LEADERSHIP FOR IT SECURITY & PRIVACY ACROSS HHS

HHS CYBERSECURITY PROGRAM

OFFICE OF INFORMATION SECURITY

LockBit Ransomware

09/23/2021

TLP: WHITE, ID# ***202109231300***

Agenda

- Introduction
- LockBit History
- LockBit v1.0 to v2.0
- Affiliate Program
- Interviews
- Victims
- Mitigations

Slides Key:

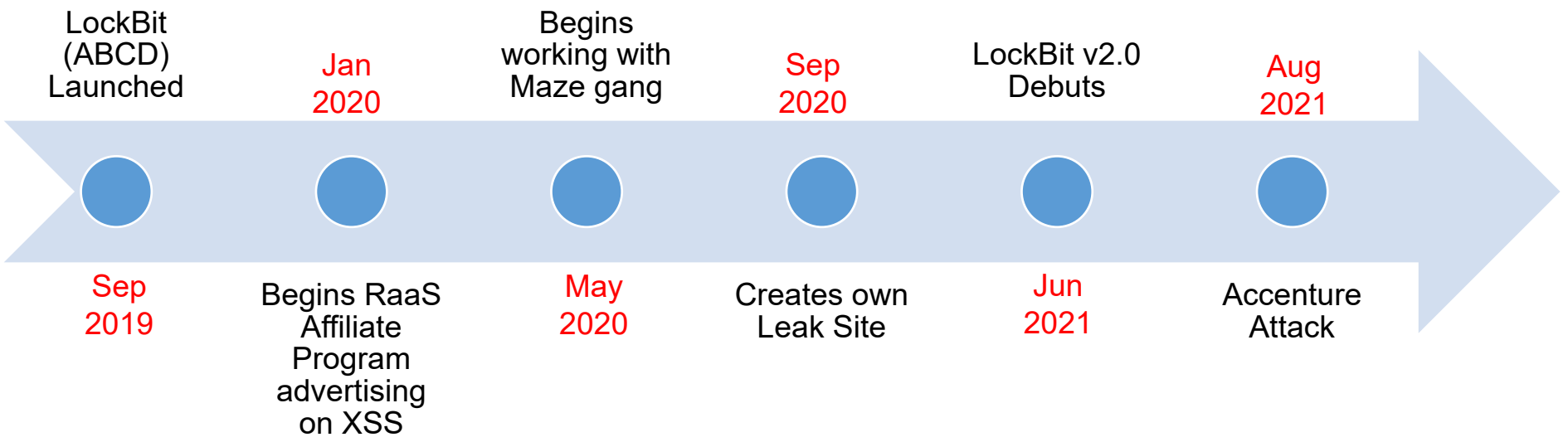
Non-Technical: Managerial, strategic and high-level (general audience)

Technical: Tactical / IOCs; requiring in-depth knowledge (sysadmins, IRT)

LockBit Overview

- LockBit attack on Accenture
- Claims fastest encryption
- Claims fastest file stealer
- Use RaaS model
- In it for the long haul
- Keep aware of LockBit!

A History of Lockbit



Lockbit v1.1

- IP-based geolocation
- Persistence via COM interface task scheduling and Windows registry hive
- Appending encrypted files with .abcd
- First ransom note version
- Debug file
- High CPU usage during encryption
- Use of exact copy of PhobosImpostor mutex

```
All your important files are encrypted!
Any attempts to restore your files with the thrid-party software will be fatal for your files!
RESTORE YOU DATA POSIBLE ONLY BUYING private key from us.
There is only one way to get your files back:

| 1. Download Tor browser - https://www.torproject.org/ and install it.
| 2. Open link in TOR browser - http://lockbitks2tvnmwk.onion/?E3D94FA5
     This link only works in Tor Browser!
| 3. Follow the instructions on this page


 ###  Attention! ###
 # Do not rename encrypted files.
 # Do not try to decrypt using third party software, it may cause permanent data loss.
 # Decryption of your files with the help of third parties may cause increased price(they add their fee to our).
 # Tor Browser may be blocked in your country or corporate network. Use https://bridges.torproject.org or use Tor Browser over
 VPN.
 # Tor Browser user manual https://tb-manual.torproject.org/about

!!! We also download huge amount of your private data, including finance information, clients personal info, network diagrams,
passwords and so on.
Don't forget about GDPR.
```

