



Selected Citrix Support Tools

(updated 01 April 08)

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- Crash dump tools
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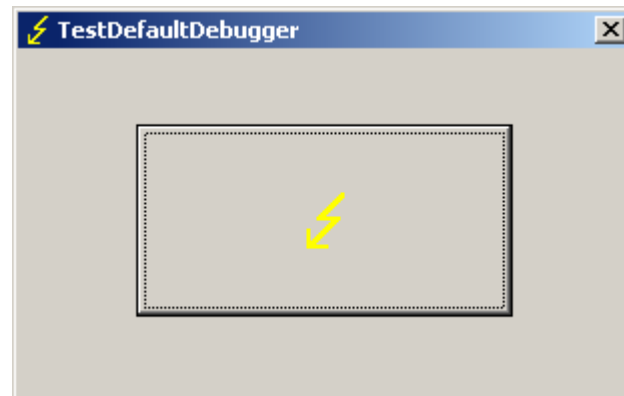
Crash Dump Tools

- TestDefaultDebugger
- TestDefaultDebugger.NET
- SystemDump
- DumpCheck
- PDBFinder

TestDefaultDebugger

<http://support.citrix.com/article/CTX11191>

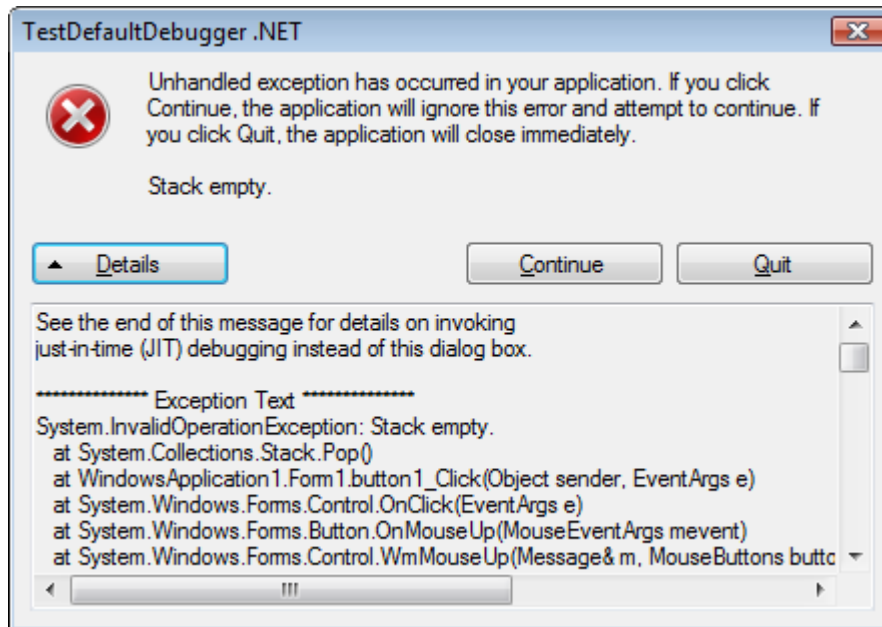
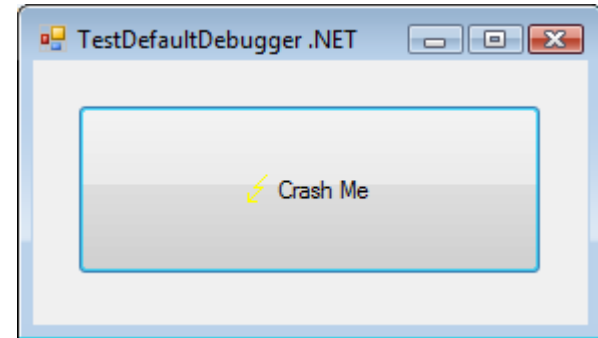
32-bit and 64-bit



```
C:\W2K3\system32\ntsd.exe
ModLoad: 7d930000 7da00000 C:\W2K3\syswow64\USER32.dll
ModLoad: 7d800000 7d890000 C:\W2K3\syswow64\GDI32.dll
ModLoad: 77f50000 77fec000 C:\W2K3\syswow64\ADVAPI32.dll
ModLoad: 7da20000 7db00000 C:\W2K3\syswow64\RPCRT4.dll
ModLoad: 73070000 73097000 C:\W2K3\system32\WINSPOOL.DRU
ModLoad: 77ba0000 77bfa000 C:\W2K3\syswow64\msvcrt.dll
ModLoad: 7c8d0000 7d0d4000 C:\W2K3\syswow64\SHELL32.dll
ModLoad: 004f0000 00542000 C:\W2K3\syswow64\SHLWAPI.dll
ModLoad: 7dbd0000 7dcd3000 C:\W2K3\WinSxS\WOW64_Microsoft.Windows.Common-Contr
ols_6595b64144ccf1df_6.0.3790.2778_x-ww_3020900A\COMCTL32.dll
ModLoad: 00550000 005dc000 C:\W2K3\syswow64\OLEAUT32.dll
ModLoad: 77670000 777a4000 C:\W2K3\syswow64\ole32.dll
ModLoad: 71c20000 71c32000 C:\W2K3\system32\tshlapi.dll
ModLoad: 4b8d0000 4b921000 C:\W2K3\SysWOW64\MSCTF.dll
ModLoad: 7df50000 7dfc0000 C:\W2K3\system32\UxTheme.dll
<id1.d30>: Access violation - code c0000005 (?!? second chance !?!?)
eax=00000000 ebx=00000001 ecx=002dfe90 edx=00000000 esi=00425ae8 edi=002dfe90
eip=004014f0 esp=002df86c ebp=002df878 iopl=0         nv up ei ng nz ac po cy
cs=0023  ss=002b  ds=002b  es=002b  fs=0053  gs=002b             efl=00010297
TestDefaultDebugger!CTestDefaultDebuggerDlg::OnBnClickedButton1:
004014f0 c7050000000000000000000000000000 mov dword ptr [00000000],0x0 ds:002b:00000000=????
????
0:000> ntsd: Reading initial command '.dump /ma /u c:\TEMP\new.dmp; q'
Creating c:\TEMP\new_2006-12-06_15-43-14-562_0D14.dmp - mini user dump
```

