### Keep up with Ransomware

# Cactus, which avoids detection with encryption, launches dark web activity.

#### Outline

In July 2023, there were 487 cases of damage caused by ransomware attacks. The number of cases increased by 48 compared to the previous month (439 cases), and the number of ransomware damage cases, which declined last month, began to go up again.

The ransomware issue worth noting this month is that the number of cases of damage caused by Clop is steadily increasing. Starting with the GoAnywhere MFT vulnerability (CVE-2023-0669¹) in February this year, Clop exploited the PaperCut vulnerability (CVE-2023-27350²) in April and the MOVEit Transfer vulnerability (CVE-2023-34362³) in June to perform a wide range of attacks. It is causing a lot of damage by continuously posting stolen data on the dark web leak site.

Meanwhile, Clop recently placed Estée Lauder, a global cosmetics company, on the list of leak site attack targets. Another ransomware group, BlackCat(Alphv), also posted an article on the leak site claiming to have attacked Estée Lauder. It said that it contacted Estée Lauder management directly, but did not receive a reply, and threatened that it would disclose information related to the leak if there were no reply. In addition, it said that Clop carried out the attack through the MOVEit Transfer vulnerability, and that its attack was independent of Clop.

<sup>&</sup>lt;sup>1</sup> CVE-2023-0669: A remote code execution vulnerability that occurred in GoAnywhere MFT

<sup>&</sup>lt;sup>2</sup> CVE-2023-27350: A remote code execution vulnerability that occurred in PaperCut

<sup>&</sup>lt;sup>3</sup> CVE-2023-34362: An SQL Injection vulnerability that enables web shell upload

The number of ransomware damages caused by LockBit decreased slightly this month as well as last month. It is speculated that this is due to the decrease in activity as the pressure from the investigative agency intensified, e.g., the continuous investigation into LockBit and the arrest of those involved in the attack. However, LockBit's activity is not stopped. It attacked the integrated terminal system that controls Japan's port of Nagoya last July. This caused a huge financial loss to the port and temporarily paralyzed business, e.g., serious disruptions in the distribution of goods to and from Japan. The absolute number of damages caused by LockBit is decreasing, but as cases of large-scale damage caused by LockBit are steadily occurring, it is still necessary to view it as a threatening group.

Notable ransomware groups this month are 8Base, which started activity in May, and Cactus, which operated a dark web leak site in July. 8Base posted 36 cases of damage as it did in the previous month, a figure that is difficult to overlook. The number of damage cases is similar to the 49 cases of damage caused by the large ransomware group LockBit. Cactus opened a dark web leak site in July and posted 18 cases of damage. The Cactus ransomware it uses has several notable features. The Cactus ransomware uses the vulnerability of the Fortinet VPN<sup>4</sup> device for initial access, and then uses a batch script to execute the ransomware with 7–Zip. At this time, to evade detection, it has a configuration file called ntuser.dat, which is encrypted by Cactus, or the ransomware is executed only when a specific key is entered. It seems that its creator aimed for the effect of hindering analysis and detection through ransomware binary encryption.

Unique new ransomwares were also found. In particular, ransomwares produced in non-mainstream languages (Go, Rust, Nim, etc.) continue to appear recently. It seems that non-mainstream languages are continuously adopted as they have advantages including ransomware encryption speed, and analysis and detection bypass. SophosEncrypt, made in the Rust language, assumes the name of Sophos, an information security company, and includes not only system encryption, which is a general ransomware behavior, but also RAT functions that can log key input and control the system remotely. The Kanti ransomware written in the Nim language was also found.

<sup>&</sup>lt;sup>4</sup> VPN: A service that can send and receive data safely like a personal communication network using the Internet

In addition, the Black Hunt2.0 ransomware, which was confirmed to be partially related as it uses the same e-mail as the Surtr ransomware, and the Big Head ransomware, which deceives victims by pretending to be a Windows update during the encryption process, were discovered. Also, the Black Berserk ransomware with a source code similarity of over 99% with the Proxima ransomware, and the Architects ransomware with a code similarity of over 94% with RanzyLocker were discovered. Most of the recently discovered ransomwares are found in a form that has a significant level of association with existing ransomwares.

The Magniber ransomware is spreading again in Korea. As it is now distributed in the Drive-by Download<sup>5</sup> method, when a user accesses a specific advertisement or page during web surfing, he or she may be redirected<sup>6</sup>, and it also induces execution by downloading an msi file disguised as an installation file or security file. So caution is needed.

