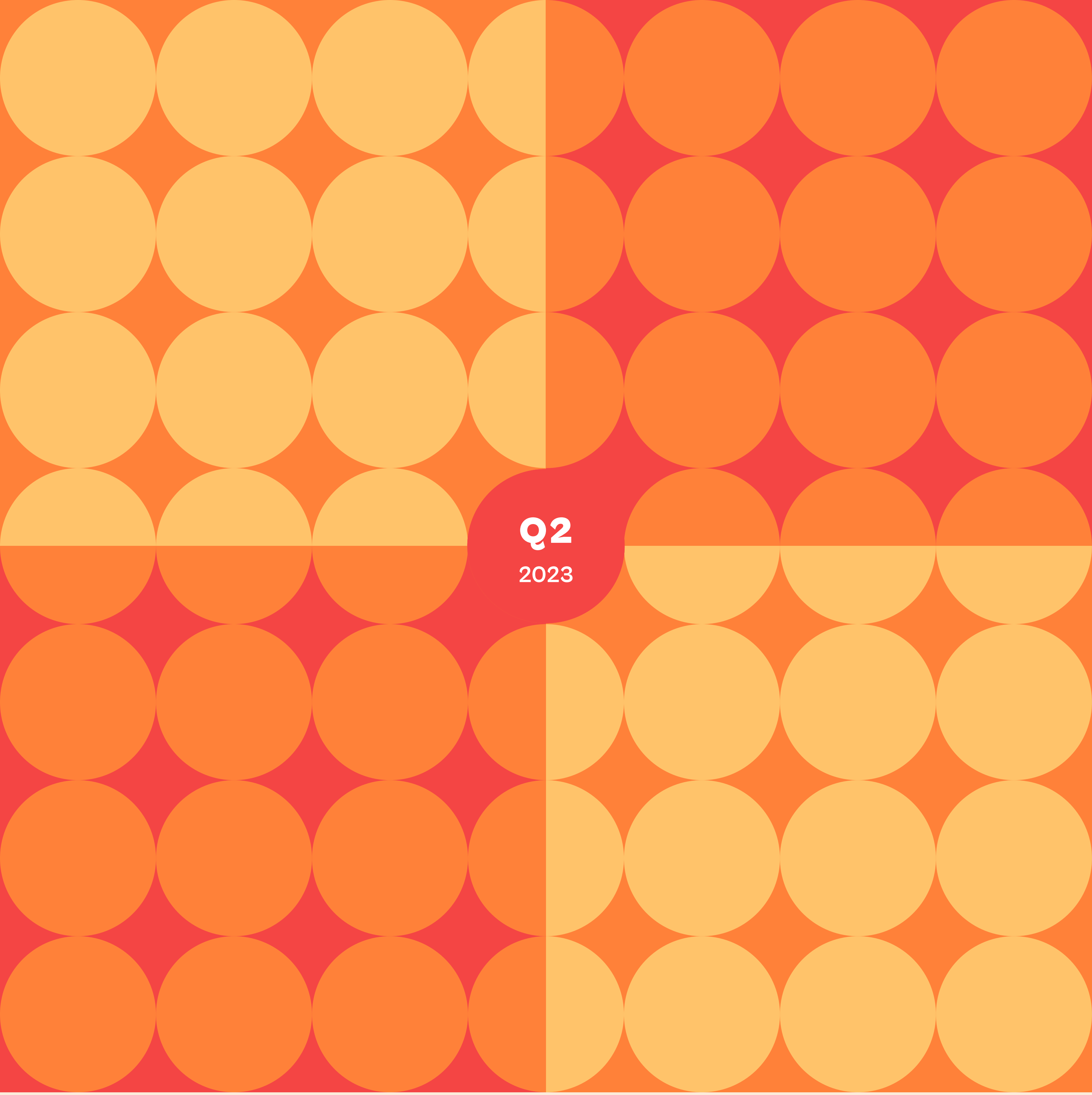


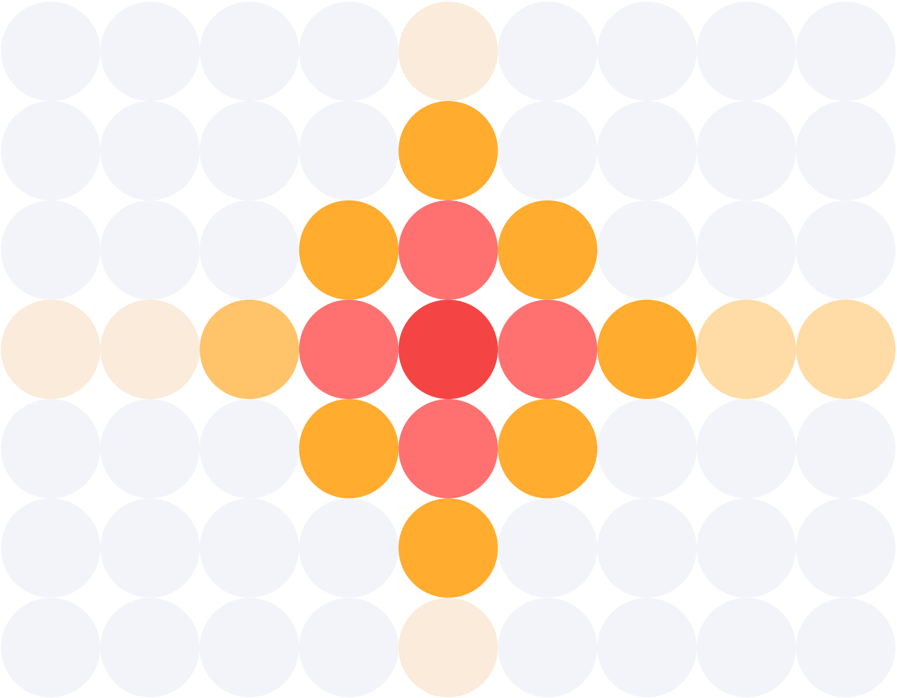
Extortion Attack Group Guide

Power Rankings: Ransomware Malicious Quartile

Q1-2023

halcyon

Table of Contents



Inside Data Extortion Attacks

More than 2,300 organizations succumbed to ransomware attacks in just the first half of 2023 according to the most recent data, with the vast majority carried out by only three ransomware operators: LockBit (35.3%), ALPHV/BlackCat (14.2%), and Cl0p (11.9%). Overall, ransomware attacks were up 74% in Q2-2023 over Q1 volumes.

No, the ransomware problem is not going away. Ransomware attacks continue to be extremely lucrative, with ransom demands and recovery costs bleeding victim organizations for millions of dollars.

Ransomware-as-a-Service (RaaS) and other operators are implementing novel evasion techniques into their payloads specifically designed to evade or completely circumvent traditional endpoint protection solutions.

The players change fast in this space as RaaS groups and other ransomware operators rise and fall with law enforcement takedowns or disband and reorganize under different brands.

The Halcyon team of ransomware experts has put together this extortion group power rankings guide as a quick reference for the extortion threat landscape based on data from throughout Q2- 2023 (the Q1-2023 report can be found here, and the full 2022 report can be found here).

More than 2,300 organizations succumbed to ransomware attacks in just the first half of 2023 according to the most recent data, with the vast majority carried out by only three.

