Ransomware Spotlight: RansomEXX - Security News

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RansomEXX

By Trend Micro Research

RansomEXX is a ransomware variant that gained notoriety after a spate of attacks in 2020 and continues to be active today. With its targeted nature and history for choosing high-profile victims, we shine our spotlight on RansomEXX to reveal its tactics, techniques, and procedures.

View infographic of "Ransomware Spotlight: RansomEXX"

RansomExx is a ransomware variant that debuted as Defray777 in 2018. It made a name for itself in 2020, after it was used in widely reported attacks on government agencies, manufacturers, and other such high-profile only months apart. By then, it was dubbed RansomEXX after the string “ransom.exx” was found in its binary. In 2020, the group also started a leak site for publishing stolen data.

Today, RansomEXX remains an active name among other ransomware variants like LockBit and Conti. Like other groups, the one running RansomEXX appears to have no qualms about publishing data stolen from its targets. It has also published information stolen from government agencies — a recent case was an attack on a Scottish mental health charity in March 2022, where they published 12GB worth of data that included the personal information and even credit card details of the charity’s volunteers.

This paints a picture of how RansomEXX operates and why it should be thwarted. To help in this regard, this report looks into its specific tactics, tools, and methods, so that organizations can be better prepared to defend against it.

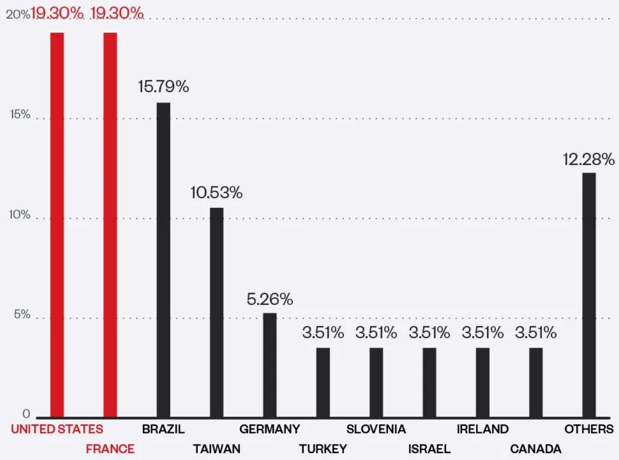
RANSOMWARE SPOTLIGHT

RansomEXX

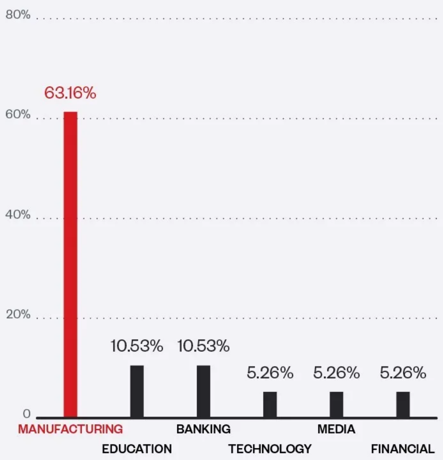
After consecutive attacks in 2020, RansomEXX became one of the more notorious ransomware families to watch out for. Here's an overview of this ransomware variant's activity and techniques:

RansomEXX Detections

Our telemetry shows data on RansomEXX activity or attack attempts from March 31, 2021 to March 31, 2022. We observed RansomEXX activity from all over the globe, but the heaviest concentration of activity was in the USA and France, followed by Brazil*



Based on our detections, RansomEXX was most active in the manufacturing sector, followed by the education and banking sectors.



*Based on data gathered through **Trend Micro™ Smart Protection™ Network** from March 31, 2021 to March 31, 2022*

Infection Routine

Given that RansomEXX operates on the RaaS model and is highly targeted, its infection chain can vary depending on which tools best fit the profile of its next target.

