Tinba Banking Trojan Variant | Zscaler Blog

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Published: 2015-07-05 · Archived: 2026-04-05 16:22:10 UTC

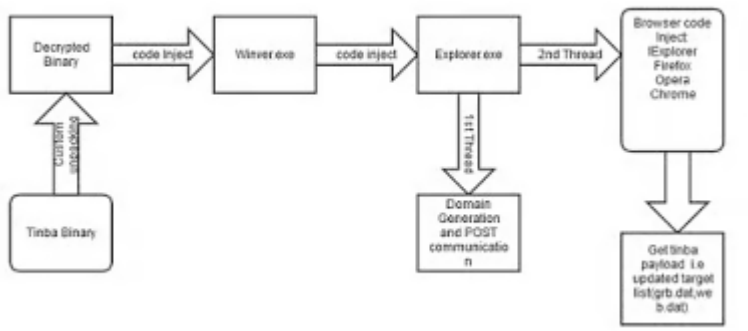
Introduction

Tinba is information stealing Trojan. The main purpose of the malware is to steal information that could be browsing data, login credentials, or even banking information. This is achieved through code injection into system process (Winver.exe and Explorer.exe) and installing hooks into various browsers like IExplorer, Chrome, Firefox and Opera.

Tinba has been known to arrive via spammed e-mail attachments and drive-by downloads. Recently, Angler Exploit Kit instances were also found to be serving Tinba banking Trojan.

Detailed Analysis of Tinba

Tinba is packed with a custom packer and uses well known anti-debugging technique using the WinAPI function “IsDebuggerPresent” to hinder reverse engineering of the binary image. The execution flow of the infection cycle for Tinba is shown below.



Execution flow of Tinba

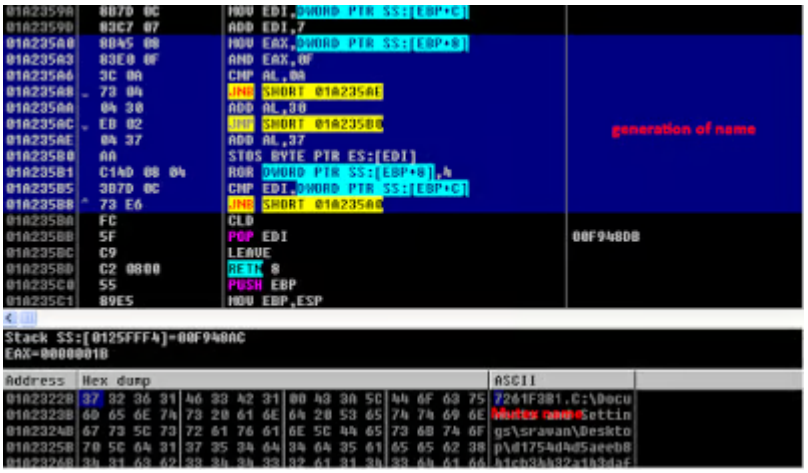
The image below shows the custom packer code being used by the Tinba sample we were looking at.

Tinba unpacking Routine

The unpacked binary image is shown below which upon execution will perform code injection into system processes like Winver.exe and Explorer.exe.

Unpacked Binary

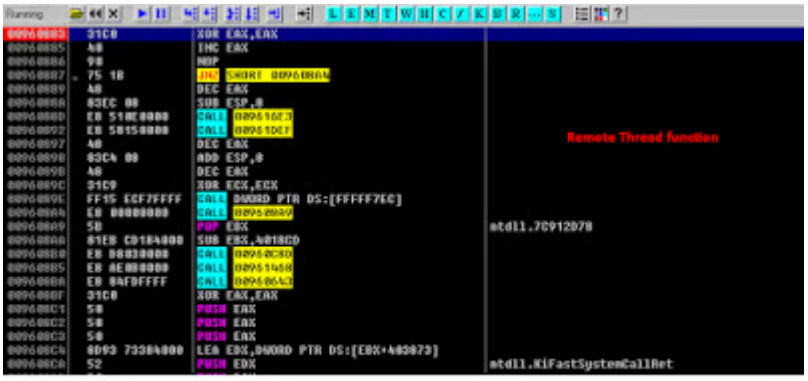
It generates Mutex name using root volume information of the victim’s machine as shown below.



Mutex name generation

Remote Thread in System Process

A remote thread is created inside Explorer process that is responsible for creating a copy of Tinba Binary in %APPDATA% & auto start registry entry in Registry hive.

