

New pastebin-like service used in multiple malware campaigns

J blogs.juniper.net/en-us/threat-research/new-pastebin-like-service-used-in-multiple-malware-campaigns

October 5, 2020



Juniper Threat Labs identified several malware campaigns that rely on a pastebin-like service for its infection chain. The domain in question is paste.nrecom.net. The attacks usually start as a phishing email and, when a user is tricked into executing the malware, it downloads the succeeding stage of the malware from paste.nrecom.net and loads it into the memory without writing to disk. Using a legitimate web-service for the malware infrastructure is not new, as we have seen APT group [FIN6](#) using [pastebin](#) to host parts of the infection chain and [Rocke](#) using it for command and control. Although using legitimate web services is not novel, this is the first time that we have seen threat actors use paste.nrecom.net. Among the malware we have identified are AgentTesla, LimeRAT, Ransomware and Redline Stealer.

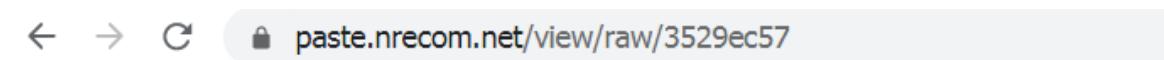
What is paste.nrecom.net?

NRE.Com.Net Create API About

Paste.nrecom has been in service since May 2014. If you are not familiar with pastebin, it is a service where you can post your code or text data with the intent of sharing it with others. Paste.nrecom does the same thing and it also offers an API that allows scripting. This is advantageous to threat actors as they can easily insert and update data programmatically. This service is powered by [Stikked](#), which is an open-source PHP based pastebin.

How do threat actors use it for malicious purposes?

Because it is a text-only service, one would think that it cannot host an executable file (binary data) into it. However, binary data can be represented as a text file by simply encoding it. The common encoding method is using [base64](#). That is exactly what the threat actors did in this case.



To add another layer of obfuscation, they encrypt the binary data with a XOR key. The following file, for example, is encrypted with XOR key, 0x02.

```

λ base64 -d 3529ec57 | xxd | head
00000000: 4f58 9202 0102 0202 0602 0202 fdfd 0202 ox.7480.....
00000010: ba02 0202 0202 0202 4202 0202 0202 0202 .....228.B.....
00000020: 0202 0202 0202 0202 0202 0202 0202 0202 .....1500.....
00000030: 0202 0202 0202 0202 0202 0202 8202 0202 .....1500.....
00000040: 0c1d b80c 02b6 0bcf 23ba 034e cf23 566a .....#..N.#Vj After base64 decoding,
00000050: 6b71 2272 706d 6570 636f 2261 636c 6c6d kq"rpmepeco"ac11m
00000060: 7622 6067 2270 776c 226b 6c22 464d 5122 v" `g"pwl"kl"FMQ"
00000070: 6f6d 6667 2c0f 0f08 2602 0202 0202 0202 omfg,...&.....
00000080: 5247 0202 4e03 0102 dbcd 655d 0202 0202 RG..N.....e]....
00000090: 0202 0202 e202 2002 0903 5202 02f6 0502 .....2022...R.P.....

```

the file is still encrypted with XOR algorithm.

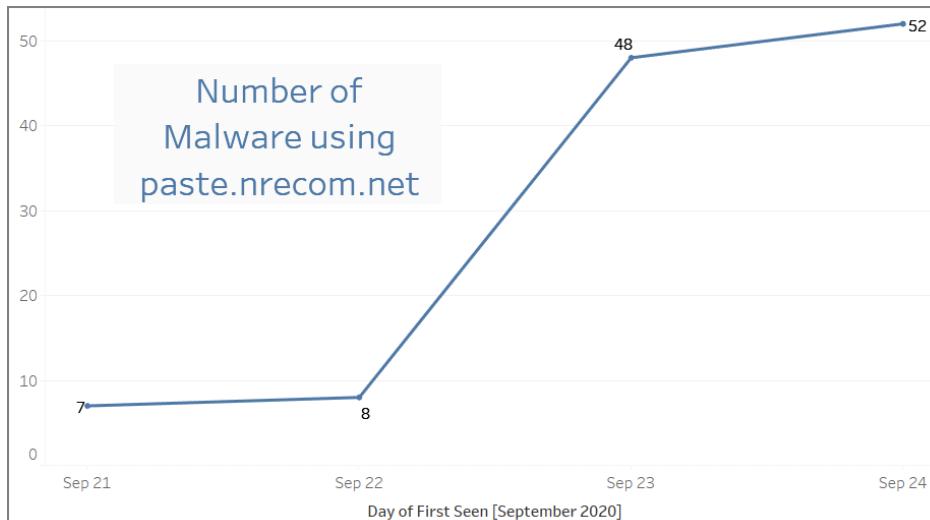
```

λ xxd 3529ec57.dec.XOR.02 | head
00000000: 4d5a 9000 0300 0000 0400 0000 ffff 0000 MZ.....
00000010: b800 0000 0000 0000 4000 0000 0000 0000 .....@.File...
00000020: 0000 0000 0000 0000 0000 0000 0000 0000 .....1500.....
00000030: 0000 0000 0000 0000 0000 0000 8000 0000 .....1500.....
00000040: 0e1f ba0e 00b4 09cd 21b8 014c cd21 5468 .....!..L.!Th After all the necessary
00000050: 6973 2070 726f 6772 616d 2063 616e 6e6f is program canno
00000060: 7420 6265 2072 756e 2069 6e20 444f 5320 t be run in DOS
00000070: 6d6f 6465 2e0d 0d0a 2400 0000 0000 0000 mode....$.....
00000080: 5045 0000 4c01 0300 d9cf 675f 0000 0000 PE..L....Application
00000090: 0000 0000 e000 2200 0b01 5000 00f4 0700 .....".P.....

