# Operation TA505: network infrastructure. Part 3

By Positive Technologies

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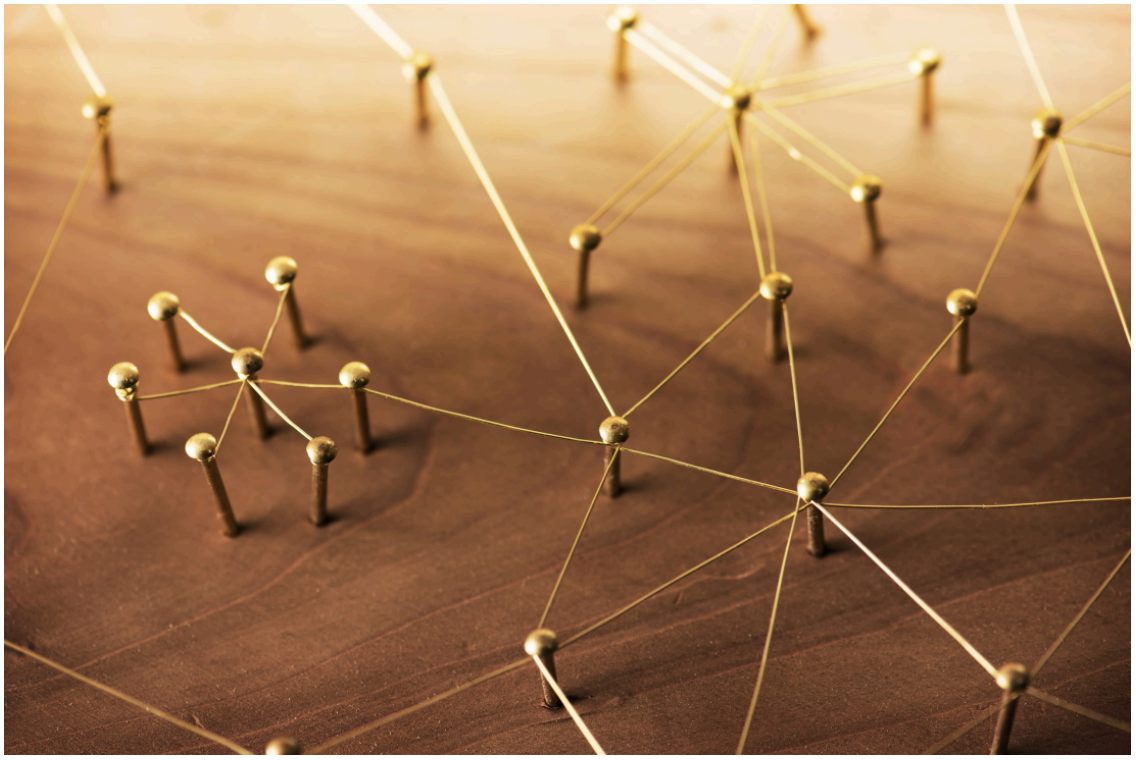


Network infrastructure analysis plays an important role in the study of malware distribution campaigns. Data on which IP addresses corresponded to a given domain name over time facilitate the identification of new malicious servers. In turn, retrospectively determining which domains were resolved to a given IP address provides new domains, for which the search procedure can be repeated, leading the process further. This information can be immensely helpful in establishing the geography of nodes, identifying "favorite" hosts and registrars, and determining which values an attacker characteristically enters into fields when registering domains.

Metainformation that appears useless at first glance may very well prove its worth after a period of a days, weeks, or months. In the course of malware analysis, sooner or later the question of attribution inevitably arises, and indirect identifiers such as network indicators can go a long way in determining which criminal group a certain tool belongs to.