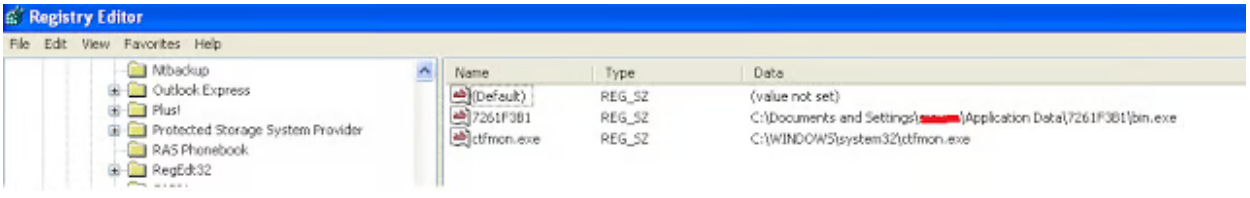


Explorer remote thread

The Tinba binary is stored in a hidden folder which is created under %APPDATA% directory:

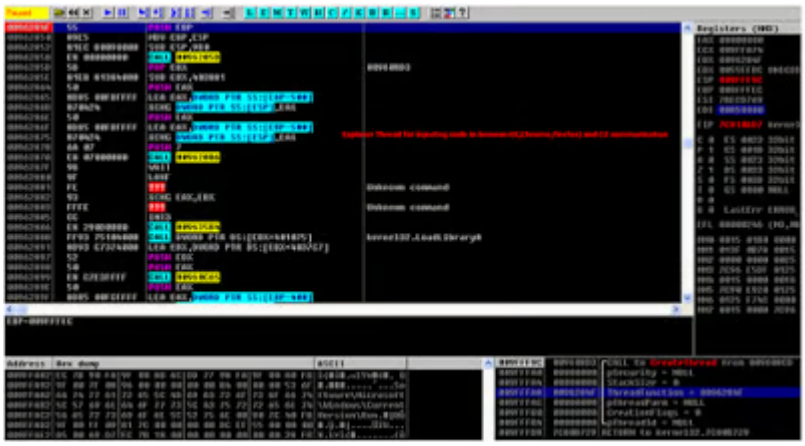
> *C:\Documents and setting \username \Application Data\mutexname\bin.exe*

It also creates an auto-run registry entry to execute Tinba binary during every windows start-up as shown below:



Auto start registry entry

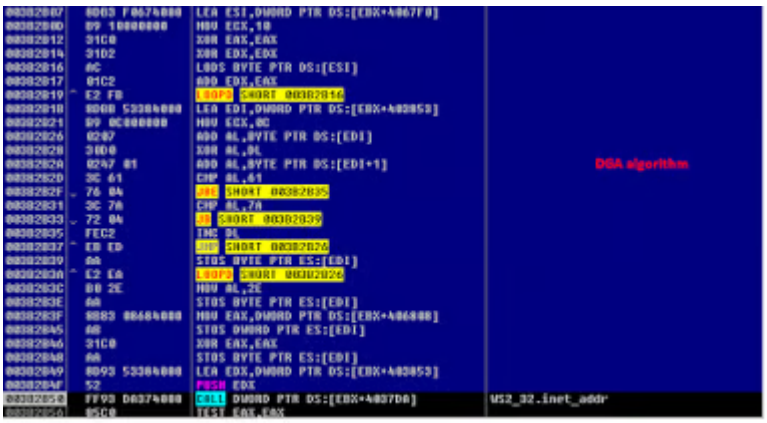
Another thread is also created in Explorer process which is responsible for generating DGA (Domain Generation Algorithm) domains and injecting code into browsers like IExplorer, Chrome, Firefox and Opera.



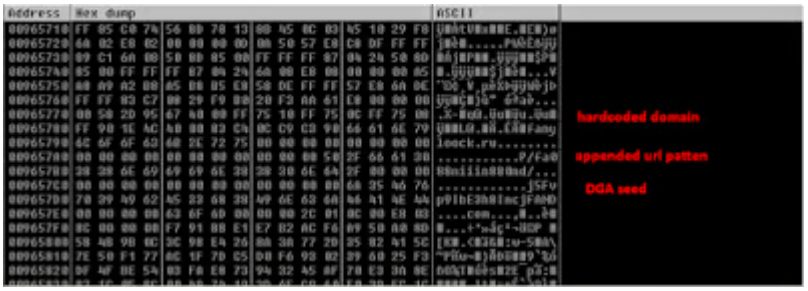
Explorer local thread

Domain Generation Algorithm

The following is the Domain Generation Algorithm (DGA) used by Tinba variant where every sample uses a hardcoded domain and seed to generate the DGA domains.



