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Indicators of Compromise Associated with Ragnar Locker Ransomware

Summary

The FBI first observed Ragnar Locker¹ ransomware in April 2020, when unknown actors used it to encrypt a large corporation's files for an approximately \$11 million ransom and threatened to release 10 TB of sensitive company data. Since then, Ragnar Locker has been deployed against an increasing list of victims, including cloud service providers, communication, construction, travel, and enterprise software companies. The FBI is providing details of Ragnar Locker ransomware to assist with understanding the code and identifying the activity. Ragnar Locker actors first obtain access to a victim's network and perform reconnaissance to locate network resources, backups, or other sensitive files for data exfiltration. In the final stage of the attack, actors manually deploy the ransomware, encrypting the victim's data.

Technical Details

The Ragnar Locker ransomware family² is frequently changing obfuscation techniques to avoid detection and prevention. The Ragnar Locker ransomware is identified by the extension ".RGNR_<ID>," where <ID> is a hash of the computer's NETBIOS name. Furthermore, the actors, identifying themselves as "RAGNAR_LOCKER," leave a .txt ransom note, with instructions on how to pay

¹ Ragnar Locker, also written as RagnarLocker and Ragnar_Locker, has no association with Ragnarok ransomware.

² Ransomware family is a group of binaries associated to several ransoms or actor groups.

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the ransom and decrypt the data. Ragnar Locker has used VMProtect, UPX, and custom packing algorithms. Ragnar Locker has been deployed within an attacker's custom Windows XP virtual machine on a target's site.

Ragnar Locker uses Windows API GetLocaleInfoW to get the infected machine's current locale. If the victim's locale is found to be "Azerbaijani," "Armenian," "Belorussian," "Kazakh," "Kyrgyz," "Moldavian," "Tajik," "Russian," "Turkmen," "Uzbek," "Ukrainian," or "Georgian," the process will terminate.

```
00401F08 lea eax, dword ptr ss:[ebp-C0]
00401F0E mov dword ptr ss:[ebp-108], eax [ebp-108]:L"Azerbaijani"
00401F14 lea eax, dword ptr ss:[ebp-6C]
00401F17 mov dword ptr ss:[ebp-104], eax [ebp-104]:L"Armenian"
00401F1D lea eax, dword ptr ss:[ebp-D8]
00401F23 mov dword ptr ss:[ebp-100], eax [ebp-100]:L"Belorussian"
00401F29 lea eax, dword ptr ss:[ebp-28]
00401F2C mov dword ptr ss:[ebp-FC], eax [ebp-FC]:L"Kazakh"
00401F32 lea eax, dword ptr ss:[ebp-38]
00401F35 mov dword ptr ss:[ebp-F8], eax [ebp-F8]:L"Kyrgyz"
00401F3B lea eax, dword ptr ss:[ebp-94]
00401F41 mov dword ptr ss:[ebp-F4], eax [ebp-F4]:L"Moldavian"
00401F47 lea eax, dword ptr ss:[ebp-C]
00401F4A mov dword ptr ss:[ebp-F0], eax [ebp-F0]:L"Tajik"
00401F50 lea eax, dword ptr ss:[ebp-48]
00401F53 mov dword ptr ss:[ebp-EC], eax [ebp-EC]:L"Russian"
00401F59 lea eax, dword ptr ss:[ebp-58]
00401F5C mov dword ptr ss:[ebp-E8], eax [ebp-E8]:L"Turkmen"
00401F62 lea eax, dword ptr ss:[ebp-18]
00401F65 mov dword ptr ss:[ebp-E4], eax [ebp-E4]:L"Uzbek"
00401F6B lea eax, dword ptr ss:[ebp-A8]
00401F71 mov dword ptr ss:[ebp-E0], eax [ebp-E0]:L"Ukrainian"
00401F77 lea eax, dword ptr ss:[ebp-80]
```

Figure 1 _ Code Snippet

The ransomware also checks for current infections to prevent multiple encryption transforms of the data, potentially corrupting it. The binary gathers the unique machine GUID, operating system product name, and user name currently running the process. This data is sent through a custom hashing algorithm to generate a unique identifier: <HashedMachineGuid>-<HashedWindowsProductName>-<HashedUser>-<HashedComputerName>-<HashedAllDataTogether>.

The Ragnar Locker ransomware identifies all attached hard drives, whether assigned a drive letter or not, using Windows APIs: CreateFileW, DeviceIoControl, GetLogicalDrives, and SetVolumeMountPointA. The ransomware assigns a drive letter to any volumes not assigned a logical drive



letter and makes them accessible. These newly attached volumes are later encrypted during the final stage of the binary.

Ragnar Locker iterates through all running services and terminates services commonly used by managed service providers to remotely administer networks.

The list of services terminated includes:

vss	sql	mentas	mepocs	sophos	dfs	splashtop
veeam	backup	pulseway	logme	logmein	mysql	connectwise

Ragnar Locker also terminates the following running processes:

sql	mysql	veeam	oracle	ocssd
dbnmp	synctime	agentsvc	isqlplussvc	xfssvccon
mydesktopservice	ocautoupds	encsvc	firefox	tbirdconfig
mydesktopqos	ocomm	dbeng50	sqbcoreservice	excel
infopath	msaccess	msspub	onenote	outlook
powerpnt	steam	thebat	thunderbird	visio
winword	wordpad	EduLink2SIMS	bengine	benetns
beserver	pvlsvr	beremote	VxLockdownServer	postgres
dfssvc.exe	SavService.exe	OWSTIMER	SAVAdminService	wsstracing
Fdhost	dfsrs.exe	sophos	WSSADMIN	swc_service.exe

The malware then attempts to silently delete all Volume Shadow Copies preventing user recovery of encrypted files, using two different methods:

- >vssadmin delete shadows /all /quiet
- >wmic.exe.shadowcopy.delete

Lastly, Ragnar Locker encrypts all available files of interest. Instead of choosing which files to encrypt, Ragnar Locker chooses which folders it will *not* encrypt. Taking this approach allows the computer to continue to operate “normally” while the malware encrypts files with known and unknown extensions containing data of value to the victim. For example, if the logical drive being processed is the C: drive, the malware does not encrypt files in the following folders:

- Windows
- Windows.old
- Tor browser
- Internet Explorer
- Mozilla
- Mozilla Firefox
- \$Recycle.Bin
- ProgramData



- Google
- Opera
- Opera Software

Also, when iterating through files, the malware does not encrypt files with the following extensions:

- .db
- .sys
- .dll
- .lnk
- .msi
- .drv
- .exe

Recommended Mitigations

- Back-up critical data offline.
- Ensure copies of critical data are in the cloud or on an external hard drive or storage device. This information should not be accessible from the compromised network.
- Secure your back-ups and ensure data is not accessible for modification or deletion from the system where the data resides.
- Install and regularly update anti-virus or anti-malware software on all hosts.
- Only use secure networks and avoid using public Wi-Fi networks. Consider installing and using a VPN.
- Use multi-factor authentication with strong passwords.
- Keep computers, devices, and applications patched and up-to-date.

Reporting Notice

The FBI encourages recipients of this document to report information concerning suspicious or criminal activity to their local FBI field office. When available, each report submitted should include the date, time, location, type of activity, number of people, and type of equipment used for the activity, the name of the submitting company or organization, and a designated point of contact.

Administrative Note

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