CYSIV
A FORESCOUT COMPANY

Threat Report: TrickBot Banking Trojan

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1 EXECUTIVE SUMMARY

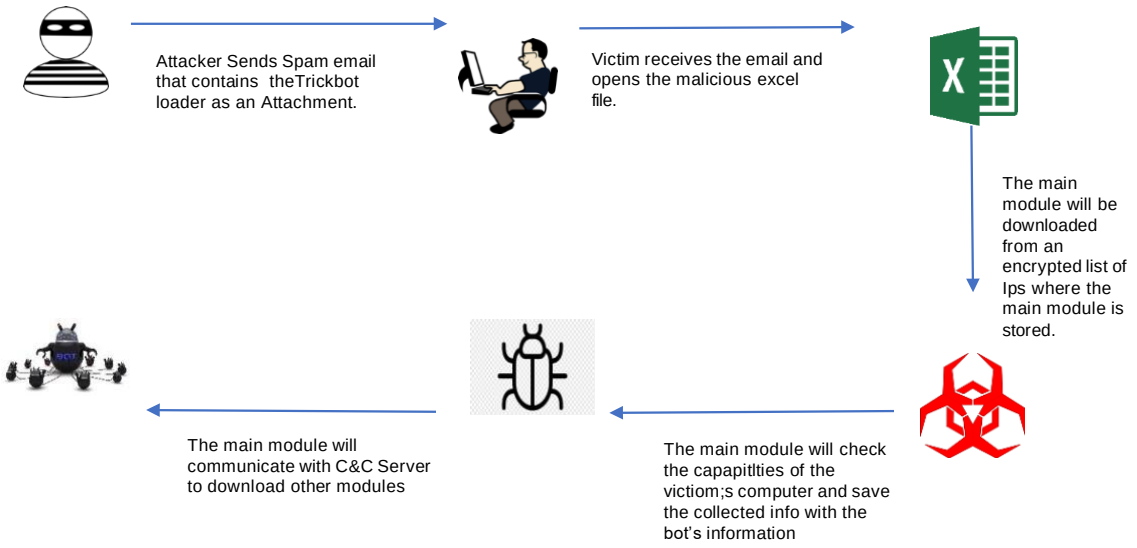
TrickBot is one of the most dangerous banking trojans due to the sophisticated techniques it employs and is mostly operated by threat actors TA505 and Wizard Spider. It was first uncovered in September 2016 and has a global reach, infecting more than a million computing devices and stealing millions of dollars from banking institutions and health care providers. Security researchers believe that it was developed by the same criminal group behind Dyre Ransomware, which suddenly stopped in late 2015, because its source code appears to be a rewritten version of Dyre.

Over the past few years, TrickBot has evolved and currently offers a full list of tools that provide a myriad of malicious activities, such as credential harvesting, data exfiltration, crypto mining, and the ability to deploy other malware such as Ryuk ransomware. This allows TrickBot to be flexible, customizable, and easily made available for cybercriminals to use in a Malware-as-a-Service model.

The preferred method used by threat actors to distribute TrickBot is the spear phishing email. These emails contain a financial lure to trick victims into opening malicious attachments and/or clicking on links that host malicious files. Malicious files are delivered in different formats, such as zipped scripts (WSF, VBS) and Microsoft Office documents (Word, Excel). Similar to other cybercriminals, TrickBot threat actors have taken advantage of current world trends with phishing campaigns leveraging different topics like COVID-19 and Black Lives Matter, enticing victims to click on malicious documents or links.

TrickBot is modular malware so it can perform many malicious activities. Its first module is the loader which contains an encrypted list of IP addresses from where it can download its main module. As shown by Figure 1, once downloaded, it starts collecting the infected machine's information and initiates a communication channel with a preconfigured list of C2 servers. It may also attempt to exploit different vulnerabilities to move laterally inside victims' networks and install itself on other computers. The Cysiv threat research team has analyzed different variants of the TrickBot banking trojan to help overcome these challenges and help ensure our clients are well-protected.

