Lethic: M86 Security

Lethic

January 7, 2010

Aliases

No obvious aliases, most samples we analyzed had varied generic detection names.

Comments

Although recently uncovered, the Lethic spambot (or its predecessors) have probably been in existence for some time. For over 2 years, we have observed a type of spam from an unknown botnet which we simply called "Type 11". Recently, malware behind this spam was discovered by Arbor Security Engineering and Response Team. Lethic is a proxy type spambot which relays spam from a control server to its destination. It is focused on sending pharmaceutical and replica watch spam campaigns. As of this writing, Lethic was responsible about for 8-10% of spam.

Features

- Acts as a proxy to relay spam
- Process injection to Explorer.exe
- Fast, multi-threaded
- Anti-debugging and Anti-VM detection

Spamming Rate

Varies depending on the relaying server ranging from 12,000 msgs/hour/bot to peaks of 60,000 msgs/hour/bot.

Command and Control

Lethic is a proxy Trojan that allows a command and control server to use the infected system to relay spam. We have observed that it connects to the following domains, many of which are hosted by FDCservers.net.

b1ij7hifd.com (66.90.104.106) on port 8900
OrgName: FDCservers.net
OrgID: FDCSE

Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

blogforyour.com (64.191.15.133) on port 8900
OrgName: Network Operations Center Inc.
OrgID: NOC
Address: PO Box 591
City: Scranton
StateProv: PA
PostalCode: 18501-0591
Country: US

busnotstop.com (66.90.101.84) on port 1430
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

elephantanimal.com (66.90.109.19) 8900
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

gooddoctorlist.com (66.90.104.166) on port 8090
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135

City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

goodhearme.cn (66.90.101.194) on port 8090
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

happymanwoman.cn (67.159.44.237) on port 8900
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

iamnothere.cn (64.237.61.132) on port 8090
OrgName: Choopa, LLC
OrgID: CHOOP-1
Address: 2400 Main Street Extension
Address: Suite 12
City: Sayreville
StateProv: NJ
PostalCode: 08872
Country: US

itsyourservice.cn (66.90.103.239) on port 8900
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago

StateProv: IL
PostalCode: 60098
Country: US

linktomem.cn (66.197.237.165) on port 8900
OrgName: Network Operations Center Inc.
OrgID: NOC
Address: PO Box 591
City: Scranton
StateProv: PA
PostalCode: 18501-0591
Country: US

MacysGiftsOnline.com (66.90.109.19) on port 8900
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

mo8f2eerrd.com on port (66.90.101.74) 8090
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

somethingwrong.cn (66.90.103.223) on port 8090
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

sometimesgood.com (67.159.44.78) on port 1430
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

tenverybest.com (66.90.103.237) on port 5050
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

underseaprawn.com (96.9.147.37) on port 8090
OrgName: Network Operations Center Inc.
OrgID: NOC
Address: PO Box 591
City: Scranton
StateProv: PA
PostalCode: 18501-0591
Country: US

verywellhere.cn (67.159.44.236) on port 8090
OrgName: FDCservers.net
OrgID: FDCSE
Address: 141 w jackson blvd.
Address: suite #1135
City: Chicago
StateProv: IL
PostalCode: 60098
Country: US

wasyoujoy.cn (208.69.112.58) on port 8090
OrgName: CPC Technologies, LLC.
OrgID: CPCTE

Address: 1301 E. Debbie Ln Ste 102
Address: #160
City: Mansfield
StateProv: TX
PostalCode: 76063
Country: US

younotgood.cn (208.69.113.130) on port 8900
OrgName: CPC Technologies, LLC.
OrgID: CPCTE
Address: 1301 E. Debbie Ln Ste 102
Address: #160
City: Mansfield
StateProv: TX
PostalCode: 76063
Country: US

Lethic seems to have a custom communication protocol. Once connected, the control server initiates the handshaking and gives the bot an IP address and port to relay the data to. It then uses the infected system as a proxy to relay spam messages to its target. The image below shows the handshaking and communication between the command and control server and the infected machine.