With the emergence of IAB<sup>7</sup> (Initial Access Broker), which is a hot topic these days, the ransomware ecosystem is becoming more organized and sophisticated. RaaS<sup>8</sup> groups work systematically, e.g., employing an affiliate, purchasing an initial access path from an IAB, performing an attack, and then laundering the profits obtained through the mixing service<sup>9</sup>. Due to this change, ransomware attacks are possible without professional knowledge, and damage cases are also increasing. In addition, in the past, most ransomware groups demanded ransom through data encryption, but these days, groups that demand ransom only by strategically stealing data are appearing one after another.

<sup>&</sup>lt;sup>5</sup> Drive-by Download: An attack technology that automatically downloads malicious software unawares when a user visits a website or opens an e-mail

<sup>&</sup>lt;sup>6</sup> Redirect: A function to connect the website address to another address

<sup>&</sup>lt;sup>7</sup> IAB: An individual or group that sells initial access paths

<sup>&</sup>lt;sup>8</sup> RaaS: It is short for Ransomware as a Service. Ransomware groups receive money from affiliates or attackers, and provide ransomware to them in return.

<sup>&</sup>lt;sup>9</sup> Mixing service: A technology for trading coins by mixing them with normally traded coins so that it is difficult to check the connection point between the sending coin wallet address and the receiving wallet address

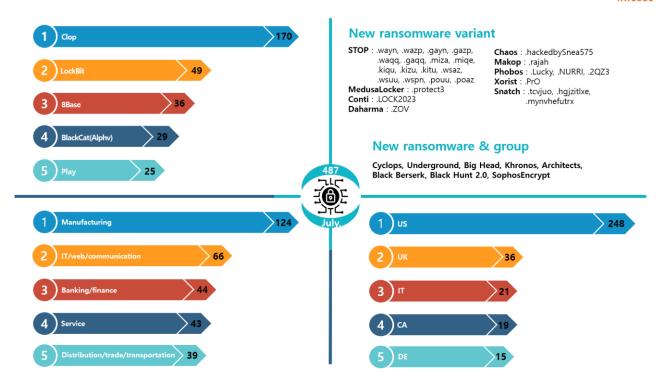
#### infosec

<b>&gt;</b>	Clop and BlackCat claims that they attacked Estée Lauder, a global cosmetics compa
Q.	The Clop group exploits the vulnerability of MOVEit Transfer, CVE-2023-34362, to perform attacks.
Q.	The Clop group claims that it stole more than 131GB of data.
Q.	The Clop group claims that it contacted the management by e-mail, but they did not answer.
Q.	The BlackCat group threatened to disclose the data it stole if Estée Lauder does not agree to join negotiations.
$\geq$	Clop can generate over \$100 million in revenue through MOVEit Transfer attacks
Q.	A ransomware recovery company claims that Clop can make up to \$100 million through MOVEit hacking.
	More money was paid than in the previous Clop campaign, far more than the average ransom.
Q.	Until now, it turns out that the number of victims due to the MOVEit hacking is about 400.
	Ransomware attackers use triple extortion
Q	Triple extortion performs a DDoS attack as well as data encryption and leakage.
Q	Triple extortion ransomware is highly associated with stealer malware as it uses the log of stealer malware.
<b>&gt;</b>	BlackCat(Alphv) uses the dark web leak site data API
Q	BlackCat posts API on the dark web leak site so that it is easy to exploit victims' data.
Q	As the proportion of victims of ransomware attacks is reduced, it is thought to have disclosed API with the intention of pressuring them by arousing a feeling of fear.
<b>&gt;</b>	NoBit, RaaS builder sold on the dark web
Q.	Currently, the NoBit ransomware builder is popular on the dark web.
Q	Using the AES-128 and SHA-128 algorithm, it guarantees efficient encryption.
Q	You can use the builder for \$200, and if you pay \$1,000, source codes will be provided.
	* RaaS: It's short for Ransomware as a Service. Ransomware is provided to affiliates to get financial gains
$\triangleright$	BlackCat distributed a ransomware, disguised as WinSCP, through Malvertising
Q	BlackCat is recently distributing ransomware payloads through online advertisements.
<b>Q</b>	Not only ransomwares, but also defense evasion tools and continuity maintenance tools are installed.  * Malvertising: A technique to distribute malware through advertisements by hacking online advertising servers
>	FIN8 used a variant of Sardonic to distribute the BlackCat ransomware
	A group identified as FIN8 uses a variant of the Sardonic backdoor to distribute the BlackCat ransomware.