Figure 1 – TrickBot Infection Method



Protection Provided by Cysiv:

Cysiv SOC-as-a-Service provides protection from a broad range of threats:

- 24x7 monitoring provides organizations with real time alerts and quick isolation and remediation to contain a threat during the early stages of an attack to prevent a compromise, data loss or breach.
- Human-led threat hunting helps to identify suspicious activity and digital footprints that are indicative of an intrusion.
- Anti-malware that may already be deployed (or can be deployed by Cysiv) on endpoints, for users, and that can be monitored as part of the Cysiv service, will constantly monitor for abnormal activities and block any connection to suspicious URLs, IPs and domains.
- Anti-malware that may already be deployed (or can be deployed by Cysiv) on servers and workloads, and that can be monitored as part of the Cysiv service, uses a variety of threat detection capabilities, notably behavioral analysis that protects against malicious scripts, injection, ransomware, memory and browser attacks related to fileless malware. Additionally, it will monitor events and quickly examines what processes or events are triggering malicious activity.
- Network security appliances that may already be deployed (or can be deployed by Cysiv) and that can be monitored as part of the Cysiv service will detect malicious attachments and URLs, and are able to identify suspicious communication over any port, and over 100 protocols. These appliances can also detect remote scripts even if they're not being downloaded in the physical endpoint.

2 DETECTION – ANATOMY OF TRICKBOT

Use the information provided in this section to study the key artifacts and behaviors of TrickBot so you can scan your system, determine if it is vulnerable, perform in-depth digital forensics, and help mitigate the impact.

2.1 Phishing Malspam – T1566

Most attackers tend to use phishing malspam as the most effective way of delivering TrickBot. An email is spammed to a list of addresses with a compelling subject line – the attention surrounding the COVID pandemic has recently been leveraged to entice users to open the malicious email, which typically contains a malicious MS Office file or a malicious link.

Figure 2 – Sample of Received TrickBot Malspam Email

2.2 Execution - T1204

Once the user clicks on the malicious attachments and enables editing, a PowerShell script downloads the main module of TrickBot, the main module is executed and TrickBot then begins downloading the additional modules it needs for its programmed use case.

Module	Usage
importDll	Stealing Browser Data.
cookiesDll	Stealing Cookies from infected machines.
pwgrab	Stealing credentials from browsers.
networkDll	Gathering Network and System Information.

injectDll	Main Banking Module, for injecting malicious content in browser to steal banking websites credentials.
tabDll	to be spread through SMB usign many windows vulnerabilities.
shareDll	For lateral Movement and Enumeration through LDAP and SMB.
vncDll	For remote Control.
rdpscanDll	For running Brute-Force attack against RDP for spicific servers.
mailsearcher	Search all files on desk to harvest email address.
outlookDll	Stealing OutLook Credentials.
psfin	Stealing POS software credenitals.

