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# FBI FLASH

FEDERAL BUREAU OF INVESTIGATION, CYBER DIVISION

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**CP-000111-MW**

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## **Kwampirs Malware Indicators of Compromise Employed in Ongoing Cyber Supply Chain Campaign Targeting Global Industries**

### **Summary:**

This is a re-release of FBI FLASH message (CP-000111-MW) previously disseminated on 06 January 2020.

Since at least 2016, an ongoing campaign using the Kwampirs Remote Access Trojan (RAT) targeted several global industries, including the software supply chain, healthcare, energy, and financial sectors. The FBI assesses software supply chain companies are a key interest and target of the Kwampirs campaign. This campaign is a two-phased approach. The first phase establishes a broad and persistent presence on the targeted network, to include delivery and execution of secondary malware payload(s). The second phase includes the delivery of additional Kwampirs components or malicious payload(s) to further exploit the infected victim host(s).

### **Technical Details:**

#### Propagation, Persistence, Backdoor (Module 1):

Upon successful infection, the Kwampirs RAT propagates laterally across the targeted network via SMB port 445, using hidden admin shares such as ADMIN\$ and C\$. The malware maintains persistence on the infected Windows host by dropping a binary to the hard drive and creating a malicious Windows system service set to auto start upon reboot. The new malicious service scans and catalogs the host configuration, encrypts the data, and transmits it to an external Command and Control (C2) server via an HTTP GET request on port 80.

TLP: WHITE



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## Secondary Payload (Module 2):

Module 2 executes additional Kwampirs RAT modular components on the infected host(s). These malicious components can allow for additional detailed collection of system and network interface configuration. This information is encrypted and transmitted to the C2 server via HTTP. The FBI has observed secondary module commands, to be highly targeted, and executed on critical business and / or network hosts, to include the following:

- Primary Domain Controllers
- Secondary Domain Controllers
- Engineering & Quality Assurance / Testing workstations
- Primary Source Code servers

Secondary Modules executed on the victim host(s), include the following additional commands being executed, resulting in much deeper and thorough reconnaissance on the targeted entity.

Command Prompt	Command Description
cmd.exe /c "hostname" 2>nul	Query infected system's hostname
cmd.exe /c "getmac" 2>nul	Query infected system's MAC address
cmd.exe /c "ver" 2>nul	Query infected system's version number
cmd.exe /c "arp -a" 2>nul	View the current ARP cache
cmd.exe /c "systeminfo" 2>nul	Display detailed configuration information, product ID, and hardware properties
cmd.exe /c "tasklist /v" 2>nul	Display the currently-running tasks in a verbose format
cmd.exe /c "tasklist /svc" 2>nul	Display the currently-running tasks with services hosted in each process
cmd.exe /c "netstat -nab" 2>nul	Deliver basic statistics on all network activities. (-n=Numerical display of address and port numbers, -a=Display all active ports, -b=Display executable file of a connection or listening port)



Command Prompt WMIC Command	Command Description
cmd.exe /c "wmic nic get caption,AdapterType,Manufacturer" 2>nul	Query infected system's network interface card type and manufacturer
cmd.exe /c "wmic timezone get caption" 2>nul	Query infected system's timezone
cmd.exe /c "wmic IRQ get caption,IRQNumber" 2>nul	Query the infected system's Interrupt ReQuest setting in the system's BIOS
cmd.exe /c "wmic port get StartingAddress, EndingAddress" 2>nul	Identify open and closed ports on an infected system
cmd.exe /c "wmic csproduct" 2>nul	Aquire the computer model of the infected system
cmd.exe /c "wmic computerSystem" 2>nul	Aquire the computer manufacturer and model, to include (32bit/64bit) architecture information
cmd.exe /c "wmic baseboard" 2>nul	Aquire motherboard manufacturer, model number, and serial number
cmd.exe /c "wmic cpu" 2>nul	Aquire the current CPU settings for the infected system
cmd.exe /c "wmic partition" 2>nul	Identify disk partitions on the infected system
cmd.exe /c "wmic bios" 2>nul	Determine the current BIOS configuration for the infected system
cmd.exe /c "wmic startup" 2>nul	List programs that run on startup on the infected system
cmd.exe /c "wmic netlogin" 2>nul	Display login sessions on an infected system
cmd.exe /c "wmic portconnector" 2>nul	Identify open ports on the infected system
cmd.exe /c "wmic memphysical" 2>nul	Display the amount of physical memory that the infected system has
cmd.exe /c "wmic share" 2>nul	Display all shared resources
cmd.exe /c "wmic logon" 2>nul	Display what username is currently logged onto the infected system
cmd.exe /c "wmic OS" 2>nul	Determine the current operating system type for the infected system
cmd.exe /c "wmic logicaldisk get caption,description,size,providername" 2>nul	Determine the current disk space, type, and manufacturer
cmd.exe /c "wmic desktop" 2>nul	Query desktop configuration settings through the infected system's desktop management software
cmd.exe /c "wmic process get caption,commandline" 2>nul	Generate process list of current infected system