LockBit v1.2 and v1.3

Lockbit v1.2

- Extension changed from .abcd to .lockbit
- Debug function removed
- Packed ransomware
- Mutexes changed from static to dynamic
- Digitally signed

Lockbit v1.3

- Ransom note updated

```
All your important files are encrypted!
There is  only one way to get your files back:
1. Contact with us
2. Send us 1 any encrypted your file and your personal key
3. We will decrypt 1 file for test(maximum file size - 1 MB), its guarantee what we can decrypt your files
4. Pay
5. We send for you decryptor software

We accept Bitcoin

Attention!
Do not rename encrypted files.
Do not try to decrypt using third party software, it may cause permanent data loss.
Decryption of your files with the help of third parties may cause increased  price(they add their fee to our)

Contact information: pcabcd@countermail.com

Be sure to duplicate your message on the e-mail: recoverymanager@cock.li

Your personal id:
B1PBs3MJinHk/XlBjMh6VYNN/q/Iq0WqJdHjTvaDCsktCkD0W0pAwdhPyb8RRb3d
3mlHm1AIrbxwA8b1hK5Ox9f+ehrt8IUVFcVIUfPQgeVXL1QgwPhZQDAhcLPH/VD5
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8zTsjKJdDoBHUFWVDm/ZwN0/ohC5Mn/EwDDy8a5Tmi0Ihxw6ltB+yuPM6bQDuha8
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nx9y6uL67580USbHz8CeHBPxOkE7yrsZEn0IuUSJ59+Bso0JBzNMMp5CWV6D1hsp
gJ9MxY9rz1HYvArCpXM2ZyvHhqRgvtDA/tCivzvYZw7venLkixOwWNjjA56lLhW7
n1JCZ2KDcjEvKwWxuVQUf2a3IrVZNY3o/UVj66gjxr0opjO/KCpGp94khVRwA6BF
WqwJLxiK2lzmW8Rv4nD52kt9pi5JZ0kyEuorTeSPmV+7w9PL7OYSWf/zNntc3Ezq
LIorjIclSpSQfaP4tptN5lcmbfB6ELw5+I9OnCrqG+CgxoYS31CnY+KkkhuM54ft
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+fgaTMYCVfPxm8qe9yg3toGEQ8uUy5d21HLJHhlgzqc=
```
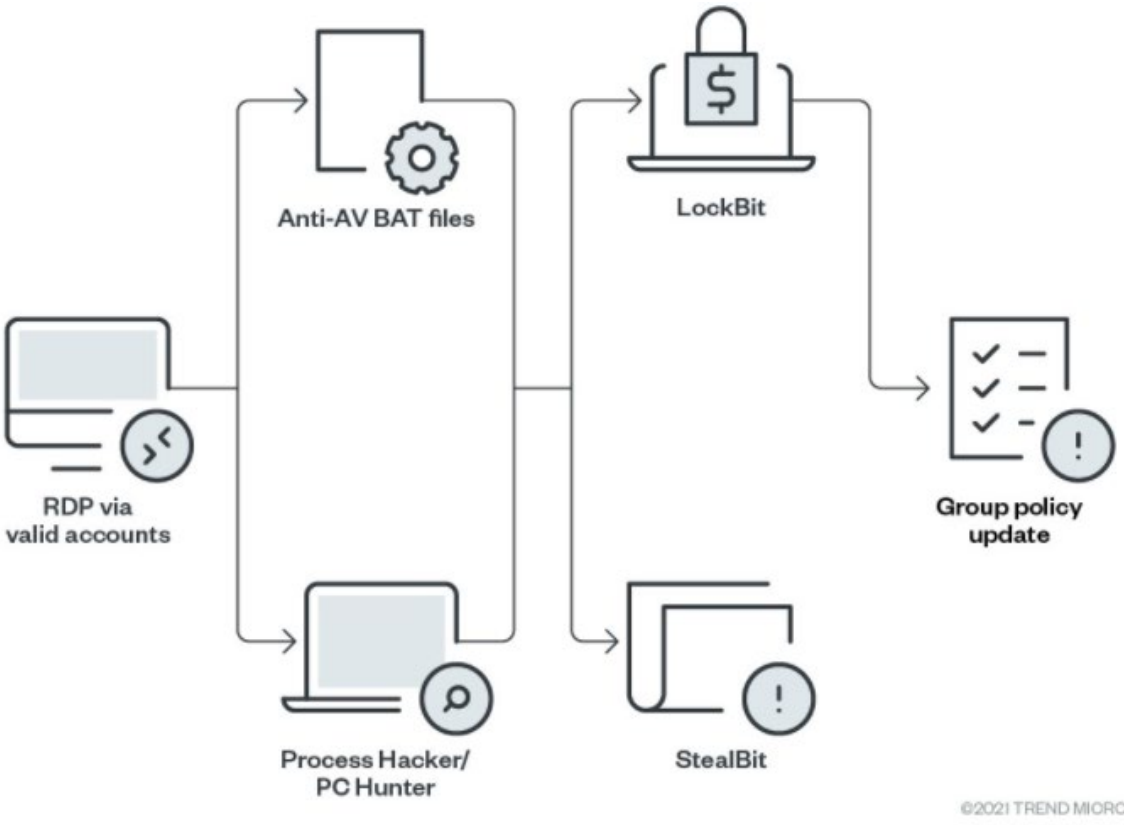