ARRIVAL

Trend Micro™ Managed XDR

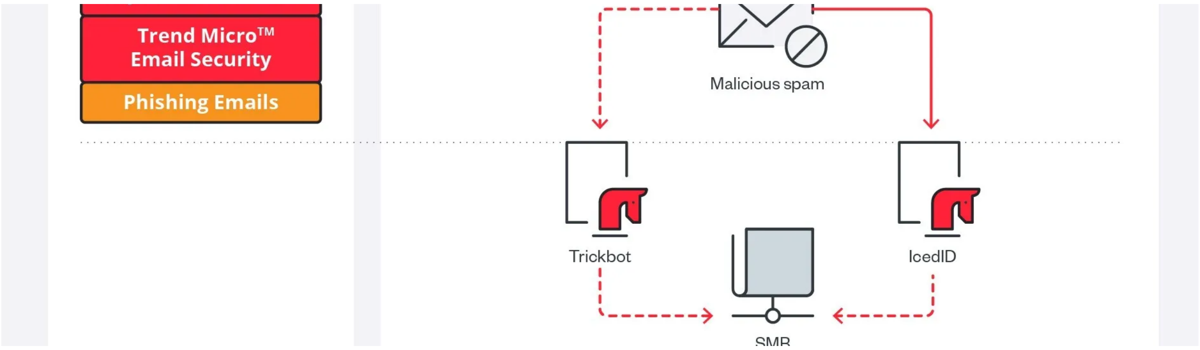
Trend Micro Vision One™

Trend Micro Web Reputation Services

INFECTION

Trend Micro™ XDR and Managed XDR

Trend Micro Vision One



What do organizations need to know about RansomEXX

RansomEXX is another ransomware variant that runs on a ransomware-as-a-service (RaaS) model and has been consistently active since its discovery. Up to the present, RansomEXX has been responsible for attacks and publishing stolen data on its leak site. Here is an overview of what RansomEXX is known for:

- **It has both a Windows and Linux variant.** RansomEXX's Linux version, discovered in late 2020, marked the first known time a major Windows ransomware variant expanded to Linux. This move allows modern ransomware variants to target core infrastructure that are often running on Linux.
- **Linked to the threat group Gold Dupont.** The threat group has been active since 2018. They are a financially motivated cybercriminal group with a main arsenal that includes RansomEXX or Defray777, Cobalt Strike, Metasploit, and Vatet Loader.
- **Uses trojanized legitimate tools.** RansomEXX campaigns, as typical of Gold Dupont attacks, involve malware like Vatet Loader, PyXie RAT, TrickBot, and post-intrusion tools like Cobalt Strike as part of their arsenal. The use of trojanized legitimate tools is common among modern ransomware variants, allowing them to deploy payloads faster while avoiding detection.
- **Hardcoded name of the target in its binary.** One of the key indicators of RansomEXX's targeted nature is how it has its target's name hardcoded in its binary. It demonstrates how RansomEXX attacks involve a certain amount of preparation and are tailored to their chosen victim's profile.

Aside from these known characteristics of RansomEXX, an interesting development in its more recent history is its attack on a mental health charity. Prior to this particular attack, RansomEXX targeted larger organizations like a government agency, a major clothing store in Brazil, and many others. Ransomware groups are known to choose targets based on their ability to pay hefty ransoms, making the attack on the charity organization a particular departure.

Operating as an RaaS, the actors behind RansomEXX conduct reconnaissance before each campaign to help them choose the right tools from their arsenal to build an efficient attack. For example, RansomEXX has employed IcedID and Vatet loader, among others, for an attack in which deploying the ransomware only took five hours after initial access. The next sections look at the regions and industries the group has targeted most often, based on our detections.

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Top affected industries and countries

Our telemetry shows data on RansomEXX activity or attack attempts from March 31, 2021 to March 31, 2022. We observed RansomEXX activity from all over the globe, but the heaviest concentration was in USA in France followed by Brazil. The reason behind this observation is the 2021 RansomEXX attack on a major hardware manufacturer in Taiwan.

