

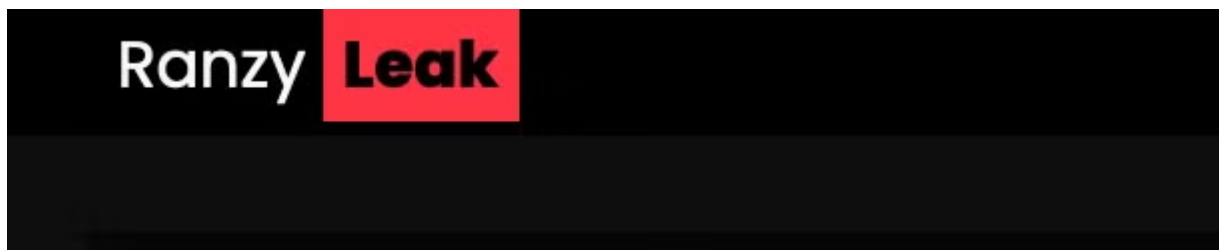
# Ranzy Ransomware | Better Encryption Among New Features of ThunderX Derivative - SentinelLabs

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## Background

Ranzy ransomware emerged in September/October this year, and appears to be an evolution of ThunderX and, to a lesser extent, Ako ransomware. Ranzy shares many features and under-the-hood elements with its predecessors. However there have been a few key updates, including tweaks to encryption, methods of exfiltration, and the (now commonplace) use of a public “leak blog” to post victim data for those who do not comply with the ransom demand.



## Evolution of Ranzy Ransomware

At its heart, Ranzy is a RaaS (Ransomware as a Service) offering. Payloads are typically distributed via email (phishing), although there are some reports of delivery via the web (drive-by downloads). The “rebrand” from ThunderX to Ranzy occurred after [free-decryption programs](#) for ThunderX started to appear. A free decryption tool for ThunderX was posted to the [NoMoreRansom](#) project in September of this year.

This ‘rebrand’ distances the actors from ThunderX as well as improves upon the encryption mechanism so as to reduce the feasibility of future, free, decryption tools. With ThunderX emerging around August 2020, it would seem as though the lifecycle of this particular family has been rather short throughout its evolution. Note that some early samples of Ako were observed around January 2020.

As we observed with Ako and ThunderX, the primary delivery method observed is email (phish) with the malicious payload attached. Current samples (Ranzy Locker 1.1) append a `.ranzy` extension to encrypted files (with early versions using just `.RNZ` ). Also of note, current Ranzy Locker payloads tend to include the same PDB patch as their ThunderX ancestors:

```
C:\UsersGh0StDesktopThunderXReleaseLockerStub.pdb
```

```
4786
4787     uStack4 = 0x54;
4788     local_64 = (void *)0x0;
4789     local_60 = 0;
4790     local_5c = 0;
4791     local_8 = 0;
4792     local_58 = param_1;
4793     DVar1 = GetLogicalDrives();
4794     uVar2 = 0;
4795     do {
4796         local_58 = (void *)0x104;
4797         local_54 = uVar2 + 0x41 & 0xffff;
4798         local_20 = (WCHAR)local_54;
4799         local_1c = 0;
4800         local_1e = 0x3a;
4801         FUN_00403437(local_38, (void *)0x104);
4802         lpRemoteName = (undefined8 *)local_38;
4803         if (7 < local_24) {
4804             lpRemoteName = local_38[0];
4805         }
4806         WNetGetConnectionW(&local_20, (LPWSTR)lpRemoteName, (LPDWORD)&local_58);
4807         FUN_00406a49((short **)local_38);
4808         FUN_00403401(local_50, (undefined8 *)local_38);
4809         FUN_00403715(local_38);
4810         local_8._0_1_ = 1;
4811         if (local_40 == 0) {
4812             if ((DVar1 & 1 << ((byte)uVar2 & 0x1f)) != 0) {
4813                 FUN_00403740(local_50, (undefined8 *)&local_54, (void *)0x1);
4814                 FUN_0040438b(local_50, (undefined8 *)&DAT_0041d598, 2);
4815                 goto LAB_00406b85;
4816             }
```

## Improved Encryption Routines

Ranzy uses a combination of encryption algorithms to affect targeted data. An embedded RSA-2048 key is built into the ransomware payloads, with Salsa20 being utilized for specific file/data encryption. Ranzy contains functionality to locate and encrypt additional local drives ( `GetLogicalDrives` ), as well as adjacent (and accessible) network drives ( `NetShareEnum` ).

Ranzy, like ThunderX and Ako, will attempt to encrypt multiple file types by extension while excluding specific extensions and/or paths based on strings. Files that do not contain the `.dll` , `.exe` , `.ini` , `.lnk` , `.key` , `.rdp` are subject for inclusion. The ransomware will also exclude specific critical paths with strings including **AppData**, **boot**, **PerfLogs**, **PerfBoot**, **Intel**, **Microsoft**, **Windows** and **Tor Browser**.