Ransomware MQ: Evaluation Criteria Definitions

- The following are the evaluation criteria for placement on the Q2-2023 Ransomware Malicious Quartile. All attack groups evaluated must be a known threat actor group in 2023 with verifiable victims who demanded a ransom payment. Click on the threat actor group name below to see a listing of recent attacks they conducted including targets, industry verticals and other details.

- The report is based on available Q2-2023 data. Given the variability between attack groups regarding breadth of targeting, volume of attacks, and overall impact of their attack campaigns, placement on the report is somewhat subjective and based on input from ransomware subject matter experts on the following criteria:

Performance

- **RaaS Platform:** Attack groups were evaluated on the relative maturity of the Ransomware-as-a-Service (RaaS) platform to successfully execute an attack, effectiveness in disrupting significant portions of a targeted network, and ability to evade detection until the ransomware payload is executed.

- **Attack Volume:** Attack groups were evaluated on attack campaign volume as well as the percentage of attacks that are known to have been successful.

- **Ransom Demands:** Attack groups were evaluated on the dollar value of their ransom demands as well as an estimation of the income generated from attacks.

Innovation

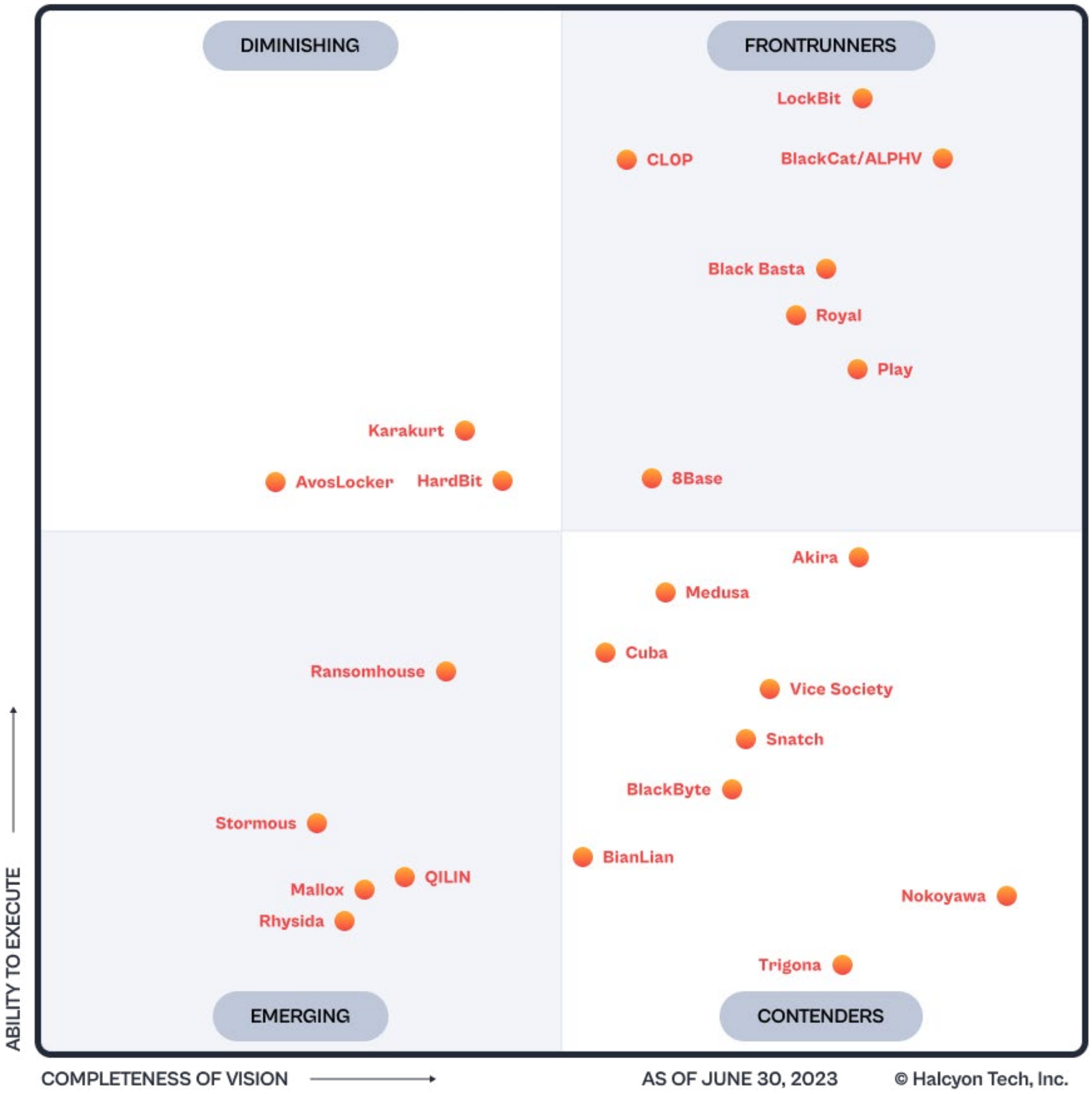
- **RaaS Platform Development:** Attack groups were evaluated on evidence of continued development and improvement of the RaaS platform and TTPs.

- **Targeted Industries:** Attack groups were evaluated on effectiveness of target selection for consistently realizing high dollar ransom demands/payments.

- **Economic Model**: Attack groups were evaluated on an assessment of their business model, estimates on R&D and recruiting efforts, and the availability of technical support services for attack affiliates.

The Q2 2023 Ransomware Malicious Quartile

Figure 1: Top Threat Groups for Ransomware-as-a-Service Ecosystem



Source: Halcyon (Q2 2023)

Frontrunners

LockBit

Performance

- **RaaS Platform:** LockBit is a RaaS that has been active since 2019 and is enabled with security tool evasion capabilities and an extremely fast encryption speed. LockBit is noted for using a triple extortion model where the victim may also be asked to purchase their sensitive information in addition to paying the ransom demand for decrypting systems. LockBit employs publicly available file sharing services and a custom tool dubbed Stealbit for data exfiltration.

- **Attack Volume:** LockBit was by far the most active attack group in 2022 and continued to be one of the top attack groups in Q1 of 2023, despite being bested in sheer volume by the Cl0p ransomware gang who surged in Q1.

- **Ransom Demands:** LockBit demanded ransoms in excess of $50 million in 2022.

Innovation

- **RaaS Platform Development:** The group continues to improve their RaaS platform following the release of LockBit 3.0 in June of 2022, adding what may be the first iteration of macOS ransomware in April of 2023. The latest versions incorporate advanced anti-analysis features and are a threat to both Windows and Linux systems. LockBit 3.0 is modular and configured with multiple execution options that direct the behavior of the ransomware on the affected systems. LockBit employs a custom Salsa20 algorithm to encrypt files. LockBit takes advantage of remote desktop protocol (RDP) exploitation for most infections, and spreads on the network by way of Group Policy Objects and PsExec using the Server Message Block (SMB) protocol. LockBit appears to also still be supporting the older LockBit 2.0 variant from 2021, where the encryptor used is LockBit 2.0 but the victim is named on the LockBit 3.0 leak site.

- **Targeted Industries:** LockBit tends to target larger enterprises across any industry vertical with the ability to pay high ransom demands, but also tends to favor Healthcare targets.