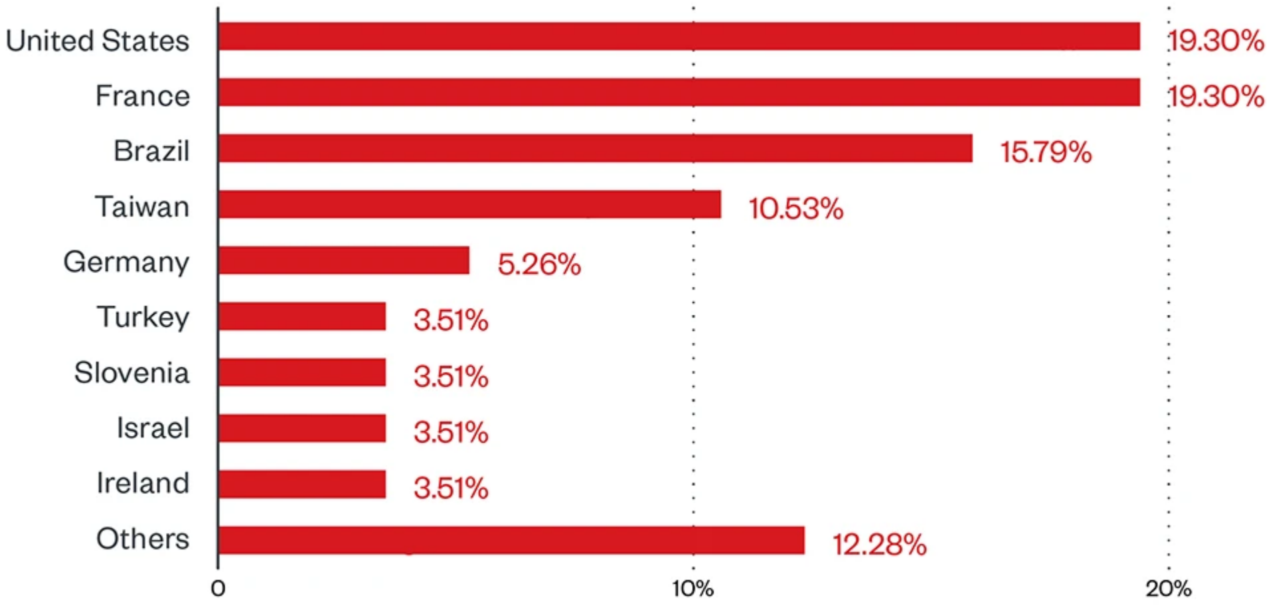


Figure 1. Countries with the highest number of attack attempts for the RansomEXX ransomware (March 31, 2021 to March 31, 2022) Source: *Trend Micro™ Smart Protection Network™* ™

Based on our detections, RansomEXX was most active in the manufacturing sector, followed by the education and banking sectors. Overall, the differences are relatively slim given the small sample size.

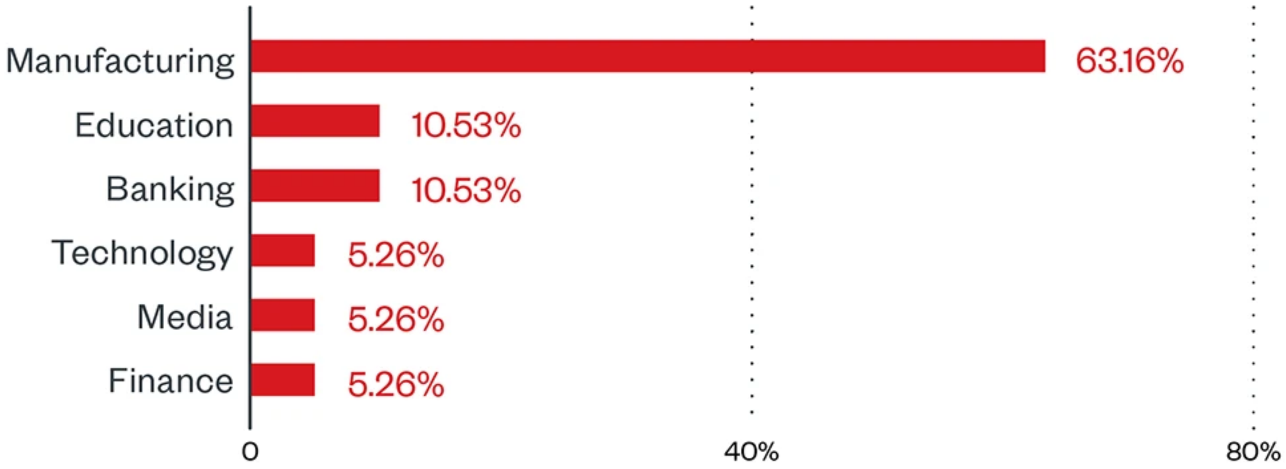


Figure 2. Industries with the highest number of attack attempts for AvosLocker ransomware (March 31, 2021 to March 31, 2022)Source: *Trend Micro™ Smart Protection Network™*

Infection chain and techniques

Given that RansomEXX operates on the RaaS model, its infection chain can vary depending on the target and the affiliate carrying out the various stages of the attack.