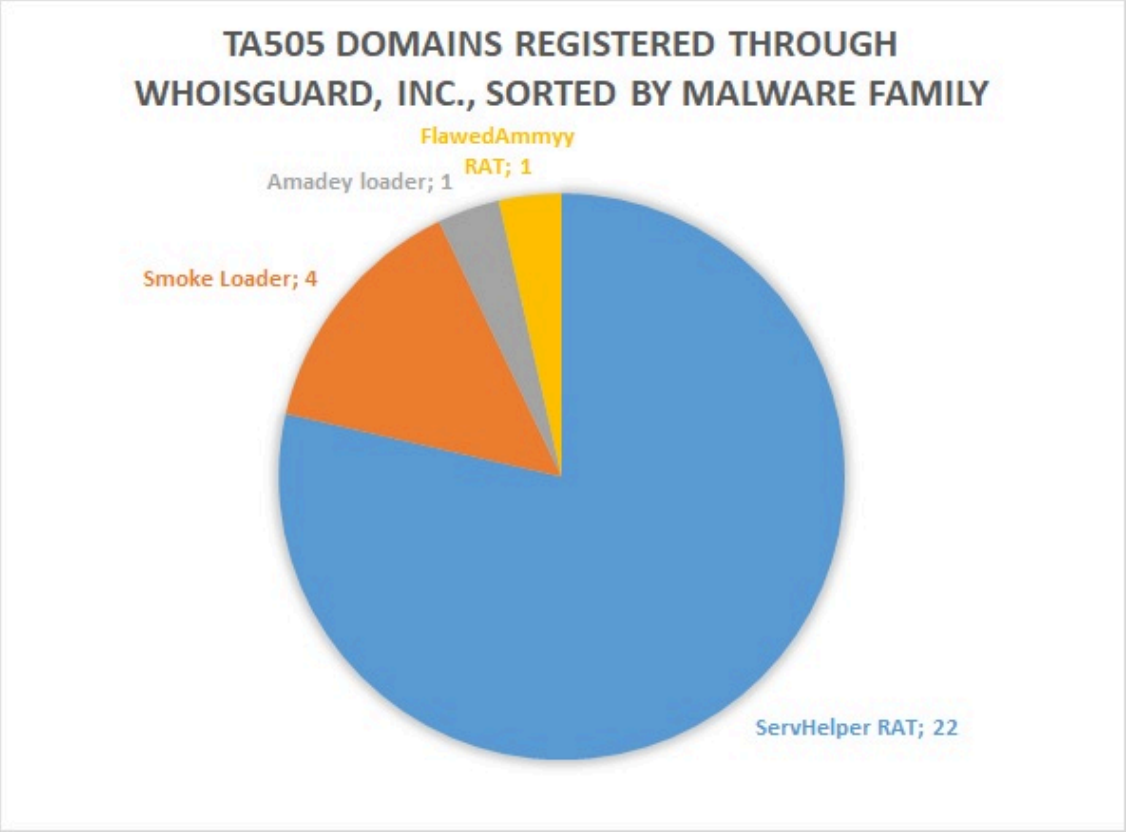
This article examines the most characteristic network infrastructure indicators of the TA505 group, as well as intersections between TA505 and another hacker group, Buhtrap.

## Domain name registrars

In total, we analyzed 372 domains belonging to TA505 and identified 22 organizations that facilitated the acquisition of these domains. The resources most frequently used were the following:

- WhoisGuard, Inc. — 28 domain names
- Eranet International Limited — 26 domain names