```

decoding and decryption, you will then see the executable file, as shown above.

From September 21, 2020, we have seen several malware families taking advantage of this service and quickly ramped up.



Malware Campaigns

The attack usually starts with a phishing email that includes an attachment, such as a document, archive or an executable. When a user is tricked into installing the malicious attachment (first stage), it downloads the next stages from paste.nrecom.net. We have also seen malware hosting their configuration data in the same service.

Agent Tesla

Agent Tesla is a spyware that is capable of stealing personal data from web browsers, mail clients and FTP servers. It can also collect screenshots, videos and capture clipboard data. Recent versions of this malware are also capable of stealing personal data from VPN clients. It is being sold on the underground markets for as low as \$15 and could go up to \$70 depending on the additional features.

Agent Tesla is among the most active malware using this pastebin-like service. Campaigns usually start with a phishing email with a malicious attachment. Based on the samples we found, these campaigns target multiple industries related to shipping, supply chain and banks. In some cases, the attachments are archives, such as .iso, .rar or .uee like below:

From: CATRINA <admin@genoxy.gq> Sent: Tue 9/22/2020 12:38 PM
To:
Cc:
Subject: Precision hardware parts for Project 68234

Message **Project 68234.iso (640 KB)** **Agent Tesla Loader**

Dear Sir/Madam,

Glad to hear that you're on the market for hardware precision parts. We are a manufacturer of machinery precision parts, stamping mould, fixture, CNC parts, with more than 19 years experience and our factory is ISO certified.

For your information, VIET TIEN's advantages are as below.

1. We can supply all kinds of metal products based on the customer's drawings.
2. For most of the products, our precision reaches 0.002mm.
3. Our equipment are advanced in this field, such as Japan Mitsubishi EDM, Japan SODICK EDM, CMM, etc.
4. We cooperate with many famous enterprises like SAMSUNG, Huawei, etc.

Presently, we have requirements so please revert with price list as we need your price list for 450 of attached, I can order 2000 in total, 1550 can follow on between now and December. Priority is getting 450 soonest.

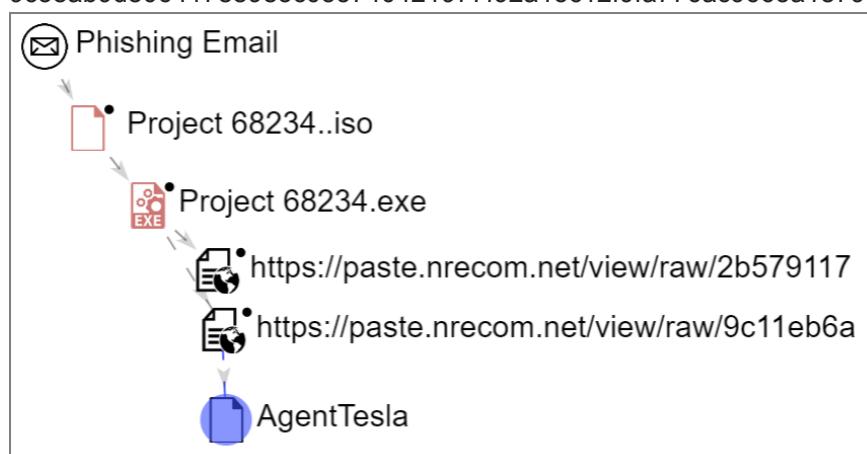
Your earliest reply will be highly appreciated.

Best regards,
CATRINA

VIET TIEN TECHNOLOGY CO., LTD
Address: 23, Street 2, Quarter 2, Binh An Ward, District 2, HCMC
Phone: (+84-80) 999-99-957 - 9999-991-999

Attachment Sha256:

9c38ab9d806417e89e3c035740421977f92a15c12f9fa776ac9665a1879e5f67



Infection Chain for

9c38ab9d806417e89e3c035740421977f92a15c12f9fa776ac9665a1879e5f67

As you can see from the chain, there are two requests to paste.nrecom because it divides the Agent Tesla payload into two. The first request is the first half of the file and the second request makes the second half. This technique makes it harder for security solutions to analyze the payload.