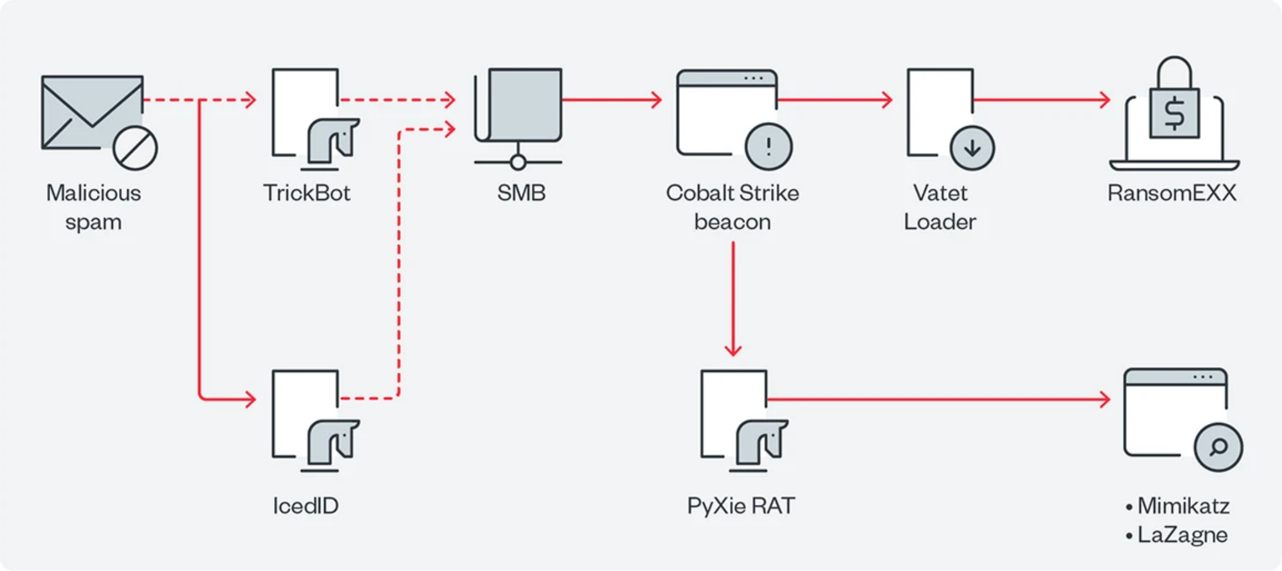


Figure 3. RansomEXX infection chain

Initial Access

RansomEXX has been known to use Malspam to infiltrate machines and deliver multiple tools and related malware before finally deploying the actual ransomware payload.

Execution and Exfiltration

The threat actors make use of different pieces of malware for execution. From our telemetry, we saw IcedID, TrickBot, Cobalt Strike beacons, and PyXie RAT. These are known to be used in other campaigns as well. PyXie RAT also has the capability to exfiltrate data and obtain information from the target machine.

