Threat updates – A new IcedID GZipLoader variant

threatray.com/blog/a-new-icedid-gziploader-variant/

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Author: Markel Picado and Carlos Rubio from Threatray Labs

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Summary

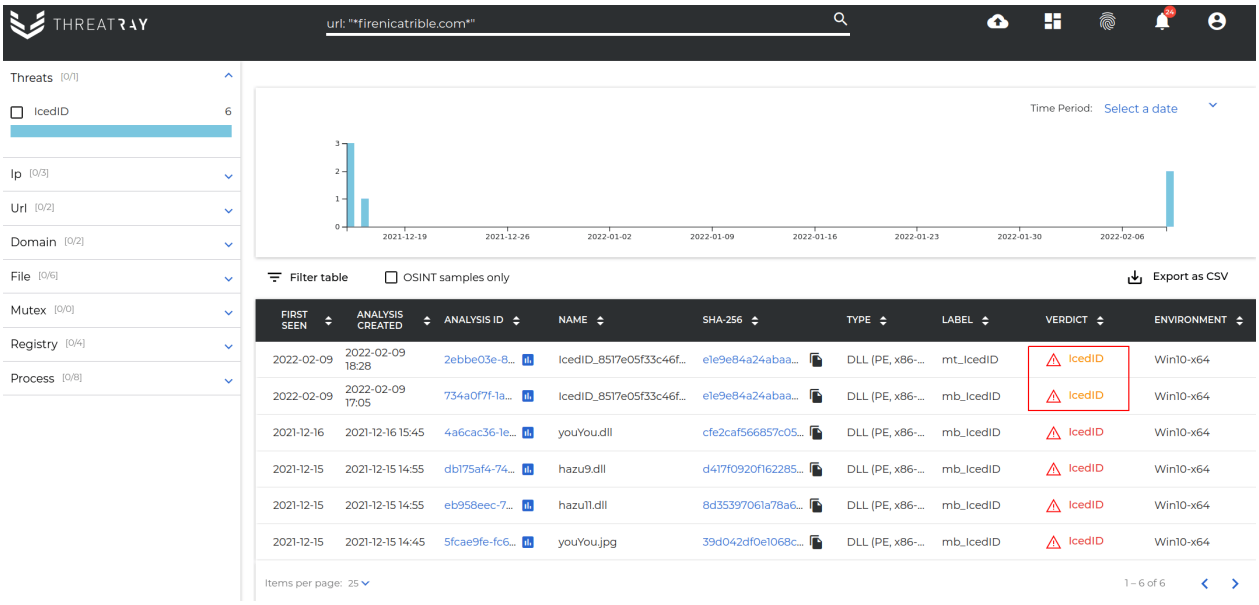
IcedId is a modular banking Trojan discovered in 2017. It is one of the most prevalent malware families in recent years, targeting financial information and acting as a dropper for other malware families, such as Vatet, Egregor, REvil.

GZipLoader is the loader component of the IcedID infection chain. Its purpose is to download and execute the final encrypted payload from the control panel. The encrypted payload mimics a GZIP file, which is why it is called GZipLoader.

While monitoring our incoming malware feeds, we have detected a new version of the IcedID GzipLoader component which is distributed since the beginning of February. This version introduces new anti-analysis techniques, whereas it is functionally equivalent to previous versions, except for the removal of the SSL-pinning feature. The anti-analysis techniques that have been introduced are the dynamic resolution of Windows API functions and string encryption.

Discovery and timeline

The new loader version came to our attention while monitoring our incoming malware feeds. Threatray classifies malware families using search algorithms that are based on code reuse analysis. We have seen (see image below) that the confidence of our classification algorithms for IcedID has dropped from high confidence (“red”) to medium confidence (“orange”). This was the trigger for further investigations.