LockBit is noted for using a triple extortion model where the victim may also be asked to purchase their sensitive information in addition to paying the ransom demand for decrypting systems.

- **Economic Model**: LockBit has a very well-run affiliate program and a great reputation amongst the affiliate (attacker) community for the maturity of the platform as well as for offering high payouts of as much as 75% of the attack proceeds. LockBit is known to employ multiple extortion techniques including data exfiltration to compel payment.

BlackCat/ALPHV

Performance

- **RaaS Platform:** First observed in late 2021, BlackCat/ALPHV employs a well-developed RaaS platform that encrypts by way of an AES algorithm. The code is highly customizable and includes JSON configurations for affiliate customization. BlackCat/ALPHV released a new ransomware version called Sphynx with upgraded evasion capabilities. BlackCat/ALPHV can disable security tools and evade analysis and is probably the most advanced ransomware family at present capable of employing different encryption routines, advanced self-propagation, and hinders hypervisors to for obfuscations and anti-analysis. BlackCat/ALPHV can impact systems running Windows, VMWare ESXi and Linux (including Debian, ReadyNAS, Ubuntu, and Synology distributions).
- **Attack Volume:** BlackCat/ALPHV became one of the more active RaaS platforms over the course of 2022, and attack volumes in Q1 2023 continued to increase although it was overtaken by CI0p in number of attacks in Q1 2023.
- **Ransom Demands:** BlackCat/ALPHV typically demands ransoms in the $400,000 to $3 million range but has exceeded $5 million.

BlackCat/ALPHV achieved a new low by publishing private, compromising clinical photographs of breast cancer patients exfiltrated during an attack.

Innovation

- **RaaS Platform Development:** BlackCat/ALPHV is the first ransomware group using Rust, a secure programming language that offers exceptional performance for concurrent processing. The ransomware deletes all Volume Shadow Copies using the vssadmin.exe utility and wmic to thwart rollback attempts and attains privilege escalation by leveraging the CMSTPLUA COM interface and bypasses User Account Control (UAC). It encrypts files with the ChaCha20 or the AES algorithm. BlackCat/ALPHV developers opted for faster over stronger encryption by employing several modes of intermittent encryption and employs a tool called Exmatter for data exfiltration.

- **Targeted Industries:** BlackCat/ALPHV has a wide variability in targeting, but most often focuses on the healthcare, pharmaceutical, financial, manufacturing, legal and professional services industries. The group achieved a new low by publishing private, compromising clinical photographs of breast cancer patients exfiltrated during an attack. BlackCat/ALPHV also hit several US municipalities, including an extremely disruptive attack on the City of Dallas.

- **Economic Model**: BlackCat/ALPHV also exfiltrates victim data prior to the execution of the ransomware – including from cloud-based deployments– to be leveraged in double extortion schemes to compel payment of the ransom demand. They have one of the more generous RaaS offerings, offering as much as 80-90% cut to affiliates. BlackCat/ALPHV is also noted for putting their leaks website on the public web instead of dark web.

Cl0p

Performance

- **RaaS Platform:** Cl0p is a RaaS platform first observed in 2019. Cl0p has advanced anti-analysis capabilities and anti-virtual machine analysis to prevent investigations in an emulated environment like those commonly used by security tools. Cl0p is increasingly using automation to exploit known vulnerabilities to infiltrate targets, as well as a SQL injection zero-day vulnerability (CVE-2023-34362) that installs a web shell – a rarity amongst ransomware operators. Cl0p was responsible for about one-fifth (21%) of all ransomware attacks in June.

- **Attack Volume:** Attacks by Cl0p surged in Q1 of 2023 as the gang leveraged patchable exploits for the GoAnywhere file transfer software to compromise more than 100 victims in a matter of weeks, although it is unknown how well they were able to monetize the attacks. Cl0p is likely to be leveraging automation to identify exposed organizations who have not patched against known vulnerability, which is why we are seeing so many new victims.

- **Ransom Demands:** Ransom demands vary depending on the target and average around $3 million dollars but have been reported as to be as high as $20 million. Ransom amounts are likely to continue to grow as Cl0p focuses more on the exfiltration of sensitive data.

Cl0p is one of just a handful of RaaS providers that have developed a Linux version, an indication that Cl0p is likely actively recruiting new talent to help improve their platform and expand the scope of what and whom they can attack

Innovation

- **RaaS Platform Development:** Cl0p is one of just a handful of RaaS providers that have developed a Linux version, an indication that Cl0p is likely actively recruiting new talent to help improve their platform and expand the scope of what and whom they can attack. Cl0p's Windows version was written in C++ and encrypts files with RC4 and the encryption keys with RSA 1024-bit. In May of 2023, Cl0p began exploiting SQL injection vulnerability (CVE-2023-34362) in Progress Software's managed file transfer (MFT) solution called MOVEit Transfer which was leveraged to steal data from victim databases beginning in June. Cl0p attackers also exploited a Fortra GoAnywhere MFT server vulnerability at the beginning of 2023.
- **Targeted Industries:** Cl0p had previously almost exclusively hit targets in the healthcare sector but has significantly expanded targeting to include most any organization with vulnerable GoAnywhere installations.
- **Economic Model**: Cl0p runs an expansive affiliate program and exfiltrates data to be leveraged in triple extortion schemes and has significantly expanded its primary target range beyond the healthcare sector. There are indications that Cl0p may be shifting to more of a pure data extortion model, but most victims still suffer the ransomware payload at this point.

Black Basta

Performance

- **RaaS Platform:** Black Basta is a RaaS that emerged in early 2022 and is assessed by some researchers to be a revival of the Conti and REvil attack groups. The group routinely exfiltrates sensitive data from victims for double extortion. Black Basta engages in highly targeted attacks, and likely only works with a limited group of approved affiliates.
- **Attack Volume:** Considering they just emerged in the spring of 2022, Black Basta quickly became one of the most prolific attack groups moving into 2023. Black Basta was observed leveraging unique TTPs for ingress, lateral movement, data exfiltration data, and deploying ransomware payloads.
- **Ransom Demands:** Ransom demands vary depending on the targeted organization with reports that they can be as high as $2 million dollars.

Innovation

- **RaaS Platform Development:** The Black Basta RaaS continues to evolve their platform, with ransomware payloads that can infect systems running both Windows and Linux systems by exploiting vulnerabilities in VMware ESXi running on enterprise servers. Black Basta ransomware is written in C++, can target both Windows and Linux systems, encrypts data with ChaCha20 and then the encryption key is encrypted with RSA-4096 for rapid encryption of the targeted network. In some cases, Black Basta leverages malware strains like Qakbot and exploits, including PrintNightmare during the infection process. Black Basta also favors abuse of insecure Remote Desktop Protocol (RDP) deployments.
- **Targeted Industries:** Black Basta typically targets manufacturing, transportation, construction and related services, telecommunications, the automotive sector, and healthcare providers.
- **Economic Model**: Black Basta also employs a double extortion scheme and maintains an active leaks website where they post exfiltrated data if an organization declines to pay the ransom demand.

Black Basta quickly became one of the most prolific attack groups moving into 2023. Black Basta was observed leveraging unique TTPs for ingress, lateral movement, data exfiltration data, and deploying ransomware payloads.