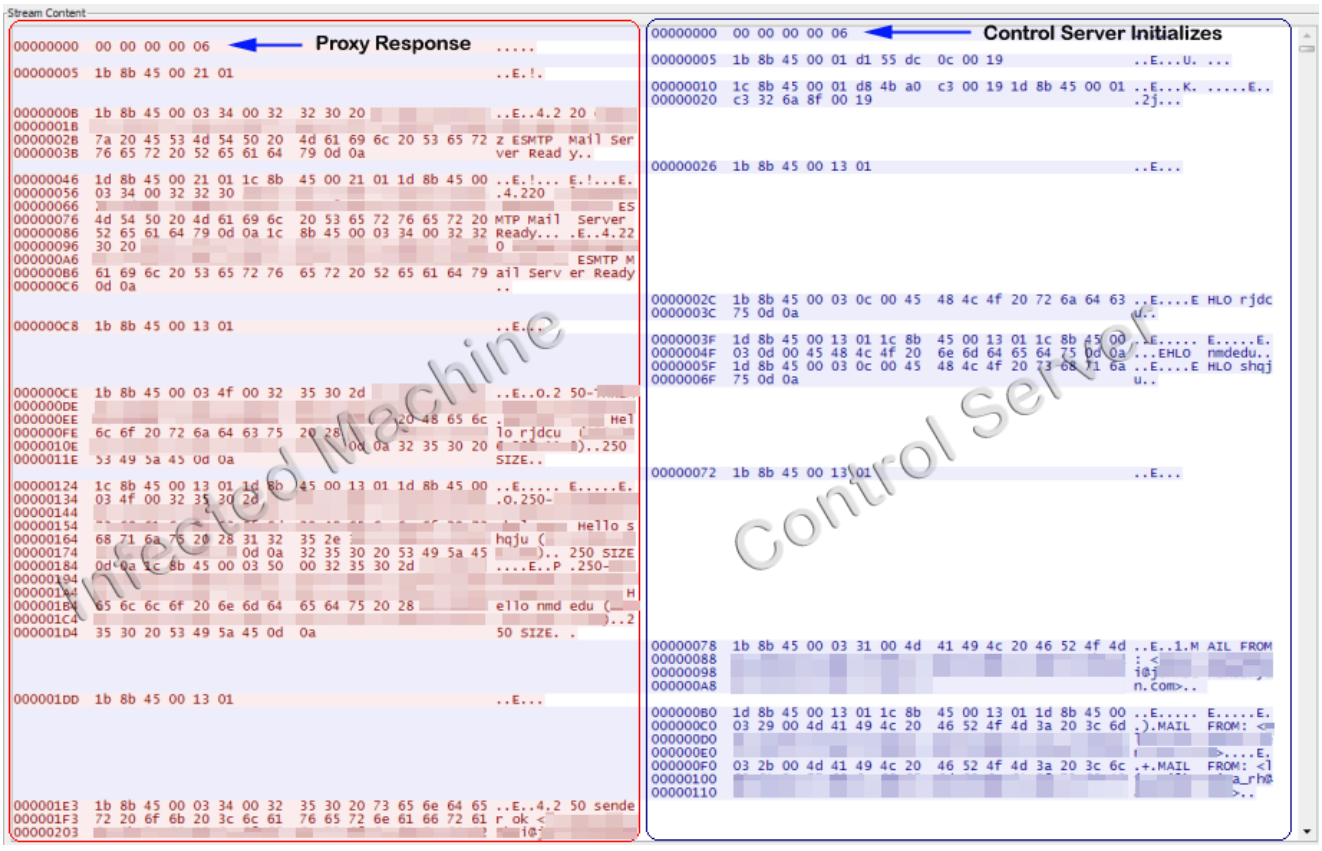
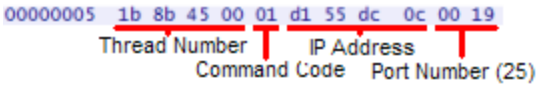


Figure 1.