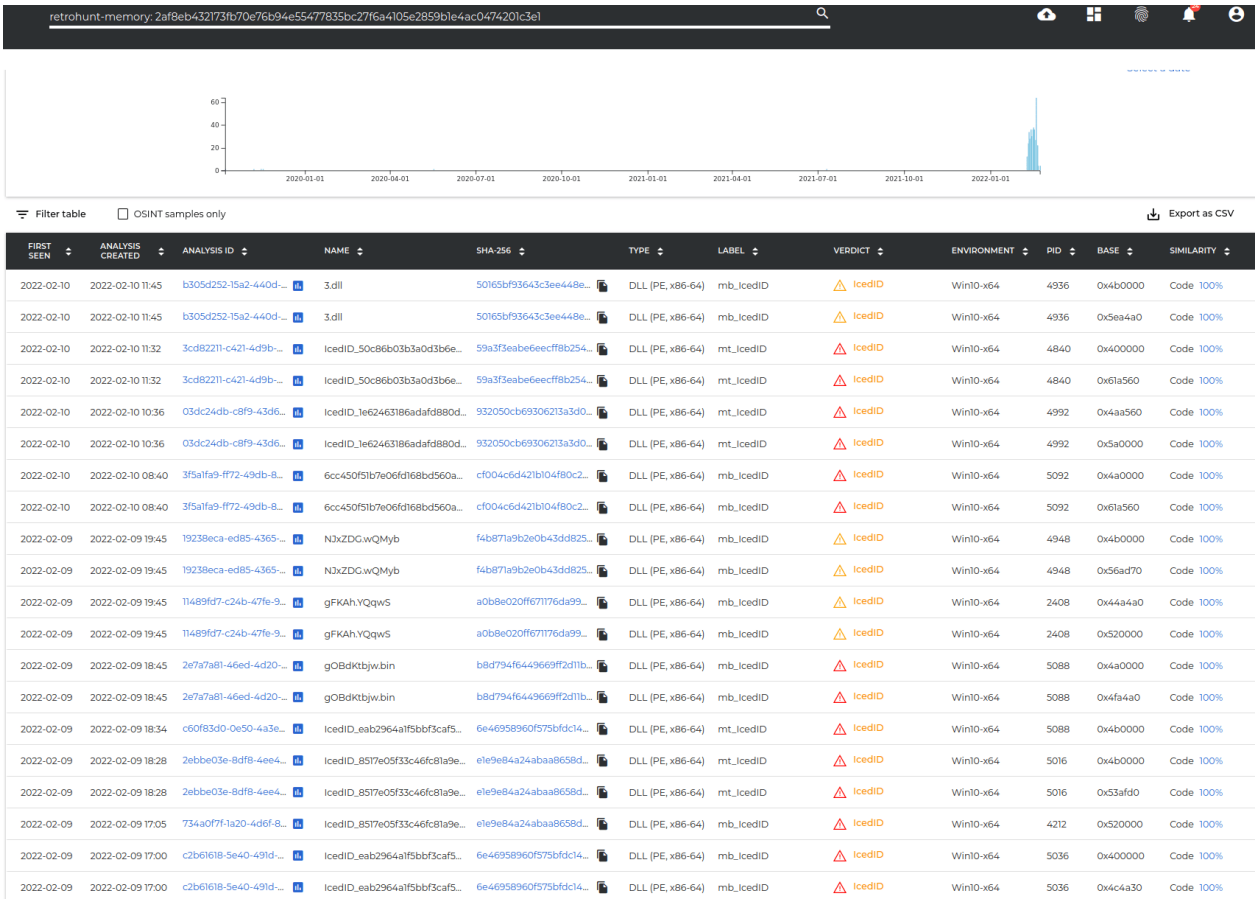


Looking for samples contacting a known IcedID URL.

Looking for instance at the analysis of the sample **e1e9e84e84a24abaa8658d871515d32e21ed51f1c54812315155f4c88bbc8722eecbfbd** we see that the virtual memory region 0x4b0000 of the regsvr32 process contains 9 functions that are related to IcedID GZipLoader component.

IcedID detection based on code reuse.

Using our retrohunting capabilities, we have searched through our platform for samples that contain a similar loader (see image below).