From: HSBC Advising Service [REDACTED] Sent: Thu 9/24/2020 12:48 PM
To: [REDACTED]
Cc:
Subject: Payment Advice - Ref: HSBC99002992/1602020

Message Payment Advice09242020.uue (189 KB)

Dear royal.

The attached payment advice is issued at the request of our customer.
who has ordered a wire transfer to your bank account. The advice is for your reference only.

Note: For security reasons, pass code is contained in file (.zip). Enter the last four (4) digits of your account number to access pass code.

Another

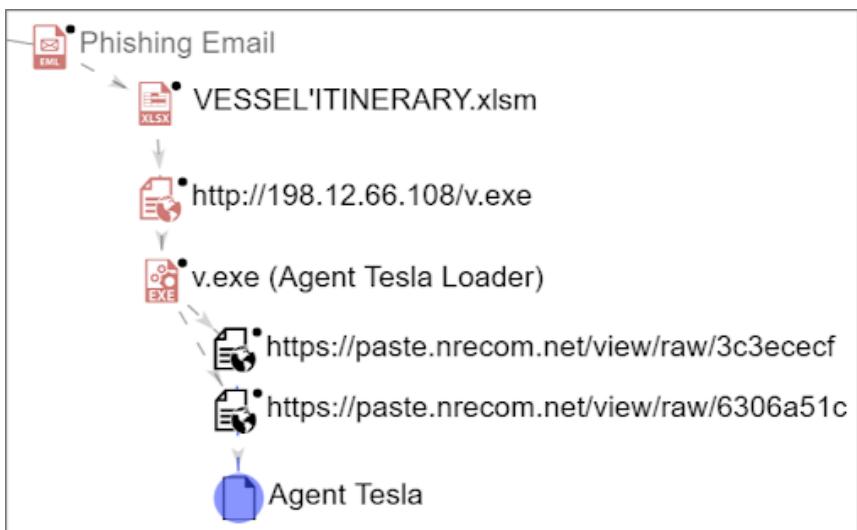
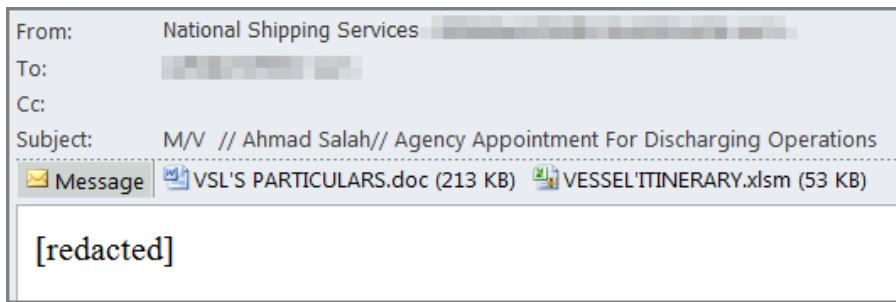
sample phishing email has the attachment with Sha256:

199a98adf78de6725b49ec1202ce5713eb97b00ae66669a6d42f8e4805a0fab9

Below are email attachments and files inside some email attachments that we have found to install Agent Tesla using paste.nrecom.

File Name	Sha256
Emirate bank TT copy 2020-09-20 at 07.30.55.uue	f8c02c3f6d22978b3c478d0fb7ad4845609b8ad4a38e0ed2a75721156a6a8e44
Inv C-22464 PO 3871.exe	27f8e739b62c685c4115f49ae146bb75271d0b8fad021436939735bf7492186b
PO#150367285 SECONDO VERGANI SPA Ref#BK043383.exe	3101003430beae11fe082a07878ac2f643a64e3abd82b7b2a787a0e1fde27307
Payment Notification.uue	b7cf6fb7557f435bab1b815a38b1771aea9d118192f6d184111754615e8881af
bank payment copy.exe	136991b95c503e13d7ed77305a305f6f568c9d93273584d19a33014202a6ebbb
Payment docs63878288882788.docx.rar	44221603cb9e19a630e35bd12a9c8bd97a9d2743a6fc5528e81db0718fc3e1b3
Attachment JOIN LEADERS PO332, pdf.exe	167139073c586fd0d7de374611f899e170fd0316463be6c65170496636b3e42d
APROBACION DE TRANSFERENCIA INUSUAL REALIZADA EXITOSAMENTE.tar	0e044c8570122a280c963cac80e0140da78ee0d378cd17cab4ea6f146ce35d15

In some cases, the attached files are Office Documents that download the Agent Tesla loader.



