



NORMAN®

A flood of malware

A view from the antivirus lab

Snorre Fagerland, senior virus analyst





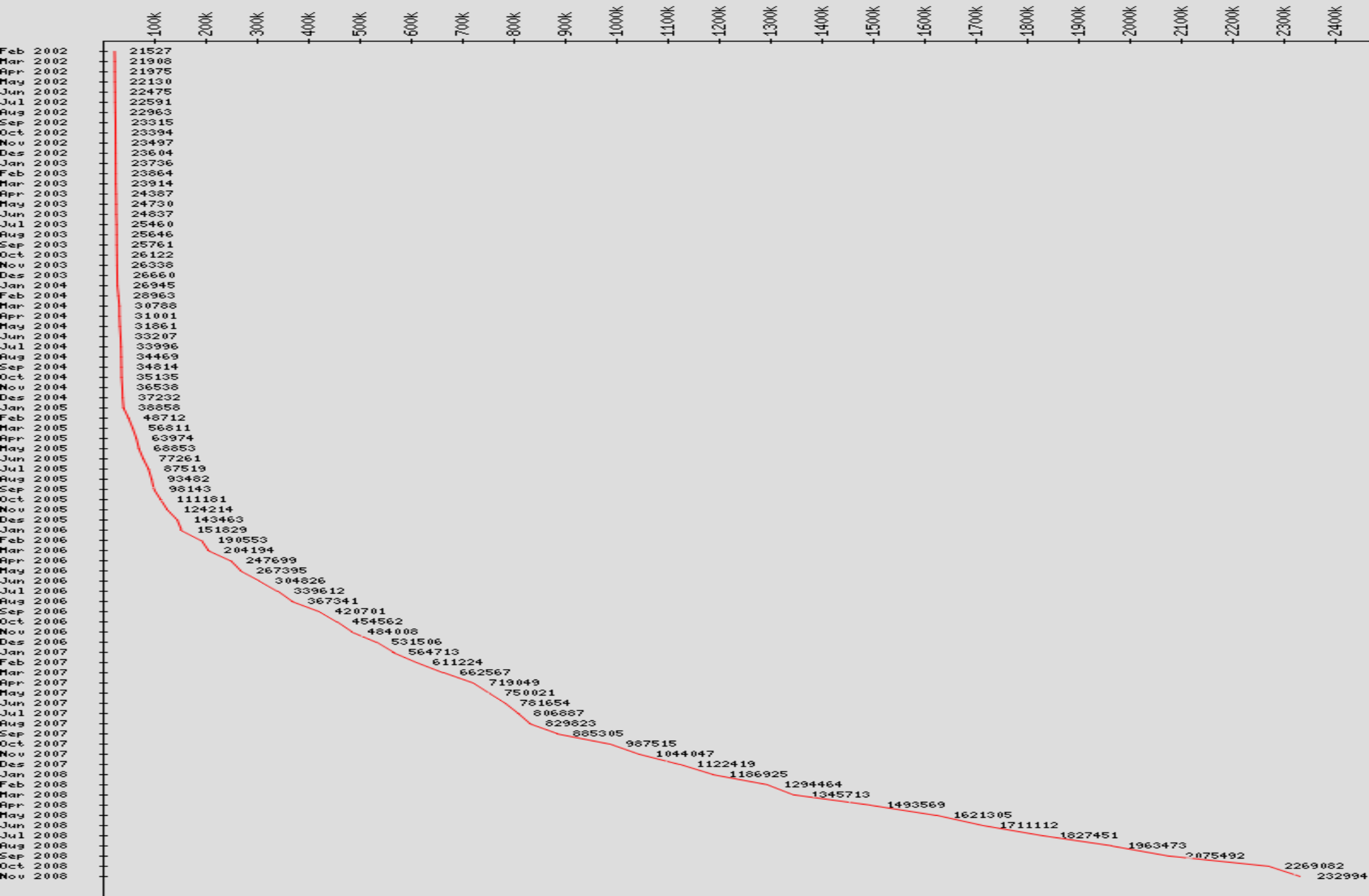
In 1988

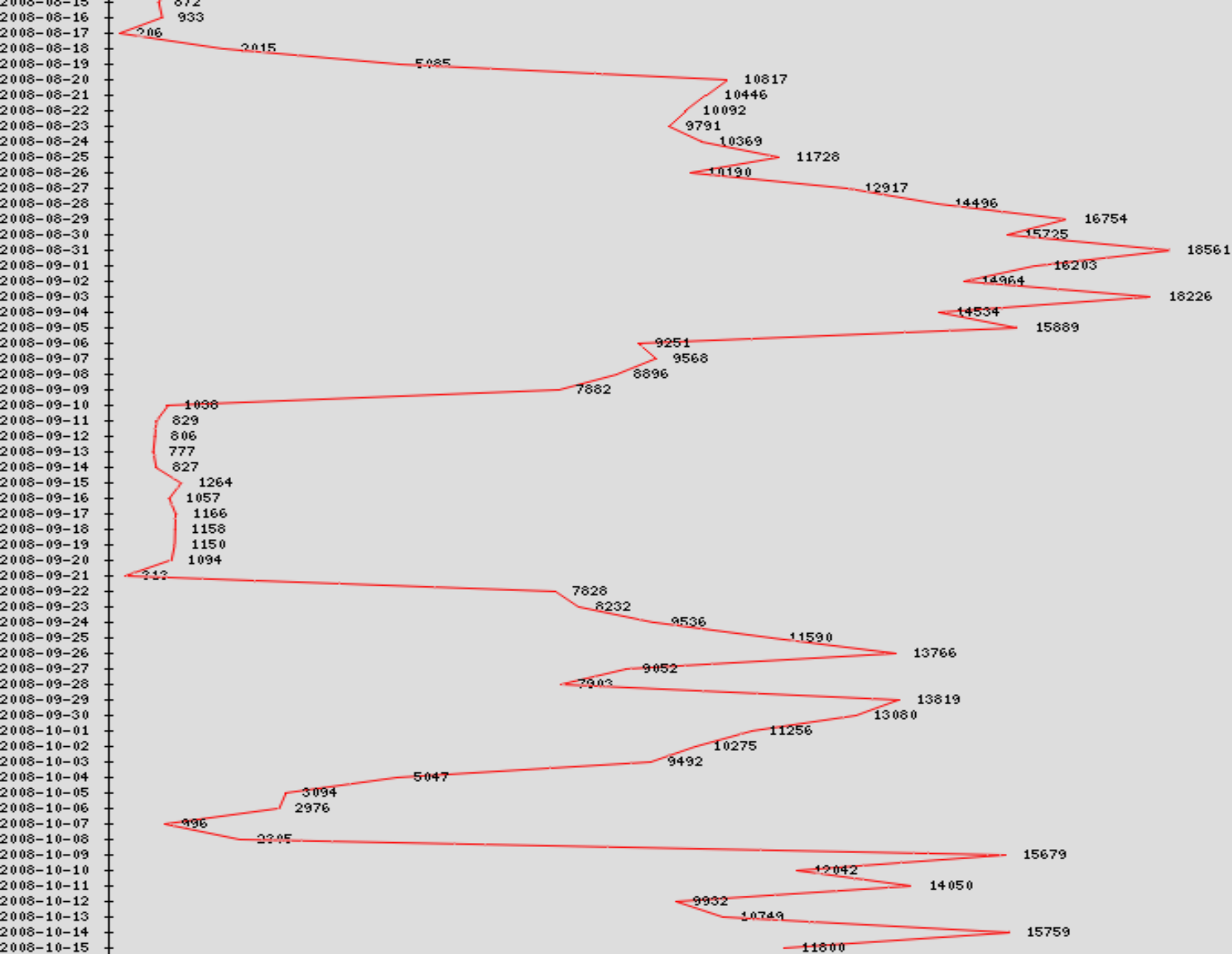
- 📌 A new virus was a major event
- 📌 Would trigger a flurry of analysis activity worldwide
- 📌 Analysis could take days
- 📌 Detailed descriptions would be made for all new viruses



In 2008

- ❏ A new malware is usually almost a negligible event
- ❏ Will trigger a small movement of electrons in automatic systems
- ❏ Analysis takes seconds or at most minutes
- ❏ Detailed descriptions are very few. Usually descriptions are made for whole families, covering hundreds of malwares.