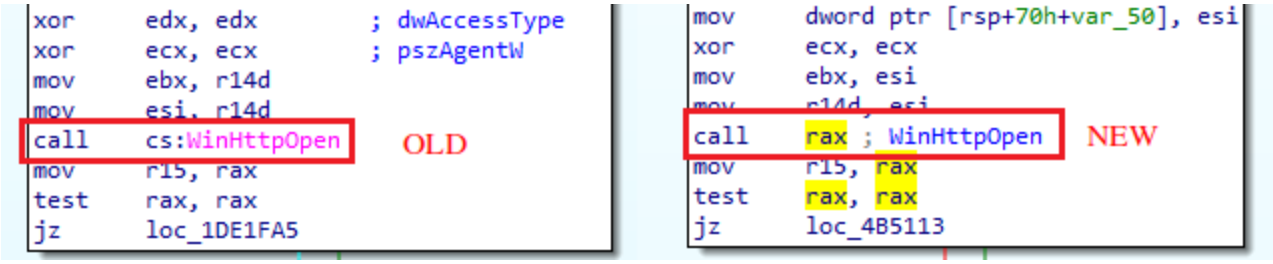
FIRST SEEN	ANALYSIS CREATED	ANALYSIS ID	NAME	SHA-256	TYPE	LABEL	VERDICT	ENVIRONMENT	PID	BASE	SIMILARITY
2022-02-10	2022-02-10 11:45	b305d252-15a2-440d-...	3.dll	50165bf93643c3ee448e...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	4936	0x4b0000	Code 100%
2022-02-10	2022-02-10 11:45	b305d252-15a2-440d-...	3.dll	50165bf93643c3ee448e...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	4936	0x5ea4a0	Code 100%
2022-02-10	2022-02-10 11:32	3cd82211-c421-4d9b-...	IcedID_50c86b03b3a0d3b6e...	59a3f3eabe6eecff8b254...	DLL (PE, x86-64)	mt_IcedID	IcedID	Win10-x64	4840	0x400000	Code 100%
2022-02-10	2022-02-10 11:32	3cd82211-c421-4d9b-...	IcedID_50c86b03b3a0d3b6e...	59a3f3eabe6eecff8b254...	DLL (PE, x86-64)	mt_IcedID	IcedID	Win10-x64	4840	0x61a560	Code 100%
2022-02-10	2022-02-10 10:36	03dc24db-c8f9-43d6...	IcedID_1e62463186adafd880d...	932050cb69306213a3d0...	DLL (PE, x86-64)	mt_IcedID	IcedID	Win10-x64	4992	0x4aa560	Code 100%
2022-02-10	2022-02-10 10:36	03dc24db-c8f9-43d6...	IcedID_1e62463186adafd880d...	932050cb69306213a3d0...	DLL (PE, x86-64)	mt_IcedID	IcedID	Win10-x64	4992	0x5a0000	Code 100%
2022-02-10	2022-02-10 08:40	3f5a1fa9-ff72-49db-8...	6cc450f51b7e06fd168bd560a...	cf004c6d421b104f80c2...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	5092	0x4a0000	Code 100%
2022-02-10	2022-02-10 08:40	3f5a1fa9-ff72-49db-8...	6cc450f51b7e06fd168bd560a...	cf004c6d421b104f80c2...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	5092	0x61a560	Code 100%
2022-02-09	2022-02-09 19:45	19238eca-ed85-4365-...	NJxZDG.wQMyb	f4b871a9b2e0b43dd825...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	4948	0x4b0000	Code 100%
2022-02-09	2022-02-09 19:45	19238eca-ed85-4365-...	NJxZDG.wQMyb	f4b871a9b2e0b43dd825...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	4948	0x56ad70	Code 100%
2022-02-09	2022-02-09 19:45	11489fd7-c24b-47fe-9...	gFKAh.YQqwS	a0b8e020ff671176da99...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	2408	0x44a4a0	Code 100%
2022-02-09	2022-02-09 19:45	11489fd7-c24b-47fe-9...	gFKAh.YQqwS	a0b8e020ff671176da99...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	2408	0x520000	Code 100%
2022-02-09	2022-02-09 18:45	2e7a7a81-46ed-4d20-...	gOBdKtbjw.bin	b8d794f6449669ff2d11b...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	5088	0x4a0000	Code 100%
2022-02-09	2022-02-09 18:45	2e7a7a81-46ed-4d20-...	gOBdKtbjw.bin	b8d794f6449669ff2d11b...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	5088	0x4fa4a0	Code 100%
2022-02-09	2022-02-09 18:34	c60f83d0-0e50-4a3e...	IcedID_eab2964a1f5bbf3caf5...	6e46958960f575bfdc14...	mt_IcedID		IcedID	Win10-x64	5088	0x4b0000	Code 100%
2022-02-09	2022-02-09 18:28	2ebbe03e-8df8-4ee4...	IcedID_8517e05f33c46fc81a9e...	e1e9e84a24abaa8658d...	DLL (PE, x86-64)	mt_IcedID	IcedID	Win10-x64	5016	0x4b0000	Code 100%
2022-02-09	2022-02-09 18:28	2ebbe03e-8df8-4ee4...	IcedID_8517e05f33c46fc81a9e...	e1e9e84a24abaa8658d...	DLL (PE, x86-64)	mt_IcedID	IcedID	Win10-x64	5016	0x53afd0	Code 100%
2022-02-09	2022-02-09 17:05	734a0f7f-1a20-4d6f-8...	IcedID_8517e05f33c46fc81a9e...	e1e9e84a24abaa8658d...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	4212	0x520000	Code 100%
2022-02-09	2022-02-09 17:00	c2b61618-5e40-491d-...	IcedID_eab2964a1f5bbf3caf5...	6e46958960f575bfdc14...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	5036	0x400000	Code 100%
2022-02-09	2022-02-09 17:00	c2b61618-5e40-491d-...	IcedID_eab2964a1f5bbf3caf5...	6e46958960f575bfdc14...	DLL (PE, x86-64)	mb_IcedID	IcedID	Win10-x64	5036	0x4c4a30	Code 100%