c66e6c6018d3e51e8b39146c6021fb51f59750b93778a063f7d591f24068c880

W3Cryptolocker Ransomware

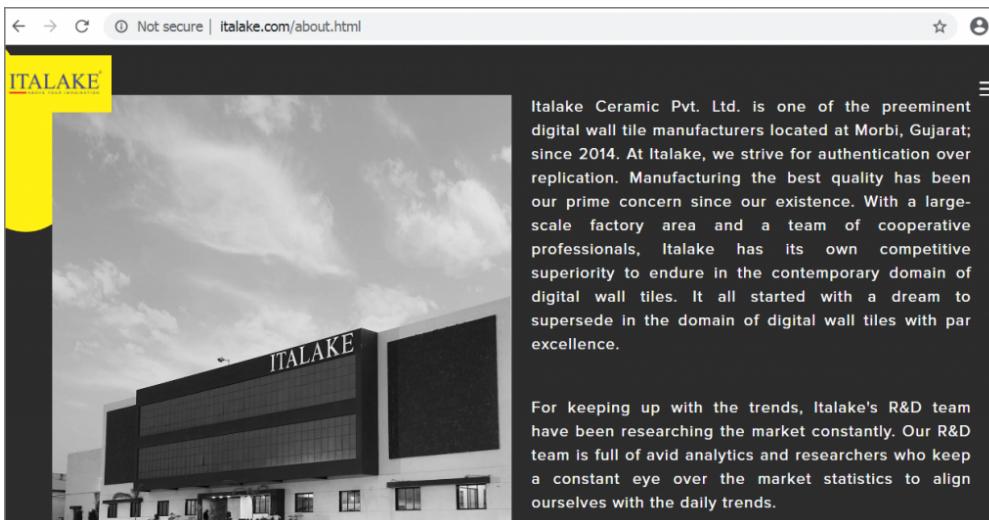
W3Cryptolocker is a relatively new ransomware. Based on our telemetry, this ransomware surfaced in July 2020. We will call this malware W3Cryptolocker, based on a string found in its code.

```
.....þÝÝ.....u~.....  
..°^[$..,B`4;Í»)Ý¹Øíž.ÈÖ™=ù&<%°íW3CRYPTO LOCKER...  
@.....Attention! ....All your files are encrypted....to purchase an unique decryptor use e-mail  
filessupport@cock.li ....or create ticket here  
: https://yip.su/2Qstd5....expand 32-byte k....
```

Strings found in the binary code of this

ransomware.

The loader was hosted on a potentially hacked site, italake.com.

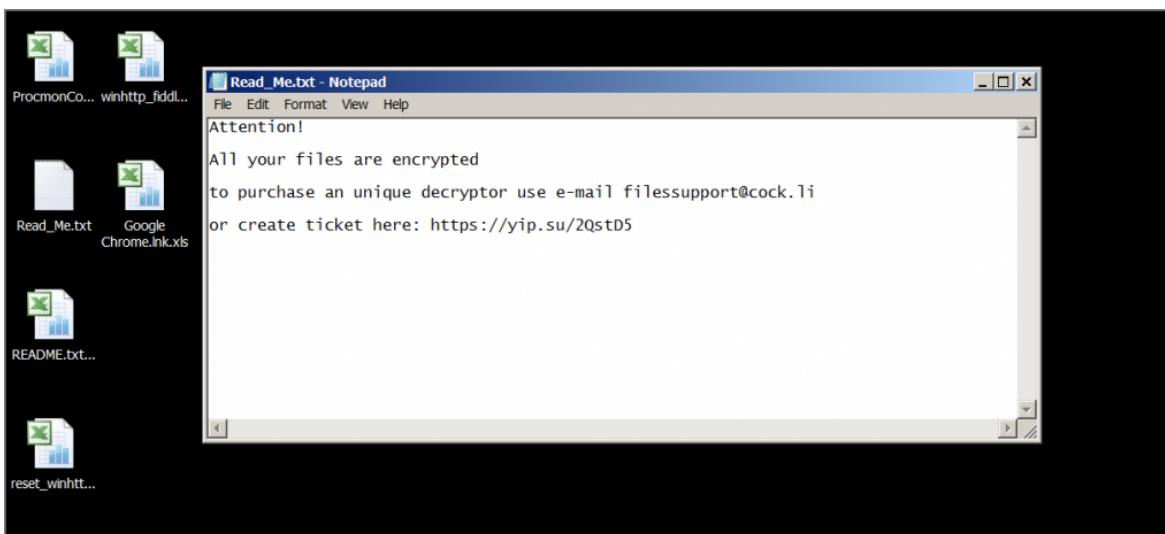


of Ede98ae4e8afea093eae316388825527658807489e5559bff6dbf5bc5b554a2c

It will encrypt all files in all drives except for files having ".xls" extension and folders having the following strings:

- Windows
- ProgramData
- \$Recycle.bin
- System Volume Information

It adds an extension .xls for encrypted files. After it is done encrypting each folder, it creates a "Read_Me.txt" file on each folder with the following message.



Visiting the [https://yip\[.\]su/2QstD5](https://yip[.]su/2QstD5) leads you to a freshdesk support site, bit7.freshdesk.com.