TestDefaultDebugger.NET

<http://support.citrix.com/article/CTX11191>



SystemDump

<http://support.citrix.com/article/CTX111072>

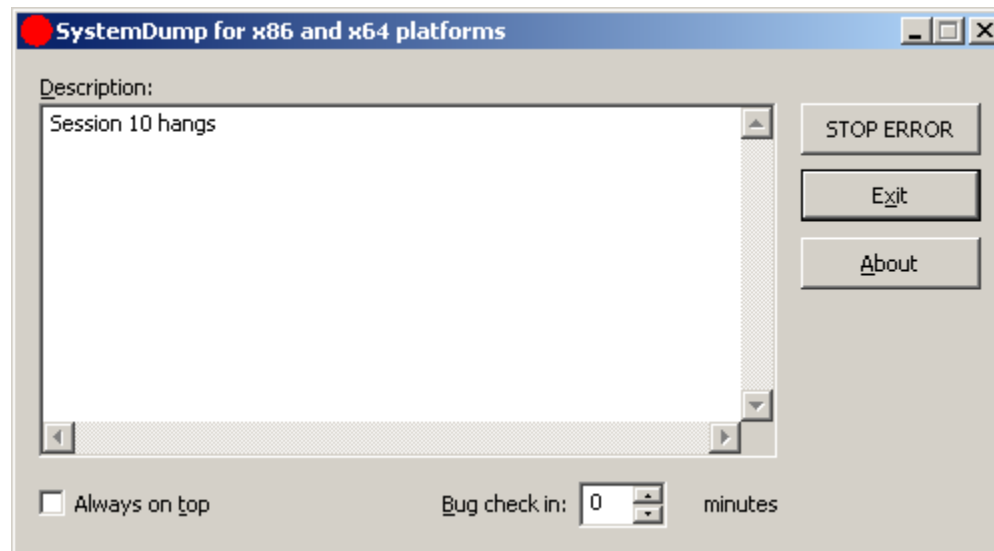
Can force a server to generate a memory dump from the session or when a keyboard is not available or non-standard. Command line options allow to generate a dump from command files and/or remotely when a console session is not available (for example, IBM blade servers).

Note: Whether the complete memory or a kernel memory dump is saved depends on the Control Panel settings.

Features:

- A customer can type a message/text (or copy it from clipboard) before forcing a memory dump. This message is saved in a dump and a support engineer can read it after loading the dump in WinDbg.exe. This is implemented to encourage writing the symptoms and conditions explaining why the dump has to be forced.
- The tool can stay on top of any window (if you need this to quickly dump the server after a repro or during the process of an activity).
- The bug check clearly shows that the dump is manually generated.
- The tool can force a memory dump on both 32-bit and 64-bit platforms.
- Before forcing a fatal error on a server, the tool warns about potential damaging consequences: Users are disconnected and all the data which is not saved will be lost. It asks for a confirmation.
- A customer can specify a period of time (in minutes) when to force a memory dump.