Retrohunting for similar GZipLoader samples.

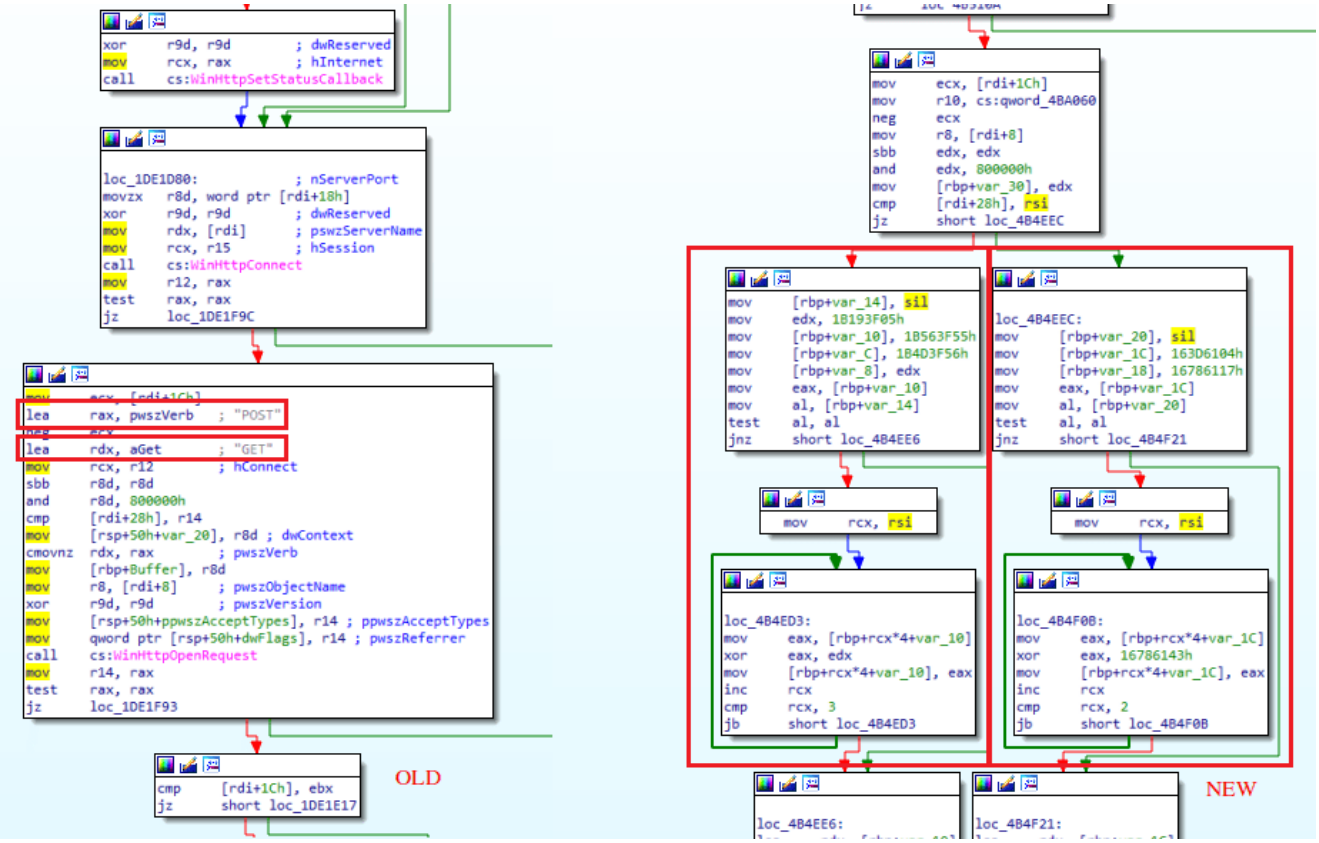
The earliest sample in our feeds with this new loader is from February 9th, 2022.