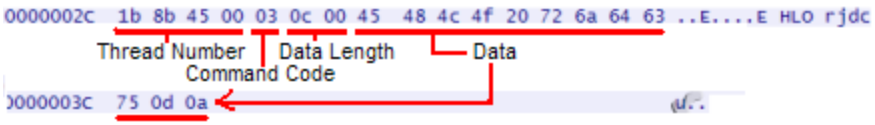
The Lethic command and control server uses command codes to communicate to its bot. The packet header consists of a thread number and command code followed by its corresponding parameter.

Here is a list of the command and control server's command codes:

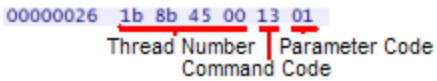
0x01 - Tells the bot on what SMTP server IP address and port to connect. The command code is followed by the IP address then the port number.



0x03 - Send data to the bot. The command code is followed by the data length and the data.

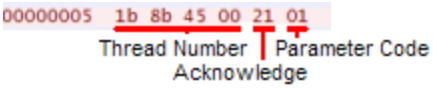


0x13 - Unknown command, usually followed by 0x01.

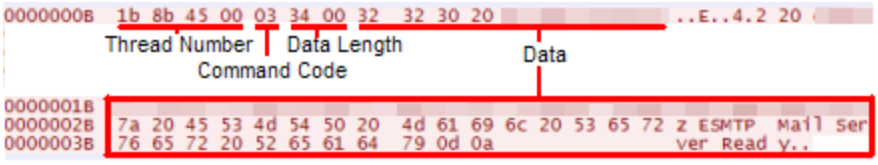


Here is a list of the bot's command codes:

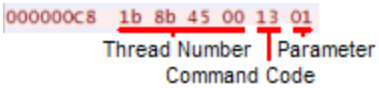
0x21 - The bot acknowledges every command sent by the control server.



0x03 - Send data to the control server. The command code is followed by the data length and the data.



0x13 - unknown command, usually followed by 0x01.



Here is a short explanation on how the C&C communcation works, based on the packet capture in figure 1.

Once the bot is connected, the control server sends an initialization packet:

```
00000000  00 00 00 00 06
```

The bot in the infected machine confirms by sending the same data:

```
00000000  00 00 00 00 06
```

The control server sends the "\x01" command code followed by the SMTP server IP address and port number where the bot will relay the spam messages:

```
00000005  1b 8b 45 00 01 d1 55 dc  0c 00 19
          Thread Number | SMTP server IP  SMTP port
                Command Code
```

The bot acknowledges the command

```
00000005  1b 8b 45 00 21 01
          Thread Number Acknowledge
```

