

# MAR-10448362-1.v1 Volt Typhoon | CISA

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## Summary

### Description

CISA received three files for analysis obtained from a critical infrastructure compromised by the People’s Republic of China (PRC) state-sponsored cyber group known as Volt Typhoon.

The submitted files enable discovery and command-and-control (C2): (1) An open source Fast Reverse Proxy Client (FRPC) tool used to open a reverse proxy between the compromised system and a Volt Typhoon C2 server; (2) a Fast Reverse Proxy (FRP) that can be used to reveal servers situated behind a network firewall or obscured through Network Address Translation (NAT); and (3) a publicly available port scanner called ScanLine.

For more information on Volt Typhoon see, joint Cybersecurity Advisory PRC State-Sponsored Actors Compromise, and Maintain Persistent Access to, U.S. Critical Infrastructure. For more information on PRC state-sponsored malicious cyber activity, see CISA’s China Cyber Threat Overview and Advisories, webpage.

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For a downloadable copy of IOCs associated with this MAR in JSON format, see:

### Submitted Files (3)

99b80c5ac352081a64129772ed5e1543d94cad708ba2adc46dc4ab7a0bd563f1 (SMSvcService.exe)

eaef901b31b5835035b75302f94fee27288ce46971c6db6221ecbea9ba7ff9d0 (eaef901b31b5835035b75302f94fee...)

edc0c63065e88ec96197c8d7a40662a15a812a9583dc6c82b18ecd7e43b13b70 (BrightmetricAgent.exe)

## Findings

**edc0c63065e88ec96197c8d7a40662a15a812a9583dc6c82b18ecd7e43b13b70**

### Tags

obfuscatedproxytrojanutility

### Details

<b>Name</b>	BrightmetricAgent.exe
<b>Size</b>	2840064 bytes
<b>Type</b>	PE32+ executable (console) x86-64 (stripped to external PDB), for MS Windows
<b>MD5</b>	fd41134e8ead1c18ccad27c62a260aa6
<b>SHA1</b>	04423659f175a6878b26ac7d6b6e47c6fd9194d1
<b>SHA256</b>	edc0c63065e88ec96197c8d7a40662a15a812a9583dc6c82b18ecd7e43b13b70
<b>SHA512</b>	df55591e730884470afba688e17c83fafb157ecf94c9f10a20e21f229434ea58b59f8eb771f8f9e29993f43f4969fe66dd913128822b534c9b...

<b>ssdeep</b>	49152:99z0w/qP1dKPzeietmd64H9QaIG0aYkn0GzkWVISAJUET6qyxASuOszP7hn+S6wB:v0R9dKSiekd68ZIQ0obVI9UG6qyuhF6
<b>Entropy</b>	7.999902

**Antivirus**

<b>Adaware</b>	Generic.Trojan.Volt.Marte.A.05F91E9C
<b>Antiy</b>	GrayWare/Win32.Kryptik.ffp
<b>Bitdefender</b>	Generic.Trojan.Volt.Marte.A.05F91E9C
<b>Emsisoft</b>	Generic.Trojan.Volt.Marte.A.05F91E9C (B)
<b>ESET</b>	a variant of WinGo/HackTool.Agent.Y trojan
<b>IKARUS</b>	Trojan.WinGo.Rozena
<b>Microsoft Defender</b>	Malware
<b>Sophos</b>	App/FRProxy-F
<b>Varist</b>	W64/Agent.FXW.gen!Eldorado

**YARA Rules**

No matches found.

**ssdeep Matches**

No matches found.

**Description**

This artifact is a cross platform full featured FRP that is written in GO language (Golang) and packed using Ultimate Packer for Executables (UPX). This utility can be used to locate servers behind a network firewall or obscured through NAT. It includes the KCP (no acronym) network protocol that allows for error-checked and anonymous delivery of data streams using the User Datagram Protocol (UDP) with packet level encryption support.

The program contains two different multiplexer libraries that can bi-directionally stream data over a NAT'd network. It also contains a command line interface (CLI) library that can leverage command shells such as PowerShell, Windows Management Instrumentation (WMI), and Z Shell (zsh). In addition, the utility features a unique capability that detects if the utility is executed from the command line or by double-clicking.

By default it is configured to connect to an Internet Protocol (IP) address on Transmission Control Protocol (TCP) port 1080. It must receive a specially formed packet from the C2 for the utility to deploy on the system.