Royal

Performance

- **RaaS Platform:** Royal is a RaaS that has been active since September 2022 but has quickly become one of the more concerning ransomware operations, and there appears to be a connection to the former Conti group. Royal opts for partial encryption for larger files for speed and to evade detection. Royal employs a range of exploitation tactics including using Nsudo, PowerShell, PCHunter, Process Hacker, GMER, or PowerTool, and batch scripts to evade security tools; compromises cloud services; abuses legitimate TLS certificates; deploys CobaltStrike and leverages QakBot, Gozi, and Vidar malware; deletes shadow copies to thwart recovery by way of rollbacks.
- **Attack Volume:** Royal increased attack activity in late 2022 and throughout q1 2023, prompting CISA and the FBI to issue alerts to critical infrastructure providers like the healthcare, communications, and education sectors.
- **Ransom Demands:** According to CISA, Royal ransom demands range between $1 million and $11 million dollars.

The Royal RaaS platform has expanded beyond targeting Windows installations to include attacks on systems running Linux and now targets ESXi servers.

Innovation

- **RaaS Platform Development:** The Royal RaaS platform has expanded beyond targeting Windows installations to include attacks on systems running Linux and now targets ESXi servers. Evidence indicates they continue to invest heavily in development, expanding their operations and capabilities. The RaaS platform includes advanced security evasion and anti-analysis capabilities. The platform previously employed an encryptor from BlackCat/ALPHV but shifted to using a new encryption module dubbed Zeon.
- **Targeted Industries:** Royal tends to target critical infrastructure sectors including the Manufacturing, Communications, Healthcare, and Education sectors, with a focus on small to medium-sized organizations.
- **Economic Model**: Royal typically does not include a specific ransom demand in the post-infection ransom note, but instead requires victims to directly negotiate terms through an Onion URL via the Tor browser.

Play

Performance

- **RaaS Platform:** Play (aka PlayCrypt) is a RaaS emerged in the summer of 2022 with high-profile attacks on the City of Oakland, Argentina's Judiciary and German hotel chain H-Hotels, as well as exfiltrating data from Fedpol and the Federal Office for Customs and Border Security (FOCBS). Play has similarities to Hive and Nokoyawa ransomware. Play often compromises unpatched Fortinet SSL VPN vulnerabilities to gain access. Play has been observed leveraging Process Hacker, GMER, IOBit and PowerTool to bypass security solutions as well as PowerShell or command script to disable Windows Defender.
- **Attack Volume:** Play continued to increase attacks through the end of 2022 and into Q1 of 2023 and is one of the most active groups today.
- **Ransom Demands:** There is little information on how much Play demands for a ransom, but they have made good on their threats to leak the data of those who refuse payment.

Play continued to increase attacks through the end of 2022 and into Q1 of 2023 and is one of the most active groups today.

Innovation

- **RaaS Platform Development:** Play is an evolving RaaS platform known to leverage PowerTool to disable antivirus tools and security monitoring solutions and SystemBC RAT for persistence. Play is known to leverage tools like Cobalt Strike for post-compromise lateral movement and SystemBC RAT executables and legitimate tools Plink and AnyDesk to maintain persistence, as well as Mimikatz and living-off-the-land binaries (LOLBins) techniques. Play also abuses AdFind for command-line queries to collect information from a target's Active Directory. Play innovated the intermittent encryption technique for improved evasion capabilities. Play developed two new custom data exfiltration tools – the Grixba information stealer and a Volume Shadow Copy Service (VSS) Copying Tool–that improve efficiency in gathering sensitive information on a targeted network.
- **Targeted Industries:** Play ransomware gang has mainly focused attacks in Latin America, especially Brazil, but have attack outside of that region.
- **Economic Model**: Play employs tactics similar to both Hive and Nokoyawa ransomware, and also attempts double extortion by first exfiltrating victim data with the threat to post it on their "leaks" website.

8Base

Performance

- **RaaS Platform:** The 8Base ransomware gang first emerged in March of 2022 and has quickly become one of the most active groups today. 8Base had a “massive spike in activity” according to reports, with 67 attacks as of May 2023, with about half of targets in the business services, manufacturing, and construction sectors. The sophistication of the operation suggests they are an offshoot of previous operators–most likely Ransomhouse, a data extortion group that first emerged in December of 2021 that had been steadily increasing attacks in late 2022 and early 2023. Other researchers see a connection to the leaked Babuk builder. Like most groups today, 8Base engages in data exfiltration for double extortion and employs advanced security evasion techniques including modifying Windows Defender Firewall for bypass.

- **Attack Volume:** 8Base quickly ascended the ranks of active ransomware operators with a high volume of attacks in late spring and throughout the summer of 2023, making them one of the most active groups, rivaling the attack volume of leaders like LockBit and Cl0p.

- **Ransom Demands:** It is unclear how much 8Base typically demands for a ransom.

> The sophistication of 8Base suggests they are an offshoot of previous operators–most likely Ransomhouse, a data extortion group that first emerged in December of 2021.

Innovation

- **RaaS Platform Development:** 8Base does not appear to have its own signature ransomware strain or maintain an RaaS open for recruiting affiliate participation openly but may service affiliate attackers privately. Like RansomHouse, they appear to use a variety of ransomware payloads and loaders in their attacks, most prevalently customized Phobos with SmokeLoader. Attacks also include wiping of Volume Shadow Copies (VSS) to prevent rollback of the encryption. 8Base does not appear to be targeting Linux systems, maintaining a focus on Windows targets.

- **Targeted Industries:** 8Base tends to target organizations who provide Business Services as well as those in the Manufacturing, Financial, and Information Technology sectors.

- **Economic Model**: 8Base does not appear to maintain a RaaS program, appearing to be opportunistic in their choice of victims, with a focus on “name and shame” via their leaks site to compel payment of the ransom demand.

Contenders

Akira

Performance

- **RaaS Platform:** Akira first emerged in March 2023, and their extortion platform uniquely included a chat feature for victims to negotiate directly with the attackers and the group may have links to the notorious Conti gang, although this is difficult to ascertain given the Conti code was leaked in 2022. Interestingly, it has been observed that Akira will inform victims who have paid a ransom of the infection vectors they leveraged to carry out the attack. A decrypter was released that may work on earlier variants of Akira, and its utility has proven relatively limited.
- **Attack Volume:** Akira maintains a modest but growing attack volume, putting them in about the middle of the pack when compared to other ransomware operators.
- **Ransom Demands:** Ransom demands appear to range between $200,000 to more than $4 million.

Innovation

- **RaaS Platform Development:** Akira operates a RaaS written in C++ that is capable of targeting both Windows and Linux systems, typically by exploiting credentials for VPNs. Akira modules will delete Windows Shadow Volume Copies leveraging PowerShell and is designed to encrypt a wide range of file types while avoiding Windows system files with .exe, .lnk, .dll, .msi, and .sys extensions. Akira also abuses legitimate LOLBins/COTS tools like PCHunter64, making detection more difficult.
- **Targeted Industries:** The group claims to have already attacked dozens of organizations across multiple industry verticals including education, finance, and manufacturing.
- **Economic Model**: Akira operations include data exfiltration for double extortion with the threat to expose or sell the data should the victim fail to come to terms with the attackers. Akira has reportedly leaked gigabytes of stolen data from victims.