Once launched, Ranzy payloads take a number of steps in order to both ensure maximum impact (encryption) as well as inhibiting standard recovery options where possible. Specific commands, and syntax, can vary across Windows versions and flavors. This includes the use of standard system tools to manipulate VSS and boot time recovery options.

After execution, the ransomware will swiftly call WMIC.EXE with the following syntax:

```
wmic.exe SHADOWCOPY /nointeractive
```

The following WBADMIN, BCDEDIT, and VSSADMIN commands are then issued to shift the victim host to the desired, compromised, state:

```
wbadmin DELETE SYSTEMSTATEBACKUP
```

```
wbadmin DELETE SYSTEMSTATEBACKUP -deleteOldest
```

```
bcdedit.exe /set {default} recoveryenabled No
```

```
bcdedit.exe /set {default} bootstatuspolicy ignoreallfailures
```

```
vssadmin.exe Delete Shadows /All /Quiet
```

Ranzy Locker makes use of the Windows '[Restart Manager](#)' API to assist in terminating any problematic process standing in the way of encryption or further manipulation of target systems. It is not uncommon for explorer.exe or other running processes to quickly exit and relaunch once Ranzy's process begins.

```
5521 FUN_0040a1e0(local_4c,0,0x42);
5522 iVar1 = RmStartSession(&local_50,0,local_4c);
5523 if (iVar1 == 0) {
5524     if (7 < (uint)param_1[5]) {
5525         param_1 = (undefined4 *)*param_1;
5526     }
5527     local_60 = param_1;
5528     iVar1 = RmRegisterResources(local_50,1,&local_60,0,0,0,0);
5529     if (iVar1 == 0) {
5530         local_54 = 0;
5531         local_58 = 0;
5532         pvVar2 = (void *)0x0;
5533         local_5c = 0;
5534         uVar3 = 0;
5535         do {
5536             iVar1 = RmGetList(local_50,&local_58,&local_54,pvVar2,&local_5c);
5537             if (iVar1 == 0) {
5538                 if (local_5c == 0) {
5539                     RmShutdown(local_50,0,0);
5540                 }
5541                 break;
5542             }
5543             if (iVar1 != 0xea) goto LAB_004077d9;
5544             local_54 = local_58;
5545             if (pvVar2 != (void *)0x0) {
5546                 thunk_FUN_0040c5cd(pvVar2);
5547             }
5548             pvVar2 = (void *)FUN_004088c6(-(uint)((int)((ulonglong)local_54 * 0x29c >> 0x20) != 0) |
5549                                     (uint)((ulonglong)local_54 * 0x29c));
5550             bVar4 = uVar3 < 3;
5551             uVar3 = uVar3 + 1;
5552         } while (bVar4);
5553         if (pvVar2 != (void *)0x0) {
5554             thunk_FUN_0040c5cd(pvVar2);
5555         }
5556         if (local_50 != -1) {
5557             RmEndSession(local_50);
5558         }
5559     }
```

Both Ranzy versions analyzed appear to retain the same multithreading capabilities that first appeared in ThunderX. The payload will first identify the number of processors available via `GetSystemInfo()`. Following this, the ransomware will leverage `IoCompletionPort` to generate a queue of files which are to be encrypted. Then, the ransomware is able to allocate a number of threads (equal to 2x the count of processors identified). This allows for fairly competitive (and therefore dangerous) encryption speeds when compared to the likes of Maze or NetWalker.

```
GetSystemInfo((LPSYSTEM_INFO)local_38);
local_24 = local_24 * 2;
DAT_00421cf4 = CreateIoCompletionPort((HANDLE)0xffffffff,(HANDLE)0x0,0,local_24);
if (DAT_00421cf4 != (HANDLE)0xffffffff) {
    while (local_24 != 0) {
        pvVar1 = FUN_0040c74f((LPSECURITY_ATTRIBUTES)0x0,0,L"오르레\xe800참", (LPCWSTR)0x0,0,
            (DWORD *)0x0);
        if (pvVar1 != (HANDLE)0x0) {
            local_20 = 0;
            local_1c = 7;
            local_30[0] = 0;
            local_8 = 0;
            FUN_00403740(local_30,(undefined8 *)L"pool",&DAT_00000004);
            local_18 = pvVar1;
            FUN_00407ea0((undefined8 *)local_30);
            local_8 = 0xffffffff;
            FUN_00403715((void **)local_30);
        }
        local_24 = local_24 - 1;
    }
    DAT_00421ce5 = 1;
    FUN_00404cb2();
}
FUN_00414e78();
return;
}
```

## Post Encryption Behavior

Ranzy’s ransom notes are deposited into each folder containing affected files/data. Across the analyzed versions, these are always identified with the name **readme.txt**. There are minor variations in the ransom notes across versions of the ransomware. That being said, the basic structure and content across ThunderX, Ranzy and Ranzy 1.1 are all quite similar.