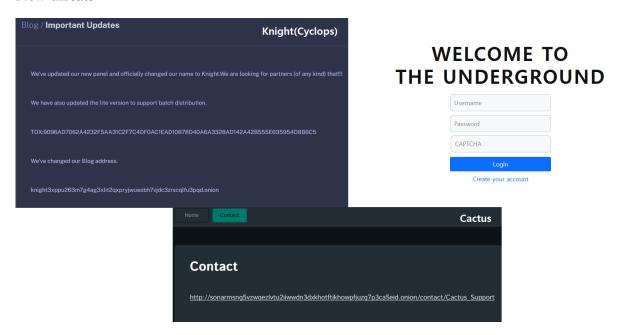
Q	TrueBot, which recons systems, collects data and distributes payloads, is spreading.
Q	As a representative example, the Clop group distributed TrueBot after initial access to steal and encrypt data.
Q	TrueBot is one of the malwares frequently used by initial access brokers.
Q	To prevent it, it is necessary to keep the system and software up-to-date.
>	The Big Head ransomware disguises itself as a Windows update
Q	The Big Head ransomware pretends that Windows is being updated to deceive victims during the encryption process.
Q	There are variants that can capture screen shots and check installed drivers.
Q	There are variants disguised as Microsoft Word.
>	Mallox accesses a vulnerable MS-SQL server
Q	Mallox uses the double exploit method, and mostly attacks areas like manufacturing and law.
Q	It uses the vulnerable MS-SQL server for penetration, and its activity increased by 174% over the previous year.
<b>&gt;</b>	Kanti, a malware based on the Nim language, has been found
	Tanta, a mantare based on the film language, has been found
Q	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.
Q	
Q	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.
	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.
	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.  SophosEncrypt, impersonating Sophos, a security company, has been found
Q Q Q	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.  SophosEncrypt, impersonating Sophos, a security company, has been found  SophosEncrypt is written in the Rust language, and it impersonates Sophos, a security company.
	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.  SophosEncrypt, impersonating Sophos, a security company, has been found  SophosEncrypt is written in the Rust language, and it impersonates Sophos, a security company.  It is possible to communicate with the operator and record key input through the Jabber instant messenger platform.
	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.  SophosEncrypt, impersonating Sophos, a security company, has been found  SophosEncrypt is written in the Rust language, and it impersonates Sophos, a security company.  It is possible to communicate with the operator and record key input through the Jabber instant messenger platform.  * Jabber: Open source protocol and service that enable real-time chatting and messagin
	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.  SophosEncrypt, impersonating Sophos, a security company, has been found  SophosEncrypt is written in the Rust language, and it impersonates Sophos, a security company.  It is possible to communicate with the operator and record key input through the Jabber instant messenger platform.  * Jabber: Open source protocol and service that enable real-time chatting and messagin  Avaddon is rebranded as NoEscape  Avaddon, which stopped operations in June 2021, was rebranded as NoEscape, and it claimed that it had nothing
	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.  SophosEncrypt, impersonating Sophos, a security company, has been found  SophosEncrypt is written in the Rust language, and it impersonates Sophos, a security company.  It is possible to communicate with the operator and record key input through the Jabber instant messenger platform.  * Jabber: Open source protocol and service that enable real-time chatting and messagin  Avaddon is rebranded as NoEscape  Avaddon, which stopped operations in June 2021, was rebranded as NoEscape, and it claimed that it had nothing to do with Avaddon, but a considerable part of their encryption routine, configuration file format, etc. are similar.
	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.  SophosEncrypt, impersonating Sophos, a security company, has been found  SophosEncrypt is written in the Rust language, and it impersonates Sophos, a security company.  It is possible to communicate with the operator and record key input through the Jabber instant messenger platform.  * Jabber: Open source protocol and service that enable real-time chatting and messagin  Avaddon is rebranded as NoEscape  Avaddon, which stopped operations in June 2021, was rebranded as NoEscape, and it claimed that it had nothing to do with Avaddon, but a considerable part of their encryption routine, configuration file format, etc. are similar.
	Kanti manufacturer chose non-mainstream languages for detection bypass and analysis interference.  As it uses cryptocurrency wallets, especially filenames related to bitcoin, it is thought to target cryptocurrency users.  SophosEncrypt, impersonating Sophos, a security company, has been found  SophosEncrypt is written in the Rust language, and it impersonates Sophos, a security company.  It is possible to communicate with the operator and record key input through the Jabber instant messenger platform.  * Jabber: Open source protocol and service that enable real-time chatting and messagin  Avaddon is rebranded as NoEscape  Avaddon, which stopped operations in June 2021, was rebranded as NoEscape, and it claimed that it had nothing to do with Avaddon, but a considerable part of their encryption routine, configuration file format, etc. are similar.  During the rebranding, NoEscape changed its encryption method from AES to Salsa20.