SystemDump (...)



DumpCheck

- Explorer extension

<http://support.citrix.com/article/CTX108825>

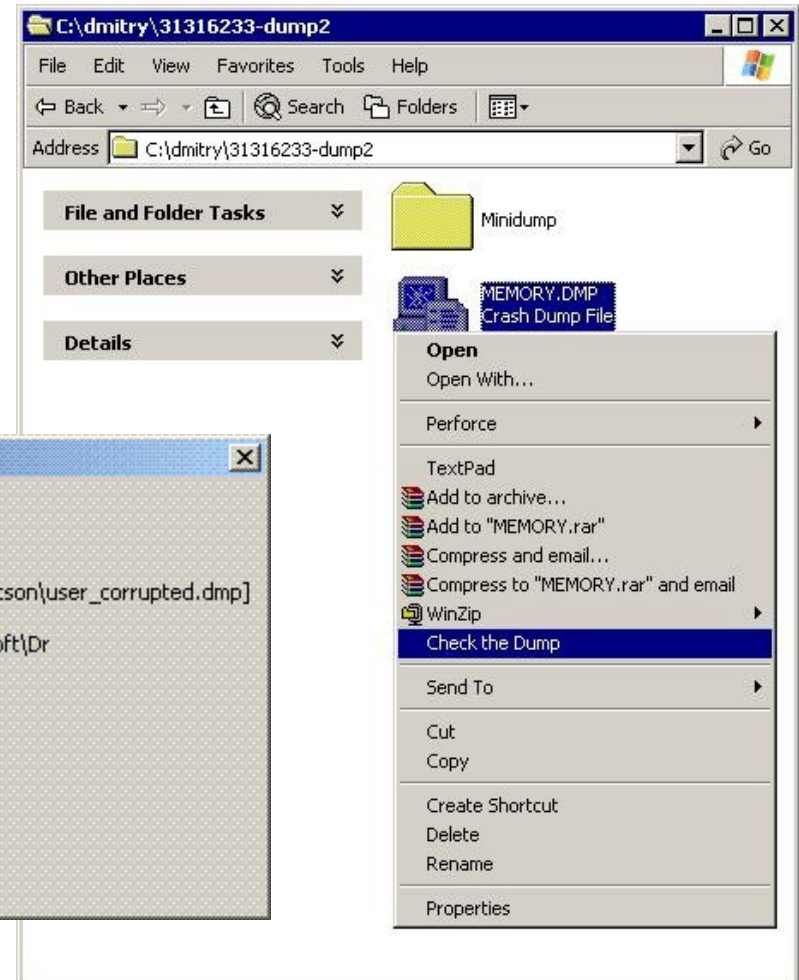
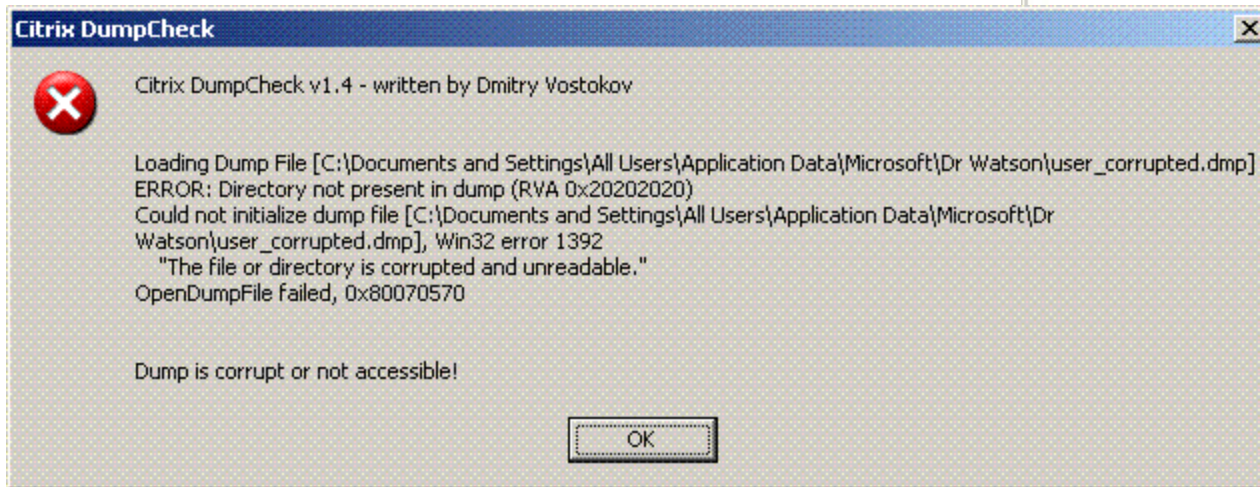
- Command line version

<http://support.citrix.com/article/CTX108890>

Helps to check dump type before sending it:

- User memory dump
- User mini dump
- Complete memory dump
- Kernel memory dump
- Kernel mini dump

DumpCheck (...)