**eaef901b31b5835035b75302f94fee27288ce46971c6db6221ecbea9ba7ff9d0**

**Tags**

pup trojan

**Details**

<b>Name</b>	eaef901b31b5835035b75302f94fee27288ce46971c6db6221ecbea9ba7ff9d0
<b>Size</b>	20480 bytes
<b>Type</b>	PE32 executable (console) Intel 80386, for MS Windows, UPX compressed
<b>MD5</b>	3a97d9b6f17754dcd38ca7fc89caab04
<b>SHA1</b>	ffb1d8ea3039d3d5eb7196d27f5450cac0ea4f34
<b>SHA256</b>	eaef901b31b5835035b75302f94fee27288ce46971c6db6221ecbea9ba7ff9d0
<b>SHA512</b>	d99941e4445efed5d4e407f91a9e5bba08d1be3f0dab065d1bfb4e70ab48d6526a730233d6889ba58de449f622e6a14e99dab853d40fc30a:

<b>ssdeep</b>	384:ahXoLj9Zez0Bm4SUZa8WLLXyjSL2RtfAwj/yne1MUogQ:ahXoLhZez0m4SIabLLCmL2Rvj/yeIEg
<b>Entropy</b>	7.297754

**Antivirus**

<b>AhnLab</b>	Unwanted/Win32.Foundstone
<b>Antiy</b>	HackTool[NetTool]/Win32.Portscan
<b>ClamAV</b>	Win.Trojan.Scanline-1
<b>Comodo</b>	ApplicUnwnt
<b>Cylance</b>	Malware
<b>Filseclab</b>	Hacktool.ScanLine.a.fsff
<b>IKARUS</b>	Virtool
<b>Microsoft Defender</b>	Malware
<b>NANOAV</b>	Riskware.Win32.ScanLine.dhhus
<b>Quick Heal</b>	Trojan.Win32
<b>Scrutiny</b>	Malware
<b>Sophos</b>	App/ScanLn-A
<b>VirusBlokAda</b>	Trojan.Genome.fl
<b>Zillya!</b>	Tool.Portscan.Win32.77

**YARA Rules**

No matches found.

**ssdeep Matches**

No matches found.

**Description**

This artifact is a command-line port scanning utility from Foundstone, Inc. called ScanLine, which is packed using UPX. It is used to scan for open UDP and TCP ports, grab banners from open ports, resolve IP addresses to host names, and bind to specified ports and IP addresses.

**Screenshots**

```

ScanLine (TM) 1.01
Copyright (c) Foundstone, Inc. 2002
http://www.foundstone.com

sl [-?bhijnprsTUvz]
[-cdgmg <n>]
[-flLo0 <file>]
[-tu <n>[,<n>-<n>]]
IP[,IP-IP]

-? - Shows this help text
-b - Get port banners
-c - Timeout for TCP and UDP attempts (ms). Default is 4000
-d - Delay between scans (ms). Default is 0
-f - Read IPs from file. Use "stdin" for stdin
-g - Bind to given local port
-h - Hide results for systems with no open ports
-i - For ping use ICMP Timestamp Requests in addition to Echo Requests
-j - Don't output "-----" separator between IPs
-l - Read TCP ports from file
-L - Read UDP ports from file
-m - Bind to given local interface IP
-n - No port scanning - only pinging (unless you use -p)
-o - Output file (overwrite)
-O - Output file (append)
-p - Do not ping hosts before scanning
-q - Timeout for pings (ms). Default is 2000
-r - Resolve IP addresses to hostnames
-s - Output in comma separated format (csv)
-t - TCP port(s) to scan (a comma separated list of ports/ranges)
-T - Use internal list of TCP ports
-u - UDP port(s) to scan (a comma separated list of ports/ranges)
-U - Use internal list of UDP ports
-v - Verbose mode
-z - Randomize IP and port scan order

Example: sl -bht 80,100-200,443 10.0.0.1-200

This example would scan TCP ports 80, 100, 101...200 and 443 on all IP
addresses from 10.0.0.1 to 10.0.1.200 inclusive, grabbing banners
from those ports and hiding hosts that had no open ports.
    
```

Figure 1 - Usage and syntax for the ScanLine utility.