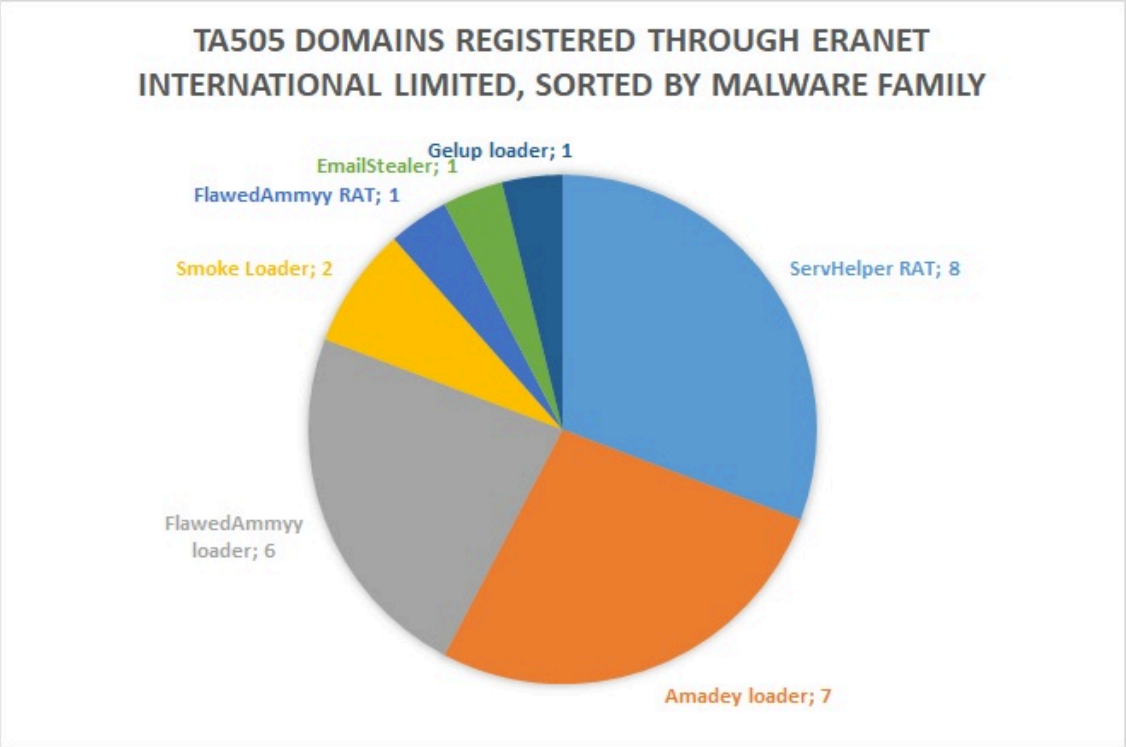
WhoisGuard, an organization based in Panama, offers the service of concealing domain owners' registration data from public access. This is not the first time we have seen their services used by hackers to establish anonymity and hinder investigations.




TA505 domains registered through WhoisGuard, sorted by malware family

TA505 has utilized other, similar services, though to a lesser extent. These include PROTECTSERVICE LTD, Whois Privacy Protection Foundation, and Domains by Proxy LLC.

Eranet International Limited is one of the largest registrars in Hong Kong. It should be noted that members of TA505 tended to use dynamic DNS when registering domains with this provider. As a result, the IP addresses that their domain names were resolved to changed frequently, making them difficult to track.




TA505 domains registered through Eranet International Limited, sorted by malware family