#### ■ Ransomware threats

#### infosec



#### New threats



<sup>\*</sup> Source: Knight(Cyclops), Underground, Cactus ransomware group site image

In July 2023, there were 487 cases of damage caused by ransomware attacks. It was confirmed that most of the damage cases were caused by Clop (170 cases), and this is because the data of Progress MOVEit Transfer campaign victims are gradually posted. As victims of the campaign have been continuously appearing since last month, it is necessary to pay attention to what will happen in the future.

Stealer as a Ransomware<sup>10</sup> called RedEnergy and RAT<sup>11</sup> as a Ransomware<sup>12</sup> called SophosEncrypt were found. RedEnergy, a combination of infostealer<sup>13</sup> malware and ransomware, disguises itself as a reliable program, i.e. Google Installer, executes binary, leaks information to the outside, and encrypts the system. The SophosEncrypt ransomware changed the extension that is changed after file encryption to '.sophos' and changed the background image to an image related to Sophos with the intention of tricking people into reminding themselves of a security company Sophos. This ransomware is written in Rust, a non–mainstream language (Go, Rust, Nim, etc.), and includes RAT (Remote Access Trojan) functions such as keyboard driver hooking for key input logging and system profiling using WMI<sup>14</sup> (Windows Management Instrumentation) commands.

Likewise, the Kanti ransomware, which is written in the non-mainstream language Nim, performs an attack by pretending that the Bitcoin wallet is locked. It is believed to be distributed through SPAM mail or phishing sites. Distributed as a compressed file, Kanti induces users to click the LNK file, executes a ransomware called 'Locked\_253\_BTC.zip', encrypts it, and changes the extension to '.kanti'.

\_

<sup>&</sup>lt;sup>10</sup> Stealer as a Ransomware: It is a malware combined with Infostealer and ransomware functions. It demands money by stealing encrypting data.

<sup>11</sup> RAT: A malware that remotely penetrates computers or systems to control them, collects data, or perform other malicious activities

<sup>&</sup>lt;sup>12</sup> RAT as a Ransomware: It is a malware that combines RAT and ransomware functions. It remotely controls the victim's system, encrypts data, and demands money

<sup>&</sup>lt;sup>13</sup> Infostealer: An information-stealing malware that steals credentials or cryptocurrency wallet addresses

<sup>&</sup>lt;sup>14</sup> WMI: A set of interfaces and tools for managing and monitoring system components in Windows

The reason why ransomwares use non-mainstream languages such as Nim is that the security mechanism or detection probability may be inferior to those written in mainstream languages. In addition, since it is a language that analysts have not encountered relatively often compared to C-family languages, it also has the purpose of interfering with analysis. Thanks to cross platform support of non-mainstream languages, the convenience of ransomware makers has also increased, and several ransomware groups such as BlackCat(Alphv), BianLian, Nokoyawa, and Chaos are using non-mainstream languages such as Go, Rust, and Nim.

Black Hunt2.0 ransomware appears to be a successor to the previous Black Hunt ransomware, and is suspected to be related as it uses the same mail address as the Surtr ransomware, i.e. 'dectokyo@onionmail.org'. The Surtr group provides RaaS, and it is designed so that ransomware is not executed when the name of the victim's system manufacturer is changed or the victim uses the CIS country<sup>15</sup> language with a phrase that pays respect to REvil<sup>16</sup>. Given this phenomenon, it is believed that the Surtr group is related to REvil or intends to take advantage of Revil's popularity. Also, Black Hunt2.0 uses the e-mail address 'ryuk<sup>17</sup>support@yahooweb.co', which has not been confirmed to have a direct relationship with ryuk, but intends to gain popularity by mentioning ryuk or evade the investigation agency by disguising itself as a successor to ryuk.

Big Head ransomware is spreading under the disguise of Windows Update and Microsoft Word. It is written in '.NET' and its behavior is not much different from other ransomwares. However, what is unusual is that in the process of encrypting the system, it fools the user by displaying a screen similar to Windows Update to prevent the user from noticing and shutting down the system. The victim is bound to be easily deceived this way. So you need to be careful not to download or run a program from an unreliable site.

\_\_\_

<sup>&</sup>lt;sup>15</sup> CIS: Commonwealth of Independent States. It is an international organization of states that became independent after the dissolution of the Soviet Union. It includes Russia, Moldova, Belarus, Uzbekistan and Kazakhstan.

<sup>&</sup>lt;sup>16</sup> REvil: It is also known as Sodinokibi. This group provides RaaS (Currently it's not active).