Examples of the Ranzy and Ranzy 1.1 ransom notes can be seen below.

```
Attention! Your network has been locked by Ranzy Locker
Your computers and server are locked now.
All encrypted files have extension: .RNZ

---- How to restore my files? ----

All files on each host in your network encrypted with strongest encryption algorithms
Backups are deleted or formatted, do not worry, we can help you restore your files

Files can be decrypted only with private key - this key stored on our servers
You have only one way for return your files back - contact us and receive universal decryption program

Do not worry about guarantees - you can decrypt any 3 files FOR FREE as guarantee by email

---- Attention ----

!!! All your sensitive data was downloaded to our servers
!!! We are ready to publish this data in our blog with your Company Name, if you will not contact with us by email
!!! Only we can delete your files from our servers
!!! Only we can restore all your files without any LOSS

---- Contact us ----

Contact us by email: # [redacted] .com or [redacted].com

And attach in first letter this file or just send all info below (copy all info!):

key: e [redacted] :0HkzNT [redacted] f212 [redacted] JQ0
personal id: L [redacted]
```

```
--== Ranzy Locker 1.1 ==--  
Attention! Your network has been locked.  
Your computers and server are locked now.  
All encrypted files have extension: .ranzy  
  
---- How to restore my files? ----  
All files on each host in your network encrypted with strongest encryption algorithms  
Backups are deleted or formatted, do not worry, we can help you restore your files  
Files can be decrypted only with private key - this key stored on our servers  
You have only one way for return your files back - contact us and receive universal decryption program  
Do not worry about guarantees - you can decrypt any 3 files FOR FREE as guarantee  
  
---- How to get your files back ----  
You have 2 ways for open our website and contact with us:  
1. Open via any browser (this way can be blocked so its better to use way 2)  
  a. Open any browser.  
  b. Open our website: https://[redacted]n6QR  
2. Open via TOR Browser  
  a. Download TOR Browser here: https://www.torproject.org/download/  
  b. Open TOR website: http://[redacted]JR  
    !! This page can be open only in TOR Browser.  
All instructions how to decrypt your files you can find on our website.  
  
!! This is only way to get your files back - do not use third-party company or software because you can lose all your files.  
  
---- Recovery information ----  
key: eyJleHQ:  
personal id: [redacted]
```

Perhaps the most significant difference between the ransom notes is with Ranzy 1.1, victims are instructed to access a TOR-based portal for payment, further instructions and “support” (live chat). Previous variations simply instructed victims to reach out via email for further instructions.

Non-compliant victims are currently being cataloged on the group’s blog, entitled “Ranzy Leak”. As of this writing there are 3 victims listed on the site, representing the electrical engineering, security & investigations, and Government administration industries.

## Conclusion

The Ranzy, ThunderX and Ako family is yet another example of how nimble and aggressive these threats and the actors behind them are becoming. With little to no barrier for entry (beyond a small investment of cash), any enterprising cybercriminal can gain access to, and manage, ransomware like Ranzy, potentially causing a great deal of financial damage. As we know, this damage is not limited to the direct payment of the ransom ([which you should avoid](#)), but now also includes any penalties associated with data breaches, public posting of private data, GDPR / compliance fallout, and beyond.

These threats are very agile, and it is clear that the actors behind them are paying attention to the efforts on the defense side. For example, when decryptor utilities are released, they quickly update their code and start distributing better and stronger payloads to nullify any workarounds.

## Indicators of Compromise

### SHA256

```
c4f72b292750e9332b1f1b9761d5aefc07301bc15edf31adeaf2e608000ec1c9
393fd0768b24cd76ca653af3eba9bff93c6740a2669b30cf59f8a064c46437a2
90691a36d1556ba7a77d0216f730d6cd9a9063e71626489094313c0afe85a939
bbf122cce1176b041648c4e772b230ec49ed11396270f54ad2c5956113caf7b7
ade5d0fe2679fb8af652e14c40e099e0c1aaea950c25165cebb1550e33579a79
```

### SHA1

```
43ccf398999f70b613e1353cfb6845ee09b393ca
35a663c2ce68e48f1a6bcb71dc92a86b36d4c497
38b86dacb1568af968365663c548bd9556fe0849
20102532dfc58bc8256f507da4a177850f349f7a
9a77e2f8bf0da35f7d84897c187e3aff322f024d
```

### MITRE ATT&CK

Indicator Removal on Host: File Deletion [T1070.004](#)

Modify Registry [T1112](#)

Query Registry [T1012](#)

System Information Discovery [T1082](#)

Peripheral Device Discovery [T1120](#)

Inhibit System Recovery [T1490](#)

Create or Modify System Process: Windows Service [T1031](#)

Exfiltration [TA0010](#)

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Source: <https://labs.sentinelone.com/ranzy-ransomware-better-encryption-among-new-features-of-thunderx-derivative/>