LockBit 2.0: How This RaaS Operates and How to Protect Against It

unit42.paloaltonetworks.com/lockbit-2-ransomware/

Amer Elsad, JR Gumarin, Abigail Barr June 9, 2022

By Amer Elsad, JR Gumarin and Abigail Barr

June 9, 2022 at 6:00 AM

Category: Ransomware, Threat Briefs and Assessments

Tags: LockBit 2.0, RaaS

This post is also available in: 日本語 (Japanese)

Executive Summary

LockBit 2.0 is ransomware as a service (RaaS) that first emerged in June 2021 as an upgrade to its predecessor LockBit (aka ABCD Ransomware), which was first observed in September 2019.

Since its inception, the LockBit 2.0 RaaS attracted affiliates via recruitment campaigns in underground forums, and thus became particularly prolific during the third quarter of calendar year 2021. The LockBit 2.0 operators claimed to have the fastest encryption software of any active ransomware strain as of June 2021, claiming accordingly that this added to its effectiveness and ability to disrupt the ransomware landscape.

While several top-tier RaaS affiliate programs, such as Babuk, DarkSide and REvil (aka Sodinokibi) disappeared from the underground in 2021, LockBit 2.0 continued to operate and gradually became one of the most active ransomware operations. While Conti was recognized as being the most prolific ransomware deployed in 2021 per our 2022 Unit 42 Ransomware Threat Report, LockBit 2.0 is the most impactful and widely deployed ransomware variant we have observed in all ransomware breaches during the first quarter of 2022, considering both leak site data and data from cases handled by Unit 42 incident responders.

According to data analysis of ransomware groups' dark web leak sites, LockBit 2.0 was the most impactful RaaS for five consecutive months. As of May 25, LockBit 2.0 accounted for 46% of all ransomware-related breach events for 2022. And the LockBit 2.0 RaaS leak site has the most significant number of published victims, with over 850 in total.

Additionally, LockBit 2.0 has affected many companies globally, with top victims based in the U.S., Italy and Germany. Its most highly targeted industry verticals include professional services, construction, wholesale and retail, and manufacturing.

Palo Alto Networks customers receive protections against LockBit 2.0 attacks from Cortex XDR, as well as from the WildFire cloud-delivered security subscription for the Next-Generation Firewall. (Please see the Conclusion section for more detail.)

Related Unit 42 Topics Ransomware, Ransomware Threat Report

Table of Contents

LockBit 2.0 Overview

LockBit 2.0 is another example of RaaS that leverages double extortion techniques as part of the attack to pressure victims into paying the ransom.

In some cases, LockBit 2.0 operators have performed DDoS attacks on the victims' infrastructure as well as using a leak site. This practice is known as triple extortion, a tactic observed in groups like BlackCat, Avaddon and SunCrypt in the past.

Like other ransomware families such as BlackByte, LockBit 2.0 avoids systems that use Eastern European languages, including many written with Cyrillic alphabets.

Unlike other RaaS programs that don't require the affiliates to be super technical or savvy, LockBit 2.0 operators allegedly only work with experienced penetration testers, especially those experienced with tools like Metasploit and Cobalt Strike. Affiliates are tasked with gaining initial access to the victim network, allowing LockBit 2.0 to conduct the rest of the attack.

LockBit 2.0 has been observed changing infected computers' backgrounds to a ransomware note. The ransomware note was also used to recruit insiders from victim organizations. The notes claimed the threat actors would pay "millions of dollars" to insiders who provided access to corporate networks or facilitated a ransomware infection by opening a phishing email and/or launching a payload manually. The threat actors also expressed interest in other access methods such as RDP, VPN and corporate email credentials. In exchange, they offer a cut of the paid ransom.

Victimology

LockBit 2.0 targets organizations opportunistically. The operators work with initial access brokers to save time and allow for a larger profit potential. While typically seeking victims of opportunity, LockBit 2.0 does appear to have victim limitations. The group announced that they would not target healthcare facilities, social services, educational institutions, charitable organizations and other organizations that "contribute to the survival of the human race". However, despite these claims, there have been instances of affiliates undermining these guidelines by still opting to attack industry verticals such as healthcare and education.

Organizations in Europe and the U.S. are hit more often by LockBit 2.0 than those in other countries, likely due to the high profitability and insurance payouts.

Leak Site Data

During the first calendar year quarter of 2022, LockBit 2.0 persisted as the most impactful and the most deployed ransomware variant we observed in all ransomware breaches shared on leak sites.

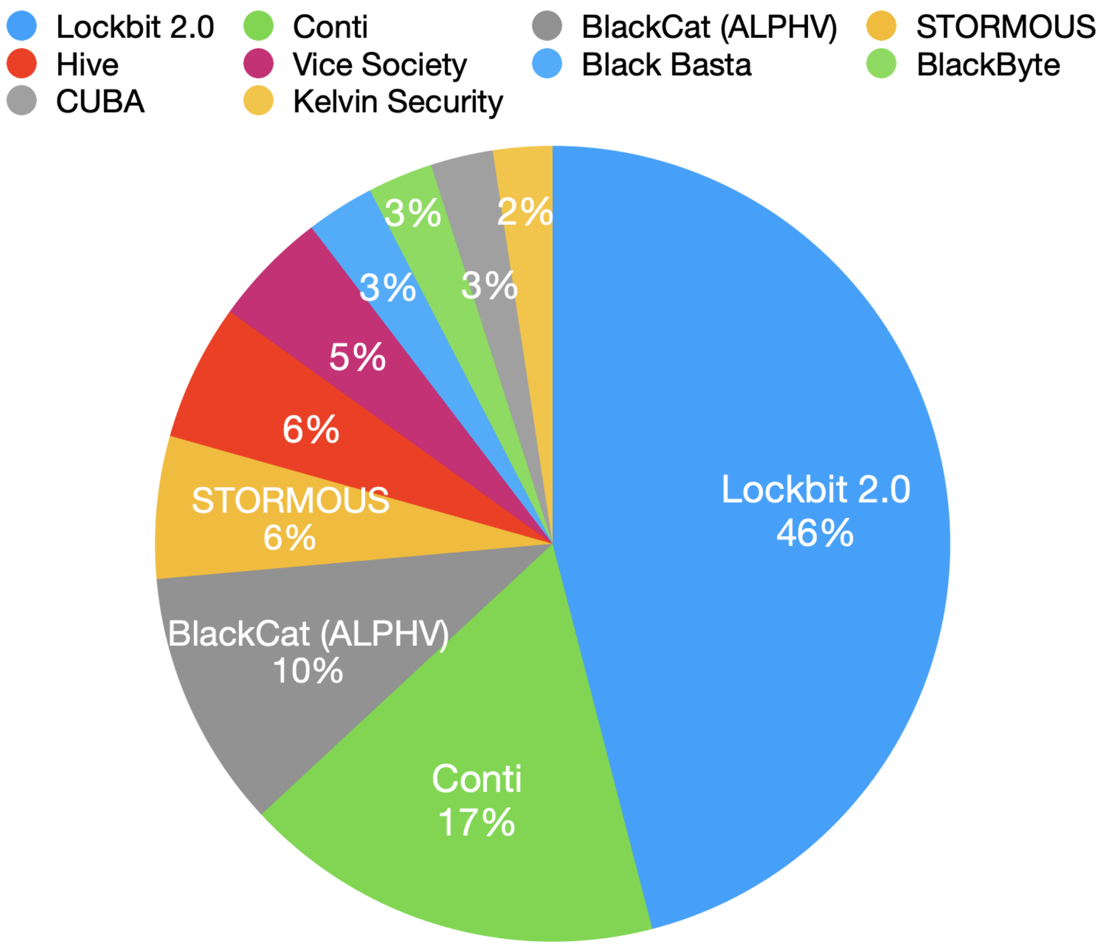
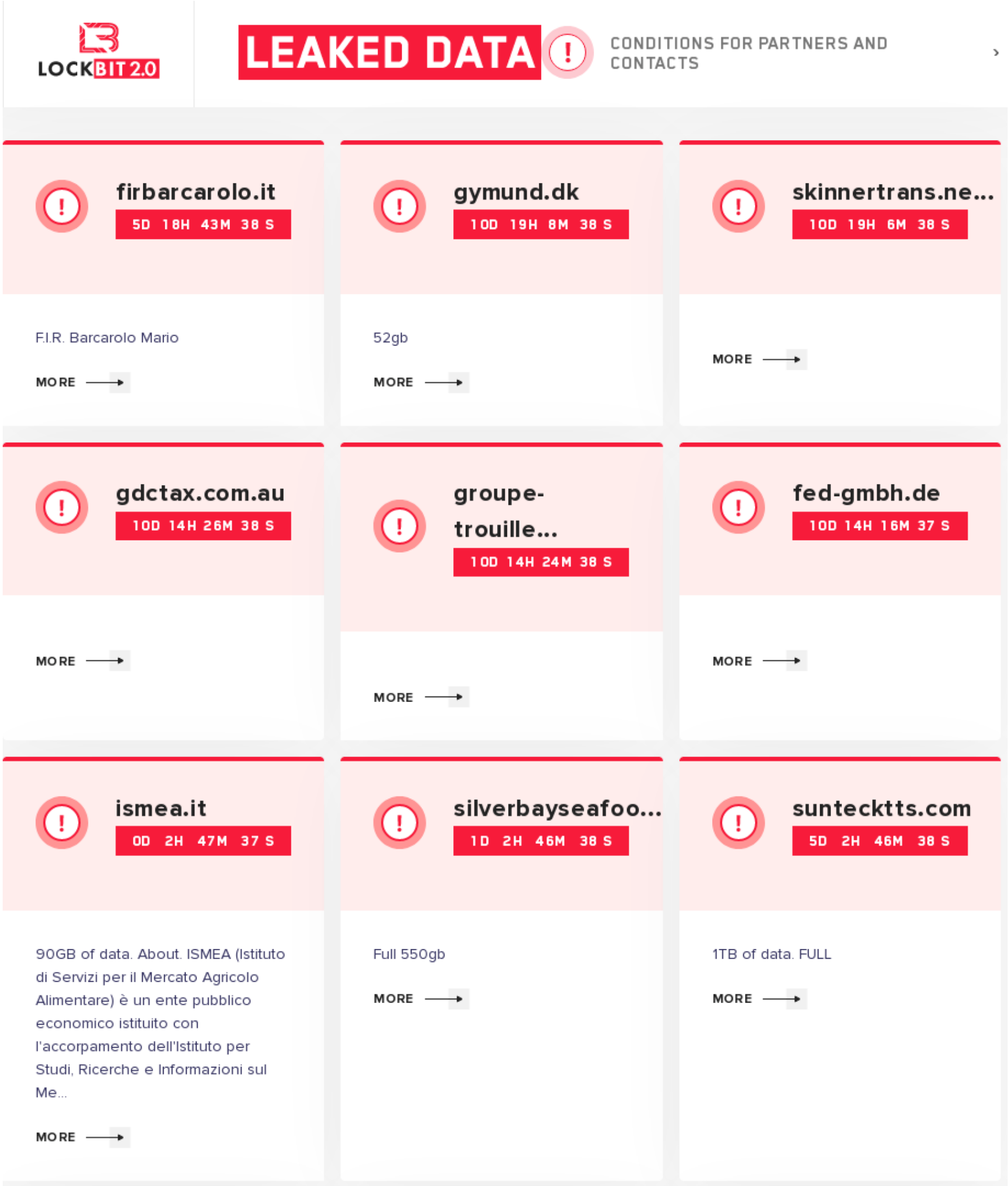