Lateral Movement

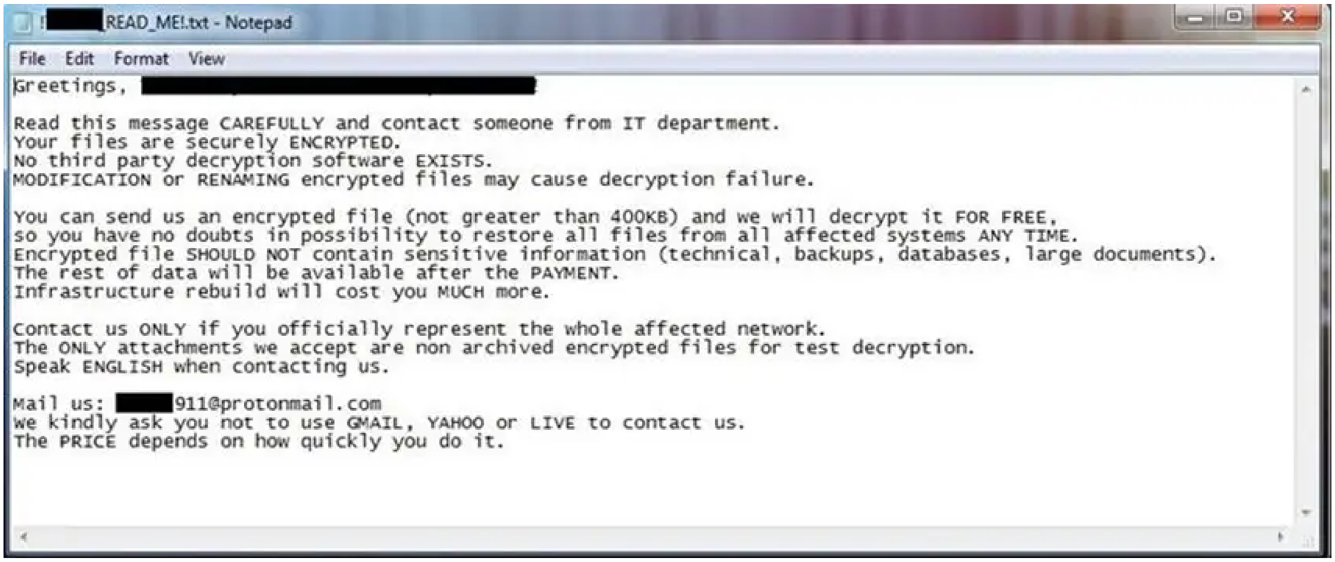
For lateral movement, multiple server message block (SMB) hits were seen on our telemetry. This has been used to deliver VATET loader.

Discovery

Similar to other campaigns, RansomEXX also makes use of Mimikatz and LaZagne to extract credentials from the target machine.

Impact

- The deployment of the final ransomware payload ensures that files are encrypted in the machine.
- RansomEXX encrypts files using advanced encryption standard (AES), while the AES key is encrypted using RSA encryption.



```
Greetings, [redacted]

Read this message CAREFULLY and contact someone from IT department.
Your files are securely ENCRYPTED.
No third party decryption software EXISTS.
MODIFICATION or RENAMING encrypted files may cause decryption failure.

You can send us an encrypted file (not greater than 400KB) and we will decrypt it FOR FREE,
so you have no doubts in possibility to restore all files from all affected systems ANY TIME.
Encrypted file SHOULD NOT contain sensitive information (technical, backups, databases, large documents).
The rest of data will be available after the PAYMENT.
Infrastructure rebuild will cost you MUCH more.

Contact us ONLY if you officially represent the whole affected network.
The ONLY attachments we accept are non archived encrypted files for test decryption.
Speak ENGLISH when contacting us.

Mail us: [redacted]911@protonmail.com
We kindly ask you not to use GMAIL, YAHOO or LIVE to contact us.
The PRICE depends on how quickly you do it.
```

Figure 4. Sample ransom note

Other technical details

- It avoids encrypting the following strings in their file path:
  - \windows\system32\
  - \windows\syswow64\
  - \windows\system\
  - \windows\winsxs\
  - \appdata\roaming\
  - \appdata\local\
  - \appdata\locallow\
  - \all users\microsoft\
  - \inetpub\logs\
  - :\boot\
  - :\perflogs\
  - :\programdata\
  - :\drivers\
  - :\wsus\
  - :\efstmpwp\
  - :\$recycle.bin\
  - crypt_detect
  - cryptolocker
  - ransomware
  - ProgramW6432
  - %ProgramFiles%

- It avoids encrypting the following files with strings in their file name:
    - bootsect.bak
    - iconcache.db
    - thumbs.db
    - debug.txt
    - boot.ini
    - desktop.ini
    - autorun.inf
    - ntuser.dat
    - ntldr
    - ntdetect.com
    - bootfont.bin
    - !{Targeted Company Acronym}_READ_ME!.txt
    - ransom
    - ransomware