It has been observed that Akira will inform victims who have paid a ransom of the infection vectors they leveraged to carry out the attack. A decrypter was released that may work on earlier variants of Akira, and its utility has proven relatively limited.

Medusa

Performance

- **RaaS Platform:** The Medusa is a RaaS that made its debut in the summer of 2021 and has evolved to be one of the more active RaaS platforms in late 2022. The attackers restart infected machines in safe mode to avoid detection by security software as well preventing recovery by deleting local backups, disabling startup recovery options, and deleting VSS Shadow Copies.
- **Attack Volume:** Medusa ramped up attacks in the latter part of 2022 and have been one of the more active groups in the first quarter of 2023.
- **Ransom Demands:** Medusa typically demands ransoms in the millions of dollars which can vary depending on the target organization's ability to pay.

Innovation

- **RaaS Platform Development:** The Medusa RaaS platform (not to be confused with the operators of the earlier MedusaLocker ransomware) ransomware typically compromise victim networks through malicious email attachments (macros), torrent websites, or through malicious ad libraries. Medusa can terminate over 280 Windows services and processes without command line arguments (there may be a Linux version as well, but it is unclear at this time.)
- **Targeted Industries:** Medusa targets multiple industry verticals, especially healthcare and pharmaceutical companies, and public sector organizations too.
- **Economic Model**: Medusa also employs a double extortion scheme where some data is exfiltrated prior to encryption, and they are not as generous with their affiliate attackers, only offering as much as 60% of the ransom if paid.

Medusa can terminate over 280 Windows services and processes without command line arguments (there may be a Linux version as well, but it is unclear at this time.)

Cuba

Performance

- **RaaS Platform:** Cuba is a RaaS that first emerged in 2019, but activity did not really ramp up until 2022, and attacks have continued to increase through the first quarter of 2023. Cuba is assessed to be Russian operated and connected to threat actors RomCom and Industrial Spy. Cuba is effective but does not really stand out amongst threat actors – their operations are vanilla, but they do have the ability to bypass security solutions.
- **Attack Volume:** Cuba's attack volume was modest in 2022, but the pace of their attacks appears to have doubled in early 2023.
- **Ransom Demands:** Cuba operators have demanded some of the highest ransoms ever (in the tens of millions) but it is highly unlikely they have collected anywhere close to their target, likely coming down significantly in negotiations.

Cuba is assessed to be Russian operated and connected to threat actors RomCom and Industrial Spy.

Innovation

- **RaaS Platform Development:** Cuba is not the most sophisticated ransomware in the wild. Like most operators, Cuba relies on phishing, exploitable vulnerabilities, and compromised RDP credentials for ingress and lateral movement, and uses the symmetric encryption algorithm ChaCha20 appended with a public RSA key. Cuba leverages PowerShell, Mimikatz, SystemBC and the Cobalt Strike platform.
- **Targeted Industries:** Cuba selects victims on their ability to pay large ransom demands, targeting larger organizations in financial services, government, healthcare, critical infrastructure, and IT sectors.
- **Economic Model**: Cuba exfiltrates victim data for double-extortion and maintain a leaks site where they publish victim data if the ransom demand is not met. Cuba operators have a decent reputation as far as providing a decryption key to victims who pay the ransom demand.

Vice Society

Performance

- **RaaS Platform:** Vice Society is not a traditional RaaS. The threat group that first emerged in 2021 and has used a variety of ransomware strains including Hello Kitty/Five Hands and Zeppelin before developing a custom ransomware strain that can infect both Windows and Linux systems. Tactics include attempts to compromise data backup solutions and clearing security logs on compromised systems to evade detection. Vice Society has been actively developing custom ransomware dubbed PolyVice and implementing better encryption methods.
- **Attack Volume:** Vice Society is a more recent arrival on the ransomware scene and has been scaling their operations significantly, including a disruptive attack on the second largest school district in the US.
- **Ransom Demands:** Vice Society typically issues ransom demands of more than $1 million dollars, but evidence suggests they are willing to negotiate for a lower ransom amount.

Innovation

- **RaaS Platform Development:** Vice Society has advanced evasion capabilities and can disable security tools like Windows Defender and evade sandbox analysis. The group is known to exploit vulnerabilities in public-facing applications and websites, exploits like PrintNightmare, or though compromised RDP credentials. Vice Society is known to use DLL side-loading techniques and abuse tools like Cobalt Strike, Mimikatz, SystemBC and PowerShell scripts for remote access to endpoints and termination of security software. Vice Society has been observed using Living-off-the-Land (LotL) techniques by way of a custom PowerShell-based tool to automate data exfiltration on targeted networks.
- **Targeted Industries:** Vice Society tends to target the education, healthcare, and manufacturing sectors, but is also noted for attacks like the one that disrupted the rapid transit system in San Francisco.
- **Economic Model**: Vice society uses a double extortion model to compel payment of the ransom demand.

Vice Society tactics include attempts to compromise data backup solutions and clearing security logs on compromised systems to evade detection.

Vice Society has been actively developing custom ransomware dubbed PolyVice and implementing better encryption methods.

Snatch

Performance

- **RaaS Platform:** Snatch is a RaaS first emerged way back in 2018 but did not become significantly active until 2021. Snatch can evade security tools and deletes Volume Shadow Copies to prevent rollbacks and any local Windows backups to thwart recovery. There has also been a Linux version observed.
- **Attack Volume:** Snatch attack volume has been modest compared to leading ransomware operators but is on pace to increase about 50% in 2023 compared to 2022 levels.
- **Ransom Demands:** Snatch ransom demands are relatively low compared to leading ransomware operators, ranging from several thousand to tens of thousands of dollars.

Innovation

- **RaaS Platform Development:** Snatch is written in Go and is somewhat unique in that the ransomware reboots in safe mode to make sure the security tools are not running. Persistence and privilege escalation are not byproducts of the reboot. Snatch abuses legitimate tools like Process Hacker, Uninstaller, IObit, BCDEDIT, PowerTool, and PsExec. Snatch deletes Volume Shadow Copies to prevent encryption rollbacks.
- **Targeted Industries:** Snatch targeting varies widely based on their affiliates preferences.
- **Economic Model**: Snatch is one of the more traditional RaaS platforms, where most of the targeting and attack sequence structure is left to the individual affiliates, including whether to exfiltrate data for double extortion.

Snatch is written in Go and is somewhat unique in that the ransomware reboots in safe mode to make sure the security tools are not running. Persistence and privilege escalation are not byproducts of the reboot.

BlackByte

Performance

- **RaaS Platform:** BlackByte is a RaaS that first emerged around July of 2021, and has similarities to LockBit v2.0 with advanced obfuscation capabilities and is assessed to be Russian operated they aborts attacks on Cyrillic language systems. They made headlines when the attacked the San Francisco 49ers and the City of Augusta, but it was their targeting of critical infrastructure targets that earned them an alert from CISA and the FBI in 2022.
- **Attack Volume:** BlackByte attack volumes were modest in 2022 compared to leading ransomware operators but are on pace to more than double the volume in 2023.
- **Ransom Demands:** Ransom demands form BlackByte vary by target but have been observed to be in the millions of dollars, with a published $2 million dollar ransom levied against the City of Augusta in 2022.