99b80c5ac352081a64129772ed5e1543d94cad708ba2adc46dc4ab7a0bd563f1

Tags

obfuscatedproxytrojan

Details

Name	SMSvcService.exe
Size	3712512 bytes
Type	PE32+ executable (console) x86-64 (stripped to external PDB), for MS Windows
MD5	b1de37bf229890ac181bdef1ad8ee0c2
SHA1	ffdb3cc7ab5b01d276d23ac930eb21ffe3202d11
SHA256	99b80c5ac352081a64129772ed5e1543d94cad708ba2adc46dc4ab7a0bd563f1
SHA512	e41df636a36ac0cce38e7db5c2ce4d04a1a7f9bc274bdf808912d14067dc1ef478268035521d0d4b7bcf96facce7f515560b38a7ebe47995d
ssdeep	98304:z2eyMq4PuR5d7wgdo0OFfnFJkEUCGdaQLhpYYEfRTl6sysis:ryxzbdo0ifnoEOdz9pY7j5
Entropy	7.890436

Antivirus

Adaware	Generic.Trojan.Volt.Marte.A.105C517F
AhnLab	HackTool/Win.Frpc
Antiy	GrayWare/Win32.Kryptik.ffp
Bitdefender	Generic.Trojan.Volt.Marte.A.105C517F
Emsisoft	Generic.Trojan.Volt.Marte.A.105C517F (B)
ESET	a variant of WinGo/Riskware.Frp.U application
IKARUS	Trojan.WinGo.Shellcoderunner
Microsoft Defender	Malware

<b>Sophos</b>	App/FRProxy-F
<b>Varist</b>	W64/Agent.FXW.gen!Eldorado

**YARA Rules**

No matches found.

**ssdeep Matches**

No matches found.

**PE Metadata**

<b>Compile Date</b>	1970-01-01 00:00:00+00:00
<b>Import Hash</b>	6ed4f5f04d62b18d96b26d6db7c18840

**PE Sections**

MD5	Name	Raw Size	Entropy
7f8e8722da728b6e834260b5a314cbac	header	512	2.499747
d41d8cd98f00b204e9800998ecf8427e	UPX0	0	0.000000
f9943591918adeeeee7da80e4d985a49	UPX1	3711488	7.890727
5c0061445ac2f8e6cadf694e54146914	UPX2	512	1.371914

**Description**

This artifact is a 64-bit Windows executable file that is packed using UPX. This packed file contains a compiled version of an open-source tool published on GitHub called "FRPC". The "FRPC" is a command-line tool written in Golang that is designed to open a reverse proxy between the compromised system and the TA's C2 server.

When the "FRPC" is installed and executed on the compromised system, it attempts to establish a connection with the Fast Reverse Proxy Server (FRPS) using the reverse proxy method to allow the TA to control the compromised system. This "FRPC" application supports encryption, compression, and allows easy token authentication. It also supports the protocols below:

```
--Begin protocols--
Transmission Control Protocol (TCP)
User Datagram Protocol (UDP)
An alternative Hypertext Transfer Protocol (HTTP)
An alternative Hypertext Transfer Protocol Secure (HTTPS)
--End protocols--
```

Displayed below is the "FRPC" tool configuration that contains the network communication method, the remote "FRPS" server's public Internet Protocol (IP) address and port numbers:

```
--Begin configuration--
[common]
server_addr = 192.168.18.111
server_port = 8081
server_addrs = [Default IP addresses]
server_ports = 8443,8443,8443
token = 1kyRdFmuk0i25JbCJmtift1c9VA05VBS
protocol = tcp
tls_enable = true
disable_custom_tls_first_byte = true
log_level = debug

[plugin_socks5]
type = tcp
```

```
remote_port = 1080
plugin = socks5
use_encryption = true
use_compression = true
--End configuration--
```

Displayed below are the command-line usages and flags of the "FRPC" tool:

--Begin usages and flags--

Usage:

frpc [flags]

frpc [command]

Available Commands:

```
help    Help about any command
tcp     Run frpc with a single tcp proxy
udp     Run frpc with a single udp proxy
verify  Verify that the configures is valid
```

Flags:

```
-c, --config string config file of frpc (default "./frpc.ini")
-h, --help            help for frpc
-v, --version         version of frpc
```

Use "frpc [command] --help" for more information about a command.