- It avoids encrypting files with the following extensions:
    - .ani
    - .cab
    - .cpl
    - .diagcab
    - .diagpkg
    - .dll
    - .drv
    - .hlp
    - .icl
    - .icns
    - .ico
    - .iso
    - .ics
    - .lnk
    - .idx
    - .mod
    - .mpa
    - .msc
    - .msp
    - .msstyles
    - .msu
    - .nomedia
    - .ocx
    - .prf
    - .rtp
    - .scr
    - .shs
    - .spl
    - .sys
    - .theme
    - .thempack
    - .exe
    - .bat
    - .cmd
    - .url
    - .mui
    - .{Targeted Company Acronym

- It terminates the following processes:
  - javaw
  - java
  - sage
  - ks_action
  - ks_email
  - ks_copy
  - ks_sched
  - ks_web
  - ks_im
  - ks_db
  - pvxiosvr
  - pvxwin32
  - xfssvccon
  - wordpad
  - wlmail
  - onenote
  - om8start
  - om8
  - ocssd
  - ocomm
  - ocautoupds
  - notepad
  - notepad++
  - node
  - nginx
  - ncsvc
  - ncs
  - mydesktopservice
  - mydesktopqos
  - mspub
  - msaccess
  - mongod
  - metiix
  - mdccom
  - mbarw
  - mail
  - i_view32
  - infopath
  - exchange
  - excel
  - encsvc
  - duplicati
  - devenv
  - dbsnmp
  - dbeng50
  - database
  - backup

- atom
- arw
- agntsvcencsvc
- agntsvcagntsvc
- agntsvc
- ARSM
- AcrSch2Svc
- Acronis VSS Provider
- AcronisAgent
- AcronixAgent
- Antivirus
- MSSQL$TPS
- MSSQL$TPSAMA
- MSSQL$VEEAMSQL2008R2
- MSSQL$VEEAMSQL2012
- MSSQLFDLauncher
- MSSQLFDLauncher$PROFXENGAGEMENT
- MSSQLFDLauncher$SBSMONITORING
- MSSQLFDLauncher$SHAREPOINT
- MSSQLFDLauncher$SQL_2008
- MSSQLFDLauncher$SYSTEM_BGC
- MSSQLFDLauncher$TPS
- MSSQLFDLauncher$TPSAMA
- MSSQLSERVER
- MSSQLServerADHelper
- MSSQLServerADHelper100
- MSSQLServerOLAPService
- McAfeeEngineService
- McAfeeFramework
- McAfeeFrameworkMcAfeeFramework
- McShield
- McTaskManager
- MongoDB
- MsDtsServer
- MsDtsServer100
- MsDtsServer110
- MySQL57
- MySQL80
- NetMsmqActivator
- OracleClientCache80
- OracleServiceXE
- TrueKey
- TrueKeyScheduler
- TrueKeyServiceHelper
- UI0Detect
- Veeam Backup Catalog Data Service
- VeeamBackupSvc
- VeeamBrokerSvc

- VeeamCatalogSvc
- VeeamCloudSvc
- VeeamDeploySvc
- VeeamDeploymentService
- VeeamEnterpriseManagerSvc
- winword
- vmwp
- vmware-vmx
- vmms
- vmconnect
- vmcompute
- visio
- veeam
- tv_x64
- tv_w32
- tomcat
- thunderbird
- thebat64
- thebat64
- teamviewer
- tbirdconfig
- tasklist
- BackupExecAgentAccelerator
- BackupExecAgentBrowser
- BackupExecDeviceMediaService
- BackupExecJobEngine
- BackupExecManagementService
- BackupExecRPCService
- BackupExecVSSProvider
- DCAgent
- DbxSvc
- EPSecurityService
- EPUpdateService
- ESHASRV
- EhttpSrv
- Enterprise Client Service
- EraserSvc11710
- EsgShKernel
- FA_Scheduler
- IISAdmin
- IMAP4Svc
- KAVFS
- KAVFSGT
- MBAMService
- MBEndpointAgent
- MSExchangeAB
- MSExchangeADTopology
- MSExchangeAntispamUpdate