Figure 1. Ransomware leak site data from the first calendar year quarter of 2022. According to leak site data analysis, LockBit 2.0 was the most impactful RaaS for five consecutive months. As of May 25, LockBit 2.0 accounted for 46% of all ransomware-related breach events for 2022 shared on leak sites.

Additionally, the LockBit 2.0 RaaS leak site has the most significant number of published victims, with over 850 in total. The site itself typically features information such as victim domains, a time tracker and measures of how much data was compromised.



LOCKBIT 2.0

LEAKED DATA

CONDITIONS FOR PARTNERS AND CONTACTS ›

firbarcarolo.it
5D 18H 43M 38 S
F.I.R. Barcarolo Mario
MORE →

gymund.dk
10D 19H 8M 38 S
52gb
MORE →

skinnertrans.ne...
10D 19H 6M 38 S
MORE →

gdctax.com.au
10D 14H 26M 38 S
MORE →

groupe-trouille...
10D 14H 24M 38 S
MORE →

fed-gmbh.de
10D 14H 16M 37 S
MORE →

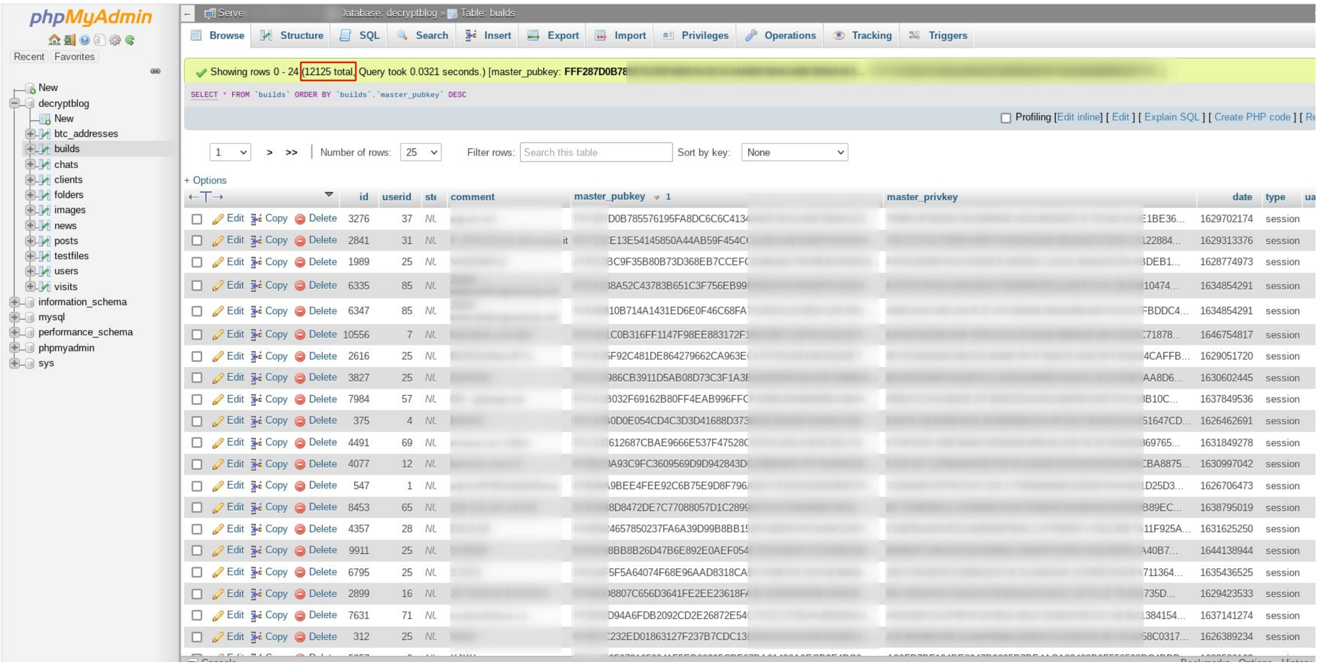
ismea.it
0D 2H 47M 37 S
90GB of data. About. ISMEA (Istituto di Servizi per il Mercato Agricolo Alimentare) è un ente pubblico economico istituito con l'accorpamento dell'Istituto per Studi, Ricerche e Informazioni sul Me...
MORE →

silverbayseafoo...
1D 2H 46M 38 S
Full 550gb
MORE →

suntecktts.com
5D 2H 46M 38 S
1TB of data. FULL
MORE →

Figure 2. LockBit 2.0 leak site extortion site.

LockBit 2.0 claims that they have demanded ransom from at least 12,125 companies, as shown in the figure below.



✓ Showing rows 0 - 24 (12125 total, Query took 0.0321 seconds.) [master_pubkey: **FFF287D0B78**[redacted]

```
SELECT * FROM `builds` ORDER BY `builds`.`master_pubkey` DESC
```

□ Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Re

1 > >> | Number of rows: 25 Filter rows: Search this table Sort by key: None

+ Options

←T→	id	userid	ste	comment	master_pubkey ▾ 1	master_privkey	date	type	ua
□ Edit Copy Delete	3276	37	NU	[redacted]	[redacted]D0B785576195FA8DC6C6C4134[redacted]	[redacted]E1BE36...	1629702174	session	
□ Edit Copy Delete	2841	31	NU	[redacted]it	[redacted]E13E54145850A44AB59F454C[redacted]	[redacted]122884...	1629313376	session	
□ Edit Copy Delete	1989	25	NU	[redacted]	[redacted]BC9F35B80B73D368EB7CCEF[redacted]	[redacted]BDEB1...	1628774973	session	
□ Edit Copy Delete	6335	85	NU	[redacted]	[redacted]8A52C43783B651C3F756EB99[redacted]	[redacted]10474...	1634854291	session	
□ Edit Copy Delete	6347	85	NU	[redacted]	[redacted]10B714A1431ED6E0F46C68FA[redacted]	[redacted]FBDDC4...	1634854291	session	
□ Edit Copy Delete	10556	7	NU	[redacted]	[redacted]C0B316FF1147F98EE883172F1[redacted]	[redacted]C71878...	1646754817	session	
□ Edit Copy Delete	2616	25	NU	[redacted]	[redacted]F92C481DE864279662CA963E[redacted]	[redacted]4CAFFB...	1629051720	session	
□ Edit Copy Delete	3827	25	NU	[redacted]	[redacted]986CB3911D5AB08D73C3F1A3[redacted]	[redacted]AA8D6...	1630602445	session	
□ Edit Copy Delete	7984	57	NU	[redacted]	[redacted]3032F69162B80FF4EAB996FFC[redacted]	[redacted]3B10C...	1637849536	session	
□ Edit Copy Delete	375	4	NU	[redacted]	[redacted]0D0E054CD4C3D3D41688D373[redacted]	[redacted]51647CD...	1626462691	session	
□ Edit Copy Delete	4491	69	NU	[redacted]	[redacted]612687CBAE9666E537F47528C[redacted]	[redacted]369765...	1631849278	session	
□ Edit Copy Delete	4077	12	NU	[redacted]	[redacted]A93C9FC3609569D9D942843D[redacted]	[redacted]CBA8875...	1630997042	session	
□ Edit Copy Delete	547	1	NU	[redacted]	[redacted]9BEE4FEE92C6B75E9D8F796[redacted]	[redacted]1D25D3...	1626706473	session	
□ Edit Copy Delete	8453	65	NU	[redacted]	[redacted]8D8472DE7C77088057D1C2899[redacted]	[redacted]B89EC...	1638795019	session	
□ Edit Copy Delete	4357	28	NU	[redacted]	[redacted]4657850237FA6A39D99B8BB15[redacted]	[redacted]11F925A...	1631625250	session	
□ Edit Copy Delete	9911	25	NU	[redacted]	[redacted]8BB8B26D47B6E892E0AEF054[redacted]	[redacted]A40B7...	1644138944	session	
□ Edit Copy Delete	6795	25	NU	[redacted]	[redacted]5F5A64074F68E96AAD8318CA[redacted]	[redacted]711364...	1635436525	session	
□ Edit Copy Delete	2899	16	NU	[redacted]	[redacted]8807C656D3641FE2EE23618F[redacted]	[redacted]735D...	1629423533	session	
□ Edit Copy Delete	7631	71	NU	[redacted]	[redacted]D94A6FDB2092CD2E26872E54[redacted]	[redacted]1384154...	1637141274	session	
□ Edit Copy Delete	312	25	NU	[redacted]	[redacted]232ED01863127F237B7CDC13[redacted]	[redacted]58C0317...	1626389234	session	

Figure 3. Source: VX-underground.

According to leak site data for LockBit 2.0, since its inception in June 2021, the RaaS has affected many companies globally, with top victims based in the U.S., Italy and Germany.

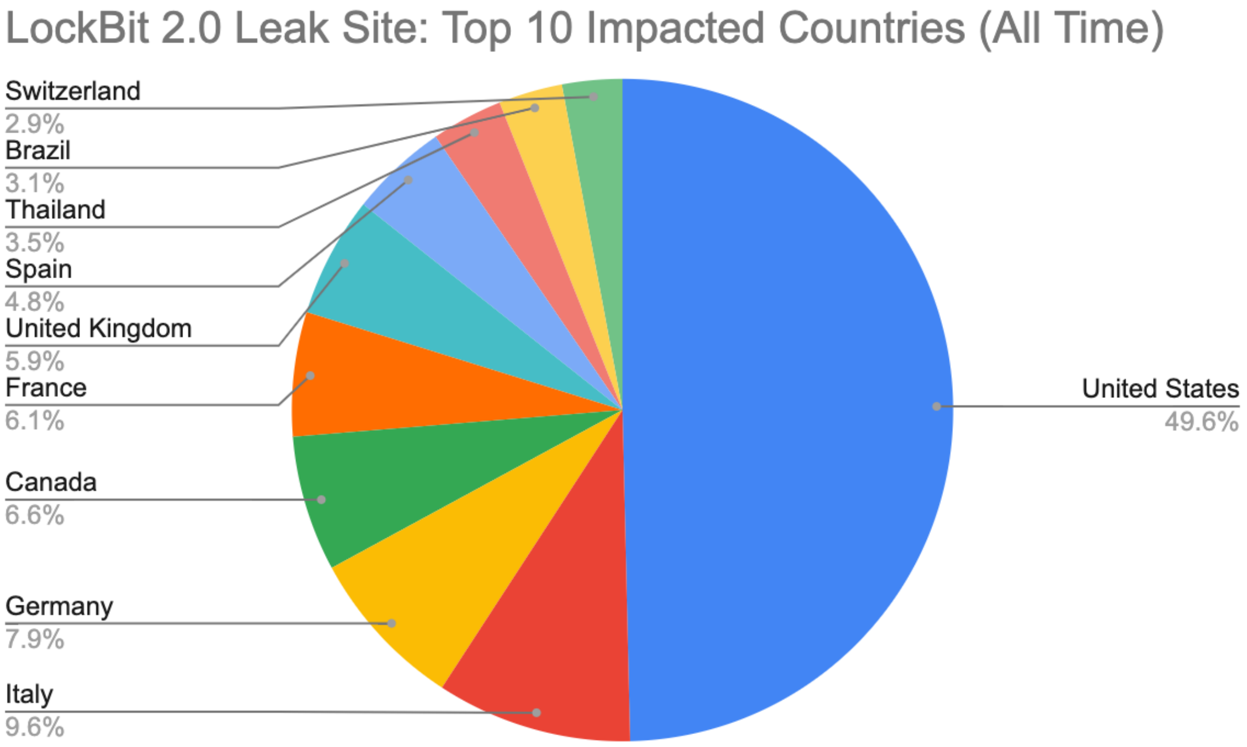


Figure 4. LockBit 2.0 geographical impact chart.

LockBit 2.0 has also impacted various victims across multiple industry verticals. Its most highly targeted industry verticals include professional services, construction, wholesale and retail and manufacturing.

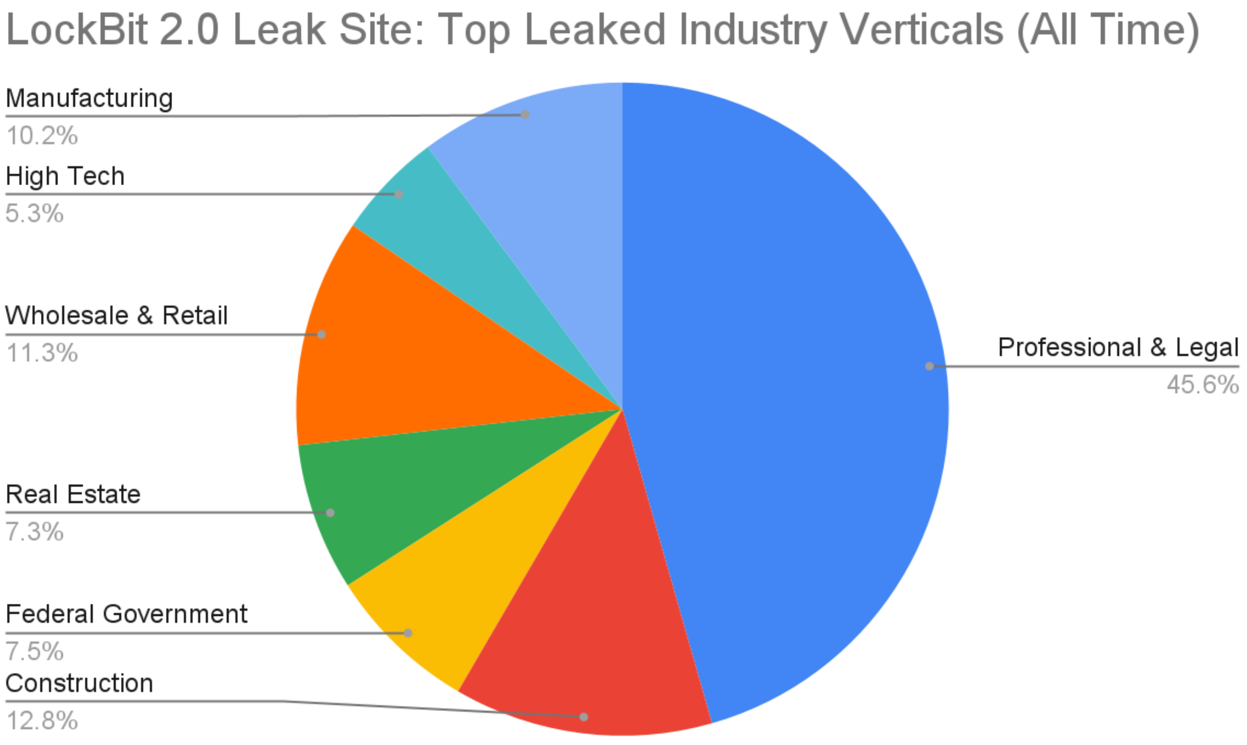


Figure 5. LockBit 2.0 impacted industry vertical chart.

When looking at leak site data across all ransomware families, we’ve observed LockBit 2.0 targeting the highest number of organizations in the following regions: JAPAC, EMEA, and LATAM.

Unit 42 Incident Response Data on LockBit 2.0

Cases handled by Unit 42 security consultants involving LockBit 2.0 since its appearance in June 2021 demonstrate shorter dwell times and less flexibility in negotiation in the beginning of FY 2022 (measured October-September) in comparison to the end of FY 2021. The following data is broken into fiscal years and quarters based on when the threat actor breached the network, not when the activity was noticed by a client.