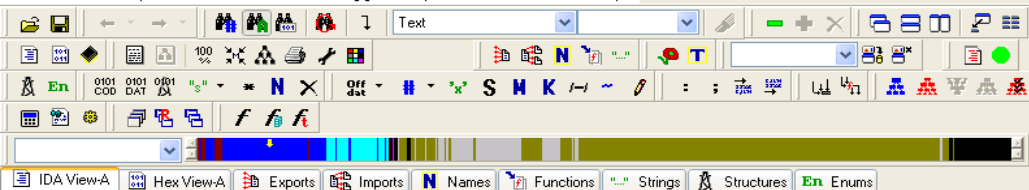






Analysis work

- ☞ Oldfashioned code analysis still used.
- ☞ Tools have improved greatly since old days
- ☞ A LOT of work done by automatic systems.



N Names window

Name	Address	P
std::basic_string<char,std::char_traits<char>,...	00403DE9	
std::basic_string<char,std::char_traits<char>,...	00403E50	
unknown_libname_1	00403F3D	
nullsub_1	00403F5E	
WinMain(x,x,x,x)	0040EA00	
HandlerRoutine	00416123	
StartAddress	004188B9	
__sprintf	004199DE	
__splitpath	00419A2F	
__strcmp	00419B80	
__memset	00419C10	
__strlen	00419C70	
__memcpy	00419CF0	
LeadUp1	00419D60	
LeadUp2	00419D8C	
LeadUp3	00419DB0	
UnwindUp7	00419DEC	
UnwindUp6	00419DF4	
UnwindUp5	00419DFC	

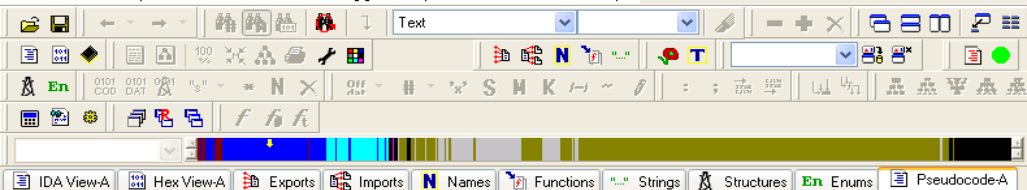
Line 1 of 3786

Strings window

Address	Length	T...	String
...:rdta:0042...	00000010	C	GetStartupInfoA
...:rdta:0042...	00000010	C	GetCommandLineA
...:rdta:0042...	00000008	C	GetVersion
...:rdta:0042...	0000000A	C	GetCPIInfo
...:rdta:0042...	00000007	C	GetACP
...:rdta:0042...	00000009	C	GetOEMCP
...:rdta:0042...	00000018	C	GetEnvironmentVariableA
...:rdta:0042...	0000000C	C	HeapDestroy
...:rdta:0042...	0000000B	C	HeapCreate
...:rdta:0042...	0000000C	C	VirtualFree
...:rdta:0042...	0000000D	C	VirtualAlloc
...:rdta:0042...	0000000E	C	IsBadWritePtr
...:rdta:0042...	0000000F	C	RaiseException
...:rdta:0042...	00000009	C	HeapSize
...:rdta:0042...	0000000D	C	LCMapStringA
...:rdta:0042...	0000000D	C	LCMapStringW
...:rdta:0042...	00000019	C	UnhandledExceptionFilter
...:rdta:0042...	00000018	C	FreeEnvironmentStringsW
...:rdta:0042...	00000018	C	FreeEnvironmentStringsA

Line 166 of 3646

IDA is analysing the input file...
You may start to explore the input file right now.
Hex-Rays plugin has been loaded (v1.0.0.80923)
License: 57-BF33-7BE4-7B Norman ASA (6 users)
The hotkeys are F5: decompile, Ctrl-F5: decompile all.
Please check the Edit/Plugins menu for more information.
Using FLIRT signature: Microsoft VisualC 2-8/net runtime
Propagating type information...
Function argument information has been propagated
The initial autoanalysis has been finished.