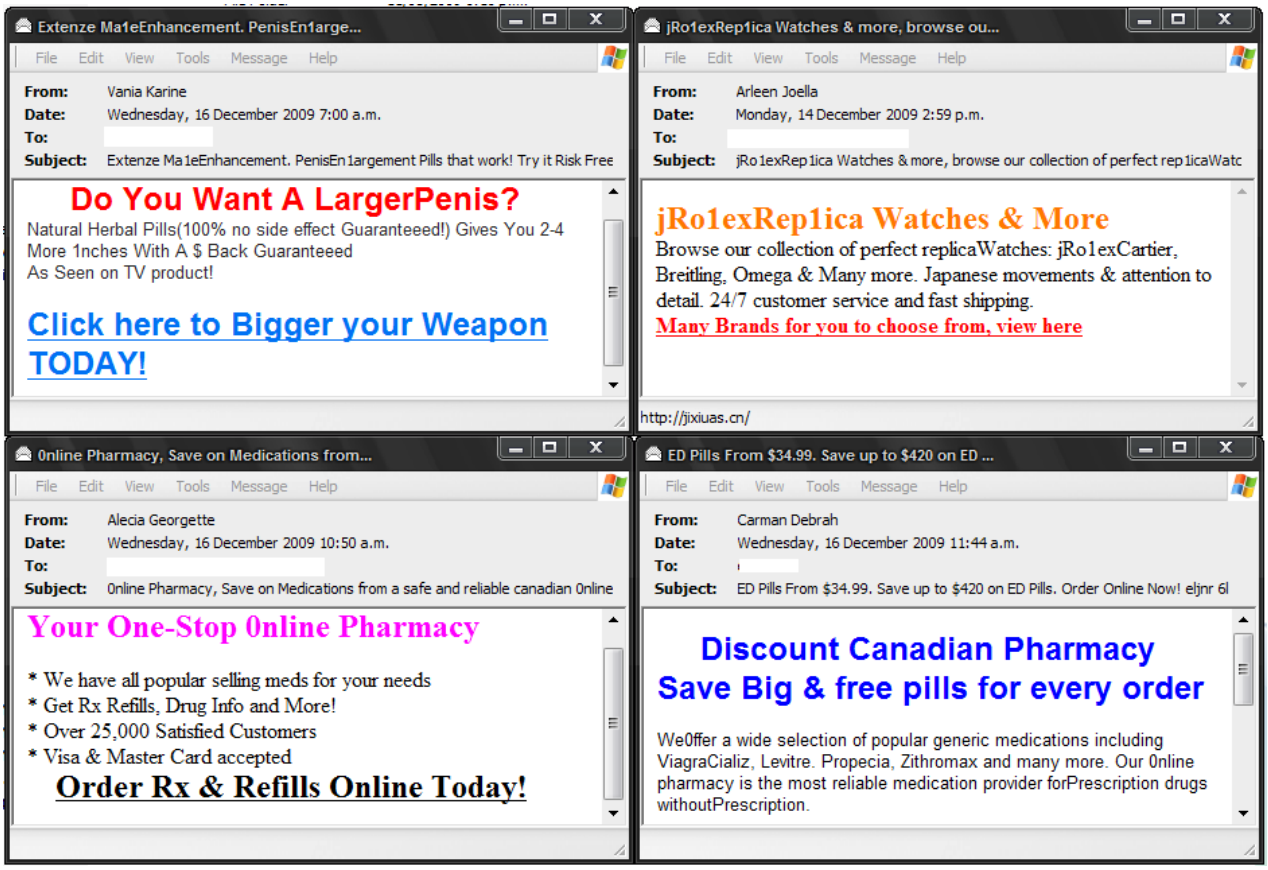
The control server sends more SMTP server IP address to connect to:

```
00000010  1c 8b 45 00 01 d8 4b a0  c3 00 19 1d 8b 45 00 01
          Thread Number | IP Address      Thread Number
                Command Code  Port Number  Command Code
00000020  c3 32 6a 8f 00 19
          IP Address  Port Number
```

The bot relays SMTP transaction from the destination server to the control server:

```
0000000B  1b 8b 45 00 03 34 00 32  32 30 20                ..E..4.2 20
0000001B
          Thread Number | Data Length  Data
                Command Number
0000002B  7a 20 45 53 4d 54 50 20  4d 61 69 6c 20 53 65 72  z ESMTP  Mail Ser
0000003B  76 65 72 20 52 65 61 64  79 0d 0a               ver Read y..
```

Here are some typical sample spam messages that the Lethic Trojan was sending at the time of writing.



Malware Behavior on Host

Drops a copy of itself in the Windows System directory. Here are the malware paths from the various samples we examined:

C:\WINDOWS\system32\xcllsx.exe
C:\WINDOWS\system32\ldfrmmd.exe
C:\WINDOWS\system32\ncmdds.exe
C:\WINDOWS\system32\lsprcxs.exe
C:\WINDOWS\system32\jdsuml.exe

An autorun registry entry was created to execute files upon Windows startup.