Detailed analysis

The new version of the loader resolves imports dynamically, whereas the old version does not:

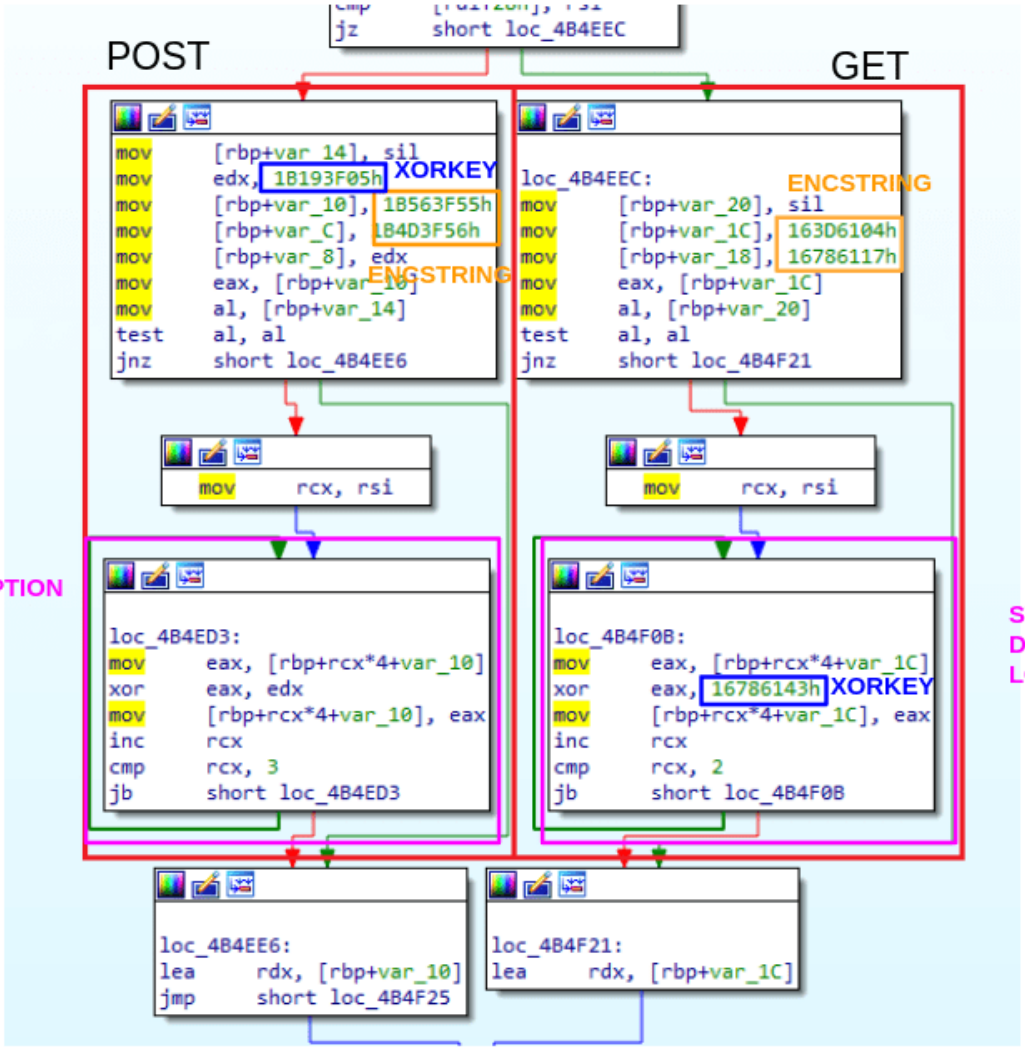


The second functionality that has been added to the new loader is string encryption:



Strings are hidden using a technique commonly known as stacked strings, which is combined with simple XOR encryption.