<sup>&</sup>lt;sup>17</sup> ryuk: This group provides RaaS. It is distributed through phishing mail or banking malware in most cases (Currently it's not active).

Meanwhile, a group identified as FIN8<sup>18</sup> is distributing the BlackCat ransomware using the Sardonic backdoor. This backdoor has the ability to collect information, execute commands, and distribute additional payloads with the DLL plugin. FIN8 was originally working with the goal of stealing card data from the PoS (payment and revenue management system) system, but it is believed that it reached out to ransomware attacks to maximize profitability. In addition, it also used the Ragnar Locker ransomware for attacks, and both ransomwares are RaaS. Looking at these cases, anyone can easily purchase ransomware and use it for an attack if they want to. So the danger of RaaS can be confirmed once again.

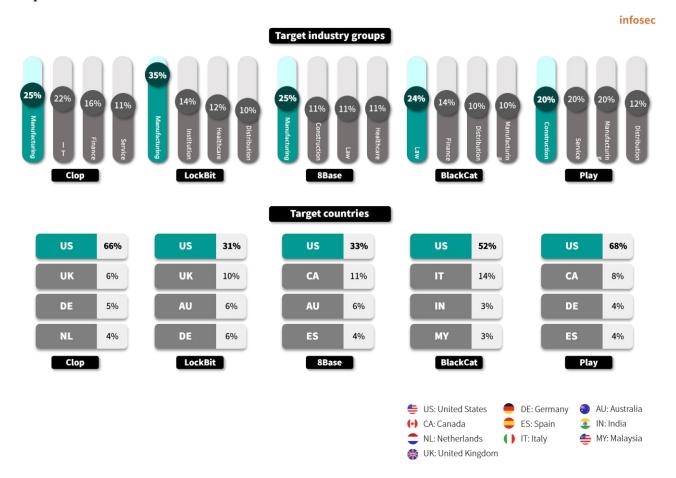
A new ransomware group that newly appeared in July is the Underground group. As the codes of the Underground group's ransomware are very similar to those of the Industrial Spy ransomware discovered in May 2022, they are suspected to be the same groups. The group distributed this ransomware by exploiting the Microsoft Office and Windows HTML RCE vulnerability, i.e. CVE—2023–36884, and used a variant of RomCom, a backdoor they created, during distribution. Seeing that the peculiarity is that the e-mails of the attackers mentioned in the Industrial Spy ransom note match those described in the Cuba ransomware, some links between the Industrial Spy ransomware and the Cuba ransomware is confirmed.

In addition, Cyclops and Cactus are groups that have newly started operating leak sites. Cyclops used Go language-based infostealer and ransomware, and there are Windows and Linux versions of the infostealer that compress files matching a specific extension in the system and transmit them to the attacker's server. As their encryption routines are similar to that of the Babuk ransomware, it is believed that the leaked Babuk source codes were borrowed. Recently, Cyclops has been showing rapid changes, e.g., changing its dark web address and group name to Knight, and at the same time announcing that it is recruiting partners.

The Cactus group launched a dark web leak site and posted 18 damage cases at the same time. It is confirmed that this group began its activities in March, and it is assumed that when the dark web was started, the accumulated victim information was uploaded at once. The Cactus group accesses the internal system and searches for users belonging to the same network to check accessible systems. After that, it creates a new user account, uses the script prepared in advance to release the ransomware payload with 7–Zip, and then deletes the compressed archive. It was found that Cactus carried out attacks mainly on large companies rather than small ones. It is believed that the purpose is to get more financial gains.

 $<sup>^{18}</sup>$  FIN8: An attack group working to make money in the retail and entertainment industry

#### Top5 ransomware



Among the major ransomware groups, The Clop group caused the most damage cases this month following last month. Clop groups posted 170 cases of damage caused by the MOVEit Transfer campaign on the dark web leak site, and the issue caused by the incident is expected to continue for the time being.

The LockBit's activity decreased slightly as it did in the previous month, but it generated the second largest number of victims. It can be thought that the influence has decreased as those who participated in the LockBit group attack are continuously arrested and the number of cases of apparent damage is decreasing, but it is difficult to say that the number of threats caused by LockBit group has decreased.

As the 8Base group is mainly performing attacks on small and medium-sized enterprises in various fields, some guess that it is similar to the data extortion group RansomHouse. In addition, 8Base group is characterized by the fact that it was built with the leaked Babuk builder, and is known to spread through phishing e-mails and exploit kits.