- MSExchangeES
- MSExchangeEdgeSync
- MSExchangeFBA
- MSExchangeFDS
- MSExchangeIS
- MSExchangeMGMT
- OracleXETNSListener
- PDVFSService
- POP3Svc
- RESvc
- ReportServer
- ReportServer$SQL_2008
- ReportServer$SYSTEM_BGC
- ReportServer$TPS
- ReportServer$TPSAMA
- SAVAdminService
- SAVService
- SDRSVC
- SMTPSvc
- SNAC
- SQL Backups
- SQLAgent$BKUPEXEC
- SQLAgent$CITRIX_METAFRAME
- SQLAgent$CXDB
- SQLAgent$ECWDB2
- SQLAgent$PRACTTICEBGC
- SQLAgent$PRACTTICEMG
- SQLAgent$PROD
- SQLAgent$PROFXENGAGEMENT
- SQLAgent$SBSMONITORING
- SQLAgent$SHAREPOINT
- SQLAgent$SOPHOS
- SQLAgent$SQLEXPRESS
- SQLAgent$SQL_2008
- SQLAgent$SYSTEM_BGC
- SQLAgent$TPS
- SQLAgent$TPSAMA
- VeeamHvIntegrationSvc
- VeeamMountSvc
- VeeamNFSSvc
- VeeamRESTSvc
- VeeamTransportSvc
- W3Svc
- WRSVC
- Zoolz 2 Service
- bedbg
- ekrn
- kavfsslp

- klnagent
- macmnsvc
- masvc
- mfefire
- taskmgr
- synctime
- sublime_text
- stream
- steam
- sqbcoreservice
- screenconnect
- ruby
- qbw32
- pythonw
- python
- processhacker
- powerpnt
- postgres
- php
- outlook
- oracle
- MSExchangeMTA
- MSExchangeMailSubmission
- MSExchangeMailboxAssistants
- MSExchangeMailboxReplication
- MSExchangeProtectedServiceHost
- MSExchangeRPC
- MSExchangeRepl
- MSExchangeSA
- MSExchangeSRS
- MSExchangeSearch
- MSExchangeServiceHost
- MSExchangeThrottling
- MSExchangeTransport
- MSExchangeTransportLogSearch
- MSOLAP$SQL_2008
- MSOLAP$SYSTEM_BGC
- MSOLAP$TPS
- MSOLAP$TPSAMA
- MSSQL$BKUPEXEC
- MSSQL$ECWDB2
- MSSQL$PRACTICEMGT
- MSSQL$PRACTTICEBGC
- MSSQL$PROD
- MSSQL$PROFXENGAGEMENT
- MSSQL$SBSMONITORING
- MSSQL$SHAREPOINT
- MSSQL$SOPHOS

- MSSQL$SQLEXPRESS
- MSSQL$SQL_2008
- MSSQL$SYSTEM_BGC
- SQLAgent$VEEAMSQL2008R2
- SQLAgent$VEEAMSQL2012
- SQLBrowser
- SQLSERVERAGENT
- SQLSafeOLRService
- SQLTELEMETRY
- SQLTELEMETRY$ECWDB2
- SQLWriter
- SQLsafe Backup Service
- SQLsafe Filter Service
- SamSs
- SepMasterService
- ShMonitor
- SmcService
- Smcinst
- SntpService
- Sophos Agent
- Sophos AutoUpdate Service
- Sophos Clean Service
- Sophos Device Control Service
- Sophos File Scanner Service
- Sophos Health Service
- Sophos MCS Agent
- Sophos MCS Client
- Sophos Message Router
- Sophos Safestore Service
- Sophos System Protection Service
- Sophos Web Control Service
- SstpSvc
- Symantec System Recovery
- TmCCSF
- mfemms
- mfevtp
- mozyprobackup
- msftesql$PROD
- ntrtscan
- sacsvr
- sophossps
- svcGenericHost
- swi_filter
- swi_service
- swi_update
- swi_update_64
- tmlisten
- wbengine