Lockbit v2.0

- Released June 2021
- Now uses double extortion via StealBit malware
- Uses group policy update to encrypt networks
- Faster encryption
- Print bombing
- Wake-on-LAN feature
- New desktop wallpaper
- UAC bypass

Standard LockBit v2.0 infection chain



Restarted Affiliated Program

- Affiliates set own ransom
- Choose method of payment
- Collect 80% of ransom
- Don’t work in Commonwealth of Independent States (CIS) countries
- Only experienced pentesters (penetration testers) need apply
- Affiliate receives payment directly from victim, then pays LockBit gang

Features of the Affiliate Program

[Ransomware] LockBit 2.0 is an affiliate program.

Affiliate program LockBit 2.0 temporarily relaunch the intake of partners.

The program has been underway since September 2019, it is designed in origin C and ASM languages without any dependencies. Encryption is implemented in parts via the completion port (I/O), encryption algorithm AES + ECC. During two years none has managed to decrypt it.

Unparalleled benefits are encryption speed and self-spread function.

The only thing you have to do is to get access to the core server, while LockBit 2.0 will do all the rest. The launch is realized on all devices of the domain network in case of administrator rights on the domain controller.

Brief feature set:

- **administrator panel in Tor system;**
- **communication with the company via Tor, chat room with PUSH notifications;**
- **automatic test decryption;**
- **automatic decryptor detection;**
- **port scanner in local subnetworks, can detect all DFS, SMB, WebDav shares;**
- **automatic distribution in the domain network at run-time without the necessity of scripts;**
- **termination of interfering services and processes;**
- **blocking of process launching that can destroy the encryption process;**
- **setting of file rights and removal of blocking attributes;**
- **removal of shadow copies;**
- **creation of hidden partitions, drag and drop files and folders;**
- **clearing of logs and self-clearing;**
- **windowed or hidden operating mode;**
- **launch of computers switched off via Wake-on-Lan;**
- **print-out of requirements on network printers;**
- **available for all versions of Windows OS;**

*Actor's claims


LOCKBIT 2.0
ALL YOUR IMPORTANT FILES ARE STOLEN AND ENCRYPTED!
All your files stolen and encrypted
for more information see
RESTORE-MY-FILES.TXT
that is located in every encrypted folder.
Would you like to earn millions of dollars?
Our company acquire access to networks of various companies, as well as insider information that can help you steal the most valuable data of any company.
You can provide us accounting data for the access to any company, for example, login and password to RDP, VPN, corporate email, etc.
Open our letter at your email. Launch the provided virus on any computer in your company.
Companies pay us the foreclosure for the decryption of files and prevention of data leak.
You can communicate with us through the Tox messenger
https://tox.chat/download.html
Using Tox messenger, we will never know your real name, it means your privacy is guaranteed.
If you want to contact us, use ToxID:
If this contact is expired, and we do not respond you, look for the relevant contact data on our website via Tor or Brave Browser

