Analysis Report

FOR SAMPLE1.EXE

[Contains a brief malware analysis report for the file sample.exe which was provides as an assignment during the SecurityXploded Student Mentorship Programme]

Mentor: Amit Malik and Monnappa KA

By Sajan Shetty

Tel : +919964224668
Email : me@thewiredgoon.com
ixcodxdx@gmail.com

Website : www.TheWiredGoon.com
Twitter: TheWiredGoon

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"A computer worm is a standalone malware computer program that replicates itself in order to spread to other computers."

Introduction and Technical Analysis

General Information

- File Name : Sample1.exe
- MD5 : aeba0e6cac52929cc48e1b7074eba86c
- SHA-1 : 84705f524f4949234692f50263ac19bbbe97f281
- Detected as : WORM_SPYBOT.CCF
- Other know Aliases : W32.Randex.gen, W32/Sdbot-Fam, Backdoor.Win32.IRCBot.gen, TR/Crypt.ULPM.Gen,W32/Sdbot.worm.gen

Analysis Overview

Sample1.exe was identified as '*WORM_SPYBOT.CCF*' which is a computer worm that connects to a host server IP and and takes instructions from the attacker. This worm has a backdoor component helping attacker to gain full system access and to spread to other computers in the network

Technical Analysis

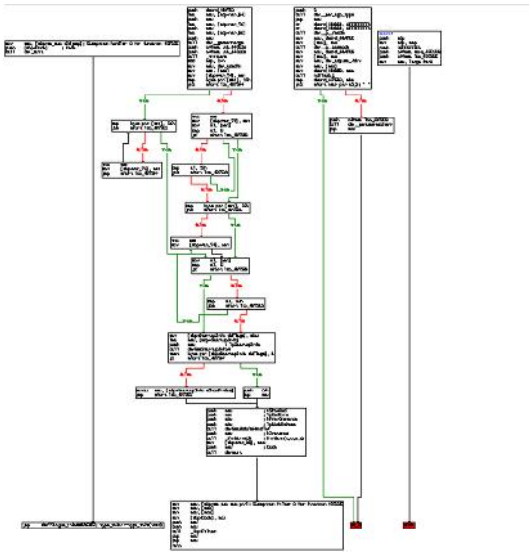
- The worm copies itself as services32.exe in system32 directory.
- It modifies and Adds new registry keys to victim machine so that it runs every time Windows starts.
- It exploits a buffer overrun vulnerability in Windows Service named '*LSASS*'.
- The attacker has full system privileges and can perform remote code execution.
- It connects to a remote IP address (217.22.59.29) to receive commands from the attacker.
- It can also run and manipulate files as specified by the attacker.
- It steals Windows Product Keys.
- It also steals game keys of popular games like Call of Duty, Soldier of fortune etc.
- It also steals credentials of Yahoo and AOL Messengers.
- It can conduct a Denial of Service attack.

Introduction and Technical Analysis

- Create an HTTP or FTP server on the victim machine.
- Spread to other vulnerable computers by exploiting vulnerabilities

```
.data:00444528                  align 10h
.data:00444530 aScanCouldnTSto  db 'scan: couldn',27h,'t stop',0 ; DATA XREF: sub_422D50+1DA↑o
.data:00444544                  align 8
.data:00444548 aScanStoppedDTh  db 'scan: stopped (%d threads)',0
.data:00444548                                          ; DATA XREF: sub_422D50+197↑o
.data:00444563                  align 8
.data:00444568 aFtpPortDTotalS  db 'ftp: port: %d, total sends: %d',0
.data:00444568                                          ; DATA XREF: sub_422D50+140↑o
.data:00444587                  align 10h
.data:00444590 aScanNotStarted  db 'scan: not started',0 ; DATA XREF: sub_422D50+B2↑o
.data:004445A2                  align 8
.data:004445A8 aScanCipS        db 'scan: cip (%s)',0   ; DATA XREF: sub_422D50+6D↑o
.data:004445B7                  db    0
.data:004445B8                  db    0
.data:004445B9                  db    0
.data:004445BA                  db    0
.data:004445BB                  db    0
.data:004445BC aSExploitedS     db '%s: exploited (%s)',0 ; DATA XREF: sub_423900+2C↑o
.data:004445CF                  db    0
.data:004445D0                  db    0
.data:004445D1                  db    0
.data:004445D2                  db    0
.data:004445D3                  db    0
.data:004445D4 aSocketClosed_   db 'Socket closed.',0   ; DATA XREF: .text:loc_423E93↑o
```