The screenshot shows a web browser window for 'bit7.freshdesk.com/support/tickets/new'. At the top, there's a header with a lock icon, the text 'Submit a ticket : bit7', and a '+' button. Below the header, the URL 'bit7.freshdesk.com/support/tickets/new' is shown. On the right side of the header, there are 'Welcome', 'LOGIN', and 'SIGN UP' buttons. The main content area is titled 'Submit a ticket'. It contains three required fields: 'Requester *' with a placeholder 'Email', 'Subject *' with a placeholder 'Email', and 'Description *' with a rich text editor toolbar. The background of the page is white, and the overall layout is clean and modern.

Other W3Cryptolocker Samples

- c97852b425e41d384227124d93baf6c2d3e30b52295a828b1eac41dc0df94d29
- 9a0af98d0b8f7eacc3fdd582bbc0d4199825e01eeb20c2a6f98023c33ece74f6
- 01eea2a4628c6b27a5249a08152655246871acafa657e391b73444c05097976e
- 9a08e87e8063b13546e464f73e87b2ca5bde9410fec4e614313e2b8a497592fa
- 8dfe87850bd17b4eb0169b85b75b5f104ae6b84deeb2c81fe6ae5e19685f6c66
- 53124033d521158771eac79ad6f489c6fdd5b25ab96712035c2ca65b3a3c5eed
- aac2024789ffd2bfce97d6a509136ecf7c43b18c2a83280b596e62d988cedb10
- fafabdfffa67883587ba1a3c29f6345a378254f720efe8c2f318a4d5acdbce373

Redline Stealer

Redline Stealer is a malware that surfaced around March 2020 and it was reported to have targeted healthcare and manufacturing industries in the United States. This malware is found being advertised on forums with several pricing options starting from \$100/month subscription. It has the following functionality:

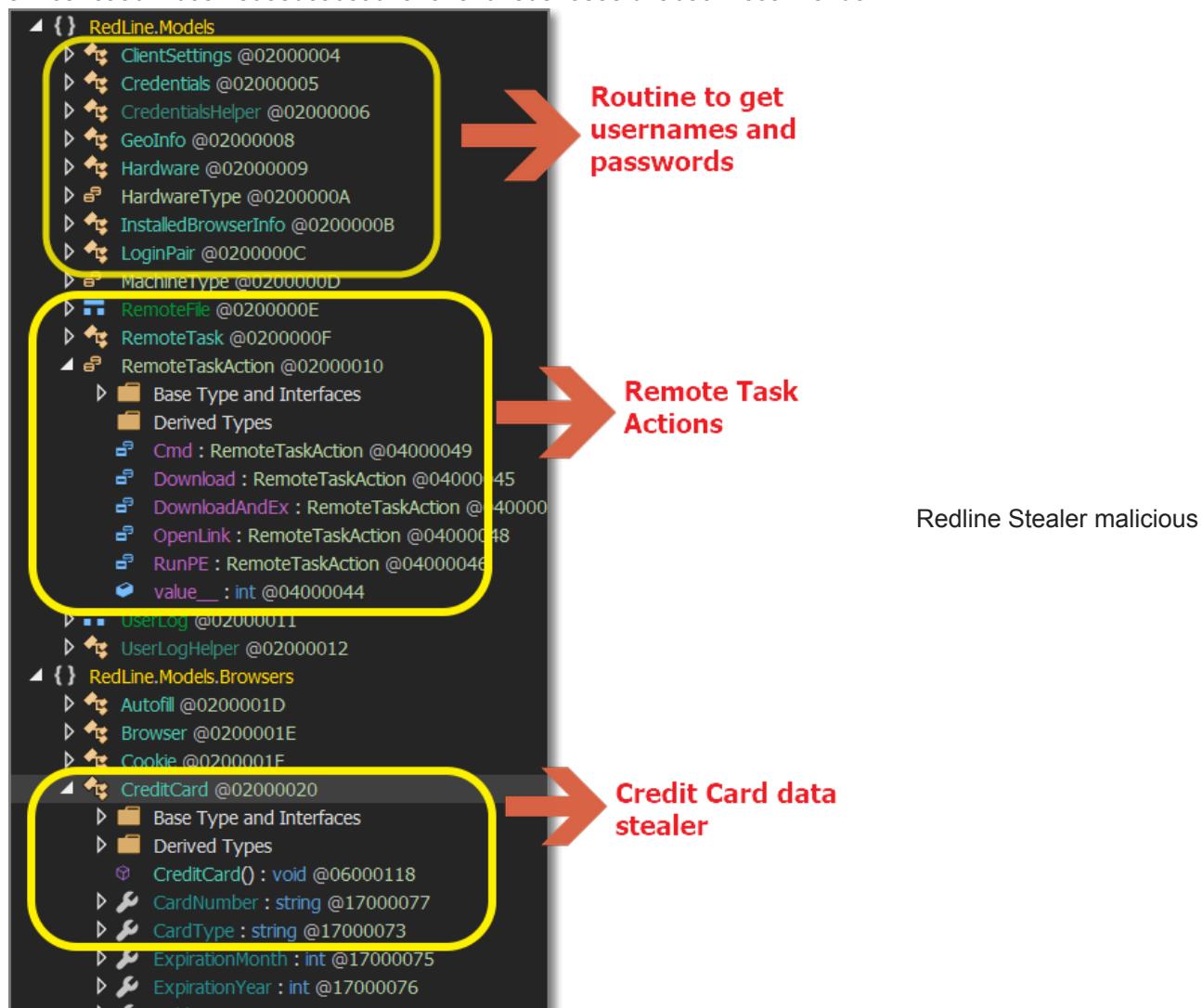
- Browser Data Stealer
 - Login and Passwords
 - Cookies
 - Autocomplete Fields
 - Credit Cards
- Remote Task Functions
 - Execute Commands
 - Download Files
 - Download Files and Execute
 - RunPE (Process Injection for fileless infection)
 - OpenLink
- FTP and IM client stealer
- File-grabber
- Collects information about the victim's system