Figure – 3 Detection of Downloading TrickBot main module

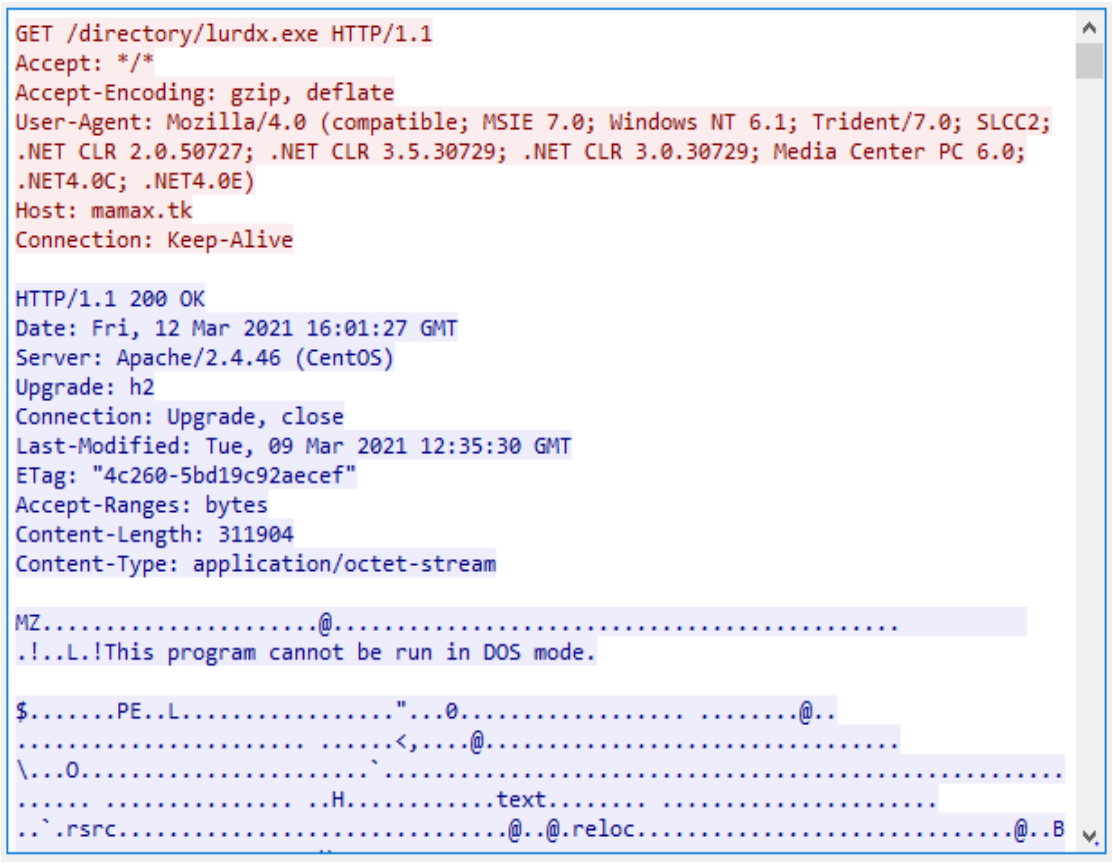


Figure – 4 Main Module is being downloaded from the Loader

2.3 Persistence - TA0003

TrickBot adds an entry to the “run keys” in the registry or startup, so the program is referenced to be executed when a user is logged in. Attackers use these system configurations to execute malware to maintain persistence even if the user reboots the machine.

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\RunOnce

2.4 Defense Evasion - TA0030

TrickBot tries to be installed as a Scheduled Task and uses familiar names such as “Sysnsef” to remain hidden from detection. Also, it may be installed as a service that points to a copy in the system device root. Some TrickBot modules try to disable running AntiVirus tools to evade detection. This can be achieved by killing the security software process or event logging process and deleting registry keys.

Figure – 5 TrickBot trying to Create File in Admin Directory

```
"C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe" Add-MpPreference -ExclusionPath "C:\Users\admin\AppData\Roaming\lurd8763.exe" -Force
```

2.5 Credenital gathering - TA0006

TrickBot tries to search local file systems and remote file shares for files containing passwords. These files may store the credentials and/or shared credentials of users, or configuration files containing passwords for a service or system.

2.6 Discovery / Collection – TA0007

TrickBot uses many modules, such as “networkdll” and “psfin”, to collect local system and Network information like Domain Controllers and Kerberos, and also conducts port scanning of SMB ports, Netbios, and LDAP.

2.7 Command and control - TA0011

Attackers use many existing, legitimate external web services as a means for relaying commands to a compromised system. TrickBot has a predefined list of C&C servers to exfiltrate data through, so it encrypts all collected data and exfiltrates it using the HTTP protocol.

3 MONITORING AND MITIGATION

This section details mitigation information for TrickBot around prevention, detection and organizational best practices.

3.1 Recommended Monitoring for Detection

The following monitoring practices are recommended in relation to TrickBot.

- Monitor internal/external emails.
- Monitor Web requests that first seen, newly registered and DGA domains.
- Monitor received emails from first seen and newly registered domains.
- Monitor for suspicious authentication activity on published services, from unexpected GeoLocations.
- Monitor windows backup deletion.
- Monitor for network share reconnaissance activities.
- Monitor outgoing communications to suspicious or newly registered domains.
- Monitor outside traffic size.
  Stay updated with the latest IOCs related to TrickBot.