LockBit 2.0 has shown a decrease in dwell time in FY 2022. From the last two quarters of FY 2021 to the first two quarters of FY 2022, there has been an average 37-day difference.

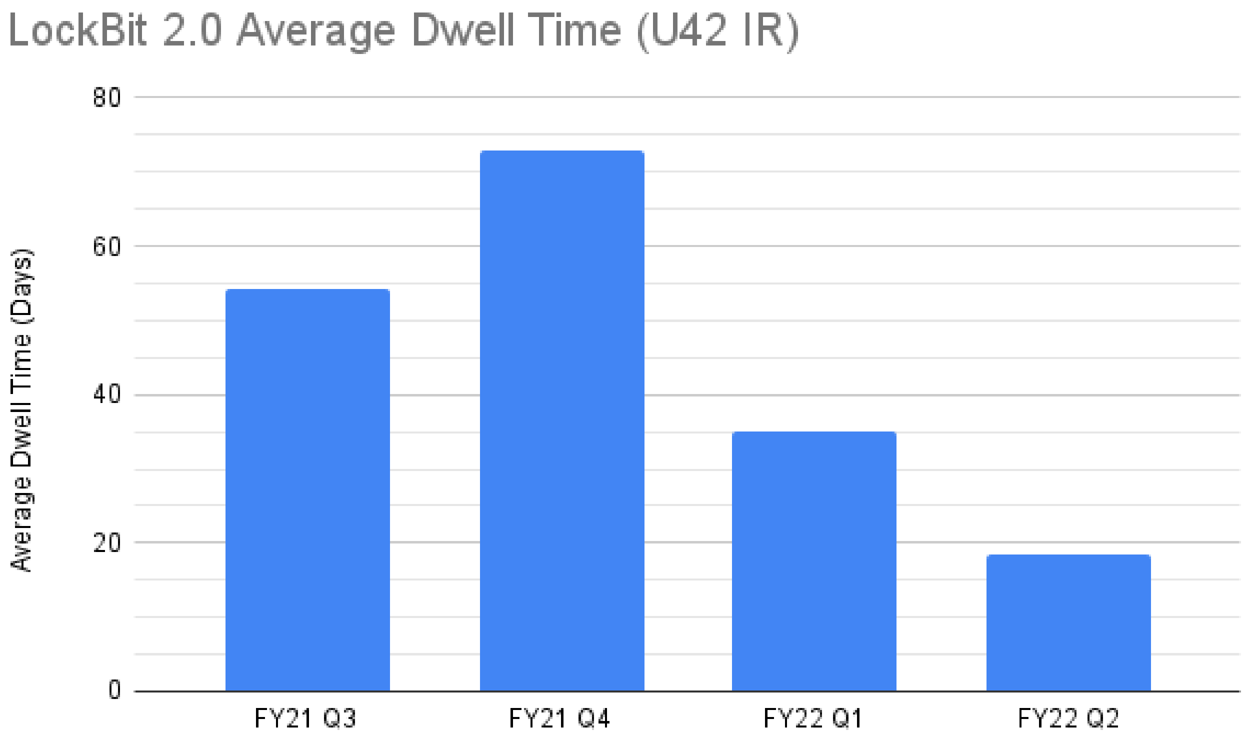


Figure 6. LockBit 2.0 average dwell time by fiscal quarter.

The difference in initial and final ransom demands over the past fiscal year has been converted to percentages and then averaged. The graph below demonstrates that at the end of FY 2021, threat actors using LockBit 2.0 were much more open to negotiations of ransom amounts; during that time the ransom was dropped approximately 83% from the initial ask on average. In comparison, we see less flexibility in FY 2022 Q1 and Q3 – threat actors only offered an average of about 30% as a price drop. FY 2022 Q2 is not included due to lack of sufficient information.

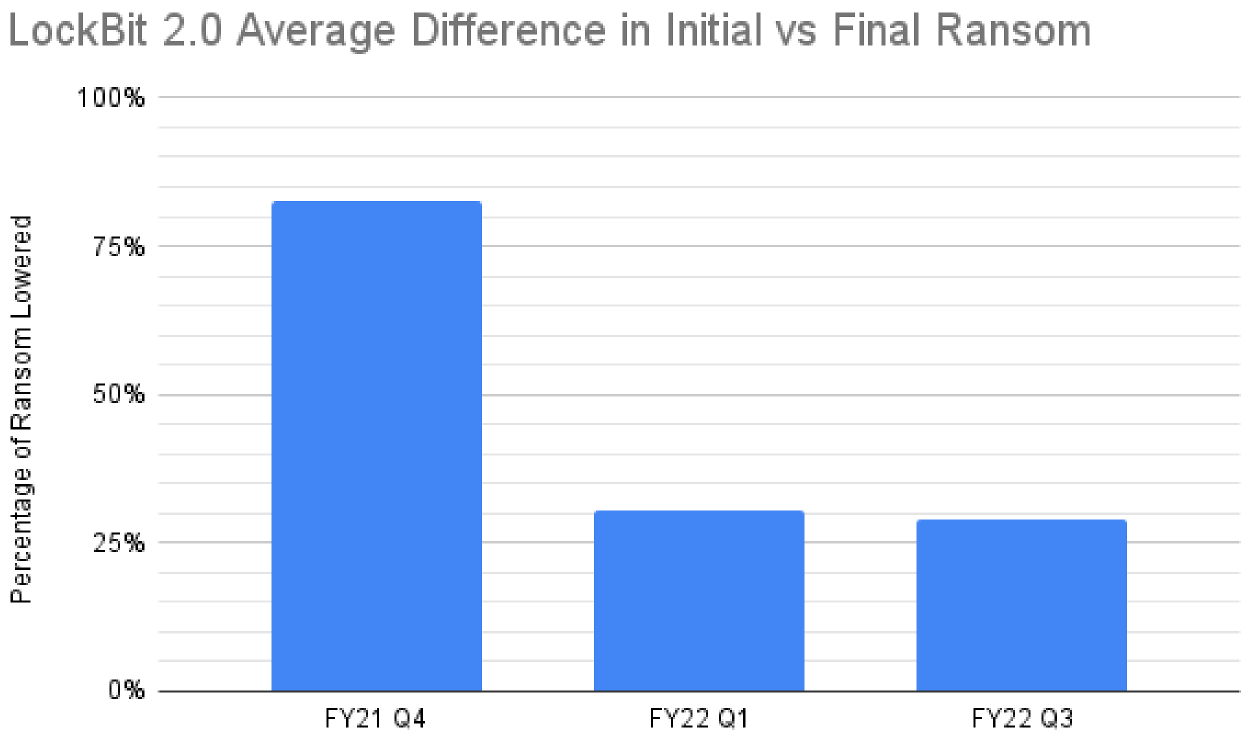


Figure 7. LockBit 2.0 average difference in initial vs final ransom amount, shown as percentages.

LockBit 2.0 Tactics, Techniques and Procedures

Technically speaking, we have observed LockBit 2.0 affiliates leveraging the following tactics, techniques and procedures:

TA0001 Initial Access	
T1078 Valid Accounts	Credentials that have either been reused across multiple platforms or have previously been exposed. Additionally, this includes VPN accounts – not just domain and local accounts.
T1133 External Remote Services	Affiliates have been seen brute forcing exposed RDP services and compromising accounts with weak passwords.
T1190 Exploit Public-Facing Applications	Vulnerabilities such as ProxyShell (CVE-2021-34473) and improper SQL sanitization (CVE-2021-20028) have been observed being utilized as footholds into the environment.
TA0002 Execution	
T1053.005 Scheduled Task/Job	Scheduled Task. LockBit 2.0 can be executed via scheduled tasks.

T1059 Command and Scripting Interpreter	LockBit 2.0 is typically executed via command line arguments via a hidden window. Windows SysInternals PsExec has been utilized for both persistence and execution purposes. Its ability to execute processes on other systems spread the ransomware and assisted in reconnaissance activities.
TA0003 Persistence	
T1053.005 Scheduled Task/Job	Scheduled Task. It was quite common to see scheduled tasks used to create persistence for the ransomware executable, PsExec, and occasionally some defense evasion batch scripts.
T1078 Valid Accounts	Compromised accounts may be used to maintain access to the network.
T1136.001 Create Account	In rare cases, LockBit 2.0 has been observed to create accounts for persistence with simple names, such as “a.”
T1505.003 Server Software Component	With the upsurgence of ProxyShell, webshells have become more common entry points.
TA0004 Privilege Escalation	
T1068 Exploitation for Privilege Escalation	The ProxyShell elevation of privilege on the Exchange PowerShell Backend (CVE-2021-34523), Windows Background Intelligent Transfer Service (BITS) improperly handling symbolic links (CVE-2020-0787), and abusing the CMSTPLUA COM interface have all been seen as methods of privilege escalation.
T1548.002 Abuse Elevation Control Mechanism: Bypass User Account Control	LockBit 2.0 has utilized a UAC bypass tool.
TA0005 Defense Evasion	
T1070 Indicator Removal on Host	Indicators, such as logs in Windows Event Logs or malicious files, are typically removed using wevtutil, a batch script, or CCleaner.
T1140 Deobfuscate/Decode Files or Information	Most PowerShell scripts involved in LockBit 2.0 cases are Base64 encoded.