The BlackCat(Alphv) group showed several distinctive moves this month as well. It is conducting a Malvertising<sup>19</sup> campaign to distribute an installation program containing malware by luring users to a fake page disguised as an official website of the WinSCP<sup>20</sup> file transfer application for Windows. WinSCP is a file management system with popular free open source SFTP, FTP, S3, SCP clients and SSH<sup>21</sup> file transmission function. As it is downloaded 400,000 times a week from file sharing sites, this campaign can create many victims. So attention must be paid to it.

Also, the BlackCat(Alphv) group said that it attacked the global cosmetics company Estée Lauder and contacted the management of Estée Lauder, but there was no reply, and expressed dissatisfaction on the dark web leak site. It also said that even though Microsoft's DART (Detection and Response Team) and Mandiant are in charge of Estée Lauder's security, the network is still vulnerable and accessible, and it did not encrypt the system, but if Estée Lauder does not agree to join negotiations, it will disclose detailed information about the stolen data. He said he would release detailed information. In addition, it provided an API on the leak site to make it easy to access the victim's leaked data, and added a page providing detailed instructions on how to use it. Although nothing has been revealed about the motive for the production of this API, it seems to be a new strategy to increase revenues by improving access to leaked data and increasing the burden of data leakage to victims as the number of victims paying ransom is decreasing in the event of an infringement incident caused by ransomware.

The Play group is also constantly posting victims on the leak site. In relation to ProxyNotShell<sup>22</sup>, OWASSRF<sup>23</sup>, and Microsoft Exchange Server RCE vulnerabilities, it is using various tools and exploit to perform attacks. Recently, it started using new tools such as Grixba, a network scanner and infostealer, and AlphaVSS<sup>24</sup>, an open source VSS management tool. As this increases the efficiency of attacks and makes access to backup files easier, risks are greatly increasing.

<sup>&</sup>lt;sup>19</sup> Malvertising: A technique to distribute malware through advertisements by hacking online advertising servers

<sup>&</sup>lt;sup>20</sup> WinSCP: SFTP, FTP, and SCP client in the Windows environment

<sup>&</sup>lt;sup>21</sup> SSH: A protocol for safely accessing a remote computer and executing commands

<sup>&</sup>lt;sup>22</sup> ProxyNotShell: Exploitation through SSRF(CVE-2022-41040), a vulnerability that uses the Microsoft Exchange Server to send unwanted requests, and the remote code execution vulnerability (CVE-2022-41082)

<sup>&</sup>lt;sup>23</sup> OWASSRF: It bypasses exploitation through the Microsoft Exchange Server privilege escalation vulnerability (CVE-2022-41080), and the remote code execution vulnerability (CVE-2022-41082), and ProxyNotSheel mitigation.

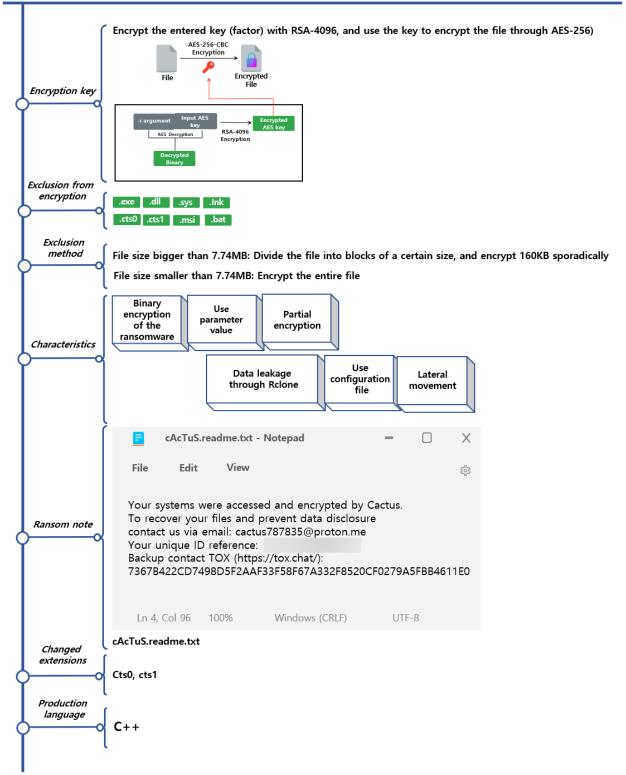
<sup>&</sup>lt;sup>24</sup> VSS: A function that allows you to back up files or data change status in Windows and restore it to the previous state