DumpCheck (.....)

Future version will:

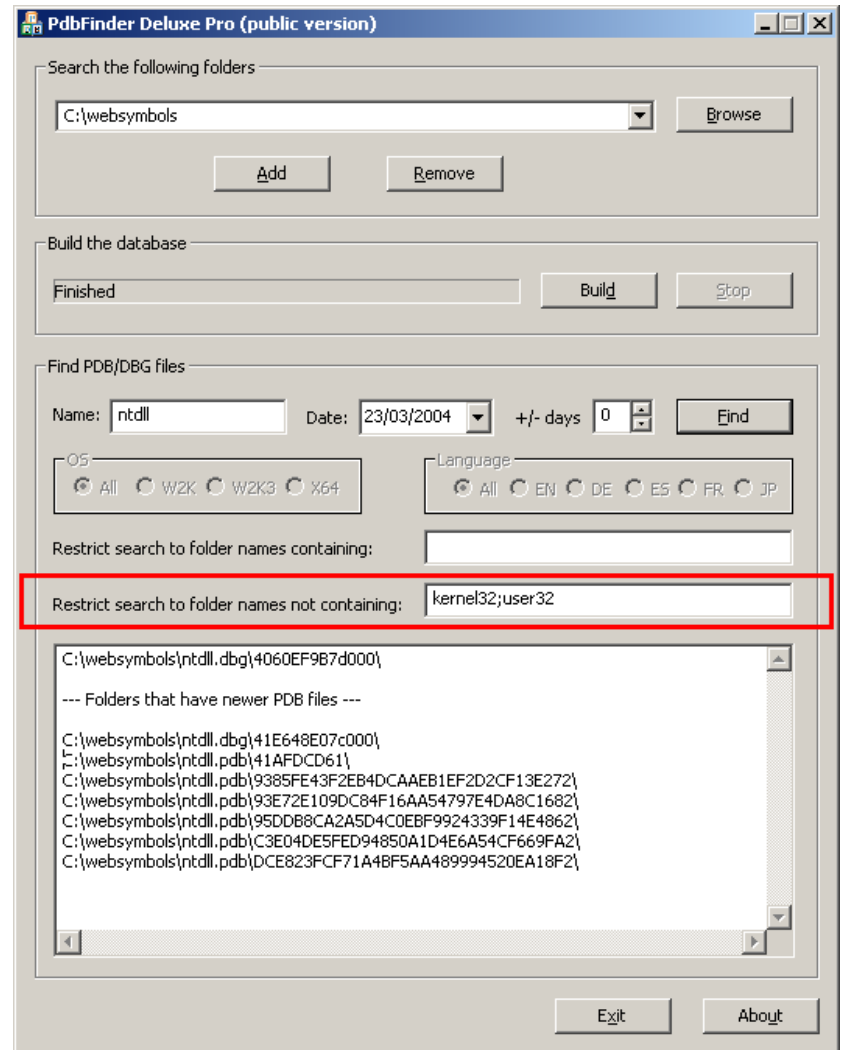
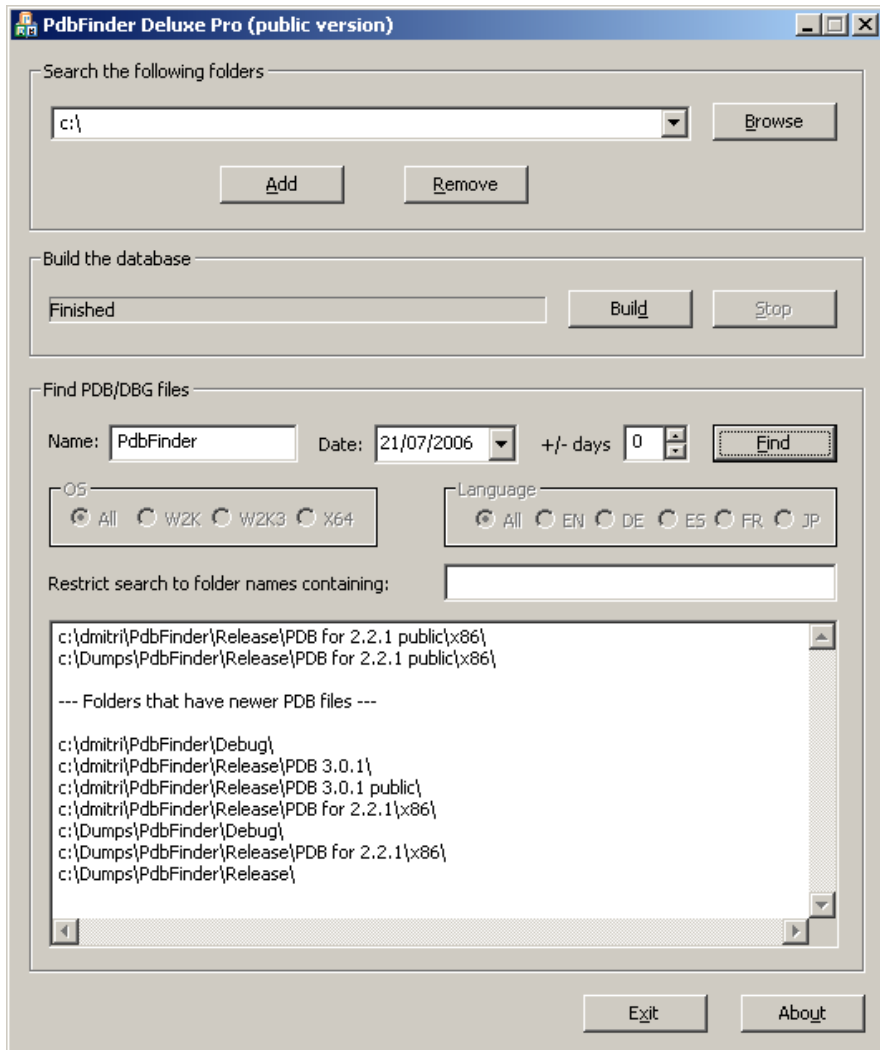
- Have an extension for 64-bit IE
- Merge explorer extension and command line version together to avoid problems with earlier MS debug engine versions
- Show a process name for user dump
- Show various flags like whether full page heap was enabled or not
- Allow to specify symbol file path