---

Run frpc with a single tcp proxy

Usage:

frpc tcp [flags]

Flags:

```
--disable_log_color  disable log color in console
-h, --help            help for tcp
-i, --local_ip string local ip (default "127.0.0.1")
-l, --local_port int  local port
--log_file string    console or file path (default "console")
--log_level string   log level (default "info")
--log_max_days int   log file reversed days (default 3)
-p, --protocol string tcp or kcp or websocket (default "tcp")
-n, --proxy_name string proxy name
-r, --remote_port int remote port
-s, --server_addr string frp server's address (default "127.0.0.1:7000")
--tls_enable         enable frpc tls
-t, --token string   auth token
--uc                use compression
--ue                use encryption
-u, --user string    user
```

Global Flags:

```
-c, --config string config file of frpc (default "./frpc.ini")
-v, --version         version of frpc
```

---

Run frpc with a single udp proxy

Usage:

frpc udp [flags]

Flags:

```
--disable_log_color  disable log color in console
-h, --help            help for udp
-i, --local_ip string local ip (default "127.0.0.1")
```

-l, --local\_port int local port  
--log\_file string console or file path (default "console")  
--log\_level string log level (default "info")  
--log\_max\_days int log file reversed days (default 3)  
-p, --protocol string tcp or kcp or websocket (default "tcp")  
-n, --proxy\_name string proxy name  
-r, --remote\_port int remote port  
-s, --server\_addr string frp server's address (default "127.0.0.1:7000")  
--tls\_enable enable frpc tls  
-t, --token string auth token  
--uc use compression  
--ue use encryption  
-u, --user string user

#### Global Flags:

-c, --config string config file of frpc (default "./frpc.ini")  
-v, --version version of frpc

---

Verify that the configures is valid

#### Usage:

frpc verify [flags]

#### Flags:

-h, --help help for verify

#### Global Flags:

-c, --config string config file of frpc (default "./frpc.ini")  
-v, --version version of frpc

--End usages and flags--

## Recommendations

CISA recommends that users and administrators consider using the following best practices to strengthen the security posture of their organization's systems. Any configuration changes should be reviewed by system owners and administrators prior to implementation to avoid unwanted impacts.

- Maintain up-to-date antivirus signatures and engines.
- Keep operating system patches up-to-date.
- Disable File and Printer sharing services. If these services are required, use strong passwords or Active Directory authentication.
- Restrict users' ability (permissions) to install and run unwanted software applications. Do not add users to the local administrators group unless required.
- Enforce a strong password policy and implement regular password changes.
- Exercise caution when opening e-mail attachments even if the attachment is expected and the sender appears to be known.
- Enable a personal firewall on agency workstations, configured to deny unsolicited connection requests.
- Disable unnecessary services on agency workstations and servers.
- Scan for and remove suspicious e-mail attachments; ensure the scanned attachment is its "true file type" (i.e., the extension matches the file header).
- Monitor users' web browsing habits; restrict access to sites with unfavorable content.
- Exercise caution when using removable media (e.g., USB thumb drives, external drives, CDs, etc.).
- Scan all software downloaded from the Internet prior to executing.
- Maintain situational awareness of the latest threats and implement appropriate Access Control Lists (ACLs).

Additional information on malware incident prevention and handling can be found in National Institute of Standards and Technology (NIST) Special Publication 800-83, "**Guide to Malware Incident Prevention & Handling for Desktops and Laptops**".

## Contact Information

## Document FAQ

**What is a MIFR?** A Malware Initial Findings Report (MIFR) is intended to provide organizations with malware analysis in a timely manner. In most instances this report will provide initial indicators for computer and network defense. To request additional analysis, please contact CISA and provide information regarding the level of desired analysis.

**What is a MAR?** A Malware Analysis Report (MAR) is intended to provide organizations with more detailed malware analysis acquired via manual reverse engineering. To request additional analysis, please contact CISA and provide information regarding the level of desired analysis.

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**Can I submit malware to CISA?** Malware samples can be submitted via three methods:

- Web: <https://www.cisa.gov/resources-tools/services/malware-next-generation-analysis>
- E-Mail: [submit@malware.us-cert.gov](mailto:submit@malware.us-cert.gov)✉

CISA encourages you to report any suspicious activity, including cybersecurity incidents, possible malicious code, software vulnerabilities, and phishing-related scams. Reporting forms can be found on CISA's homepage at [www.cisa.gov](http://www.cisa.gov).

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