#### ■ Focus of ransomware

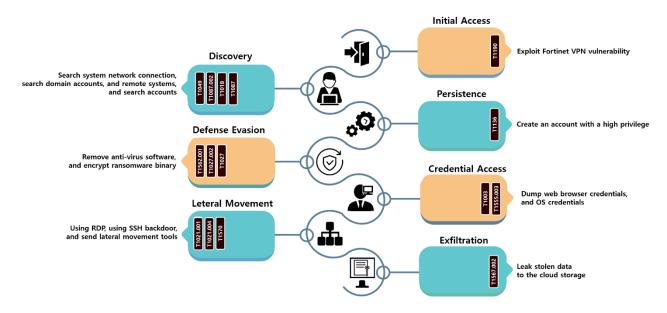
#### Cactus Ransomware Outline

Cactus is a ransomware group that was first discovered last March, but has been active since it opened its first dark web leak site this month. At the same time as it opened the leak site, it became a hot topic by posting 18 cases of damage. It performed attacks against companies in various fields, but it has not been known so far not only because it is not operating a dark web leak site, but also because the data necessary for ransomware operation is encrypted, and the Cactus ransomware is executed only when the decryption key is delivered as a command line factor or there is ntuser.dat file, and presumably it was difficult to discover it easily. The file name is the same as the unique victim ID, which is randomly generated with the regular expression  $[a-z1-9]\{4\}-[a-z1-9]\{4\}$ .





infosec



The Cactus ransomware uses the vulnerability of Fortinet VPN to access the system and secure continuous access through the SSH backdoor. It scans and infects internal hosts with the SoftPerfect<sup>25</sup> scanner, and checks the accessibility of the host and account through PowerShell and Windows events. These activities are logged as text files. It maintains the continuity of the backdoor using various tools, performs lateral movement to the anti–virus account using RDP<sup>26</sup> and Super Ops<sup>27</sup> with msiexec<sup>28</sup>, and transmits data to the MEGA cloud server through Rclone<sup>29</sup>. Finally, it distributes the ransomware using PowerShell and extracts the payload with 7–Zip to encrypt the system.

<sup>&</sup>lt;sup>25</sup> SoftPerfect: A tool for checking if the system is accessible and scanning available ports

<sup>&</sup>lt;sup>26</sup> RDP: A protocol that makes it possible to remotely operate the computer

<sup>&</sup>lt;sup>27</sup> Super Ops: A platform for integrated management of remote access tools, such as Splashtop and Teamviewer

<sup>&</sup>lt;sup>28</sup> msiexec: A tool that installs or manages the MSI package in Windows

<sup>&</sup>lt;sup>29</sup> Rclone: A tool for managing or migrating data in the cloud storage

# 1. Initial access through a vulnerability 2. . Explore hosts on the same network 5. Distribute the ransomware

Cactus ransomware attack scenario

One of the attack processes of the Cactus ransomware starts with the attacker installing an SSH backdoor to continuously access the system after the initial access. Then, it performs internal reconnaissance through the SoftPerfect network scanner to infect all hosts in the same network band. At this time, it executes the PowerShell command to list the hosts, identify the user account by checking the Windows Security 4624 event<sup>30</sup>, and check if they can be accessed. Records of these actions are stored as text files in the compromised host system.

The attacker maintains continuity in various ways in case the backdoor is deleted, and accesses the target system using tools such as Cobalt Strike<sup>31</sup>, proxy tool Chisel<sup>32</sup>, a legal remote access tool like Splashtop<sup>33</sup>, or a tool like AnyDesk<sup>34</sup>. Then it executes a batch script to remove the anti-virus software using msiexec.

<sup>&</sup>lt;sup>30</sup> Windows Security 4624 event: All attempts to successfully log on to the system are recorded.

<sup>&</sup>lt;sup>31</sup> Cobalt Strike: Commercial access test tool

<sup>&</sup>lt;sup>32</sup> Chisel: It provides C2 communication, and brings additional scripts or tools to the victimized system.

<sup>&</sup>lt;sup>33</sup> Splashtop: Remote desktop software and remote support software

<sup>&</sup>lt;sup>34</sup> AnyDesk: It provides such functions as remote desktop software, remote control and file transmission and VPN.

After accessing a specific host and successfully removing the anti-virus software, the credentials to be leaked will be stolen from the disk or web browser, and the LSASS<sup>35</sup> memory will be dumped for privilege escalation. It will be spread internally using those accounts with high privileges among stolen credentials and remote management tools like RDP and Super Ops.