PDBFinder

<http://support.citrix.com/article/CTX110629>

- Maps module name and date to its location
- Can be used for hot fix identification
- FixFinder feature helps to find newer modules
- Fully configurable OS and language search options (version 4.0)

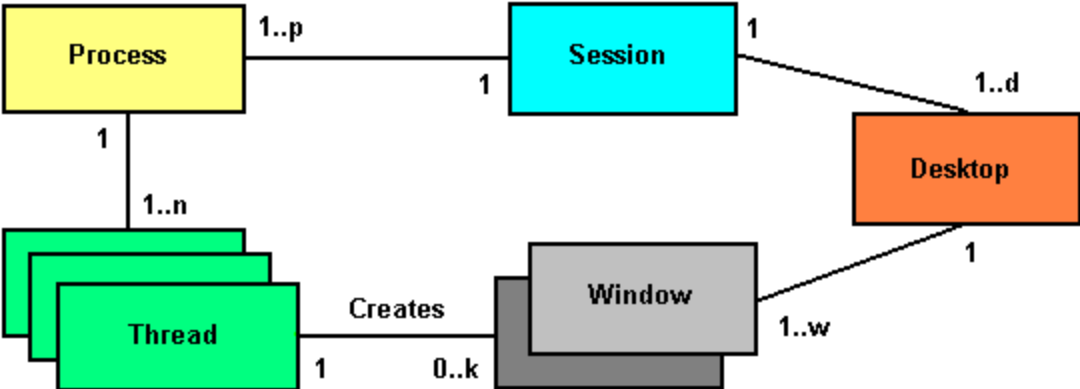
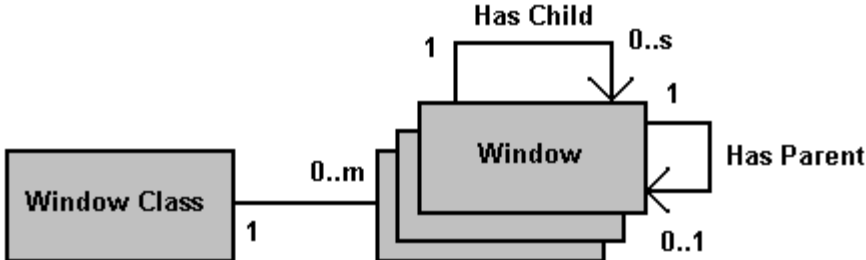
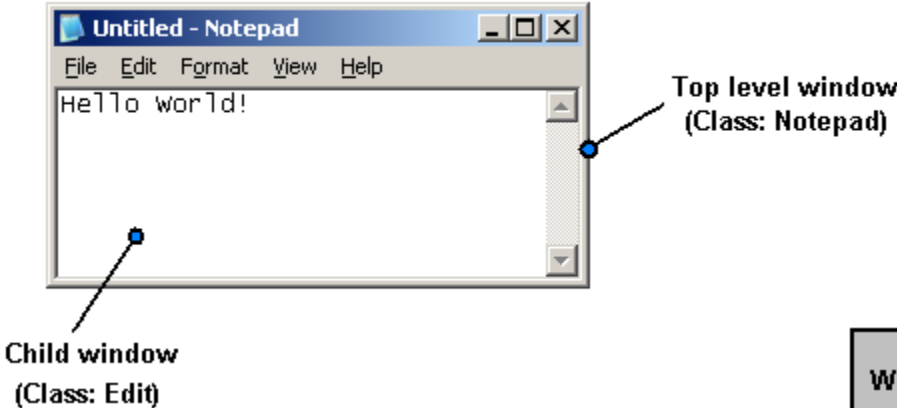
PDBFinder (...)