DGA routine



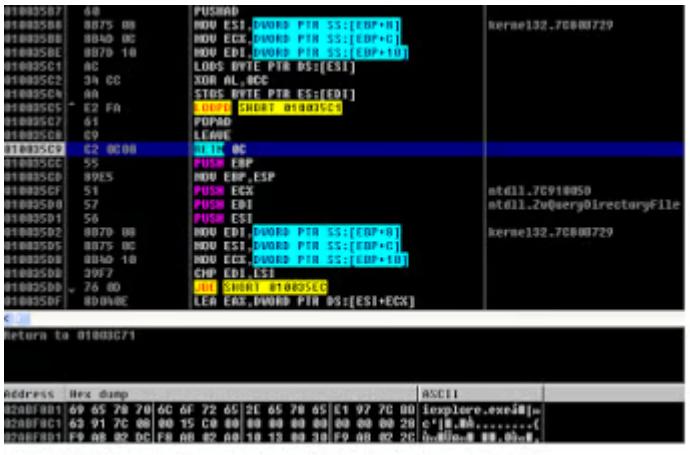
Hardcoded Domain and seed

These DGA domains are fast flux domains where single domain is frequently switched to different IPs by registering it as part of the DNS A record list for a single domain.

targetHost	***targetIP***
eudvwwwrmyqi.in	89.111.166.60
eudvwwwrmyqi.in	95.163.121.94
jrhijuuwgopx.com	176.31.62.78
jrhijuuwgopx.com	176.31.62.77
norubjjpsvfg.ru	210.1.226.15
norubjjpsvfg.ru	104.223.122.20
norubjjpsvfg.ru	104.223.15.16
scpxsbsjjqje.ru	5.178.64.90
scpxsbsjjqje.ru	192.198.90.228
scpxsbsjjqje.ru	5.178.64.90
wgwnmffclqvu.ru	192.198.90.228
wgwnmffclqvu.ru	192.3.95.140

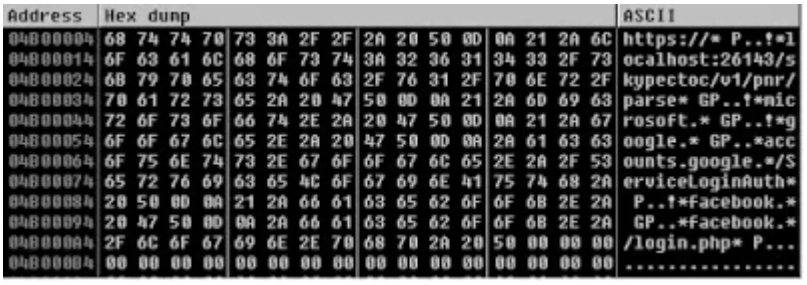
Remote Thread in browsers

The Explorer thread searches for browser process either by checking path of the browser executable or by loaded application specific DLL (e.g. NSS3.dll for firefox.exe). If the targeted browser process is found, then the secondary thread is created in the process.



Browser thread

This thread is responsible to get updated Bot configuration details like Target URL list and strings (BOTUID) from a remote C&C server. If there is no updated list of target URLs from C&C server, then it uses default targeted list of URLs which is stored in the injected code. The list of default target URLs after decryption is shown below.



Address	Hex dump															ASCII
04B00004	68	74	74	70	73	3A	2F	2F	2A	20	50	0D	0A	21	2A	6C	https://* P..!*l
04B00014	6F	63	61	6C	68	6F	73	74	3A	32	36	31	34	33	2F	73	ocalhost:26143/s
04B00024	6B	79	70	65	63	74	6F	63	2F	76	31	2F	70	6E	72	2F	kypectoc/v1/pnr/
04B00034	70	61	72	73	65	2A	20	47	50	0D	0A	21	2A	6D	69	63	parse* GP..!*mic
04B00044	72	6F	73	6F	66	74	2E	2A	20	47	50	0D	0A	21	2A	67	rosoft.* GP..!*g
04B00054	6F	6F	67	6C	65	2E	2A	20	47	50	0D	0A	2A	61	63	63	oogle.* GP..*acc
04B00064	6F	75	6E	74	73	2E	67	6F	6F	67	6C	65	2E	2A	2F	53	ounts.google.*/S
04B00074	65	72	76	69	63	65	4C	6F	67	69	6E	41	75	74	68	2A	erviceLoginAuth*
04B00084	20	50	0D	0A	21	2A	66	61	63	65	62	6F	6F	6B	2E	2A	P..!*facebook.*
04B00094	20	47	50	0D	0A	2A	66	61	63	65	62	6F	6F	6B	2E	2A	GP..*facebook.*
04B000A4	2F	6C	6F	67	69	6E	2E	70	68	70	2A	20	50	00	00	00	/login.php* P...
04B000B4	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....