Innovation

- **RaaS Platform Development:** The BlackByte RaaS serves up multiple variants of BlackByte ransomware and has been observed in the wild, including versions written in Go, C, and .NET. Operators have exploited ProxyShell vulnerabilities for ingress, and leverage tools like Cobalt Strike and WinRAR. BlackByte uses its own custom exfiltration tool called Exbyte.
- **Targeted Industries:** U.S. and global organizations in the energy, agriculture, financial services, and public sectors.
- **Economic Model**: BlackByte exfiltrates victim data for double extortion and maintain a leaks site where expose or sell victim data. The operators even go so far as to link the auction site in the ransom note to scare victims.

BlackByte made headlines when they attacked the San Francisco 49ers and the City of Augusta, but it was their targeting of critical infrastructure targets that earned them an alert from CISA and the FBI in 2022.

BianLian

Performance

- **RaaS Platform:** BianLian is not a traditional RaaS. They first emerged in June 2022 as a typical RaaS provider with Golang-based ransomware until a decrypter was released. In early 2023 they appear to have abandoned the ransomware payload portion of attacks in favor of less complicated data exfiltration and extortion attacks. This shows how successful the double extortion strategy is for ransomware groups, and we will likely see more groups join the likes of BianLian (and Karakurt before them). BianLian leverages open-source tooling and command-line scripts to engage in credential harvesting and data exfiltration.
- **Attack Volume:** BianLian increased attack volumes as they have moved away from deploying ransomware payloads in favor of pure data extortion attacks, making them one of the more prominent groups in Q1-2023, although still lagging far behind leaders.
- **Ransom Demands:** It is unclear how much BianLian typically requests for a ransom amount, or if they are keen to negotiate the demand down.

Innovation

- **RaaS Platform Development:** BianLian successfully attacked several high-profile organizations before a free decryption tool was released to help victims recover files encrypted by ransomware. The group appears to have abandoned the RaaS model in favor of pure data extortion attacks where data is exfiltrated and ransom demand issues, but no ransomware is deployed. BianLian has been observed deploying a custom Go-based backdoor for remote access. BianLian uses PowerShell and Windows Command Shell to bypass and evade security solutions.
- **Targeted Industries:** BianLian primarily targets financial institutions, healthcare, manufacturing, education, entertainment, and energy sectors by leveraging compromised Remote Desktop Protocol (RDP) credentials.
- **Economic Model**: Almost exclusively a data extortion attack group now, rarely observed deploying ransomware payloads.

In early 2023 BianLian appeared to have abandoned the ransomware payload portion of attacks in favor of less complicated data exfiltration and extortion attacks. This shows how successful the double extortion strategy is for ransomware groups.

Nokoyawa

Performance

- **RaaS Platform:** Nokoyawa is a RaaS that emerged in February 2022 targeting Windows systems and has similarities to Karma and Nemty ransomware. It has been assessed that Nokoyawa operators may have intentionally forked with two different programming languages in an effort to evade detection. Nokoyawa is notable for being one of the first attack groups to burn a Windows zero-day vulnerability in attacks, exploiting a privilege escalation flaw (CVE-2023-28252) impacting the Windows Common Log File System (CLFS). It is highly unusual to see ransomware gangs using zero-day exploits targeting vulnerabilities in Windows, as these exploits are highly valuable to attackers and usually leveraged in nation-state operations as opposed to cybercriminal attacks.
- **Attack Volume:** Nokoyawa attack volume has been modest compared to leaders, but the level of development that has been observed in addition to Rust variants and the use of zero-day exploits and other advanced TTPs means we will likely see more from them in the near future.
- **Ransom Demands:** It is unclear how much the average Nokoyawa ransom is, but at least one IcedID attack that distributed Nokoyawa ransomware ended with a $200,000 ransom demand.
- **RaaS Platform Development:** Nokoyawa has a robust RaaS offering originally written in C with several variants now in the wild, including Nevada ransomware that is written in Rust (similar to BlackCat/ALPHV) that can also target Linux systems. Rust is a secure, cross-platform programming language that offers exceptional performance for concurrent processing, making it easier to evade security controls and develop variants to target multiple OSs. Nokoyawa employs asymmetric Elliptic Curve Cryptography leveraging the Tiny-ECDH open-source library and a Salsa20 symmetric key. Nokoyawa employs Cobalt Strike and custom loaders to evade security solutions and appears to include portions of the leaked Babuk source code.
- **Targeted Industries:** Nokoyawa typically targets the healthcare, retail, energy, manufacturing, healthcare, and government sectors.
- **Economic Model**: Nokoyawa operations include data exfiltration for double extortion with the threat to expose or sell the data should the victim fail to come to terms with the attackers.

Nokoyawa is notable for being one of the first attack groups to burn a Windows zero-day vulnerability in attacks, exploiting a privilege escalation flaw (CVE-2023-28252) impacting the Windows Common Log File System (CLFS).

Trigona

Performance

- **RaaS Platform:** Trigona is not a traditional RaaS. The ransomware gang emerged around June of 2022 and operators have been observed scanning for internet-exposed Microsoft SQL servers to exploit via brute-force or dictionary attacks, and they also maintain a Linux version. The attackers will drop malware researchers dubbed CLR Shell to collect system information, to make configuration changes, and to escalate privileges by way of a vulnerability in the Windows Secondary Logon Service.
- **Attack Volume:** Trigona attack volume in 2022 was minimal, but is increasing in 2023, with more than twice the detected attacks in Q1-2023 than 2H-2022
- **Ransom Demands:** As Trigona is emerging, it is unclear how much they typically demand for a ransom.

Innovation

- **RaaS Platform Development:** There are multiple Trigona versions detected in the wild targeting both Windows and Linux systems. Trigona TTPs have some overlap with BlackCat/ALPHV but are considered much less technically savvy. They employ a 4,112-bit RSA and 256-bit AES encryption in OFB mode which is buggy and complicated to decrypt, but they do have a reputation for reliably providing the decryption sequence to victims who pay the ransom demand. Trigona abuses legitimate programs including AteraAgent, Splash Top, ScreenConnect, AnyDesk, LogMeIn and TeamViewer.
- **Targeted Industries:** Trigona may be opportunistic, but most attacks seem to focus on companies in the technology, healthcare, banking, manufacturing, and retail sectors.
- **Economic Model**: Trigona is written in Delphi and includes a data wiper feature and has been observed to exfiltrate victim data for double extortion. Trigona hosts their leaks site on a public website versus being hosted on TOR..

Trigona has been observed scanning for internet-exposed Microsoft SQL servers to exploit via brute-force or dictionary attacks, and they also maintain a Linux version.

Emerging

RansomHouse

Performance

- **RaaS Platform:** RansomHouse does not maintain a RaaS platform. RansomHouse is a data extortion group that first emerged in December of 2021. They appear to have some level of political motivation, stating they are "pro-freedom and support the free market" and claim to not work with other hacktivists or any intelligence agencies. They made headlines in 2022 for attacking chipmaker AMD and exfiltrating 450GB of data.

- **Attack Volume:** RansomHouse attack volumes pale compared to leading threat actors but have been steadily increasing in late 2022 and early 2023.