## Domain name registrants

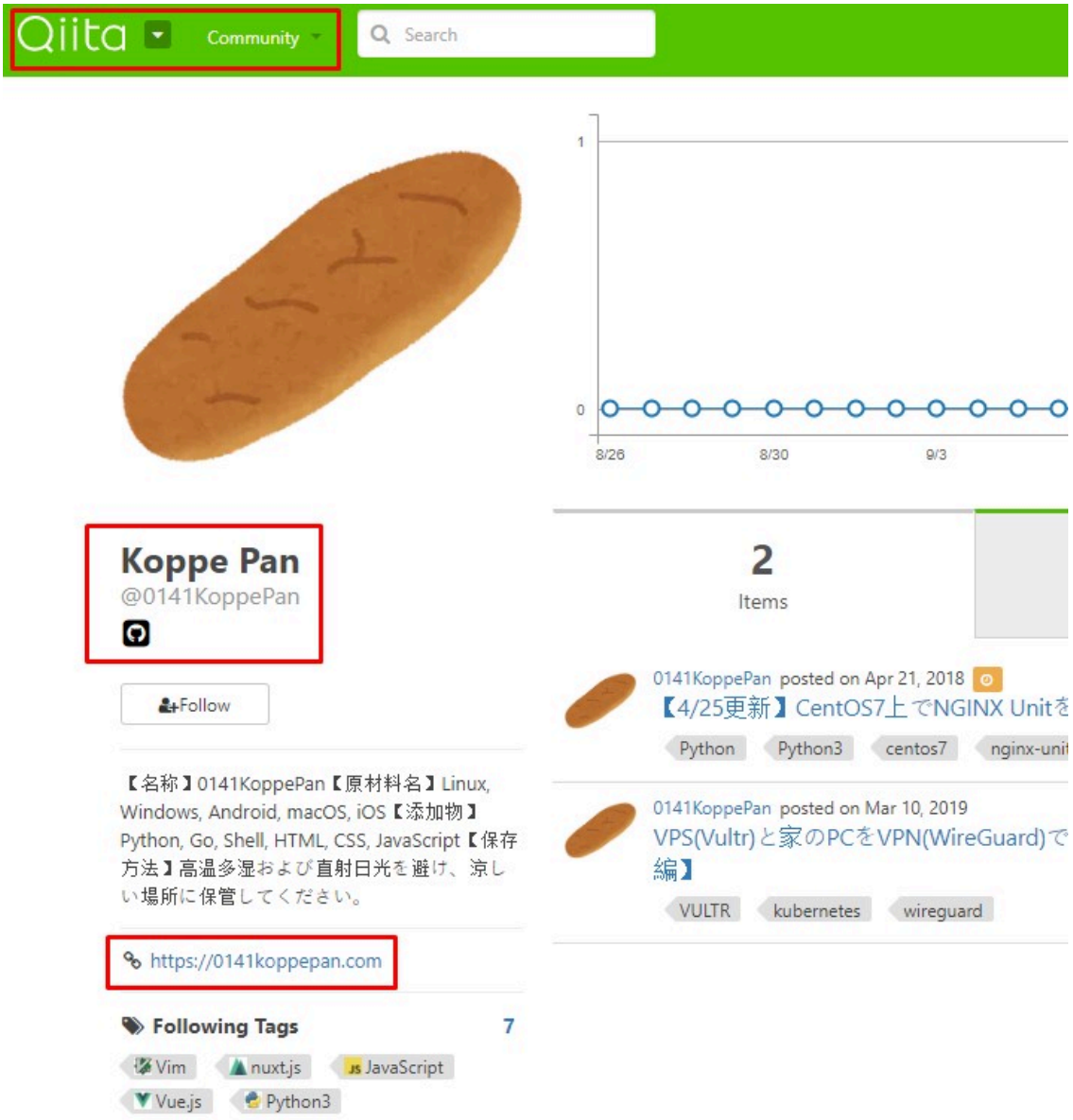
While investigating the WHOIS data of various domain names, we were able to obtain unique values for certain fields in a number of cases.

WHOIS data for TA505 domain names

| Domain | WHOIS field | Value | Malware |
|---|---|---|---|
| kentona[.]su | Email | ctouma2@gmail.com | Smoke Loader/RMS RAT |
| koppepan[.]app | Email | nox1u9bruzgg@contactprivacy.email | FlawedAmmyy loader |
| 0141koppepan[.]com | Email | 0141.koppe.pan@gmail.com | FlawedAmmyy loader |
| elast[.]pw | City | hai dian hai dian | ServHelper RAT |
| | Name | Lei Sun Lei | |
| | Phone | +86.15810310076 | |
| | Email | std3199@163.com | |
| makosoft[.]hu | Email | takagimeister@gmail.com | EmailStealer |