Default Targeted URL list

The collected information form webmail, social media and the banking sites are stored in "log.dat" file.

00B8F99C	88	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	▮.....
00B8F9AC	25	4C	4F	43	41	4C	41	50	50	44	41	54	41	25	5C	50	%LOCALAPPDATA%\P
00B8F9BC	61	63	6B	61	67	65	73	5C	77	69	6E	64	6F	77	73	5F	ackages\windows_
00B8F9CC	69	65	5F	61	63	5F	30	30	31	5C	41	43	5C	37	32	36	ie_ac_001\AC\726
00B8F9DC	31	46	33	42	31	5C	6C	6F	67	2E	64	61	74	00	00	00	1F3B1\log.dat...
00B8F9EC	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....

Log file path

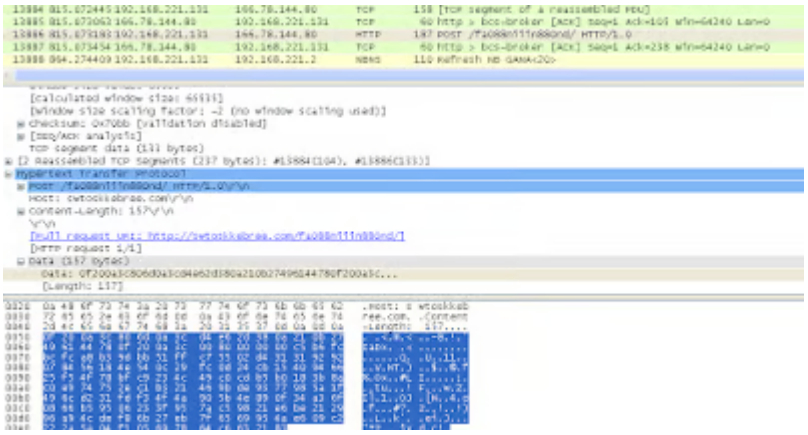
C&C communication & Cryptography:

The POST request to C&C server contains encrypted system information like system volume & version information. The cryptography routine is a simple byte 'XOR' with an 8 bit 'ROR' of the key after each write.

```
00963590   55            PUSH EBP
00963591   89E5          MOV EBP,ESP
00963593   8B55 08       MOV EDX,DWORD PTR SS:[EBP+8]
00963596   8B4D 0C       MOV ECX,DWORD PTR SS:[EBP+C]
00963599   8B45 10       MOV EAX,DWORD PTR SS:[EBP+10]
0096359C   3002          XOR BYTE PTR DS:[EDX],AL
0096359E   C1C8 08       ROR EAX,8
009635A1   42            INC EDX
009635A2   E2 F8         LOOPD SHORT 0096359C
009635A4   C9            LEAVE
009635A5   C2 0C00       RETN 0C
```

Send Data Encryption

A sample Tinba POST request to DGA domains with 157 bytes of encrypted data is shown below.



C&C POST Request

Geo distribution of C&C call back attempts that we blocked in past one month:

Geo Location

We have seen following C&C server IP addresses:

- 103.1.149[.]36
- 104.223.122[.]20
- 104.223.15[.]16
- 104.223.15[.]234

- 104.255.97[.]136
- 104.255.97[.]15
- 162.218.89[.]118
- 176.31.62[.]77
- 176.31.62[.]78
- 192.198.90[.]228
- **192.210.139[.]138**
- 192.3.95[.]140
- 198.100.29[.]2
- 198.56.237[.]21
- 210.1.226[.]15
- 5.178.64[.]90
- 5.2.189[.]251
- 82.165.37[.]127
- 89.111.166[.]60
- 95.163.121[.]94

Conclusion:

Tinba also known as small banking Trojan continues to be prevalent in the wild. The arrival method varies from e-mail spam, drive-by downloads and most recently Exploit Kit infection cycle. Zscaler ThreatlabZ is actively monitoring this malware family and ensuring coverage for our customers.

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