The following code is in charge of decrypting the strings using XOR operations:



A Python version of the decryption function for POST requests is as follows:

```
In [1]: enc_string = b"\x55\x3F\x56\x1B\x56\x3F\x4D\x1B"

In [2]: key = b"\x05\x3F\x19\x1B"

In [3]: dec_string = ''

In [4]: for i in range(len(enc_string)):
   ...:     dec_string += chr(key[i % len(key)] ^ enc_string[i])
   ...:

In [5]: dec_string
Out[5]: 'P\x00O\x00S\x00T\x00'

In [6]: dec_string.replace('\x00', '')
Out[6]: 'POST'
```

The same string decryption method is used throughout the binary.

The string encryption code is in-lined (as opposed to take place in a dedicated function). This new code changes the control flow graph of all functions which are referencing strings. This could break some detections rules based on patterns recognition such as YARA rules. We thus recommend to double-check your detections rules for IcedID.

Retired features

We have also realized that in this new version, the SSL-pinning feature has been removed. For more details about this feature, we highly recommend reading the report from Group-IB on the old version (https://blog.group-ib.com/icedid). To summarize, IcedID sets a callback when it sends data to a legit server (mostly to aws.amazon.com) and it verifies the checksum of the public key from the server's certificate.

As you can see in the image below, in the old variant when the set_bot_information() function is called, the result of SSL_pinning_feature() is passed as argument. However, in this new variant (since the feature has been removed) the value passed to set_bot_information() is hardcoded to 1.

Old variant

```
decrypt_cnc((__int64)&v12);
SSL_Pinning = SSL_pinning_feature();
botinfo = set_bot_information(v13, SSL_Pinning, (__int64)&v11);
if ( botinfo && cnc_comm1(&v14, botinfo, &lpMem, &v16) && v16 >= 0x400 )
{
  v5 = create_directory(lpMem);
```

New variant

```
botinfo = set_bot_information(v12, 1u, (__int64)&v11);
if ( botinfo && cnc_comm1(&v13, botinfo, &lpMem, &v15) && v15 >= 0x400 )
{
  v5 = create_directory(lpMem);
```

Searching in our telemetry for IcedID samples , we see that the most prevalent URL among all IcedID samples was aws.amazon.com, due to the SLL pinning feature.

However, if we limit the search scope to the last 2 weeks, we can confirm that the aws.amazon.com URL is no longer used:

```
threatray-lab> python3 check_url_prevalence.py
TOP 3 contacted URLS by IcedID samples last year:
    http://aws.amazon.com: 8070
    http://calldivorce.fun: 3163
    http://tvorartificialnature.xyz: 1127
TOP 3 contacted URLS by IcedID samples last 14 days:
    http://keepfootbal.com: 111
    http://reseptors.com: 57
    http://hdtrenity.com: 5
```

Another less important change that occurs in this version is that the function responsible of decrypting the command and control has disappeared. In this new version the code of this function is in-lined in the main function.

IOCs

02e58a9e73e314497356a4d420f83584ccb85d49edce98a36f9e738b85ca637f
03a41a586c17dd1bd79aa20dfa9a0b1e11d8b0acc21d687bfc3953baf8907a86
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05e4a3ef8a29fd09f10e500acf62d628b77b2719b5664a011e66811af6509a69
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1fa43e3a239c517b2af4fbf9cd176b7ef8282d82f6f555917fefc64e4c9cde30
204bcb9f2278761c541c5be310382f02e21a7b83d6944fb619abec110063dc66
205e180196d948fe19ba8ca04d244f505b667af92e8e85ee05caf61c39e38510
23bd947bcd5946b8b7c985562b6c866b3f573f26929726ec2b24a793d9245639
24a6327b7913db912a1c22fdacc0c7148a03c1aa04ee8e67c5c2f63f894d9fef
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About Threatray

Threatray is a novel malware analysis and intelligence platform. We support all key malware defense use cases, including identification / detection, hunting, response, and analysis. Threatray helps security teams of all skill levels to effectively identify and analyze ongoing and past compromises.

At the core of Threatray are highly scalable code similarity search algorithms that find code reuse between a new and millions of known samples in seconds. Our core search algorithms do not make use of traditional byte pattern matches and are thus highly resilient to code mutations.

Our user facing features are based on the core search technology. They include best of class threat family identification and detection, easy to use real-time retro-hunting and retro-detection, cluster analysis to quickly find relevant IOCs, and low-level multi-binary analysis capabilities. Some of our binary analysis capabilities have been used for the research presented in this report.