GUI Troubleshooting Tools

- **Intro: Windows**
- WindowHistory
- CtxHideEx32
- **Intro: Messages**
- RepairCBDChain
- **Intro: Message processing**
- MessageHistory

Intro: Windows



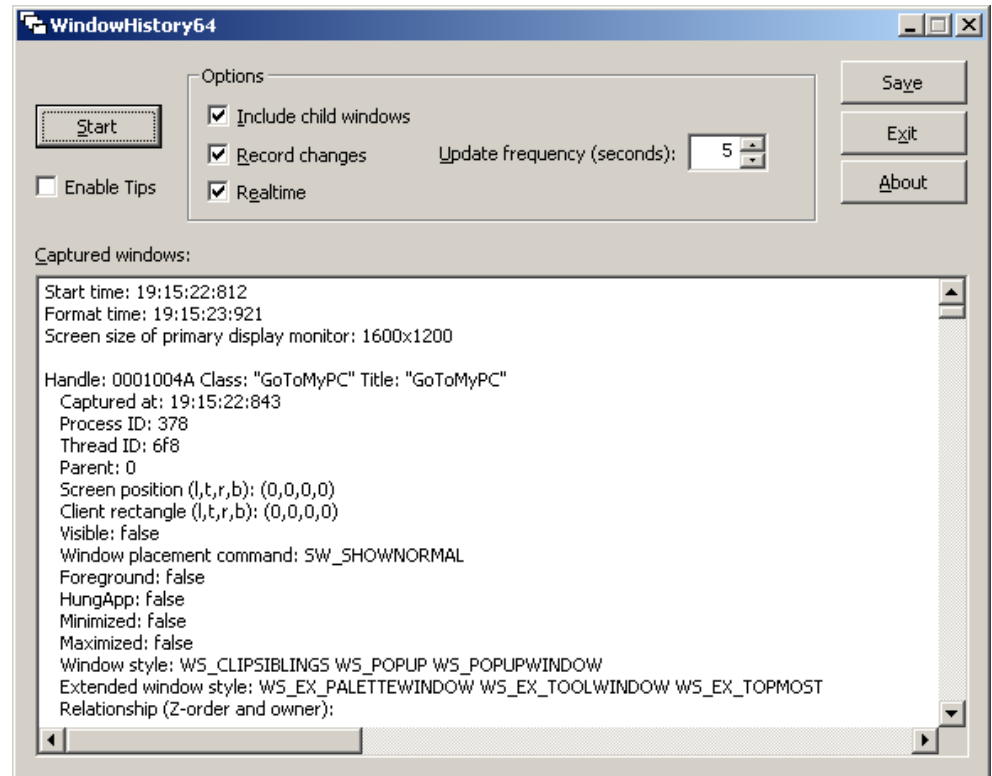
WindowHistory

- <http://support.citrix.com/article/CTX106985>
- <http://support.citrix.com/article/CTX109235> (64-bit)
- <http://support.citrix.com/article/CTX110775> (Mobile)