| Domain | WHOIS field | Value | Malware |
|---|---|---|---|
| bigpresense[.]top | Fax | +1.7246992079 | EmailStealer |
| | Email | armstrongdom@slimemail.com | |
| solsin[.]top | Organization | Brandon P. Thurman | FlawedAmmyy loader |
| | Fax | +1.3084575035 | |
| | Email | BrandonPThurman@grr.la | |
| newfolder2-service[.]space | State | smolenskaya oblast | Smoke Loader |
| | Phone | +7.9385040686 | |
| | Email | ssserviceshop1@yandex.ru | |
| windows-several-update[.]com | Street | NO.1111 Chaoyang Road | FlawedAmmyy loader |
| | Name | Wiet Lee | |
| | Phone | +86.86756381050 | |
| | Email | whois-protect@hotmail.com | |
| windows-update-02-en[.]com | Street | Shinararneri str. 43 | FlawedAmmyy loader |
| | Name | Artak Gasparyan | |
| | Phone | +374.37494527465 | |
| test-service012505[.]com | Street | Mangilik yel, 52, 102 | Smoke Loader |
| | Name | Askar Dyussekeyev | |
| | Phone | +7.71727172 | |
| microsoftsyncservice[.]biz | Organization | zhuhaiyingxunkejiyouxiangongsi | Smoke Loader |
| office365onlinehome[.]com | Organization | Internet Invest, Ltd. dba Imena.ua | ServHelper RAT |
| | Street | Gaidara, 50 st. | |

Naturally, not all this information can be taken at face value. There are, however, certain values particularly worth noting. For instance, a search on the email address **ctouma2@gmail.com** leads to a list of additional domains registered to the same address. Another email address, **0141.koppe.pan@gmail.com**, is linked with a variety of resources—an account on Github, Steam, the Japanese hacker forum Qiita (with a link to a malicious domain in the profile), a YouTube channel, an account in Skype (live: 141.koppe.pan), and so forth.




Page on the Quiita hacker forum linked with suspicious domain registrant

We will refrain from delving into a deep analysis of these WHOIS data, as it lies outside the scope of this article. We will, however, note that hackers often utilize legitimate resources that have been compromised to host the first stage of their malware campaigns. The following domains are cases in point:

- greenthumbsup[.]jp
- fakers.co[.]jp
- nanepashemet[.]com
- nagomi-753[.]jp
- iluj[.]in

## Autonomous systems (AS)

For the sake of completeness, here are the top autonomous systems to which the IP addresses of C&C servers used by TA505 belong. Of course, a single autonomous system serves many hosts, both legitimate and non-legitimate,

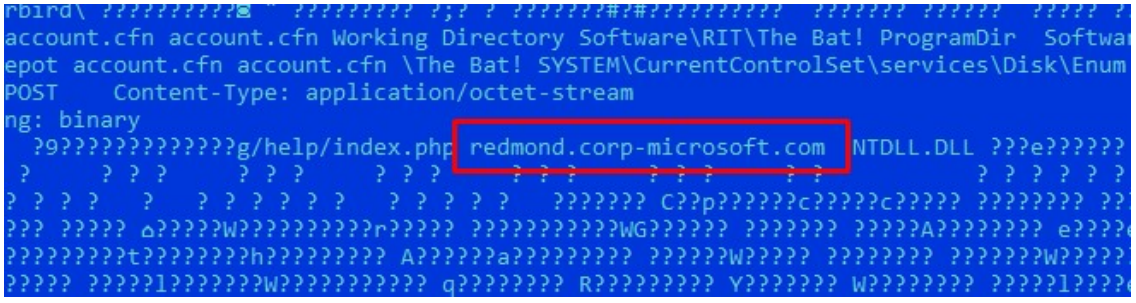
including various malware families of disparate origins. The following statistics should simply be viewed as an overview of the attacker's preferences. Taken with other data, they can be used for attribution.

Autonomous systems frequently used by TA505

| Autonomous system number (ASN) | AS name | Number of IP addresses |
|---|---|---|
| 39798 | MivoCloud SRL | 21 |
| 61138 | Zappie Host LLC | 14 |
| 51852 | Private Layer INC | 8 |
| 13335 | Cloudflare, Inc. | 5 |
| 199524 | G-Core Labs S.A. | 5 |
| 21100 | ITL LLC | 5 |
| 45102 | Alibaba (US) Technology Co., Ltd. | 5 |

## TA505 and Buhtrap

On July 11, 2019, specialists from ESET released an article about a recent attack carried out by the Buhtrap group using a zero-day vulnerability in the Win32k component of Windows. The article described a so-called 'grabber' module used to harvest user passwords from email clients, browsers, and other sources. Later, we unearthed another similar module (MD5: c6e9d7280f77977a6968722e8124f51c) with the same C&C server in its body (redmond.corp-microsoft[.]com).