MITRE tactics and techniques

Initial Access	Execution	Defense Evasion	Discovery	Impact
T1078 - Valid Accounts *Like other human-operated ransomware families, it can arrive by brute-forcing weak remote desktop protocol (RDP) credentials*	**T1059.003** - Command-Line Interface: Windows Command Shell *Can be executed using cmd.exe*	**T1140** - Deobfuscate/Decode Files or Information *Some strings used, such as the strings that will be displayed on the console, are encrypted, and will only be decrypted when needed* **T1562.001** - Impair Defenses: Disable or Modify Tools *RansomEXX stops services related to security software to avoid being detected*	**T1082** - System Information Discovery *It gathers the system's computer name, which it uses to create a mutex* **T1049** - System Network Connections Discovery *It enumerates available network resources on the infected machine to look for files to encrypt; it does this by using the Wnet API's* **T1083** - File and Directory Discovery *For its file encryption, it enumerates files and directories on each drive while avoiding safe-listed files or directories* **T1486** - Data encrypted for impact *It encrypts*	**T1489** - Service stop *The ransomware stops services to avoid file access violations when encrypting files that are still being accessed* **T1490** -Inhibit system recovery *Inhibits restoration of files from backup by executing the following commands:* *- wbadmin.exe delete catalog -quiet* *- bcdedit.exe /set {default} recoveryenabled no* *- bcdedit.exe /set {default} bootstatuspolicy ignoreallfailures* *- schtasks.exe /Change /TN “\Microsoft\Windows\SystemRestore\SR" /disable fsutil.exe usn deletejournal /D C:*

Initial Access	Execution	Defense Evasion	Discovery	Impact
			files using AES encryption while the AES key is encrypted using RSA encryption	

Summary of malware, tools, and exploits used

Security teams can watch out for the presence of the following malware tools and exploits that are typically used in RansomEXX attacks:

Initial Access	Execution	Discovery	Lateral Movement	Impact
Malspam	IcedID	Mimikatz	SMB	RansomEXX
	TrickBot	LaZagne		
	PyXie RAT			
	Cobalt Strike beacon			
	Vatet Loader			

Recommendations

RansomEXX is not as active as it had been in 2020, when its consecutive attacks made it one of the newer ransomware families to watch out for. However, being a highly targeted and human-operated ransomware, its attacks affect its victims and their reputation significantly. The combination of memory-based techniques, legitimate Windows tools, and post-intrusion contribute a lot to RansomEXX's successes.

Preventing the attacks from the outset is key to avoiding the worst of ransomware campaigns. Organizations should learn from past RansomEXX campaigns and be vigilant against initial access tactics. Users should be wary of enabling macros, and of documents that prompt them to do so.

To help defend systems against similar threats, organizations can establish security frameworks that can allocate resources systematically for establishing solid defenses against ransomware.

Here are some best practices that can be included in these frameworks:

Audit and inventory

- Take an inventory of assets and data.
- Identify authorized and unauthorized devices and software.
- Make an audit of event and incident logs.

Configure and monitor

- Manage hardware and software configurations.
- Grant admin privileges and access only when necessary to an employee’s role.
- Monitor network ports, protocols, and services.
- Activate security configurations on network infrastructure devices such as firewalls and routers.
- Establish a software allowlist that only executes legitimate applications.

Patch and update

- Conduct regular vulnerability assessments.
- Perform patching or virtual patching for operating systems and applications.
- Update software and applications to their latest versions.

Protect and recover

- Implement data protection, back up, and recovery measures.
- Enable multifactor authentication (MFA).

Secure and defend

- Employ sandbox analysis to block malicious emails.
- Deploy the latest versions of security solutions to all layers of the system, including email, endpoint, web, and network.
- Detect early signs of an attack such as the presence of suspicious tools in the system.
- Use advanced detection technologies such as those powered by AI and machine learning.

Train and test

- Regularly train and assess employees on security skills.
- Conduct red-team exercises and penetration tests.

A multilayered approach can help organizations guard possible entry points into the system (endpoint, email, web, and network). Security solutions that can detect malicious components and suspicious behavior can also help protect enterprises.

- Trend Micro Vision One™ provides multilayered protection and behavior detection, which helps block questionable behavior and tools early on before the ransomware can do irreversible damage to the system.

- Trend Micro Cloud One™ Workload Security protects systems against both known and unknown threats that exploit vulnerabilities. This protection is made possible through techniques such as virtual patching and machine learning.
- Trend Micro™ Deep Discovery™ Email Inspector employs custom sandboxing and advanced analysis techniques to effectively block malicious emails, including phishing emails that can serve as entry points for ransomware.
- Trend Micro Apex One™ offers next-level automated threat detection and response against advanced concerns such as fileless threats and ransomware, ensuring the protection of endpoints.

Indicators of Compromise (IOCs)

The IOCs for this article can be found here. Actual indicators might vary per attack.