3.2 Prevention Methods

Patching of End User Productivity Tools – By regularly patching end-user productivity tools like MS-Office, Adobe Acrobat Reader, organizations can minimize the exposure to weaponized attachments that include malicious code exploits and unpatched vulnerabilities.

Disabling Macros – A macro is a series of commands that a user can use to automate a repeated task. Attackers can use macros as an attack vector, including using macro language such as VBScript as a means of propagation, so whenever possible macros should be disabled.

User Awareness – Users are the prime targets of phishing campaigns and hence any effective prevention must involve training users on how to spot phishing emails and messages when they receive them and how to report them through the appropriate channels to the relevant incident response teams.

Stay up to Date – Most threat actors use known and exploitable vulnerabilities to attack organizations. Once a new vulnerability is discovered and disclosed or even sold on the dark web, a hacker will try to use it before organizations update their servers. So make sure to regularly maintain and update software and patch security vulnerabilities on all endpoints and software.

Encrypt Sensitive Data – Sensitive or classified data that you don't want anyone to access should be encrypted with a strong key and stored in a safe place so that in the event of a data breach the data will be unreadable to the attackers.

3.3 Detection controls

Email Security – Email security is a set of measures used to secure an organization's email service. It allows an individual or organization to protect the overall access to one or more email addresses/accounts. Because of its ubiquity and inherent vulnerabilities, email is a popular vector for cyber-attacks, which can include malware, spam, and phishing. Well-configured and updated email security may detect phishing mails that contain malicious attachments and/or malicious URLs or domains, and even block them.

Anti-Malware – Anti-malware is software built to detect and destroy threats like viruses, malware, ransomware, spyware and others. It is mandatory for every organization to add this security layer in case of any malware attack that can affect its internal network. In many cases, phishing emails contain malicious attachments and when a victim clicks/downloads the attachment it will spread the malware to their machine. A properly configured and updated Antivirus program may detect or even prevent the malware from executing.

Threat Hunting For IOCs – Threat hunting is the proactive search for attack symptoms on your network, and IOCs (Indicators of Compromise) containing IPs, hashes, URLs and domains.

3.4 Organizational Best Practices

Quickly Changing Passwords – Organizations must develop detailed incident response procedures that involve the resetting of passwords of users who have received spear phishing emails or might have clicked on the links they contain. The effective implementation of this incident response procedure requires educating the users on how to report phishing emails and having the means to identify other users who might have received the malicious email and interacted with it in any way.

Incident Response Plans – An incident response defines the procedure for cleanup/recovery when for a discovered cybersecurity breach. It is recommended that every organization have a plan and a team dedicated to managing the incident and minimizing the damage and cost of recovery.