C&C server in the Buhtrap grabber module

Running a query through the PaSiveTotal resource reveals that this host has been rendered to the IP address 95[.]179.159.170 since June 6, 2019.

Several days earlier, on July 2, 2019, specialists from Proofpoint released a report regarding new tools used by the TA505 group, one of which is called Andromut (also known as Gelup). Andromut is a downloader for the FlawedAmmyy RAT. One of the variations of the downloader that we encountered (MD5: 0cbeb424d96e5c268ec2525d603f64eb) uses the domain compatexchange-cloudapp[.]net as its C&C server.

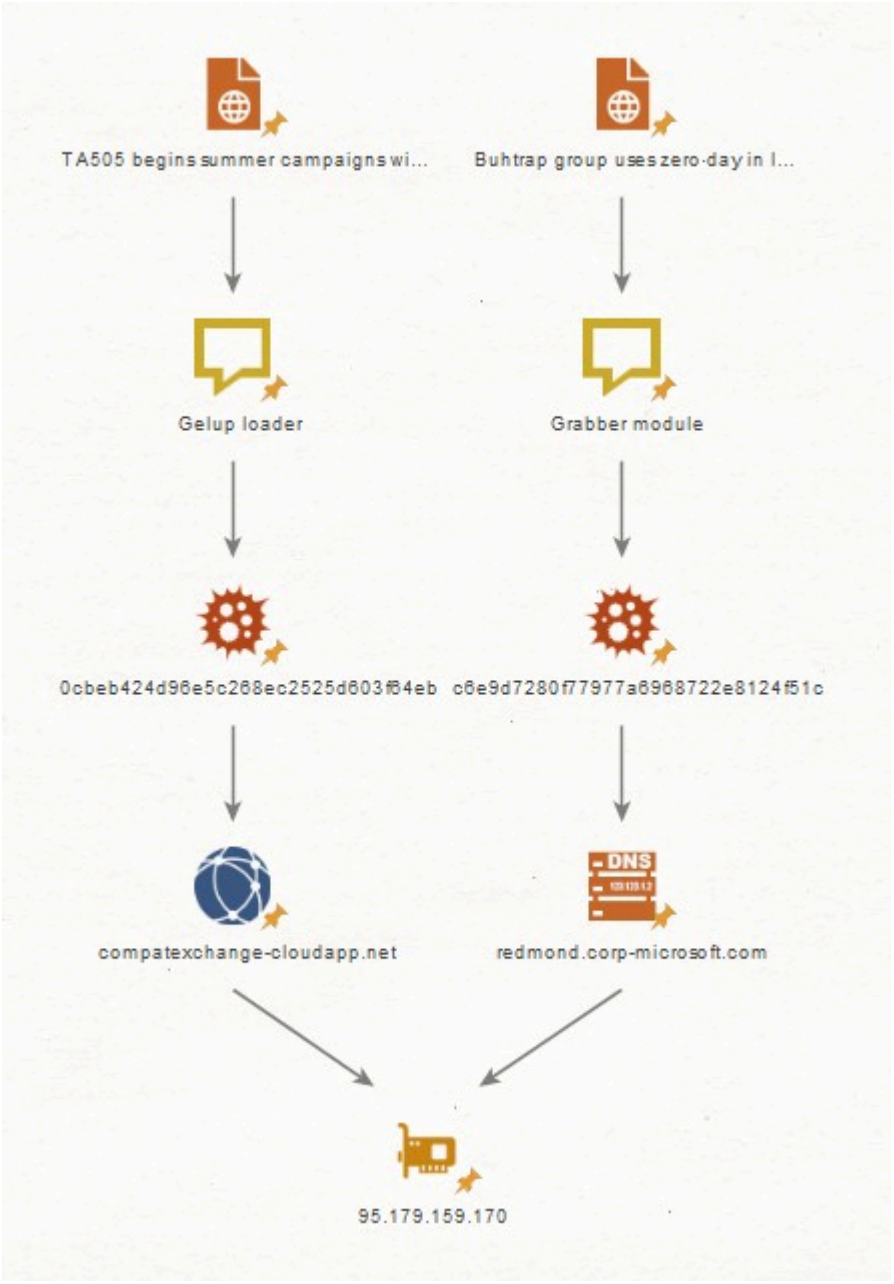
```
mov     edx, ds:off_1002198C ; "526372456845635968576260685473A73"
lea     eax, [esp+2F0h+var_258]
mov     ecx, ds:off_10021988 ; "2AAC28kdjQ0NCU8XuYmNhV3br5TveM5yiPXk8qk"...
push    eax             ; int
push    edi             ; Dst
push    edi             ; char
call    fstr_decrypt    ; compatexchange-cloudapp.net
mov     edx, ds:off_10021984 ; "7A5552576354456A6F547666666C5775"
lea     eax, [esp+2FCh+var_2D4]
mov     ecx, ds:off_10021980 ; "HqJl0czvpNNyt192br3Fmw=="
add     esp, 14h
push    eax             ; int
push    edi             ; Dst
push    edi             ; char
call    fstr_decrypt    ; 80
mov     edx, ds:off_1002197C ; "59596F756969774F7974677961757164"
lea     eax, [esp+2F4h+var_2AC]
mov     ecx, ds:off_10021978 ; "m21aUDUCSFkplChefiUFNQ=="
add     esp, 0Ch
push    eax             ; int
push    edi             ; Dst
push    edi             ; char
call    fstr_decrypt    ; /help/index.php
mov     edx, ds:off_10021974 ; "6464616770777274F707A6854546D77"
lea     eax, [esp+2F4h+var_290]
mov     ecx, ds:off_10021970 ; "jesUgVSnNjdQwC8cqPXGna8YcOVSdFTiqPohGKr"...
```