- **Ransom Demands:** Ransom demands have been reported to range between $1 million and $11 million.

Innovation

- **Raas Development:** RansomHouse does not maintain a RaaS platform.

- **Targeted Industries:** RansomHouse appears to be opportunistic, choosing targets for ease of compromise or for ability to pay. RansomHouse is a different kind of threat actor who uniquely "blames" victim organizations for lax security.

- **Economic Model**: RansomHouse maintains an active leaks site where they engage in "name and shame" to put pressure on victims to pay the ransom demand. RansomHouse exfiltrates victim data for double extortion but is also observed to be actively selling stolen data to other threat actors.

> RansomHouse appears to have some level of political motivation, stating they are "pro-freedom and support the free market" and claim to not work with other hacktivists or any intelligence agencies. They made headlines in 2022 for attacking chipmaker AMD and exfiltrating 450GB of data.

Stormous

Performance

- **RaaS Platform:** Stormous does not maintain a RaaS platform. Stormous emerged in mid-2021 or early 2022 and made headlines claiming to have exfiltrated 200GB of data from victim Epic Games as well as the Ministry of Foreign Affairs of Ukraine. They also were purported to have offered Coca-Cola data for sale. Stormous is assessed to have targeted companies whose data was leaked by other threat actors, and some have asserted they are a scam operation.
- **Attack Volume:** Stormous attack volume has been modest and is assessed that they may not be responsible for some of the attacks they claim.
- **Ransom Demands:** It is unclear how much Stormous demands for ransom payments on average, but it was observed that they were selling what they claimed to be Coca-exfiltrated Cola files for about $65,000.

Innovation

- **RaaS Platform Development:** Stormous does not maintain a RaaS platform.
- **Targeted Industries:** Stormous claims to target Western companies and espouses a lot of rhetoric about the Russian and Ukrainian conflict, but it is not clear if they are hacktivist-oriented or using this to sew confusion.
- **Economic Model**: It is still unclear exactly how Stormous operates. They claim politically motivated targeting may be more opportunistic or could be trying to make money from the threat actors' work by leveraging the chaos and confusion around the high volume of ransomware attacks today.

Stormous is assessed to have targeted companies whose data was leaked by other threat actors, and some have asserted they are a scam operation.

Qilin

Performance

- **RaaS Platform:** Qilin (aka Agenda) is a RaaS operation that first emerged in July of 2022 that is written in the Go and Rust programming languages and is capable of targeting Windows and Linux systems. Rust is a secure, cross-platform programming language that offers exceptional performance for concurrent processing, making it easier to evade security controls and develop variants to target multiple OSs. Qilin operators are known to exploit vulnerable applications including Remote Desktop Protocol (RDP).
- **Attack Volume:** Qilin attack volumes are modest compared to leaders but given they are putting so many resources into developing one of the most generous profit sharing RaaS platforms in the market, combined with the use of advanced programming languages and a versatile attack platform, we are likely to see more from this group.
- **Ransom Demands:** Ransom demands are likely to be in the millions of dollars, as the affiliate program offers and 80% take for ransoms under $3 million and 85% for those over $3 million.

Qilin reportedly offers one of the most generous affiliate programs, with affiliate attackers taking home as much as 85% of collected ransoms.

Innovation

- **RaaS Platform Development:** The Qilin RaaS offers multiple encryption techniques giving operators several configuration options when conducting the attack.
- **Targeted Industries:** Qilin is assessed to be a big game hunter selecting targets for their ability to pay large ransom demands, as well as targeting the healthcare and education sectors.
- **Economic Model**: Qilin operations include data exfiltration for double extortion with the threat to expose or sell the data via their leaks site should the victim fail to come to terms with the attackers. Qilin reportedly offers one of the most generous affiliate programs, with affiliate attackers taking home as much as 85% of collected ransoms.

Mallox (TargetCompany)

Performance

- **RaaS Platform:** Mallox is an emerging RaaS that first emerged in October of 2021 using a ransomware variant dubbed "tohnichi" for its file extension. The group then introduced a variant that appended files with ".mallox" which resulted in most researchers calling the group "Mallox." Mallox was notable for its swift encryption speed, ability to bypass security tools like Windows Defender, and deletion of Shadow Copies to thwart encryption rollback.
- **Attack Volume:** Mallox attack volume was low but began to accelerate in late 2022 and continues to increase in Q1-2023.
- **Ransom Demands:** There is not much info on how much TargetCompany demands for ransoms, but they appear to be relatively low compared to leading threat actors (in the thousands of dollars), but they are a newer group who has only recently started to recruit affiliates and they are constantly improving their malware, so we expect ransom demands to increase.

Innovation

- **RaaS Platform Development:** Mallox employs a unique delivery method for the ransomware payload that does not require a loader, but instead uses a batch script to inject into the "MSBuild.exe" process in memory to evade detection. Mallox has been observed using advanced TTPs like DLL hijacking that is not common to ransomware attacks. Mallox uses the Chacha20 algorithm for encryption. In 2023 they began using a variant that appends with ".xollam" which leverages malicious OneNote file attachments for infection where earlier variants targeted vulnerable MS SQL instances. Mallox only recently appears to be recruiting affiliates for a RaaS platform, so this group is one to watch.
- **Targeted Industries:** Mallox has hit some critical infrastructure IT providers, but appears to be opportunistic, hitting targets mostly located in the US and India.
- **Economic Model**: It is unclear if TargetCompany engages in data exfiltration for double extortion, but they likely will follow other attackers in using this tactic as they develop their RaaS platform.

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Rhysida

Performance

- **RaaS Platform:** Rhysida is a RaaS that was first observed on May 17, 2023, Rhysida has been observed deploying Cobalt Strike or similar command-and-control frameworks and abusing PSExec for lateral movement, dropping PowerShell scripts, and for payload delivery. They engage in data exfiltration for double extortion and maintain both a leaks site and a victim support portal on TOR. They are thought to be responsible for attacks against the Chilean military and more recently against Prospect Medical Holdings which impacted services at hundreds of clinics and hospitals across the US.
- **Attack Volume:** Rhysida has been steadily increasing their attack volume and continuing to expand the targeted industries, but volume is modest compared to leaders. Rhysida appears to be opportunistic attackers with a similar victimology as Vice Society.
- **Ransom Demands:** IT remains unclear how much Rhysida operators typically demand for a ransom payment currently.

Innovation

- **RaaS Platform Development:** Rhysida appears to have an advanced RaaS offering, with capabilities that include advanced evasion techniques that can bypass antivirus protection, the wiping of Volume Shadow Copies (VSS) to prevent rollback of the encryption, and the ability to modify Remote Desktop Protocol (RDP) configuration. Rhysida employs 4096-bit RSA key and AES-CTR for file encryption. Rhysida does not appear to be targeting Linux systems, maintaining a focus on Windows targets. TTPs are like those of Vice Society, which has been less active as Rhysida has emerged.
- **Targeted Industries:** Rhysida has been observed targeting the healthcare, education, government, manufacturing, and tech industries.
- **Economic Model**: Rhysida operators purport to be a “cybersecurity team” conducting unauthorized “penetration testing” to ostensibly “help” victim organizations identify potential security issues and secure their networks. The subsequent ransom demand is viewed as “payment” for their services.