IDA View-A

Pseudocode-A

Names window

Name	Address	P
std::basic_string<char,std::char_traits<char>,...	00403DE9	
std::basic_string<char,std::char_traits<char>,...	00403E50	
unknown_libname_1	00403F3D	
nullsub_1	00403F5E	
WinMain(x,x,x,x)	0040EA00	
HandlerRoutine	00416123	
StartAddress	004188B9	
__sprintf	004199D0	
__splitpath	00419A2F	
__strcmp	00419B80	
__memset	00419C10	
__strlen	00419C70	
__memcpy	00419CF0	
LeadUp1	00419D60	
LeadUp2	00419D8C	
LeadUp3	00419DB0	
UnwindUp7	00419DEC	
UnwindUp6	00419DF4	
UnwindUp5	00419DFC	

Line 1 of 3786

Strings window

Address	Length	T...	String
...:rdata:0042...	00000010	C	GetStartupInfoA
...:rdata:0042...	00000010	C	GetCommandLineA
...:rdata:0042...	00000008	C	GetVersion
...:rdata:0042...	0000000A	C	GetCPIInfo
...:rdata:0042...	00000007	C	GetACP
...:rdata:0042...	00000009	C	GetOEMCP
...:rdata:0042...	00000018	C	GetEnvironmentVariableA
...:rdata:0042...	00000008	C	HeapDestroy
...:rdata:0042...	0000000B	C	HeapCreate
...:rdata:0042...	0000000C	C	VirtualFree
...:rdata:0042...	0000000D	C	VirtualAlloc
...:rdata:0042...	0000000E	C	IsBadWritePtr
...:rdata:0042...	0000000F	C	RaiseException
...:rdata:0042...	00000009	C	HeapSize
...:rdata:0042...	0000000D	C	LCMapStringA
...:rdata:0042...	0000000D	C	LCMapStringW
...:rdata:0042...	00000019	C	UnhandledExceptionFilter
...:rdata:0042...	00000018	C	FreeEnvironmentStringsA
...:rdata:0042...	00000018	C	FreeEnvironmentStringsW