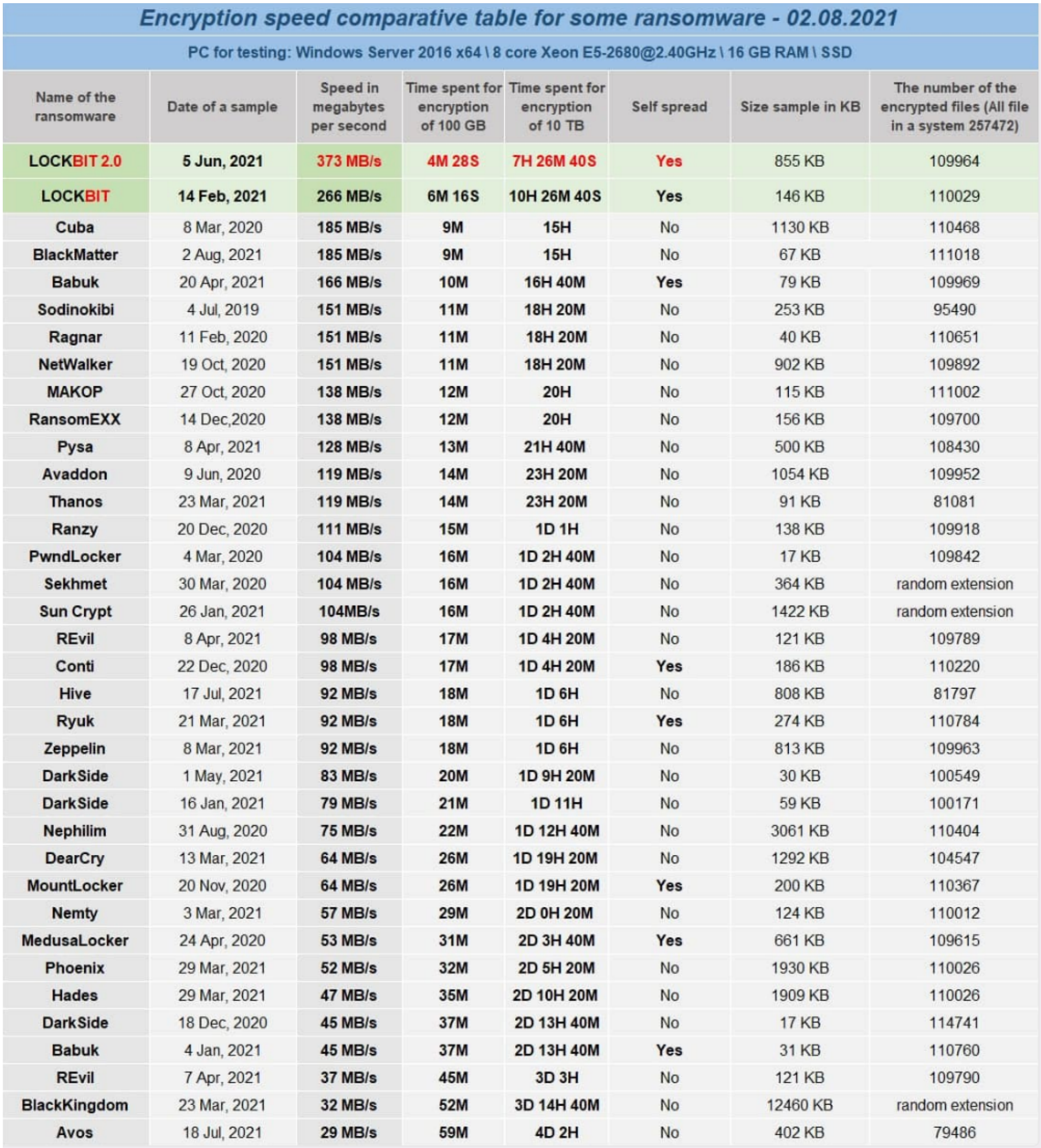
T1484.001 Domain Policy Modification: Group Policy Modification	LockBit 2.0 has been seen using the PowerShell module InvokeGPUpdate to update the group policy.
T1562.001 Impair Defenses: Disable or Modify Tools	Windows Defender, other anti-malware solutions and monitoring tools are disabled utilizing a process explorer tool, a batch script or a specially crafted command line script.
T1564.003 Hide Artifacts: Hidden Window	Affiliates use hidden windows to hide malicious activity from plain sight.
TA0006 Credential Access	
T1003 OS Credential Dumping	As seen with other ransomware cases, Mimikatz is a key player in dumping credentials but LockBit 2.0 has been occasionally seen utilizing MiniDump as well.
T1555 Credentials from Password Stores	LockBit 2.0 has been seen utilizing numerous tools to dump passwords from password stores and Chrome using GrabChrome and GrabRFF.
TA0007 Discovery	
T1046 Network Service Discovery	Both Advanced Port Scanner and NetScan have been used to discover local network infrastructure devices and services running on remote hosts. Active Directory queries for remote systems have been performed by ADFind.
T1057 Process Discovery	Process Explorer, Process Monitor and PCHunter have been utilized to discover any anti-malware or monitoring software and terminate it.
T1082 System Information Discovery	LockBit 2.0 enumerates system information such as hostname, shares, and domain information.
T1614 System Location Discovery	Attempts to check the language settings.
TA00008 Lateral Movement	
T1021 Remote Services	Although Cobalt Strike has many capabilities beneficial to threat actors in ransomware attacks, it was mainly seen in LockBit 2.0 investigations acting as a command and control beacon, a method of lateral movement and a tool for downloading/executing files.

T1021.002 Remote Services: SMB/Windows Admin Shares	LockBit 2.0 has been known to self-propagate via SMB.
TA0010 Exfiltration	
T1030 Data Transfer Size Limits	In some cases, LockBit 2.0 will limit the data transfer sizes to fly under the radar of any monitoring services a client may have set up.
T1041 Exfiltration over C2 Channel	MEGASync is the leading way for LockBit 2.0 affiliates to exfiltrate data from clients with it being occasionally replaced by RClone.
TA0011 Command and Control	
T1219 Remote Access Software	AnyDesk has been the most common legitimate desktop software used to establish an interactive command and control channel, with ConnectWise seen slightly less frequently.
TA0040 Impact	
T1486 Data Encrypted for Impact	LockBit 2.0 is known for its extortion tactics, encrypting devices and demanding a ransom.
T1489 Service Stop	During the defense evasion phase, anti-malware and monitoring software is often disabled. Firewall rules have occasionally been seen being disabled as well.

LockBit 2.0 Technical Details

LockBit 2.0 was developed using the Assembly and Origin C programming languages and leverages advanced encryption standard (AES) and elliptic-curve cryptography (ECC) algorithms to encrypt victim data. It can affect both Windows and Linux OS, as the operator released a Linux version of LockBit 2.0 to target VMware ESXi hypervisor systems in October 2021, coded exclusively in the C programming language.

The LockBit group claimed that LockBit 2.0 is “the fastest encryption software all over the world” and provided a comparative table showing the encryption speed of various ransomware samples.



Encryption speed comparative table for some ransomware - 02.08.2021

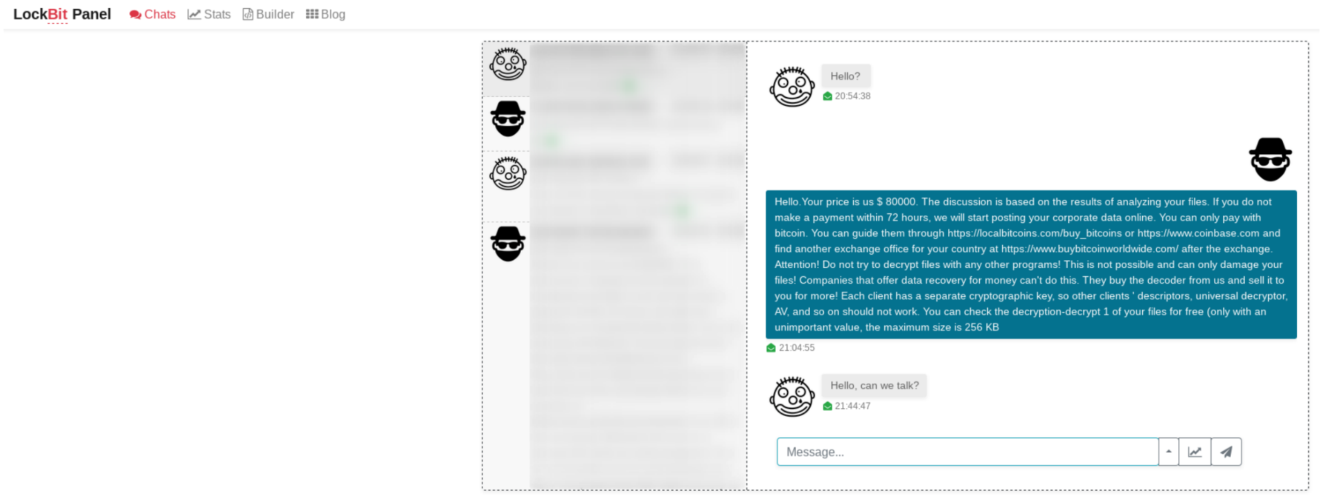
PC for testing: Windows Server 2016 x64 \ 8 core Xeon E5-2680@2.40GHz \ 16 GB RAM \ SSD