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Diminishing

Karakurt

Performance

- **RaaS Platform:** Karakurt does not maintain a RaaS platform. Karakurt practices a unique style of the ransomware model in that they do not encrypt compromised machines or files but instead focus on data exfiltration and demanding a ransom payment with the threat to leak or sell the stolen data.
- **Attack Volume:** While Karakurt maintains a lower volume of attacks than some of their peers, the attacks are extremely effective and yield high ransom payments.
- **Ransom Demands:** Karakurt ransom demands have ranged widely from range from $25,000 to $13,000,000+ with strict payment deadlines.
- Innovation
- **RaaS Platform Development:** Karakurt does not maintain a RaaS platform but has been assessed to be closely related with the defunct Conti ransomware syndicate. They have been observed deploying or abusing tools like Cobalt Strike, Mimikatz, AnyDesk and other tools to elevate privileges and move laterally within a network.
- **Targeted Industries:** Karakurt is opportunistic and does not target specific sectors, industries, or types of victims and has likely automated some target selection based on ease of compromise by way of vulnerability exploits like Log4Shell, outdated VPN appliances, or through stolen VPN and RDP credentials.
- **Economic Model**: Karakurt threat actors attempt to exfiltrate massive quantities of sensitive data and send victims a TOR link and access code where victims negotiate directly with Karakurt actors. Some victims reported Karakurt did not honor the agreement to delete victim information even after a ransom was paid.

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AvosLocker

Performance

- **RaaS Platform:** AvosLocker is a RaaS that was first observed in July of 2021, and follows the RaaS model. AvosLocker attacks typically leverage vulnerability exploits and are adept at evading security tools by using polymorphic techniques for payloads and running in Safe Mode.
- **Attack Volume:** While not nearly as prolific as leading threat actors, AvosLocker became more active in 2022 and are on pace to exceed those attack levels in 2023.
- **Ransom Demands:** AvosLocker began with ransom demands in the hundreds of thousands of dollars but increased those demands into the millions of dollars over time.

Innovation

- **RaaS Platform Development:** AvosLocker is written in C++ and has versions for Windows, Linux, and VMware EXSi. It uses the legitimate AnyDesk software to access victim machines and leverages legitimate anti-debugging services for obfuscation. When possible, AvosLocker will delete system restore points, VSS shadow copies, and any backups to thwart recovery efforts. Older versions use RSA AES-256 and ChaCha20 for encryption, while newer versions use Salas20 for file encryption then it encrypts the file encryption keys with RSA AES-256. AvosLocker leverages the CobaltStrike encoded PowerShell scripts.
- **Targeted Industries:** In the spring of 2022, the FBI issued an alert that AvosLocker ransomware being used in attacks targeting US critical infrastructure.
- **Economic Model**: AvosLocker engages in data exfiltration for double extortion and negotiators may threaten distributed denial-of-service (DDoS) attacks during negotiations.

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HardBit

Performance

- **RaaS Platform:** HardBit is a RaaS was first observed in October of 2022 and quickly released version 2.0 of their ransomware in November. The HardBit ransomware gang has introduced a new tactic – the effectiveness of which is yet to be seen – where they instruct victims to provide details of their cyber insurance coverage to set the ransom demand.
- **Attack Volume:** Attack volume escalated in late 2022 and continued to increase in Q1-2023.
- **Ransom Demands:** HardBit seeks to determine the level of cyber insurance coverage to set the ransom amount, and typically engages in negotiation with the victim to set the final demand.

Innovation

- **RaaS Platform Development:** HardBit is capable of evading security tools and deletes Volume Shadow Copy Service (VSS) leveraging the Service Control Manager as well as deleting the Windows backup utility catalog to thwart encryption rollbacks. HardBit established persistence and is re-executed when the infected system is rebooted.
- **Targeted Industries:** HardBit appears to be opportunistic in their targeting.
- **Economic Model**: HardBit engages in data exfiltration but there is no evidence yet that they use double extortion tactics on victims as they do not maintain a leaks site, and it is possible they may be selling the information.

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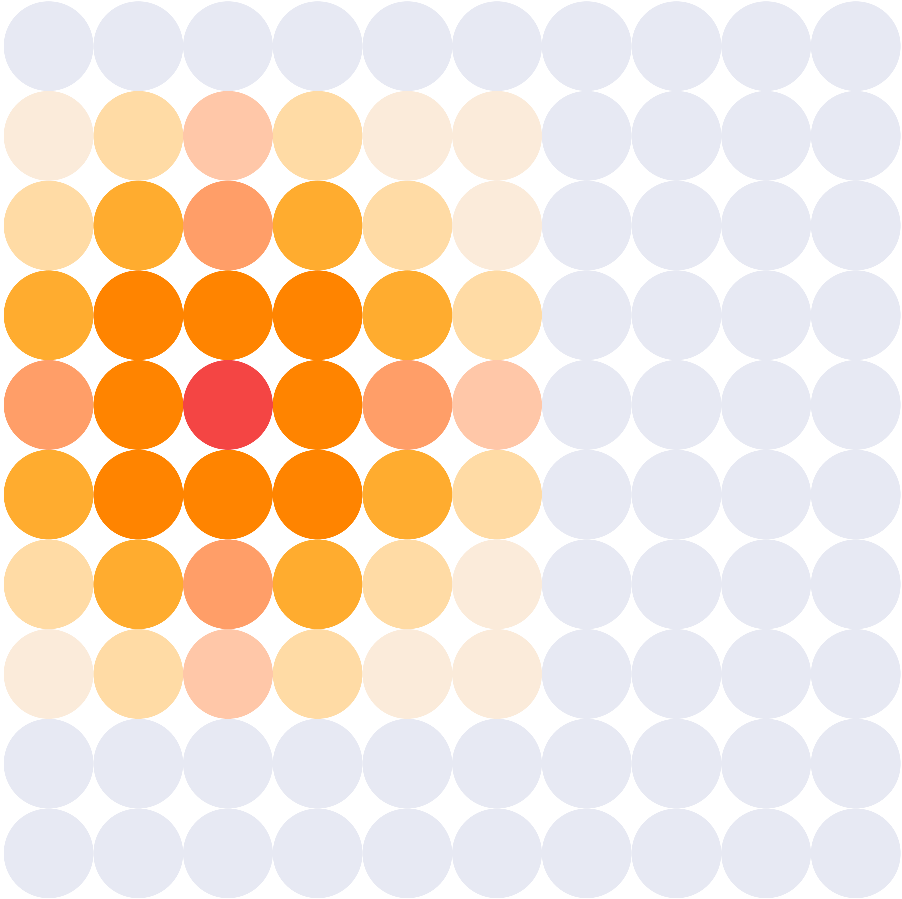

The Halcyon Mission: Defeat Ransomware

Halcyon is the cyber resilience platform that Global 2000 companies rely upon to defeat ransomware-as-a-service attacks. With the fastest endpoint recovery capabilities and multiple layers of resiliency that includes bypass and evasion protection, key capture and automated decryption and data extortion prevention, the Halcyon Anti-Ransomware and Resilience platform reverses the impact of ransomware attacks in just minutes. **For more information on how Halcyon efficiently and effectively defeats ransomware attacks, contact an expert here or visit halcyon.ai to request a free consultation**.

halcyon