4 TRICKBOT INDICATORS OF COMPROMISE

Indicator	Type
AD41DF394F597F7F20D20A47F5DDF9514BDA74B3789AFC22105C3209F1AE77A6	SHA-256
415E04EB340F1B092288CBCC71295A2C95E864FC1BBFCD55D6E3F5AA67099B1A	SHA-256
94AFDE50189796D71A329F77C8058E6748E473543140CF12EB5919898CC38172	SHA-256
7BD6F034A4C3DC1E3DC2516F6962502AA8E243A3DA541FD73E886F287792E970	SHA-256
9C129DA79A8FB3658FD590DFE50E99C541955CA4ED085D809C39F43D36A00575	SHA-256
3D90F14C88DDACD592856E9E0D657D95E7BBC4BF41A0805CEA58FB725BB0D61D	SHA-256
13EF6FBD0FE8204DBE8831CAD802CCD300B8696A1815B830C7820E02E2E538EA	SHA-256
E56A7E5D3AB9675555E2897FC3FAA2DD9265008A4967A7D54030AB8184D2D38F	SHA-256
18624CAE215E58079E8A9B236056A3A98EFEBF35CE799CB84CBAAF67B0972E0D	SHA-256
653C5BAB1504F9A6B9F3C865D50AE8993E307CDF6B2B58761CF7EE7AC5D62B7D	SHA-256
121118A0F5E0E8C933EFD28C9901E54E42792619A8A3A6D11E1F0025A7324BC2	SHA-256
DD20506B3C65472D58CCC0A018CB67C65FAB6718023FD4B16E148E64E69E5740	SHA-256
3253BC9300DD0AA24997846B532C6966A3545DAE830EB6B7D54657AA3F739DB7	SHA-256
05903B62D309D5B4C04C7C6865B1711CD9E4E6370D4DBF419B1611FF17C7A112	SHA-256
E407F2ABF8E890E536D1699AEFC58CE3B3094D26CA47DDBC72C1608F80F4F194	SHA-256
6F1B1F3EF3598DF52054935D75EE1BF2E2BBB43643BC40693562859F17B5D405	SHA-256
8E803B4F0640AACF8D6ADEAFA9AF182083711D09C6024B4DD91036933F1EF7A6	SHA-256
6DB1BA2FA5CC9E8906E388FC2CF54283801771D36575D4F862320C16FA6577D7	SHA-256
79A40AC47EA2B57727437A7A9365E860CC1FA1C7C96900F5A2A90133959C4694	SHA-256
2AFEA8912F1B7AFA3A4348EF4E027F7A46F4A2ADE824196265EA1AC952E172B3	SHA-256
88bef4abd4db5e07764358ca39fe5bbf257603dbf3f0e4eeec2e8c127cfa7bfd	SHA-256
36b83f1df7c918efcde6ec5a895b4b53ec0307b1b8603a5ba3a3ab63ab7c2265	SHA-256
36.91.45.10	IP v4
123.231.149.122	IP v4
85.204.116.188	IP v4
27.110.228.186	IP v4
180.250.197.188	IP v4

66.181.167.72	IP v4
181.113.20.186	IP v4
103.94.122.254	IP v4
181.115.168.69	IP v4
186.42.186.202	IP v4
52.37.89.225	IP v4
95.171.16.42	IP v4
107.181.175.122	IP v4
186.159.1.217	IP v4
31.214.138.207	IP v4
181.113.17.230	IP v4
47.7.211.242	IP v4
170.238.117.187	IP v4
103.102.220.50	IP v4
45.234.248.66	IP v4
23.95.97.59	IP v4
51.254.25.115	IP v4
193.183.98.66	IP v4
91.217.137.37	IP v4
87.98.175.85	IP v4
wearedevs.com	Domain
caplinked.com	Domain
majul.com	Domain
isns.net	Domain
fiberglassflyrodders.info	Domain
zolatee.com	Domain
zullari.com	Domain
youwantwork.com	Domain
krupskaya.com	Domain
m-onetrading-jp.com	Domain

thuocnam.tk	Domain
msgsndr.com	Domain
smtp.aiotecs.com	Domain
measurements-api.wonderpush.com	Domain
rockfeed.net	Domain
www.sciencetechniz.com	Domain
mediafire.fun	Domain
afarmersway.com	Domain
apexcpafirm.com	Domain
tierwelt-live.de	Domain
ipecho.net	Domain
api.ipify.org	Domain
checkip.amazonaws.com	Domain
ip.anysrc.net	Domain
wtfismyip.com	Domain
ipinfo.io	Domain
icanhazip.com	Domain
myexternalip.com	Domain
ident.me	Domain
kostunivo.com	Domain
chishir.com	Domain
mangoclone.com	Domain
onixcellent.com	Domain
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hxxps://mcrsal-rossais.com/font-awesome/css/155.dll	URL
hxxps.//94.140.115.91.447/	URL
hxxps.//45.230.8.34.449/	URL
hxxps.//43.245.216.190.449/	URL
hxxps.//49.156.41.74.449/	URL
hxxps.//195.123.241.22.447/	URL
hxxps.//91.200.103.217.447/	URL
hxxps.//144.172.64.26.443/	URL
hxxps.//91.200.103.193.443/	URL
hxxps.//94.140.115.229.447/	URL
hxxps.//156.96.62.82.447/	URL
hxxp://myexternalip.com/raw	URL
hxxp://api.ipify.org	URL
hxxp://icanhazip.com	URL
hxxp://bot.whatismyipaddress.com	URL
hxxp://ip.anysrc.net/plain/clientip	URL

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