Line 166 of 3646

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00033:0041C2D4	55	8B	EC	6A	FF	68	90	66	42	00	68	68	1E	42	00	64	U..j.h.f.B.hh.B.d	Accesses Registry key "HKLM\Software\Microsoft\OLE".
00033:0041C2E4	A1	00	60	50	60	50	64	89	25	00	00	00	83	EC	58Pd.x.....X	Accesses Registry key "HKLM\SYSTEM\CurrentControlSet\Control\Lsa".	
00033:0041C2F4	53	56	57	89	65	8B	FF	15	90	61	42	00	33	D2	8A	D4	S0W.e.....aB.3...	Accesses Registry key "HKLM\Software\Microsoft\OLE".
00033:0041C304	89	15	48	DF	48	00	8B	C8	81	E1	FF	00	00	89	00	..H.H.....	Accesses Registry key "HKLM\SYSTEM\CurrentControlSet\Control\Lsa".	
00033:0041C314	44	DF	48	00	C1	E1	08	03	CA	89	0D	40	DF	48	00	C1	D.H.....e.H..	
00033:0041C324	E8	10	A3	3C	DF	48	00	33	B6	56	E8	6E	10	00	59	..<.H.3.U.n.....Y	[Network services]	
00033:0041C334	85	00	75	6A	EC	00	00	59	75	7C	E8	..	00	59	..u.....Y.u..	Looks for an internet connection.		
00033:0041C344	6A	59	00	FF	15	8C	61	42	00	03	88	85	48	00	E8	..	Connects to "irc.alltremenet.net" on port 6667 (TCP).	
00033:0041C354	28	58	00	00	A3	7C	DF	48	00	E8	D1	55	00	00	E8	13	Connects to IRC server.	
00033:0041C364	55	00	00	E8	6F	FD	FF	FF	89	75	D0	8D	45	A4	50	FF	IRC: Uses nickname "URX1-44479".	
00033:0041C374	15	88	61	42	00	E8	A4	54	00	00	89	45	9C	F6	45	00	IRC: Uses username lculpz.	
00033:0041C384	01	74	06	0F	B7	45	D4	EB	03	6A	00	58	50	FF	75	9C	IRC: Joins channel #uns-hidden with password superbots.	
00033:0041C394	56	56	FF	15	F8	60	42	00	50	E8	5E	26	FF	FF	89	45	IRC: Sets the usermode for user "URX1-44479 to +xi+B+u.	
00033:0041C3A4	00	50	E8	5D	FD	FF	FF	8B	45	EC	8B	08	8B	09	89	4D	IRC: Joins channel #uns-hidden with password superbots.	
																	Attempts to delete share named "" on local system.	

```
#0004548 0x00406D3B=ADUAP132!RegCloseKey (0x7203F715)
#0004549 0x00406D07=ADUAP132!RegCreateKeyEx (0x80000001,"Software\Microsoft\OLE",0x00000000,NULL,0x00000000,0x000F003F,0x00000000,0x4FE59BB8,0x00000000)
#0004550 0x00406D26=ADUAP132!RegSetValueEx (0x7203F739,"2k6 updatz",0x00000000,0x00000001,"crss3.exe",0x00000009)
#0004551 0x00406D3B=ADUAP132!RegCloseKey (0x7203F739)
#0004552 0x00406D5E=KERNEL32!Sleep (0x00000078)
#0004553 0x00406D07=ADUAP132!RegCreateKeyEx (0x80000002,"Software\Microsoft\Windows\CurrentVersion\Run",0x00000000,NULL,0x00000000,0x000F003F,0x00000000,0x4FE59BB8,0x00000000)
#0004554 0x00406D26=ADUAP132!RegSetValueEx (0x7203F75D,"2k6 updatz",0x00000000,0x00000001,"crss3.exe",0x00000009)
#0004555 0x00406D3B=ADUAP132!RegCloseKey (0x7203F75D)
#0004556 0x00406D07=ADUAP132!RegCreateKeyEx (0x80000002,"Software\Microsoft\Windows\CurrentVersion\RunServices",0x00000000,NULL,0x00000000,0x000F003F,0x00000000,0x4FE59BB8,0x00000000)
#0004557 0x00406D26=ADUAP132!RegSetValueEx (0x7203F781,"2k6 updatz",0x00000000,0x00000001,"crss3.exe",0x00000009)
#0004558 0x00406D3B=ADUAP132!RegCloseKey (0x7203F781)
#0004559 0x00406D07=ADUAP132!RegCreateKeyEx (0x80000001,"Software\Microsoft\OLE",0x00000000,NULL,0x00000000,0x000F003F,0x00000000,0x4FE59BB8,0x00000000)
#0004560 0x00406D26=ADUAP132!RegSetValueEx (0x7203F7A5,"2k6 updatz",0x00000000,0x00000001,"crss3.exe",0x00000009)
#0004561 0x00406D3B=ADUAP132!RegCloseKey (0x7203F7A5)
#0004562 0x00406D5E=KERNEL32!Sleep (0x00000078)
#0004563 0x00406D07=ADUAP132!RegCreateKeyEx (0x80000002,"Software\Microsoft\Windows\CurrentVersion\Run",0x00000000,NULL,0x00000000,0x000F003F,0x00000000,0x4FE59BB8,0x00000000)
#0004564 0x00406D26=ADUAP132!RegSetValueEx (0x7203F7C9,"2k6 updatz",0x00000000,0x00000001,"crss3.exe",0x00000009)
#0004565 0x00406D3B=ADUAP132!RegCloseKey (0x7203F7C9)
#0004566 0x00406D07=ADUAP132!RegCreateKeyEx (0x80000002,"Software\Microsoft\Windows\CurrentVersion\RunServices",0x00000000,NULL,0x00000000,0x000F003F,0x00000000,0x4FE59BB8,0x00000000)
#0004567 0x00406D26=ADUAP132!RegSetValueEx (0x7203F7ED,"2k6 updatz",0x00000000,0x00000001,"crss3.exe",0x00000009)
#0004568 0x00406D3B=ADUAP132!RegCloseKey (0x7203F7ED)
#0004569 0x00406D07=ADUAP132!RegCreateKeyEx (0x80000001,"Software\Microsoft\OLE",0x00000000,NULL,0x00000000,0x000F003F,0x00000000,0x4FE59BB8,0x00000000)
#0004570 0x00406D26=ADUAP132!RegSetValueEx (0x7203F811,"2k6 updatz",0x00000000,0x00000001,"crss3.exe",0x00000009)
#0004571 0x00406D3B=ADUAP132!RegCloseKey (0x7203F811)
#0004572 0x00406D5E=KERNEL32!Sleep (0x00000078)
```

```
>
Number of breakpoints set: 2
#0 executed address at 002B:00400000-00491000[*]
C:\>
```