The FBI has discovered that the Kwampirs RAT establishes persistence on the victim host by creating a service with the following configuration:

Kwampirs RAT Created Service	
Service name:	WmiApSrvEx
Service display name:	WMI Performance Adapter Extension
Registry key:	SYSTEM\CurrentControlSet\Services\WmiApSrvEx
Service image path:	%SystemRoot%\system32\**Executable Filename**

The FBI has identified the following Kwampirs RAT executable filenames:

Kwampirs RAT Executable Files - Found in: c:\windows\system32\		
wmiaprvc.exe	wmiapsrvc.exe	wmiapsvrce.exe
wmiapsrvce.exe	wmiApSrvEx.exe	wmiapsvre.exe
wmiapvsre.exe	wmipsvrce.exe	wmipvsre.exe
wmipsrvce.exe	wmiprvce.exe	wmipsvre.exe

The FBI has identified additional Kwampirs RAT DLL files, utilized by the malware:

Kwampirs RAT DLL files dropped to disk		
Files identified in c:\windows\syswow64\		
wmipadp.dll	wmiassn.dll	wmipdpa.dll
wmiamgmt.dll		
Files identified in c:\windows\system32\		
wmiadv.dll	wmipadp.dll	wmiassn.dll
wmipdpa.dll	wmiamgmt.dll	

Other files created by the Kwampirs RAT Found in: %SystemRoot%/inf/	
mtmndkb32.pnf	digirps.pnf
mkdiawb3.pnf	ie11.pnf

**Recommended Actions Post Infection:**

If a Kwampirs RAT infection is detected, contact your IT mitigation and remediation company and coordinate your mitigation efforts with your local FBI field office. The following information would assist the FBI's investigation of this malware:

- Full capture of network traffic in PCAP format from the infected host(s). (48 hour capture)
- Full image and memory capture of infected host(s).
- Web proxy logs capture, to include cache of the Web proxy.
- DNS and firewall logs.
- Identification and description of host(s) communicating with the C2 (ex: server, workstation, other).
- Identification of patient zero and attack vector(s), if able.

**Best Practices for Network Security and Defense:**

- Employ regular updates to applications and the host operating system to ensure protection against known vulnerabilities.
- Establish, and backup offline, a "known good" version of the relevant server and a regular change-management policy to enable monitoring for alterations to servable content with a file integrity system.
- Employ user input validation to restrict local and remote file inclusion vulnerabilities.
- Implement a least-privileges policy on the Web server to:
  - Reduce adversaries' ability to escalate privileges or pivot laterally to other hosts.
  - Control creation and execution of files in particular directories.
- If not already present, consider deploying a demilitarized zone (DMZ) between the Web-facing systems and corporate network. Limiting the interaction and logging traffic between the two provides a method to identify possible malicious activity.
- Ensure a secure configuration of Web servers. All unnecessary services and ports should be disabled or blocked. All necessary services and ports should be restricted where feasible. This can include whitelisting or blocking external access to administration panels and not using default login credentials.
- Utilize a reverse proxy or alternative service to restrict accessible URL paths to known legitimate ones.
- Conduct regular system and application vulnerability scans to establish areas of risk. While this method does not protect against zero day attacks, it will highlight possible areas of concern.



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# FBI FLASH

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- Deploy a Web application firewall and conduct regular virus signature checks, application fuzzing, code reviews, and server network analysis.

## Reporting Notice:

The FBI encourages recipients of this document to report information concerning suspicious or criminal activity to their local FBI field office. With regards to specific information that appears in this communication; the context, individual indicators, particularly those of a non-deterministic or ephemeral nature (such as filenames or IP addresses), may not be indicative of a compromise. Indicators should always be evaluated in light of your complete information security situation.

Field office contacts can be identified at [www.fbi.gov/contact-us/field](http://www.fbi.gov/contact-us/field). When available, each report submitted should include the date, time, location, type of activity, number of people, and type of equipment used for the activity, the name of the submitting company or organization, and a designated point of contact.

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