Contact us at https://threatray.com/contact-us or https://twitter.com/threatray

Freddy Dezeure

Freddy Dezeure graduated from the KUL University in Belgium in 1982, with a master of science in engineering. He was CIO of a private company from 1982 until 1987. He joined the European Commission in 1987 where he held a variety of management positions in administrative, financial and operational areas, in particular in information technology.

He founded CERT-EU, the Computer Emergency and Response Team of the EU institutions, agencies and bodies in 2011. Until May 2017 he held the position of the Head of CERT-EU.

Presently, he is an Independent Advisor in cybersecurity and cyber-risk management and he acts as Board Member and Advisory Board Member in several high-tech companies. He is a highly respected keynote speaker and is very active in the cybersecurity community. He is leading the EU MITRE ATT&CK Community.

@FDezeure

https://www.FreddyDezeure.eu/

Mathias Wegmüller

Matthias is a highly accomplished entrepreneur, board member and investor. He has multi-year expertise in digital transformation, facilitating the effective execution of digital engagement initiatives. A passionate, action-oriented and motivational team leader, Mathias Co-founded Qumram in 2011 and led it in different roles until the successful exit and trade-sale in November 2017 to Dynatrace.

Pierre Noel

Pierre has over 30 years of international experience in Information Security, Data Privacy, and Enterprise Risk Management. He is in charge of the nation-wide Swiss Finance Service cybersecurity information sharing program. Previously, Pierre was the Chief Security Officer for Microsoft, covering the wide Asian region and the Chief Security & Privacy Officer (CSPO) for Huawei Worldwide He designed, built, and operated complete Security and

Enterprise Risk Management environments for Governments, Finance, Transport, and large conglomerate industries over the World. Pierre was the advisor to three large nations in Australasia, working directly with their ministers or presidential offices in building nationwide cybersecurity & privacy programs. He is a member of the board of advisors of Airbus Industries and also sits on the board of several established and start-up organizations in the field of CyberSecurity and Privacy.

Thomas Dübendorfer

Thomas Dübendorfer holds a Ph.D. in computer science from ETH Zurich and is the president of the Swiss ICT Investor Club (SICTIC). He has worked at HP Research Labs in Silicon Valley and seven years at Google on security engineering projects. He is an angel investor in more than twenty tech startups in Switzerland. UBS, Nasdaq, Lufthansa, Adobe, Swiss Re and many other highly ranked companies are customers of tech startups that he co-founded. He was honoured as “Top 100 Digital Shapers of Switzerland” in 2016 and 2018 and as “Top 200 most prominent persons of Zurich, Switzerland” in Who Is Who in Zürich 2019. He has published a paper on Web browser security that got downloaded more than 100’000 times and that proved Web browsers with silent security update mechanisms to protect their users significantly better from vulnerabilities than others.

Peter Stalder

After studying Computer Science at the ETH in Zurich, Peter worked as a software developer, system technician, consultant and project lead in multiple industry projects. He was the CTO of Finnova, a leading banking software in Switzerland, for 20 years. At Finnova, he was responsible for the System- and Software Architecture, as well as the development of its core technologies. In 2015, Peter transitioned to independent consulting and now supports startups with his experience.

Ariel F. Lüdi

As the CEO of Hybris Software, Ariel was instrumental to make Hybris become the global leader in omnichannel commerce and the sale to SAP in 2013 for around 1.5 B USD. Since then, Ariel is investing in and coaching innovative IT start-ups. Prior to joining Hybris, he held senior positions at Salesforce.com, BroadVision and Oracle. Ariel studied Physics at ETH in Zurich.

Jonas Wagner

CTO and Co-Founder

Jonas is founder and CTO of Threatray

Jonas has over 10 years of professional experience in software engineering, with a focus on machine learning and cyber security data analysis. He holds a M.Sc. in Computer Science from the Bern University of Applied Sciences, where he spent years researching and developing the core algorithms that now power Threatray.

Endre Bangerter

CEO and Co-Founder

Endre Bangerter is founder and CEO of Threatray.

Endre has over 20 years of experience in Information Security and Cyber Defense. He has been serving as a malware analyst for the government and as a technical consultant for Accenture and IBM. Endre has rich experience in developing novel IT security technologies gained while working at IBM Research in Zurich and as a professor and lab director at Bern University of Applied Sciences. He has a Ph.D. in IT security from the Horst Görtz Institute For IT-security at the University of Bochum in Germany.