C&C server in Gelup from TA505, after decryption

The PaSiveTotal resource shows us that this host has been resolved to the IP address 95[.]179.159.170 since June 8, 2019.

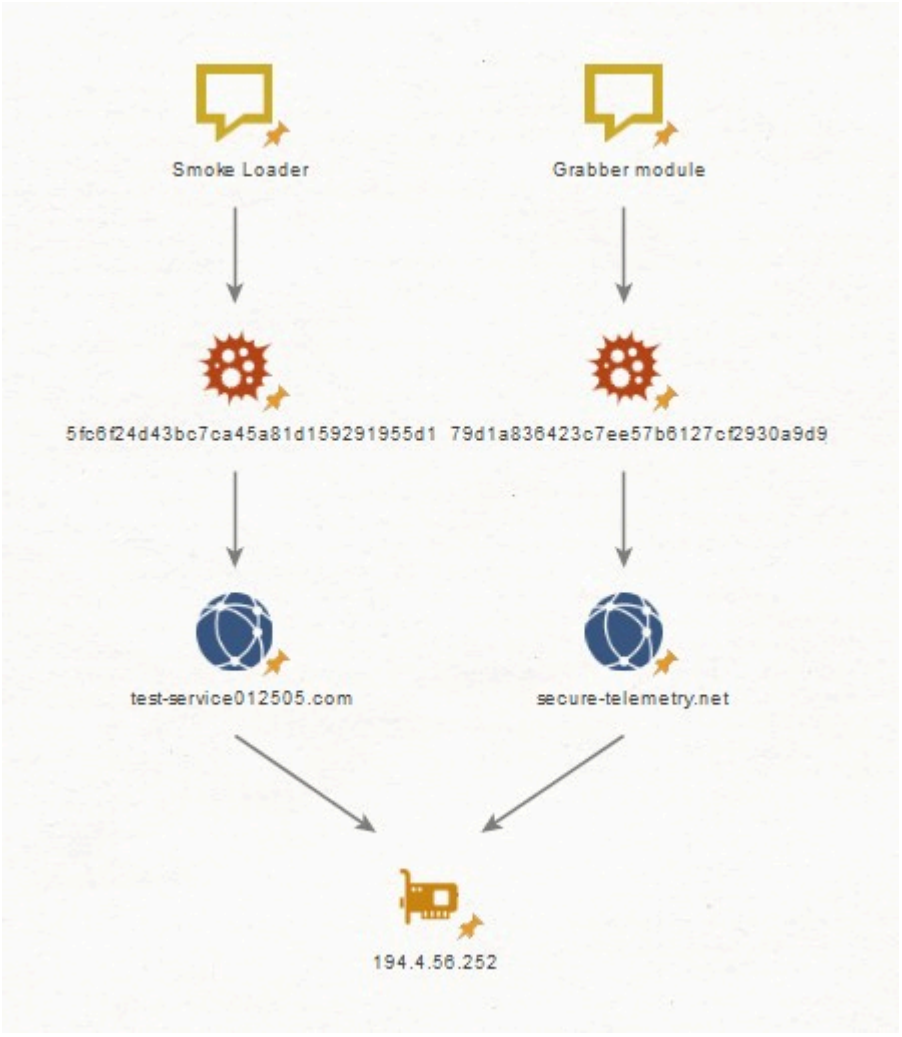
These two domains were registered with the same registrar (Tucows Domains Inc.) within two days of one another, and are resolved to the same IP address. Considering that both groups carried out attacks throughout June, it is reasonable to conclude that Buhtrap and TA505 used the same host as a C&C server.