The sample we found poses as a Bitcoin Miner archived into a RAR file. The archive contains an executable, MinerBitcoin.exe, that downloads the Redline Stealer payload from paste.nrecom.net.



Chain of Redline Stealer: Sha256:

a719affc96b41b63f78d03dc3bc6b7340287d25d876e58fd1ab307169a1751dc

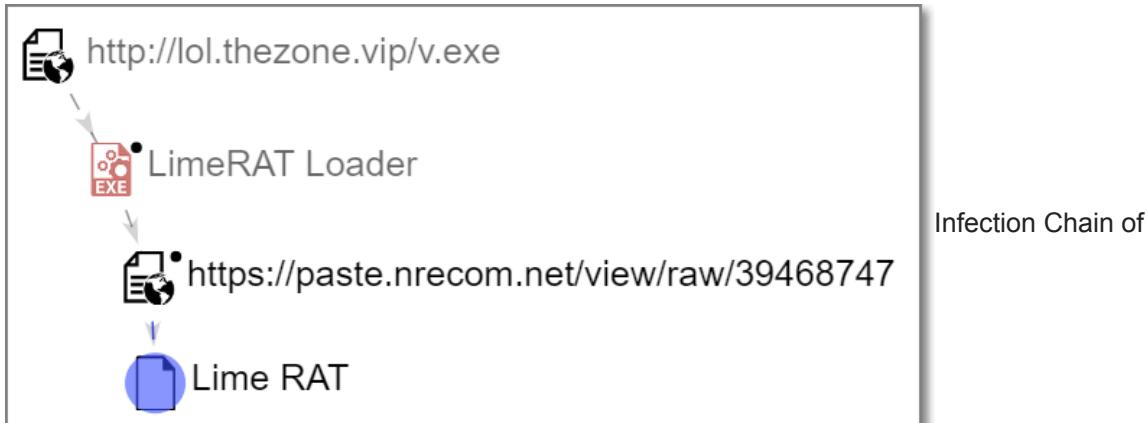


functions

LimeRAT

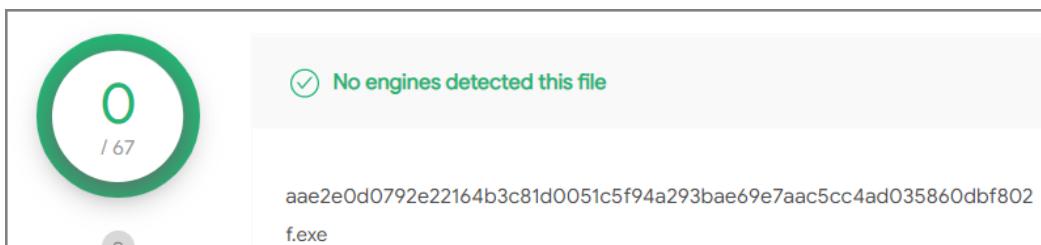
LimeRAT is a remote administration trojan coded in .NET and is open source. It was a malware used to target Colombian government institutions by the APT-C-36 group. Among its many capabilities, it can be used as:

- Ransomware
- Remote Desktop
- Crypto Mining
- CryptoStealer
- DDOS
- Keylogger
- Password Stealer



20ad344d20337f8a782135e59bc1f6e1a7999bcddc50fc1dc3b8b6645abcb91e

Another sample we found is aae2e0d0792e22164b3c81d0051c5f94a293bae69e7aac5cc4ad035860dbf802. At the time of this analysis, this sample still has zero VT detections. It downloads the LimeRAT from [https://paste\[.\]nrecom\[.\]net/view/raw/93a7cd20](https://paste[.]nrecom[.]net/view/raw/93a7cd20).



aae2e0d0792e22164b3c81d0051c5f94a293bae69e7aac5cc4ad035860dbf802 with no VT hits

Conclusion

Using legitimate web-services like pastebin or paste.nrecom for malware infrastructure gives cybercriminals an advantage, as these services cannot be easily taken down due to their legitimate use. We recommend Security Operations to add paste.nrecom to potentially web services being abused for malicious purposes. It is recommended to monitor web-services like this one for suspicious content particularly binary data encoded in base64. Juniper's Encrypted Traffic Insights capability on the SRX NGFW does detect the malicious TLS connections to paste.nrecom.net as malicious using machine learning as seen in the screenshot below for W3Cryptolocker loader.