Encryption Speed Chart from the Affiliate Program

Encryption speed comparative table for some ransomware - 02.08.2021 (added BlackMatter)

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

*Actor's claims

StealBit performance comparison chart

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**

*Actor's claims

Interviews, pt. 1


Interview with a LockBit ransomware operator
By Azim Khodjibaev, Dmytro Korzhevin and Kendall McKay

Key Takeaways by Cisco Talos

- Threat actors continue to view unpatched systems as an easy, if not preferred, method of intrusion.
- Many cybercriminals rely almost exclusively on common open-source tools that are readily available on the internet and easy to use.
- Cybercriminals are avid consumers of security news and remain up to date on the latest research and vulnerabilities, weaponizing that information to use in future attacks.
- While threat actors may state publicly that their personal ethics influence their target selection, many adversaries go after the easiest victims regardless of any moral obligation, based on our experience.

LockBit Affiliate Claims

- The actor appears to have a contradictory code of ethics, portraying a strong disdain for those who attack health care entities, while displaying conflicting evidence about whether he targets them himself.
- Hospitals are considered easy targets.
- Maze formerly kept up to 35% of ransom profits earned by its affiliates.
- The EU's General Data Protection Regulation (GDPR) law plays to adversaries' favor.
- The U.S. also has lucrative targets, but with data privacy laws requiring victim companies to report all breaches, the incentive for such entities to pay the ransom is likely somewhat reduced.

Confirmed Theories

- Maze was once a franchise/affiliate program.
- A selection process existed for Maze and still does for LockBit.
- LockBit has a profit-sharing requirement that the affiliate has to meet for the first four or five ransoms.
- Keeping your word to the victim is an important part of LockBit's business model.