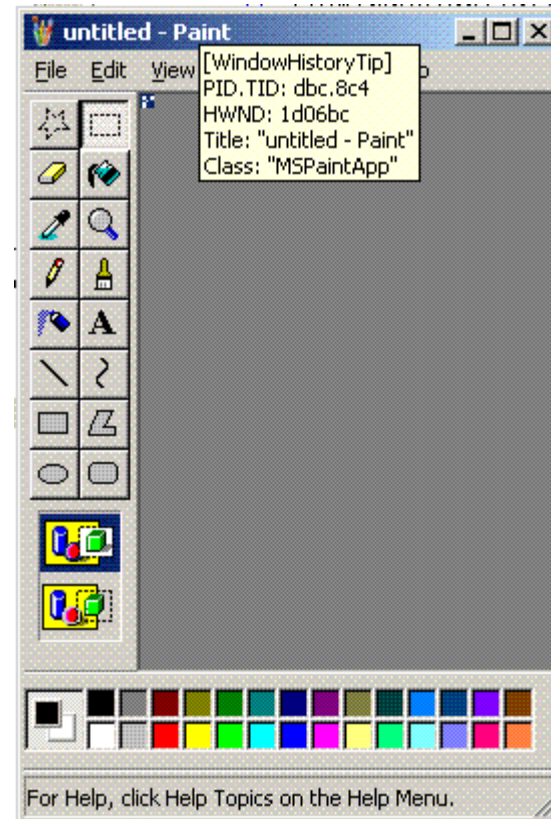
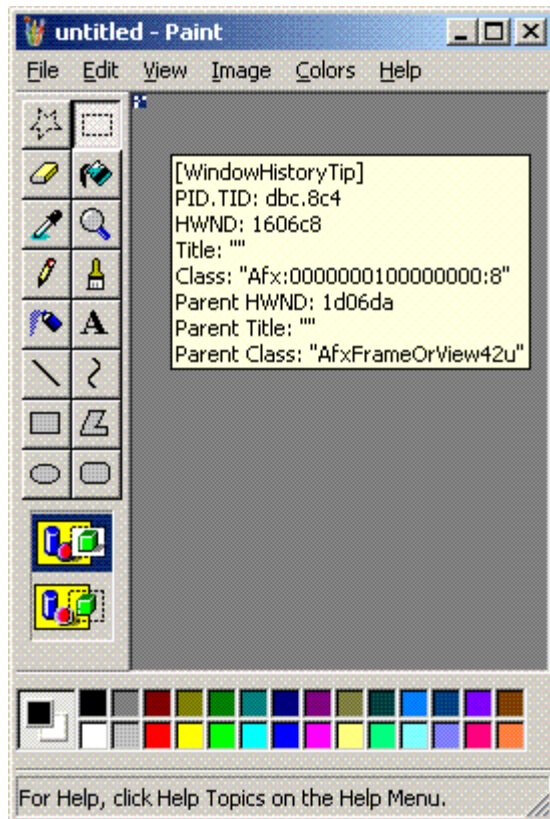
New in version 4.0:

“Real time” capture and millisecond resolution

Tool tips with PID.TID, window title and class information



WindowHistory (...)



WindowHistory (.....)

Handle: 000505B4 Class: "Notepad" Title: "Untitled - Notepad"
Captured at: 21:55:14:633
Process ID: 908
Thread ID: a8
Parent: 0
Screen position (l,t,r,b): (302,277,712,644)
 Position changed at 21:55:16:926 to (l,t,r,b): (-4,-4,1028,772)
 Position changed at 21:55:19:790 to (l,t,r,b): (-32000,-32000,-31840,-31976)
 Position changed at 21:55:24:607 to (l,t,r,b): (-4,-4,1028,772)
 Position changed at 21:55:26:259 to (l,t,r,b): (302,277,712,644)
Visible: true
Window placement command: SW_SHOWNORMAL
 Placement changed at 21:55:16:926 to SW_SHOWMAXIMIZED
 Placement changed at 21:55:19:790 to SW_SHOWMINIMIZED
 Placement changed at 21:55:24:607 to SW_SHOWMAXIMIZED
 Placement changed at 21:55:26:259 to SW_SHOWNORMAL
Foreground: true
 Foreground changed at 21:55:19:790 to false
 Foreground changed at 21:55:24:607 to true
 Foreground changed at 21:55:29:965 to false
HungApp: false
Minimized: false
 Minimized changed at 21:55:19:790 to true
 Minimized changed at 21:55:24:607 to false
Maximized: false
 Maximized changed at 21:55:16:926 to true
 Maximized changed at 21:55:19:790 to false
 Maximized changed at 21:55:24:607 to true
 Maximized changed at 21:55:26:259 to false

WindowHistory (.....)