Juniper Advanced Threat Protection (ATP) detects these threats.

Monitor / File Scanning / [HTTP File Downloads](#)

What's new tenant

9c38ab9d806417e89e3c... ⓘ

[Report False Positive](#) [Download STIX Report](#)

Threat Level 9 File name 9c38ab9d806417e89e3c0357... Category other (MIME type: applic...	Top Indicators Malware Name: Unavailable; Signature Match: Production; Antivirus: Clean	Prevalence Global prevalence: Medium Unique users: 1 Protocols seen: HTTP	
GENERAL	BEHAVIOR ANALYSIS	NETWORK ACTIVITY	BEHAVIOR DETAILS
Status Threat Level: ⓘ 9 Global Prevalence: Medium Last Scanned: Oct 1, 2020 11:41 AM	File Information File Name: 9c38ab9d806417e89e3c03574042197f92a15c12f9fa776ac9665a1879e5f67 Category: other (MIME type: application/octet-stream) Size: 640KB Platform: Generic Malware Name: Unavailable:Production Type: Generic Strain: Unavailable:Production	Other Details sha256: 9c38ab9d806417e89e3c03574042197f92a15c12f9fa776ac9665a1879e5f67 md5: eb7da6ec44167818dc6e01ba787f3ef6	

Detection of AgentTesla Loader (Project 68234.iso)

c66e6c6018d3e51e8b39... ⓘ

[Report False Positive](#) [Download STIX Report](#)

Threat Level 9 File name VESSEL'ITINERARY.xlsm Category document (Extension: xlsm...)	Top Indicators Malware Name: Unavailable; Signature Match: Js:Unavailable:Production Antivirus: Clean	Prevalence Global prevalence: Medium Unique users: 1 Protocols seen: HTTP	
GENERAL	BEHAVIOR ANALYSIS	NETWORK ACTIVITY	BEHAVIOR DETAILS
Status Threat Level: ⓘ 9 Global Prevalence: Medium Last Scanned: Oct 1, 2020 12:00 PM	File Information File Name: VESSEL'ITINERARY.xlsm Category: document (Extension: xlsm, MIME type: application/open-office+xml) Size: 53KB Platform: Generic	Other Details sha256: c66e6c6018d3e51e8b39146c6021fb51f59750b93778a063f7d591f24068c880 md5: 0e71c5aa8e8078858f45a73a67beb9b2	

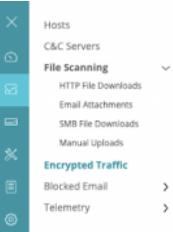
Detection of AgentTesla Loader (VESSEL'ITENERARY.xlsm)

ede98ae4e8afea093eae... ⓘ

[Report False Positive](#) [Download STIX Report](#)

Threat Level 9 File name wrcryptoloker_loader.exe Category executable (Extension: exe...)	Top Indicators Malware Name: Win32:Trojan:Unavailable:Production Signature Match: Unavailable (Trojan) Antivirus: Clean	Prevalence Global prevalence: Medium Unique users: 1 Protocols seen: HTTP	
GENERAL	BEHAVIOR ANALYSIS	NETWORK ACTIVITY	BEHAVIOR DETAILS
Status Threat Level: ⓘ 9 Global Prevalence: Medium Last Scanned: Oct 1, 2020 12:05 PM	File Information File Name: wrcryptoloker_loader.exe Category: executable (Extension: exe, MIME type: application/dosexec) Size: 106KB Platform: Win32	Other Details sha256: ede98ae4e8afea093eae316388825527658807489e5559bff6dbf5bc5b554a2c md5: d6edc18e25ca020cb5aba8366e8be1f3	

Detection of W3Cryptolocker Loader (0022.exe)



Encrypted Traffic Insights ⓘ

External Server IP	External Server Hostname	Highest Threat Level	Count	Country	Last Seen	Category
7.0.0.27	paste.nrecom.net	ⓘ 10	2	United States	Oct 1, 2020 11:44 AM	

Detection of malicious connection to paste.nrecom using Juniper Encrypted Traffic Insights

Indicators of Compromise (IOC)

Domain

Paste.nrecom.net

192.12.66.108

lol.thezone.vip

URL

[http://198\[.\]12\[.\]66\[.\]108/v\[.\]exe](http://198[.]12[.]66[.]108/v[.]exe)

[http://lol\[.\]thezone\[.\]vip/v\[.\]exe](http://lol[.]thezone[.]vip/v[.]exe)