Name of the ransomware	Date of a sample	Speed in megabytes per second	Time spent for encryption of 100 GB	Time spent for encryption of 10 TB	Self spread	Size sample in KB	The number of the encrypted files (All file in a system 257472)
LOCKBIT 2.0	5 Jun, 2021	373 MB/s	4M 28S	7H 26M 40S	Yes	855 KB	109964
LOCKBIT	14 Feb, 2021	266 MB/s	6M 16S	10H 26M 40S	Yes	146 KB	110029
Cuba	8 Mar, 2020	185 MB/s	9M	15H	No	1130 KB	110468
BlackMatter	2 Aug, 2021	185 MB/s	9M	15H	No	67 KB	111018
Babuk	20 Apr, 2021	166 MB/s	10M	16H 40M	Yes	79 KB	109969
Sodinokibi	4 Jul, 2019	151 MB/s	11M	18H 20M	No	253 KB	95490
Ragnar	11 Feb, 2020	151 MB/s	11M	18H 20M	No	40 KB	110651
NetWalker	19 Oct, 2020	151 MB/s	11M	18H 20M	No	902 KB	109892
MAKOP	27 Oct, 2020	138 MB/s	12M	20H	No	115 KB	111002
RansomEXX	14 Dec,2020	138 MB/s	12M	20H	No	156 KB	109700
Pysa	8 Apr, 2021	128 MB/s	13M	21H 40M	No	500 KB	108430
Avaddon	9 Jun, 2020	119 MB/s	14M	23H 20M	No	1054 KB	109952
Thanos	23 Mar, 2021	119 MB/s	14M	23H 20M	No	91 KB	81081
Ranzy	20 Dec, 2020	111 MB/s	15M	1D 1H	No	138 KB	109918
PwndLocker	4 Mar, 2020	104 MB/s	16M	1D 2H 40M	No	17 KB	109842
Sekhmet	30 Mar, 2020	104 MB/s	16M	1D 2H 40M	No	364 KB	random extension
Sun Crypt	26 Jan, 2021	104MB/s	16M	1D 2H 40M	No	1422 KB	random extension
REvil	8 Apr, 2021	98 MB/s	17M	1D 4H 20M	No	121 KB	109789
Conti	22 Dec, 2020	98 MB/s	17M	1D 4H 20M	Yes	186 KB	110220
Hive	17 Jul, 2021	92 MB/s	18M	1D 6H	No	808 KB	81797
Ryuk	21 Mar, 2021	92 MB/s	18M	1D 6H	Yes	274 KB	110784
Zeppelin	8 Mar, 2021	92 MB/s	18M	1D 6H	No	813 KB	109963
DarkSide	1 May, 2021	83 MB/s	20M	1D 9H 20M	No	30 KB	100549
DarkSide	16 Jan, 2021	79 MB/s	21M	1D 11H	No	59 KB	100171
Nephilim	31 Aug, 2020	75 MB/s	22M	1D 12H 40M	No	3061 KB	110404
DearCry	13 Mar, 2021	64 MB/s	26M	1D 19H 20M	No	1292 KB	104547
MountLocker	20 Nov, 2020	64 MB/s	26M	1D 19H 20M	Yes	200 KB	110367
Nemty	3 Mar, 2021	57 MB/s	29M	2D 0H 20M	No	124 KB	110012
MedusaLocker	24 Apr, 2020	53 MB/s	31M	2D 3H 40M	Yes	661 KB	109615
Phoenix	29 Mar, 2021	52 MB/s	32M	2D 5H 20M	No	1930 KB	110026
Hades	29 Mar, 2021	47 MB/s	35M	2D 10H 20M	No	1909 KB	110026
DarkSide	18 Dec, 2020	45 MB/s	37M	2D 13H 40M	No	17 KB	114741
Babuk	4 Jan, 2021	45 MB/s	37M	2D 13H 40M	Yes	31 KB	110760
REvil	7 Apr, 2021	37 MB/s	45M	3D 3H	No	121 KB	109790
BlackKingdom	23 Mar, 2021	32 MB/s	52M	3D 14H 40M	No	12460 KB	random extension
Avos	18 Jul, 2021	29 MB/s	59M	4D 2H	No	402 KB	79486

Figure 8. LockBit encryption comparative table | Source: LockBit blog.

LockBit 2.0 also contains a self-spreading feature, clears logs and can print the ransom note on network printers until the paper runs out.

A management panel that affiliates can use to manage victims and affiliate accounts, generate new ransomware builds and generate the decryptor if the demanded ransom is paid also exists.



Hello?
20:54:38

Hello.Your price is us $ 80000. The discussion is based on the results of analyzing your files. If you do not make a payment within 72 hours, we will start posting your corporate data online. You can only pay with bitcoin. You can guide them through https://localbitcoins.com/buy_bitcoins or https://www.coinbase.com and find another exchange office for your country at https://www.buybitcoinworldwide.com/ after the exchange. Attention! Do not try to decrypt files with any other programs! This is not possible and can only damage your files! Companies that offer data recovery for money can't do this. They buy the decoder from us and sell it to you for more! Each client has a separate cryptographic key, so other clients ' descriptors, universal decryptor, AV, and so on should not work. You can check the decryption-decrypt 1 of your files for free (only with an unimportant value, the maximum size is 256 KB
21:04:55

Hello, can we talk?
21:44:47

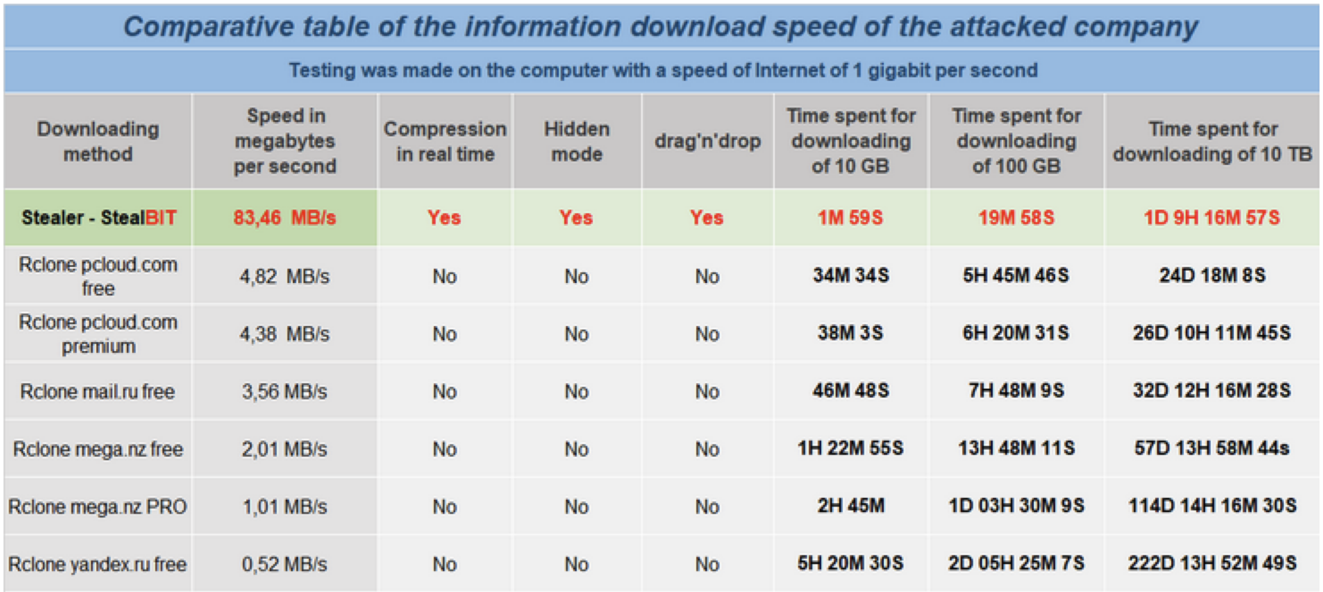
Figure 9. LockBit 2.0 management panel. Source: ProDaft.

LockBit 2.0 operators also released an information-stealer dubbed StealBit, which was developed to support affiliates of the LockBit 2.0 RaaS when exfiltrating data from breached companies.

StealBit contains the following capabilities:

- Operates as a file grabber and dumps/uploads victim data to the LockBit victim-shaming site.
- No reliance on third-party cloud file-sharing services, where data can be easily removed if the victim submitted a complaint.
- The download speed is limited only by internet connection bandwidth, so it is possible to clone folders from corporate networks and upload them to the LockBit victim shaming blog quickly.