544

Drops files in %WINSYS% folder.

[Changes to filesystem]

Creates file C:\WINDOWS\SYSTEM32\crss3.exe.

Deletes file 76.

[Changes to registry]

Creates value "2k6 updatz"="crss3.exe" in key "HKLM\Software\Microsoft\Windows\CurrentVersion\Run".

Creates value "2k6 updatz"="crss3.exe" in key "HKLM\Software\Microsoft\Windows\CurrentVersion\RunServices".

Creates key "HKCU\Software\Microsoft\OLE".

Sets value "2k6 updatz"="crss3.exe" in key "HKCU\Software\Microsoft\OLE".

Accesses Registry key "HKLM\Software\Microsoft\OLE".

Accesses Registry key "HKLM\SYSTEM\CurrentControlSet\Control\Lsa".

Sets value "restrictanonymous"="@" in key "HKLM\System\CurrentControlSet\Control\Lsa".

Accesses Registry key "HKLM\Software\Microsoft\OLE".

Accesses Registry key "HKLM\SYSTEM\CurrentControlSet\Control\Lsa".

Accesses Registry key "HKLM\Software\Microsoft\OLE".

Accesses Registry key "HKLM\SYSTEM\CurrentControlSet\Control\Lsa".

[Network services]

Looks for an Internet connection.

Connects to "irc.allxtremenet.net" on port 6667 (TCP).

Connects to IRC server.

IRC: Uses nickname [UrX]-44479.

IRC: Uses username lculpz.

IRC: Joins channel #wns-hidden with password superbots.

IRC: Sets the usermode for user [UrX]-44479 to +xi+B+u.

IRC: Joins channel #wns-hidden with password superbots.

Attempts to delete share named "" on local system.

- Home
- Manage Users
- Sample Queue
- Cases (+63)
- Requests
- Sigbase
- Tools
- FP Network
- Statistics
- Search
- Search_New
- Defs & Fixes
- Submit a case
- Sample Groups
- Scheduler
- Settings
- Mailbox (3 new mail)
- Bugreports (+20)
- Knowledge Base
- Nbash
- Logout

General info:
Logged in as: snf
Access level: Super Analyst

Current issues:

- Opera 9.5 users will need a new certificate. Send a mail to tbr@norman.no to get one.

News:

- NAD v2.0 released!
If you encounter any errors,



Main



Norman Analysis Desktop

Use the menu to the left to navigate

[Display all stats](#)

NAD Agent:
server.exe:

MONKEY1
MONKEY2
MONKEY3
MONKEY4
MONKEY5
MONKEY6
MONKEY7
MONKEY8
MONKEY9
MONKEY10
MONKEY11
MONKEY12
MONKEY13
MONKEY14
MONKEY15
MONKEY16
MONKEY17
MONKEY18
MONKEY19
MONKEY20
MONKEY21
MONKEY22
MONKEY23

Virtual Monkey 1
Virtual Monkey 2
Virtual Monkey 3
Virtual Monkey 4
Virtual Monkey 5
Virtual Monkey 6
Virtual Monkey 7
Virtual Monkey 8
Virtual Monkey 9
Virtual Monkey 10
Virtual Monkey 11
Virtual Monkey 12