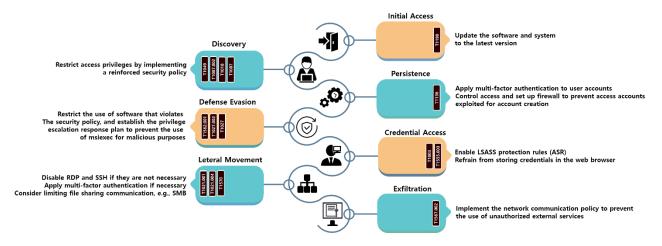
The attacker automatically extracts the stolen data to the MEGA cloud server through a legitimate tool like Rclone, and acquires it. After confirming that the data has been leaked, the attacker automates the distribution of the ransomware through PowerShell script, which is also frequently used by the BlackBasta group, extracts the payload with 7–Zip for binary execution, and then encrypts the system.

\_

<sup>&</sup>lt;sup>35</sup> LSASS: The process of inspecting the login of Windows system users and managing password change

#### Response plan for each stage of the Cactus ransomware campaign

infosec



As the initial access of ransomware is performed through vulnerabilities, it is important to always keep software and systems up to date with vulnerabilities patched. Even if an initial access occurs, it is necessary to manage access privileges so that information about the system and accounts cannot be searched, and to establish policies or firewalls that block access to prevent account exploitation.

In addition, considering that Cactus attackers exploit msiexec to remove anti-virus software or use software commonly found in security incidents such as Cobalt Strike, you should establish a policy restricting the tool and do your best to ensure account security to prevent privilege escalation. You should refrain from storing web credentials in the browser, and protect LSASS by activating ASR<sup>36</sup> (Attack Surface Reduction) rules, which began to be applied starting with Windows 10 to prevent LSASS memory dump that is most frequently exploited to steal OS credentials. You should disable RDP and SSH when they are not in use, and if you must use them, you should use multi-factor authentication to prevent attackers from easily accessing them.

In addition, as there are cases in which tools used for attacks are transmitted through file sharing communication protocols like SMB, it is also necessary to consider policies that restrict them. Attackers often obtain stolen data by transferring it to the cloud storage. Data leakage can be prevented simply by restricting the use of external services like Rclone, which can easily automate this process.

<sup>&</sup>lt;sup>36</sup> ASR: A technology for blocking the attack path of malware

## **Indicator Of Compromise** [a-z1-9]{4}-[a-z1-9]{4}.exe: SHA256 509A533ADE43406EB50FA9CB8984B2E10D008AD0EA8C22D0652F3EE101125BB7 D7429C7ECEA552403D8E9B420578F954F5BF5407996AFAA36DB723A0C070C4DE 78C16DE9FC07F1D0375A093903F86583A4E32037A7DA8AA2F90ECB15C4862C17 C52AD663FF29E146DE6B7B20D834304202DE7120E93A93DE1DE1CB1D56190BFD 69B6B447CE63C98ACC9569FDCC3780CED1E22EBD50C5CAD9EE1EA7A4D42E62CC 0933F23C466188E0A7C6FAB661BDB8487CF7028C5CEC557EFB75FDE9879A6AF8 9EC6D3BC07743D96B723174379620DD56C167C58A1E04DBFB7A392319647441A File Name ntuser.dat : Configuration File [a-z1-9]{4}-[a-z1-9]{4}.exe: Binary of Cactus Ransomware

#### ■ Reference sites

URL: https://www.sangfor.com/farsight-labs-threat-intelligence/cybersecurity/analysis-of-cactus-ransomware

URL: https://www.kroll.com/en/insights/publications/cyber/cactus-ransomware-prickly-new-variant-evades-detection

URL: https://thehackernews.com/2023/07/blackcat-operators-distributing.html

 $\label{lem:url:lem:u$ 

URL: https://thehackernews.com/2023/07/redenergy-stealer-as-ransomware-threat.html

 $\label{lem:url:lem:lem:url:l$ 

URL: https://thehackernews.com/2023/07/beware-of-big-head-ransomware-spreading.html

URL: https://www.securityweek.com/blacklotus-uefi-bootkit-source-code-leaked-on-github/

URL: https://www.bleepingcomputer.com/news/security/meet-noescape-avaddon-ransomware-gangs-likely-successor/

URL: https://symantec-enterprise-blogs.security.com/blogs/threat-intelligence/syssphinx-fin8-backdoor

URL: https://www.bleepingcomputer.com/news/security/cybersecurity-firm-sophos-impersonated-by-new-sophosencrypt-ransomware/

URL: https://www.bleepingcomputer.com/news/security/est-e-lauder-beauty-giant-breached-by-two-ransomware-gangs/

URL: https://www.bleepingcomputer.com/news/security/clop-gang-to-earn-over-75-million-from-moveit-extortion-attacks/

URL: https://thecyberexpress.com/nobit-raas-new-generation-ransomware-builder/