The operator of LockBit 2.0 has provided a comparative table speed showing the information stealer compared to other tools.



Comparative table of the information download speed of the attacked company

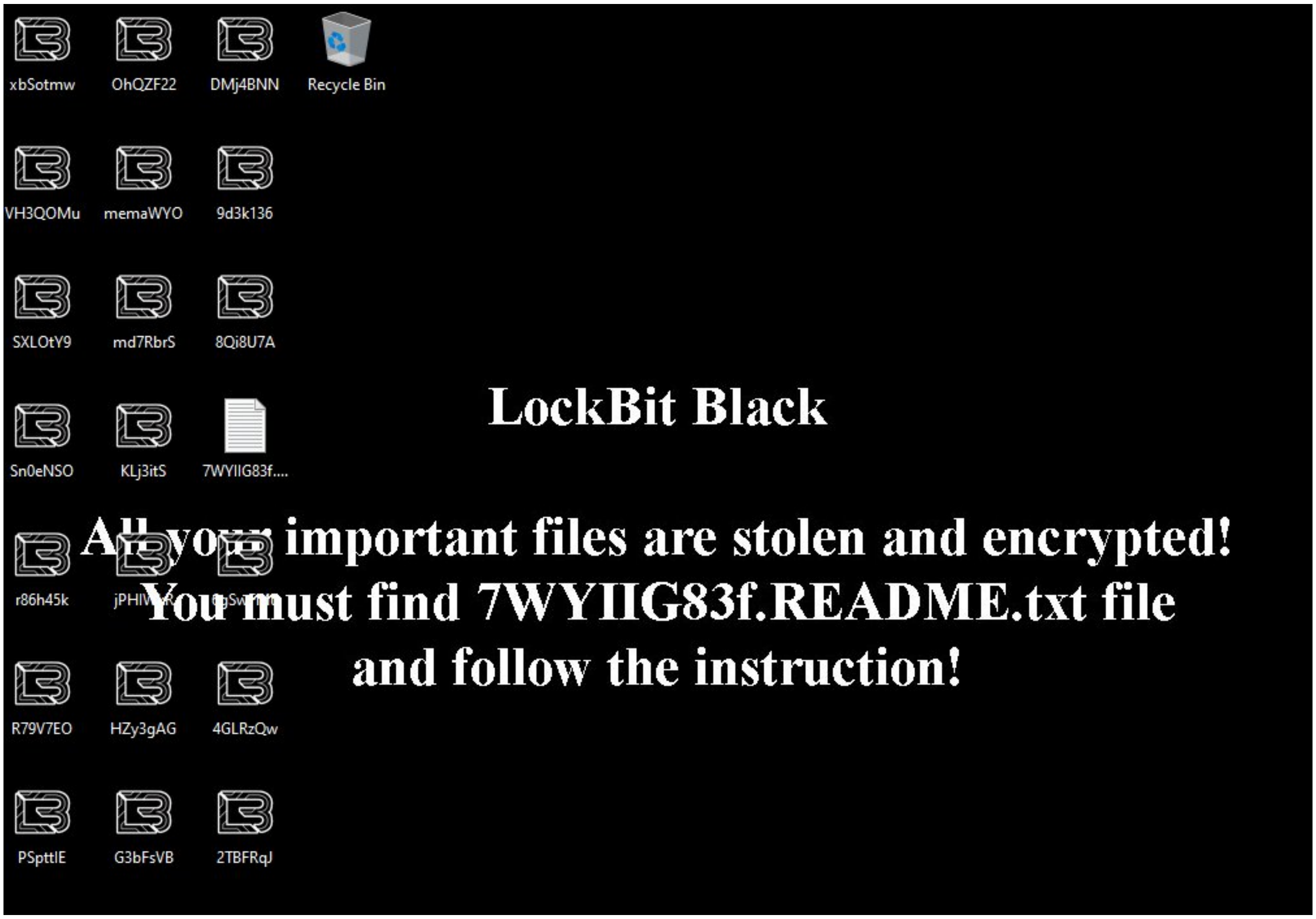
Testing was made on the computer with a speed of Internet of 1 gigabit per second

Downloading method	Speed in megabytes per second	Compression in real time	Hidden mode	drag'n'drop	Time spent for downloading of 10 GB	Time spent for downloading of 100 GB	Time spent for downloading of 10 TB
Stealer - StealBIT	83,46 MB/s	Yes	Yes	Yes	1M 59S	19M 58S	1D 9H 16M 57S
Rclone pcloud.com free	4,82 MB/s	No	No	No	34M 34S	5H 45M 46S	24D 18M 8S
Rclone pcloud.com premium	4,38 MB/s	No	No	No	38M 3S	6H 20M 31S	26D 10H 11M 45S
Rclone mail.ru free	3,56 MB/s	No	No	No	46M 48S	7H 48M 9S	32D 12H 16M 28S
Rclone mega.nz free	2,01 MB/s	No	No	No	1H 22M 55S	13H 48M 11S	57D 13H 58M 44s
Rclone mega.nz PRO	1,01 MB/s	No	No	No	2H 45M	1D 03H 30M 9S	114D 14H 16M 30S
Rclone yandex.ru free	0,52 MB/s	No	No	No	5H 20M 30S	2D 05H 25M 7S	222D 13H 52M 49S

Figure 10. LockBit 2.0 download speed, according to LockBit 2.0 operator.

LockBit 3.0

There was a bug that existed in LockBit 2.0 that allowed researchers to revert the encryption process on an MSSQL database. After the bug's disclosure, LockBit forum members discussed how the bug will not exist in LockBit's next iteration. Moreover, on March 17, LockBit forum members mentioned the release of LockBit's next version in one or two weeks. On March 25, VX underground posted a tweet with details of this new version, dubbed LockBit Black.



LockBit Black

All your important files are stolen and encrypted!
You must find 7WYIIG83f.README.txt file
and follow the instruction!

Figure 11. LockBit Black post-infection desktop wallpaper (Source: VX-underground).

Courses of Action

Several adversarial techniques were observed in this activity and the following measures are suggested within Palo Alto Networks products and services to ensure mitigation of threats related to LockBit 2.0 ransomware, as well as other malware using similar techniques:

Product / Service	Course of Action
Initial Access, Execution, Persistence, Privilege Escalation, Defense Evasion	

The courses of action below mitigate the following techniques: Exploit Public-Facing Application [T1190], Command and Scripting Interpreter [T1059], Local Account [T1136.001], Web Shell [T1505.003], Exploitation for Privilege Escalation [T1068], Indicator Removal on Host [T1070], Deobfuscate/Decode Files or Information [T1140], Disable or Modify Tools [T1562.001], Hidden Window [T1564.003], Valid Accounts [T1078], External Remote Services [T1133], Scheduled Task [T1053.005], Bypass User Account Control [T1548.002], Group Policy Modification [T1484.001]	
THREAT PREVENTION	Ensure a secure Vulnerability Protection Profile is applied to all security rules allowing traffic
Ensure a Vulnerability Protection Profile is set to block attacks against critical and high vulnerabilities, and set to default on medium, low, and informational vulnerabilities	
Ensure DNS sinkholing is configured on all anti-spyware profiles in use	
Ensure an anti-spyware profile is configured to block on all spyware severity levels, categories, and threats	
Ensure a secure anti-spyware profile is applied to all security policies permitting traffic to the internet	
Ensure passive DNS monitoring is set to enabled on all anti-spyware profiles in use	
CORTEX XSOAR	Deploy XSOAR Playbook Cortex XDR - Isolate Endpoint
Deploy XSOAR Playbook - Block Account Generic	
Deploy XSOAR Playbook - Access Investigation Playbook	
Deploy XSOAR Playbook - Impossible Traveler	
NEXT-GENERATION FIREWALLS	Ensure 'Service setting of ANY' in a security policy allowing traffic does not exist

Ensure application security policies exist when allowing traffic from an untrusted zone to a more trusted zone	
Ensure 'Security Policy' denying any/all traffic to/from IP addresses on Trusted Threat Intelligence Sources Exists	
Ensure that the User-ID service account does not have interactive logon rights	
Define at least one 'Include Network'.	
Ensure that User-ID is only enabled for internal trusted interfaces	
Ensure that 'Include/Exclude Networks' is used if User-ID is enabled	
Ensure remote access capabilities for the User-ID service account are forbidden.	
Ensure that the User-ID Agent has minimal permissions if User-ID is enabled	
CORTEX XDR PREVENT	Enable Anti-Malware Protection
Enable Anti-Exploit Protection	
Configure Host Firewall Profile	
Configure Behavioral Threat Protection under the Malware Security Profile	
Credential Access	
The courses of action below mitigate the following techniques: OS Credential Dumping [T1003], Credentials from Password Stores [T1555]	
CORTEX XDR PREVENT	Enable Anti-Exploit Protection
Enable Anti-Malware Protection	
Discovery	
The below courses of action mitigate the following techniques: Network Service Scanning [T1046], Process Discovery [T1057], System Location Discovery [T1614], System Information Discovery [T1082]	