Interviews with Russian OSINT YouTube

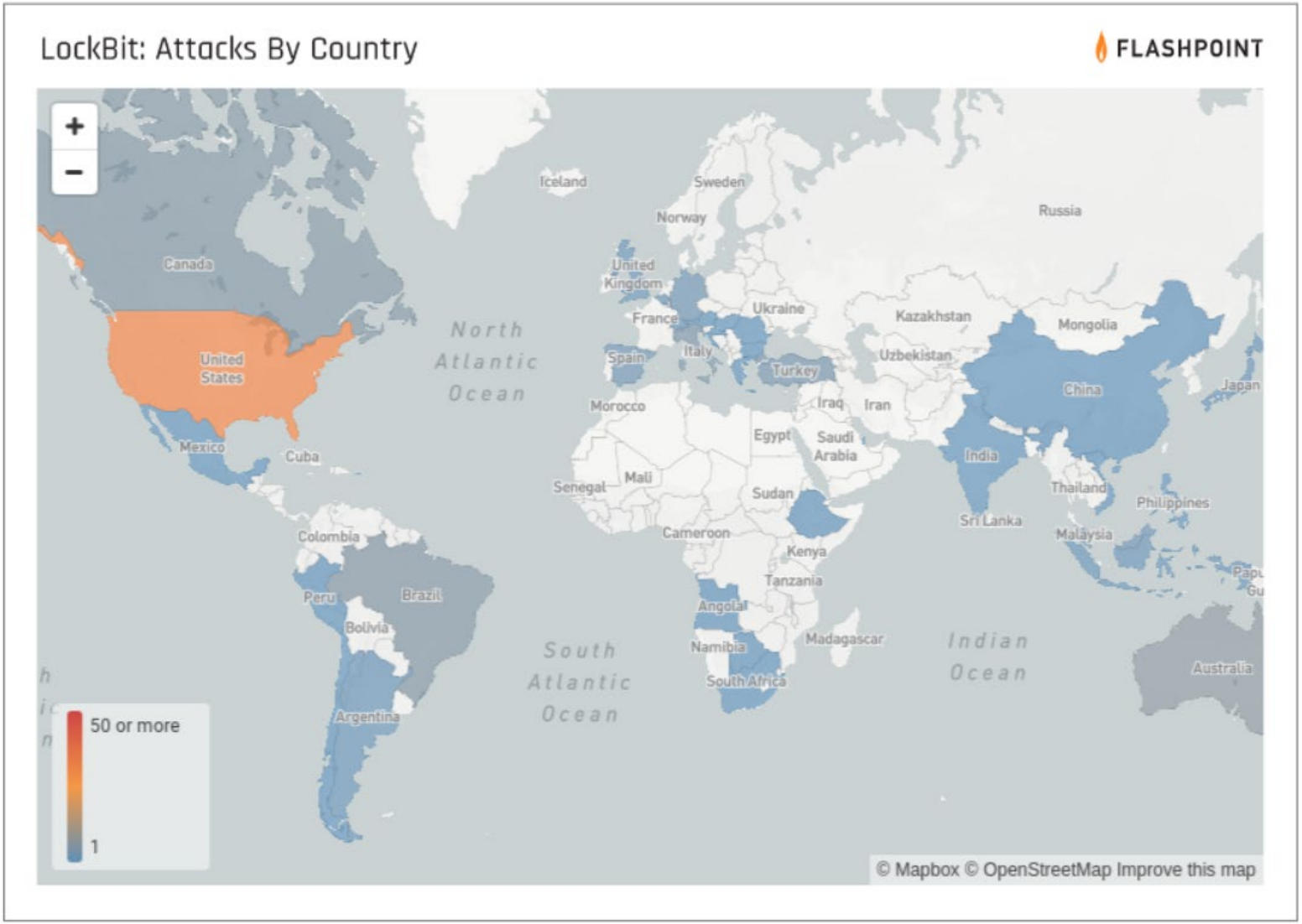
Key Takeaways

1. The U.S. and EU remain top targets.
2. The pandemic has been a boon.
3. Why victims choose to pay a ransom.
4. Expect more supply chain attacks.
5. Victims without backups are more likely to pay.
6. Ransomware bans have not disrupted established operations.
7. Multiple cryptocurrencies are accepted.
8. Criminals prefer public silence.
9. Attacks are now more automated.

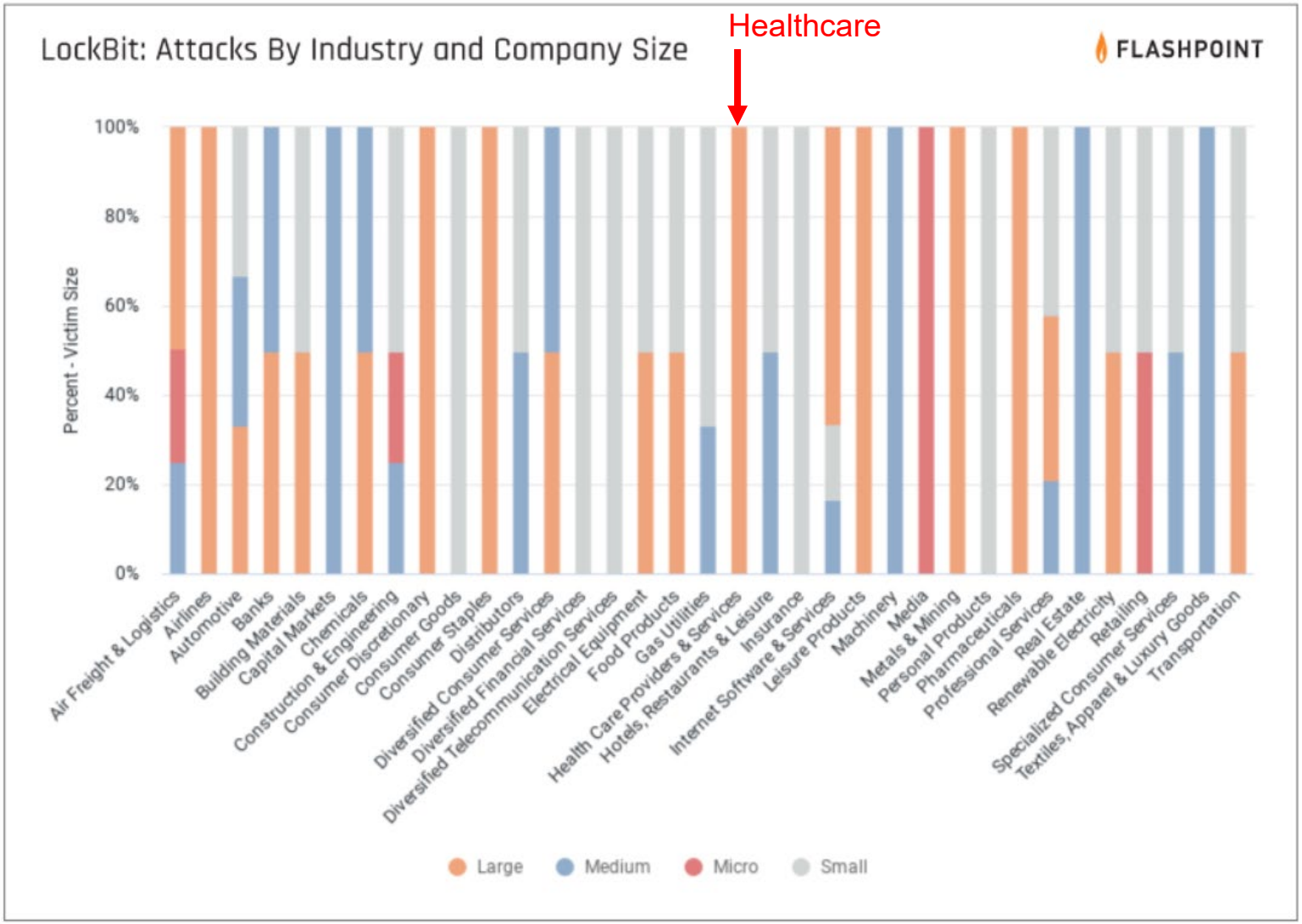
"Employ a full-time red team, regularly update all software, perform preventive talks with a company's employees to thwart social engineering and … use the best ransomware-fighting antivirus."