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run
<random value> = "C:\WINDOWS\system32\ldfrmmd.exe"

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run
<random value> = "C:\WINDOWS\system32\jdsuml.exe"

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run
<random value> = "C:\WINDOWS\system32\lsprcxs.exe"

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run
<random value> = "C:\WINDOWS\system32\ncmdds.exe"

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run
<random value> = "C:\WINDOWS\system32\xcllsx.exe"

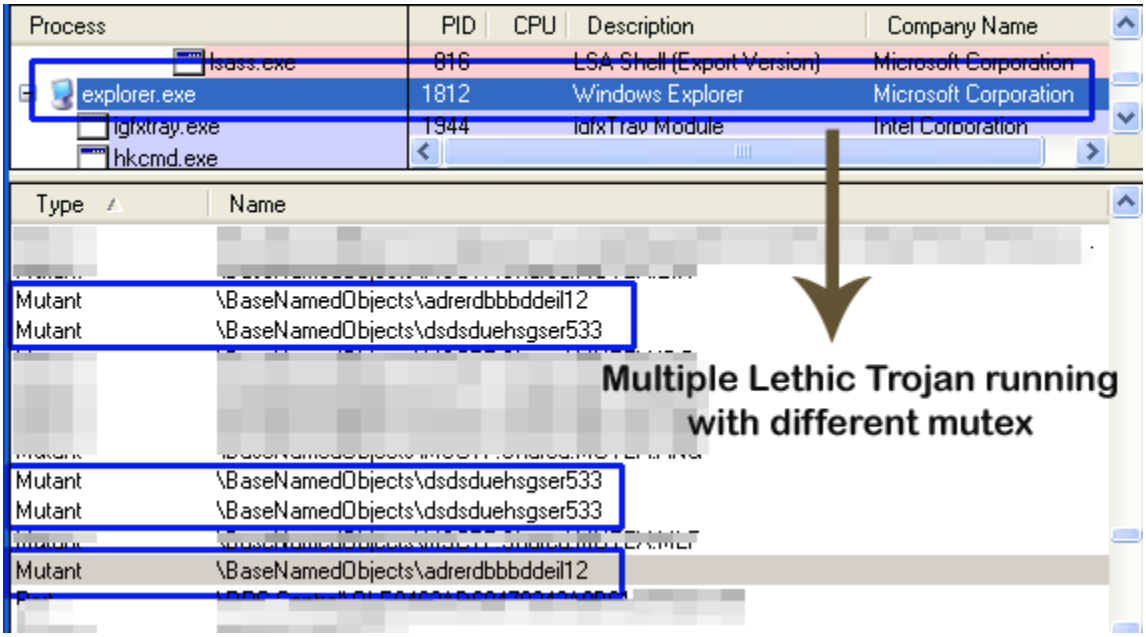
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon
Taskman = "C:\WINDOWS\system32\jdsuml.exe"

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon
Taskman = "C:\WINDOWS\system32\ldfrmmd.exe"