Above is the code excerpt from the worm which exploits ‘ LSASS ‘ Windows Service



Above is the graph of execution flow of the worm

System Activity

Registry changes

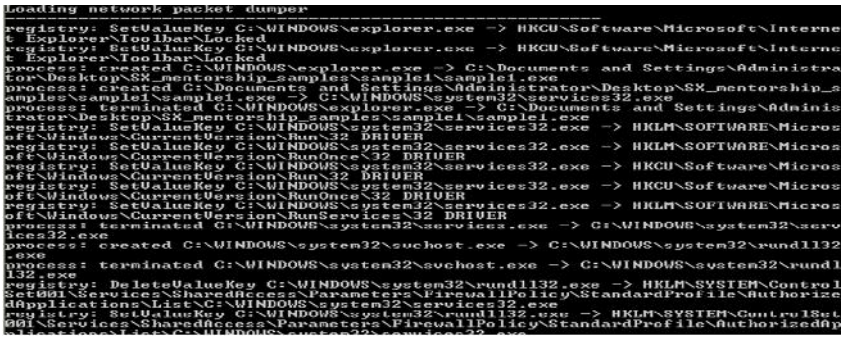
This worm creates the following registry entries to enable its automatic execution at every system startup:

HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run
HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\RunOnce
HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run
HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\RunOnce
HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\RunServices
With Sets value: " *32 DRIVER* " and data: " *services32.exe* "

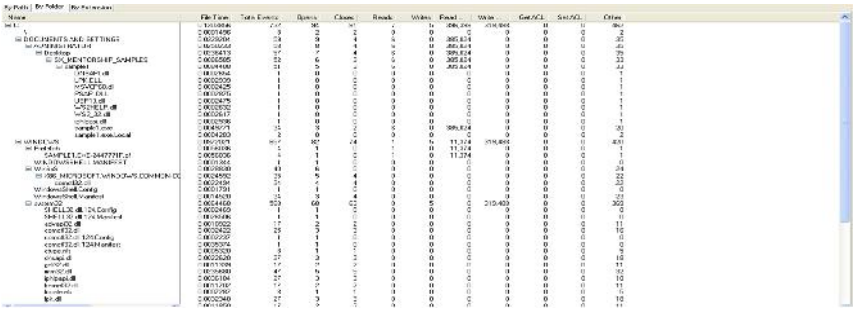
File Changes

It creates a replica of itself at the system folder (system32) with a name services32.exe

An Image excerpt from CaptureBat showing registry entries



An image from excerpt process monitor showing file changes.



Network Activity

The Worm tries to connect to remote IP address (217.22.59.29) from where the attacker sends commands to be performed on the victim machine. It uses the port no 6667 to talk to the attacker.

The worm opened up a tcp port, with no 5307 to listen to the attacker server.

An image from Wireshark showing the IP address the worm is trying to connect to

14	18.952687	192.168.75.134	217.22.59.29	TCP	62 31-11 > 6667 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1
15	18.953014	217.22.59.29	192.168.75.134	TCP	60 6667 > 31-11 [RST, ACK] Seq=3871684576 Ack=1 Win=64240 Len=0
16	19.390067	192.168.75.134	217.22.59.29	TCP	62 31-11 > 6667 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1
17	19.390402	217.22.59.29	192.168.75.134	TCP	60 6667 > 31-11 [RST, ACK] Seq=2822385511 Ack=1 Win=64240 Len=0
18	29.390423	192.168.75.134	217.22.59.29	TCP	62 [TCP Port numbers reused] 31-11 > 6667 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1
19	29.390813	217.22.59.29	192.168.75.134	TCP	60 6667 > 31-11 [RST, ACK] Seq=1 Ack=1 Win=64240 Len=0
20	29.890078	192.168.75.134	217.22.59.29	TCP	62 31-11 > 6667 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1
21	29.891029	217.22.59.29	192.168.75.134	TCP	60 6667 > 31-11 [RST, ACK] Seq=247270431 Ack=1 Win=64240 Len=0
22	30.436812	192.168.75.134	217.22.59.29	TCP	62 31-11 > 6667 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1
23	30.437118	217.22.59.29	192.168.75.134	TCP	60 6667 > 31-11 [RST, ACK] Seq=772513112 Ack=1 Win=64240 Len=0
24	40.437211	192.168.75.134	217.22.59.29	TCP	62 [TCP Port numbers reused] 31-11 > 6667 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1
25	40.437507	217.22.59.29	192.168.75.134	TCP	60 6667 > 31-11 [RST, ACK] Seq=1 Ack=1 Win=64240 Len=0
26	40.936920	192.168.75.134	217.22.59.29	TCP	62 31-11 > 6667 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1
27	40.937326	217.22.59.29	192.168.75.134	TCP	60 6667 > 31-11 [RST, ACK] Seq=991562453 Ack=1 Win=64240 Len=0
28	41.483612	192.168.75.134	217.22.59.29	TCP	62 31-11 > 6667 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1
29	41.484018	217.22.59.29	192.168.75.134	TCP	60 6667 > 31-11 [RST, ACK] Seq=970798576 Ack=1 Win=64240 Len=0