It is also worth noting that the domain compatexchange-cloudapp[.]net was used not only in the downloader earlier discussed, but also in older versions of Buhtrap components.




First intersection of TA505 and Buhtrap found in network infrastructure

We later discovered another intersection between the two hacker groups. The domains of TA505's Smoke Loader and a second grabber from Buhtrap displayed a similar congruence: the domain test-service012505[.]com from Smoke Loader (MD5: 5fc6f24d43bc7ca45a81d159291955d1) and the domain secure-telemetry[.] net from the gabber (MD5: 79d1a836423c7ee57b6127cf2930a9d9) have been resolved to the IP address 194[.]4.56.252 since June 17th and 16th, 2019, respectively.




Second intersection of TA505 and Buhtrap found in network infrastructure

## Conclusions

This article has examined the network infrastructure of the hacker group TA505. Starting with a look at their preferred domain name registrars and the hosts of their C&C servers, we unearthed interesting details in the client information provided by the group during domain registration. This could serve as a starting point for further investigations. We then discussed intersections that were discovered between the infrastructure of the TA505 and Buhtrap hacker groups. The incidence of shared servers between the two groups could have several explanations: the groups could have a bilateral agreement to share the servers, they could be managed and coordinated by a single entity, or they could both rent the servers from a third party (thereby economizing on expenditures). Our work investigating these groups will not end here. We will continue to monitor their activity and search for new information on their possible connections and collaboration.

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## IOCs

TA505 C2:
0141koppepan[.]com

bigpresense[.]top
elast[.]pw
fakers.co[.]jp
greenthumbsup[.]jp
iluj[.]in
kentona[.]su
koppepan[.]app
makosoft[.]hu
microsoftsyncservice[.]biz
nagomi-753[.]jp
nanepashemet[.]com
newfolder2-service[.]space
office365onlinehome[.]com
solsin[.]top
test-service012505[.]com
windows-several-update[.]com
windows-update-02-en[.]com
c6e9d7280f77977a6968722e8124f51c — grabber module Buhtrap
redmond.corp-microsoft[.]com — Grabber C&C
0cbeb424d96e5c268ec2525d603f64eb — Gelup loader of TA505
compatexchange-cloudapp[.]net — Gelup C&C
95.179.159[.]170 — TA505 and Buhtrap shared host
79d1a836423c7ee57b6127cf2930a9d9 — grabber module Buhtrap
secure-telemetry[.]net — Grabber C&C
5fc6f24d43bc7ca45a81d159291955d1 — Smoke Loader of TA505
test-service012505[.]com — Smoke Loader C&C
194[.]4.56.252 — TA505 and Buhtrap shared host

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