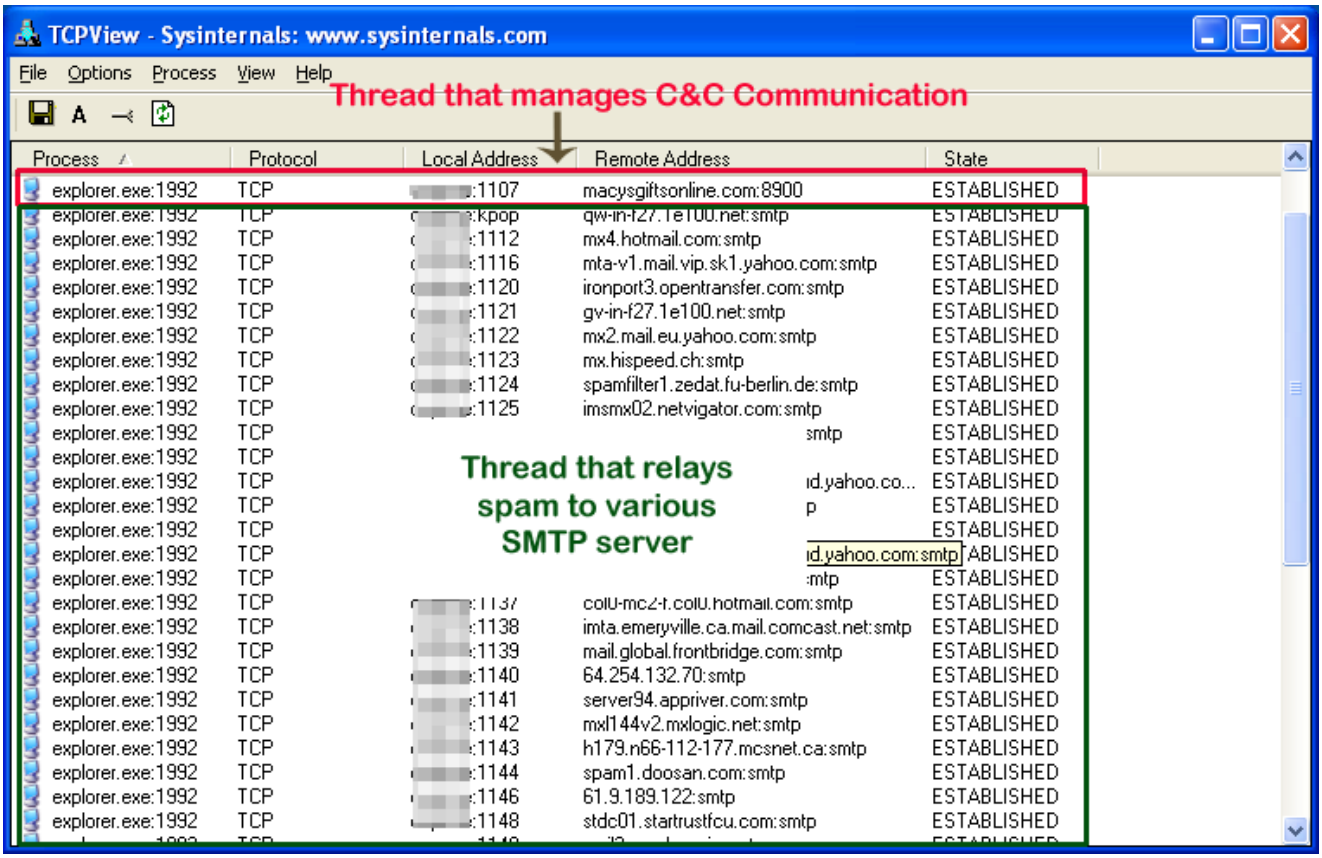
HKEY_CURRENT_USER\Software\Microsoft\Windows NT\CurrentVersion\Winlogon
Shell = "explorer.exe,C:\WINDOWS\system32\xcllsx.exe"

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon
Taskman = "C:\WINDOWS\system32\xcllsx.exe"

Lethic injects its code into Explorer.exe and creates a random-named mutex in the infected machine:



Once the malicious code is injected to Explorer.exe, the infected machine tries to contact the C&C server using a hardcoded domain name on a predefined port. The infected machine then receives spamming data from the C&C server. The infected explorer process spawns multiple threads that relays spam to a destination SMTP server.



Finally, during our analysis, we also saw Lethic installed alongside other spambots such as Grum and Pushdo, all of which were distributed by Virut.

 Last Reviewed: January 6, 2010 by Rodel Mendrez