CORTEX XDR PREVENT	Configure Behavioral Threat Protection under the Malware Security Profile
NEXT-GENERATION FIREWALLS	Ensure that all zones have Zone Protection Profiles with all Reconnaissance Protection settings enabled, tuned, and set to appropriate actions
Ensure 'Service setting of ANY' in a security policy allowing traffic does not exist	
Ensure 'Security Policy' denying any/all traffic to/from IP addresses on Trusted Threat Intelligence Sources Exists	
Ensure application security policies exist when allowing traffic from an untrusted zone to a more trusted zone	
CORTEX XSOAR	Deploy XSOAR Playbook - Port Scan
Lateral Movement	
The courses of action below mitigate the following techniques: Remote Services [T1021], SMB/Windows Admin Shares [T1021.002]	
NEXT-GENERATION FIREWALLS	Ensure remote access capabilities for the User-ID service account are forbidden.
Ensure that User-ID is only enabled for internal trusted interfaces	
Ensure that the User-ID Agent has minimal permissions if User-ID is enabled	
Ensure that the User-ID service account does not have interactive logon rights	
Ensure that 'Include/Exclude Networks' is used if User-ID is enabled	

Ensure that security policies restrict User-ID Agent traffic from crossing into untrusted zones	
CORTEX XSOAR	Deploy XSOAR Playbook - Block Account Generic
Deploy XSOAR Playbook - Access Investigation Playbook	
Command and Control	
The courses of action below mitigate the following techniques: Remote Access Software [T1219]	
NEXT-GENERATION FIREWALLS	Ensure that the Certificate used for Decryption is Trusted
Ensure application security policies exist when allowing traffic from an untrusted zone to a more trusted zone	
Ensure 'Security Policy' denying any/all traffic to/from IP addresses on Trusted Threat Intelligence Sources Exists	
Ensure 'SSL Forward Proxy Policy' for traffic destined to the internet is configured	
Ensure 'SSL Inbound Inspection' is required for all untrusted traffic destined for servers using SSL or TLS	
Ensure 'Service setting of ANY' in a security policy allowing traffic does not exist	
THREAT PREVENTION	Ensure DNS sinkholing is configured on all anti-spyware profiles in use
Ensure passive DNS monitoring is set to enabled on all anti-spyware profiles in use	
Ensure a secure anti-spyware profile is applied to all security policies permitting traffic to the Internet	
Ensure that antivirus profiles are set to block on all decoders except 'imap' and 'pop3'	
Ensure an anti-spyware profile is configured to block on all spyware severity levels, categories, and threats	

Ensure a secure antivirus profile is applied to all relevant security policies	
URL FILTERING	Ensure secure URL filtering is enabled for all security policies allowing traffic to the internet
Ensure all HTTP Header Logging options are enabled	
Ensure that PAN-DB URL Filtering is used	
Ensure that URL Filtering uses the action of ‘block’ or ‘override’ on the URL categories	
Ensure that access to every URL is logged	
CORTEX XSOAR	Deploy XSOAR Playbook - PAN-OS Query Logs for Indicators
Exfiltration	
The courses of action below mitigate the following techniques: Data Transfer Size Limits [T1030], Exfiltration Over C2 Channel [T1041]	
THREAT PREVENTION	Ensure DNS sinkholing is configured on all anti-spyware profiles in use
Ensure that antivirus profiles are set to block on all decoders except 'imap' and 'pop3'	
Ensure an anti-spyware profile is configured to block on all spyware severity levels, categories, and threats	
Ensure passive DNS monitoring is set to enabled on all anti-spyware profiles in use	
Ensure a secure anti-spyware profile is applied to all security policies permitting traffic to the Internet	
Ensure a secure antivirus profile is applied to all relevant security policies	

URL FILTERING	Ensure that PAN-DB URL Filtering is used
Ensure that access to every URL is logged	
Ensure that URL Filtering uses the action of ‘block’ or ‘override’ on the URL categories	
Ensure secure URL filtering is enabled for all security policies allowing traffic to the internet	
Ensure all HTTP Header Logging options are enabled	
CORTEX XSOAR	Deploy XSOAR Playbook - Block URL
Deploy XSOAR Playbook - PAN-OS Query Logs for Indicators	
Deploy XSOAR Playbook - Block IP	
DNS SECURITY	Enable DNS Security in Anti-Spyware profile
NEXT-GENERATION FIREWALLS	Setup NetFlow Monitoring
Ensure application security policies exist when allowing traffic from an untrusted zone to a more trusted zone	
Ensure 'Service setting of ANY' in a security policy allowing traffic does not exist	
Ensure 'Security Policy' denying any/all traffic to/from IP addresses on Trusted Threat Intelligence Sources Exists	
Impact	
The courses of action below mitigate the following techniques: Data Encrypted for Impact [T1486], Service Stop [T1489]	
CORTEX XSOAR	Deploy XSOAR Playbook - Ransomware Manual for incident response.

†These capabilities are part of the NGFW security subscriptions service
Note: This is not an all-inclusive list of the protections provided by Palo Alto Networks. This is a subset of our current Courses of Action initiative and will be updated as the project progresses.

Conclusion

LockBit 2.0 and its evolution over time is a perfect example to illustrate the persistence, increasing complexity and impact brought by the ransomware landscape as a whole. With claims of this RaaS offering the fastest encryption on the ransomware market, coupled with the fact that it has been delivered in high volume by experienced affiliates, this RaaS poses a significant threat. LockBit's continuation with operations and its next iteration coming up on the horizon means that organizations and their security teams need to stay vigilant in the ever-evolving threat landscape.

Palo Alto Networks detects and prevents LockBit 2.0 ransomware in the following ways:

- WildFire: All known samples are identified as malware.
- Cortex XDR:
  - Identifies indicators associated with LockBit 2.0.
  - Anti-Ransomware Module to detect LockBit 2.0 encryption behaviors on Windows.
  - Local Analysis detection for LockBit 2.0 binaries on Windows.
- Next-Generation Firewalls: DNS Signatures detect the known C2 domains, which are also categorized as malware in Advanced URL Filtering.

If you think you may have been compromised or have an urgent matter, get in touch with the Unit 42 Incident Response team or call:

- North America Toll-Free: 866.486.4842 (866.4.UNIT42)
- EMEA: +31.20.299.3130
- APAC: +65.6983.8730
- Japan: +81.50.1790.0200

Palo Alto Networks has shared these findings, including file samples and indicators of compromise, with our fellow Cyber Threat Alliance members. CTA members use this intelligence to rapidly deploy protections to their customers and to systematically disrupt malicious cyber actors. Learn more about the Cyber Threat Alliance.

Appendix A

In August 2021, a Russian blogger published a 22-minute interview with an alleged representative of the group behind LockBit 2.0 called "LockBitSupp" on a YouTube channel called "Russian-language open source intelligence (OSINT)." The same Russian blogger previously published interviews with a representative of the group behind the REvil ransomware-as-a-service (RaaS), hackers and security experts.

Some key takeaways from the claims made in the interview were:

- The LockBit 2.0 threat actor claimed the group's RaaS was unlikely to be rebranded since the team allegedly was a business that was honest with their customers – suggesting a supposed contrast between LockBit 2.0 and Avaddon, DarkSide and REvil affiliates.
- The LockBit 2.0 ransomware disregarded keyboard layout, but it allegedly would not run on a host where the system language was set to any of the languages spoken in the Commonwealth of Independent States region.
- The group did not devise attacks on companies of their choice; they simply worked with initial access to any corporate network they obtained elsewhere, since this was more profitable and saved time. The team selected targets for ransomware attacks based on the company's finances — the bigger, the better. The location also did not matter. However, team members allegedly did not attack healthcare facilities, social services, educational institutions and charitable organizations or any other organization that "contributed to the survival of the human race." [Note that Unit 42 case data does include indications that threat actors using LockBit 2.0 have targeted healthcare organizations at times.]
- The threat actor claimed that the largest number of victims who paid ransom were company representatives who did not care about creating backup copies and did not protect their sensitive data. According to the threat actor's claims, companies that violated regulations about collecting and handling customer or user personal information were among those eager to pay. The threat actor claimed that there generally were only a few companies who refused to pay ransom on principle, while most of the victims evaluated profit and loss to decide whether or not to pay a ransom.
- LockBit 2.0 operators allegedly almost always offered discounts to their victims since the goal was to streamline attacks.
- The threat actor claimed that the COVID-19 pandemic facilitated ransomware attacks significantly, saying it was easy to compromise home computers of employees who work remotely and use them as a springboard to access other networked systems.
- Companies in Europe and the U.S. were hit with ransomware much more often than companies based in other countries allegedly because of high profit and insurance and not because of language barriers.
- Ransomware operators usually recruit negotiators, who coerce victims to pay ransom, since professional penetration testers allegedly lack the time for chatter.

Additional Resources

LockBit 3.0: Another Upgrade to the World’s Most Active Ransomware
Ransomware Groups to Watch: Emerging Threats
Average Ransom Payment Up 71% This Year, Approaches $1 Million
2022 Unit 42 Ransomware Threat Report Highlights