"We do not attack healthcare, education, charitable organizations, social services – everything that contributes to the development of personality and sensible values from the survival of the species perspective." - LockBitSupp

Map of LockBit Victims



Victims by Industry



"Through our security controls and protocols, we identified irregular activity in one of our environments. We immediately contained the matter and isolated the affected servers.

We fully restored our affected systems from backup, and there was no impact on Accenture's operations, or on our clients' systems." – Accenture

General efforts to help prevent ransomware attacks include:

1. Maintain offline, encrypted backups of data and regularly test your backups.

2. Create, maintain, and exercise a basic cyber incident response plan, resiliency plan, and associated communications plan.

3. Mitigate internet-facing vulnerabilities and misconfigurations.

4. Reduce the risk of phishing emails from reaching end users.

5. Practice good cyber hygiene.

Specific efforts to help prevent LockBit ransomware attacks include:

1. Monitoring for, and alerting on, the anomalous execution of legitimate Windows command line tools such as the use of net.exe, taskkill.exe, vssadmin.exe and wmic.exe.

2. Making use of network segregation to limit communications between nodes, especially endpoints, to provide damage limitation and limit the propagation of threats.

CISA ransomware tips: https://www.cisa.gov/sites/default/files/publications/CISA_Fact_Sheet-Protecting_Sensitive_and_Personal_Information_from_Ransomware-Caused_Data_Breaches-508C.pdf

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Questions

Upcoming Briefs

- 10/7 – Blockchain for Healthcare

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Products

Sector & Victim Notifications

Direct communications to victims or potential victims of compromises, vulnerable equipment or PII/PHI theft, as well as general notifications to the HPH about current impacting threats via the HHS OIG.

White Papers

Document that provides in-depth information on a cybersecurity topic to increase comprehensive situational awareness and provide risk recommendations to a wide audience.

Threat Briefings & Webinar

Briefing presentations that provide actionable information on health sector cybersecurity threats and mitigations. Analysts present current cybersecurity topics, engage in discussions with participants on current threats, and highlight best practices and mitigation tactics.

Need information on a specific cybersecurity topic, or want to join our Listserv? Send your request for information (RFI) to HC3@HHS.GOV,or visit us at www.HHS.Gov/HC3.

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