector & Victim Notifications

Directed communications to victims or potential victims of compromises, vulnerable equipment or PII/PHI theft and general notifications to the HPH about currently impacting threats via the HHS OIG

White Papers

Document that provides in-depth information on a cybersecurity topic to increase comprehensive situational awareness and provide risk recommendations to a wide audience.

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Need information on a specific cybersecurity topic or want to join our listserv? Send your request for information (RFI) to HC3@HHS.GOV or call us Monday-Friday, between 9am-5pm (EST), at (202) 691-2110.

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