[http://italake\[.\]com/assets/css/0022\[.\]exe](http://italake[.]com/assets/css/0022[.]exe)

[https://paste\[.\]nrecom\[.\]net/view/raw/3c3ecef](https://paste[.]nrecom[.]net/view/raw/3c3ecef)

[https://paste\[.\]nrecom\[.\]net/view/raw/6306a51c](https://paste[.]nrecom[.]net/view/raw/6306a51c)

[https://paste\[.\]nrecom\[.\]net/view/raw/bfefa179](https://paste[.]nrecom[.]net/view/raw/bfefa179)

[https://paste\[.\]nrecom\[.\]net/view/raw/39468747](https://paste[.]nrecom[.]net/view/raw/39468747)

[https://paste\[.\]nrecom\[.\]net/view/raw/c230a816](https://paste[.]nrecom[.]net/view/raw/c230a816)

[https://paste\[.\]nrecom\[.\]net/view/raw/3529ec57](https://paste[.]nrecom[.]net/view/raw/3529ec57)

[https://paste\[.\]nrecom\[.\]net/view/raw/7900ed08](https://paste[.]nrecom[.]net/view/raw/7900ed08)

[https://paste\[.\]nrecom\[.\]net/view/raw/bd63e76f](https://paste[.]nrecom[.]net/view/raw/bd63e76f)

[https://paste\[.\]nrecom\[.\]net/view/raw/658b9281](https://paste[.]nrecom[.]net/view/raw/658b9281)

[https://paste\[.\]nrecom\[.\]net/view/raw/b44fe71a](https://paste[.]nrecom[.]net/view/raw/b44fe71a)

[https://paste\[.\]nrecom\[.\]net/view/raw/93a7cd20](https://paste[.]nrecom[.]net/view/raw/93a7cd20)

[https://paste\[.\]nrecom\[.\]net/view/raw/d8aedaf6](https://paste[.]nrecom[.]net/view/raw/d8aedaf6)

[https://paste\[.\]nrecom\[.\]net/view/raw/91aec4e7](https://paste[.]nrecom[.]net/view/raw/91aec4e7)

[https://paste\[.\]nrecom\[.\]net/view/raw/4736837b](https://paste[.]nrecom[.]net/view/raw/4736837b)

[https://paste\[.\]nrecom\[.\]net/view/raw/aec14685](https://paste[.]nrecom[.]net/view/raw/aec14685)

[https://paste\[.\]nrecom\[.\]net/view/raw/c7dfc858](https://paste[.]nrecom[.]net/view/raw/c7dfc858)

[https://paste\[.\]nrecom\[.\]net/view/raw/bebcab0a](https://paste[.]nrecom[.]net/view/raw/bebcab0a)

[https://paste\[.\]nrecom\[.\]net/view/raw/bfbb1544](https://paste[.]nrecom[.]net/view/raw/bfbb1544)

[https://paste\[.\]nrecom\[.\]net/view/raw/7f41da66](https://paste[.]nrecom[.]net/view/raw/7f41da66)

[https://paste\[.\]nrecom\[.\]net/view/raw/0d9233c8](https://paste[.]nrecom[.]net/view/raw/0d9233c8)

[https://paste\[.\]nrecom\[.\]net/view/raw/4f789f73](https://paste[.]nrecom[.]net/view/raw/4f789f73)

[https://paste\[.\]nrecom\[.\]net/view/raw/6550c073](https://paste[.]nrecom[.]net/view/raw/6550c073)

[https://paste\[.\]nrecom\[.\]net/view/raw/3066146f](https://paste[.]nrecom[.]net/view/raw/3066146f)

[https://paste\[.\]nrecom\[.\]net/view/raw/019f27dd](https://paste[.]nrecom[.]net/view/raw/019f27dd)

[https://paste\[.\]nrecom\[.\]net/view/raw/04fba6cb](https://paste[.]nrecom[.]net/view/raw/04fba6cb)

Sha256

9c38ab9d806417e89e3c035740421977f92a15c12f9fa776ac9665a1879e5f67

Ede98ae4e8afea093eae316388825527658807489e5559bff6dbf5bc5b554a2c

cb1da05bac46d1aeb0eec67b2249aa8f539784c4a9ff9245b4ed4a8937ccd0f

337f28a9250592d0ebc58f5a913114df82e69ef4c44243191204adfa61f9819b

8d804533708c03ed4236be70e113a419ce1c8d8a5c36baa755cb7b787f29f54f

20ad344d20337f8a782135e59bc1f6e1a7999bcdcc50fc1dc3b8b6645abcb91e

bc2e03ca292da305602c8755453fa87073810a6359f2ec9a0935fe3bb51ef886

4f31265917db7d9abddf4b6378da0822158cc9b4bff1904adad63a87cfa82f2e

3d3ab28f09d5736fc2215fb6395e7b15e6e9f1f86931b1d3d956c70879e9d33

13b630c5c157585f6abcb2fc8e3388c23a09f881c20cdeaffda291fb36a37539

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