Window style: WS_BORDER WS_CAPTION WS_CLIPSIBLINGS WS_DLGFRAME WS_GROUP WS_MAXIMIZEBOX WS_MINIMIZEBOX WS_OVERLAPPEDWINDOW WS_POPUPWINDOW WS_SIZEBOX WS_SYSMENU WS_TABSTOP WS_THICKFRAME WS_TILEDWINDOW WS_VISIBLE

Style changed at 21:55:16:926 to WS_BORDER WS_CAPTION WS_CLIPSIBLINGS WS_DLGFRAME WS_GROUP WS_MAXIMIZE WS_MAXIMIZEBOX WS_MINIMIZEBOX WS_OVERLAPPEDWINDOW WS_POPUPWINDOW WS_SIZEBOX WS_SYSMENU WS_TABSTOP WS_THICKFRAME WS_TILEDWINDOW WS_VISIBLE

Style changed at 21:55:19:790 to WS_BORDER WS_CAPTION WS_CLIPSIBLINGS WS_DLGFRAME WS_GROUP WS_ICONIC WS_MAXIMIZEBOX WS_MINIMIZE WS_MINIMIZEBOX WS_OVERLAPPEDWINDOW WS_POPUPWINDOW WS_SIZEBOX WS_SYSMENU WS_TABSTOP WS_THICKFRAME WS_TILEDWINDOW WS_VISIBLE

Style changed at 21:55:24:607 to WS_BORDER WS_CAPTION WS_CLIPSIBLINGS WS_DLGFRAME WS_GROUP WS_MAXIMIZE WS_MAXIMIZEBOX WS_MINIMIZEBOX WS_OVERLAPPEDWINDOW WS_POPUPWINDOW WS_SIZEBOX WS_SYSMENU WS_TABSTOP WS_THICKFRAME WS_TILEDWINDOW WS_VISIBLE

Style changed at 21:55:26:259 to WS_BORDER WS_CAPTION WS_CLIPSIBLINGS WS_DLGFRAME WS_GROUP WS_MAXIMIZEBOX WS_MINIMIZEBOX WS_OVERLAPPEDWINDOW WS_POPUPWINDOW WS_SIZEBOX WS_SYSMENU WS_TABSTOP WS_THICKFRAME WS_TILEDWINDOW WS_VISIBLE

Extended window style: WS_EX_ACCEPTFILES WS_EX_OVERLAPPEDWINDOW WS_EX_PALETTEWINDOW WS_EX_WINDOWEDGE

Relationship (Z-order and owner):

GW_CHILD: 000405C4

GW_HWNDFIRST: 00040032

GW_HWNDFIRST changed at 21:55:24:607 to 0001008A

GW_HWNDLAST: 00010090

GW_HWNDNEXT: 000904C2

GW_HWNDNEXT changed at 21:55:19:790 to 0001009C

GW_HWNDNEXT changed at 21:55:24:607 to 0004057A

GW_HWNDPREV: 000C0502

GW_HWNDPREV changed at 21:55:19:790 to 00090542

GW_HWNDPREV changed at 21:55:24:607 to 000C0502

GW_HWNDOWNER: 00000000

WindowHistory (.....)

Child windows:

Handle: 000405C4 Class: "Edit" Title: ""

Captured at: 21:55:14:633

Parent: 505b4

ID: f

Client rectangle (l,t,r,b): (-2,-2,400,319)

Position changed at 21:55:16:926 to (l,t,r,b): (-2,-2,1022,728)

Position changed at 21:55:26:259 to (l,t,r,b): (-2,-2,400,319)

Visible: true

Window style: WS_CHILD WS_CHILDWINDOW WS_VISIBLE WS_VSCROLL

Extended window style: WS_EX_CLIENTEDGE WS_EX_OVERLAPPEDWINDOW

Relationship (Z-order and owner):

GW_CHILD: 00000000

GW_HWNDFIRST: 000405C4

GW_HWNDLAST: 000505C6

GW_HWNDNEXT: 000505C6

GW_HWNDPREV: 00000000

GW_HWNDOWNER: 00000000

Handle: 000505C6 Class: "msctls_statusbar32" Title: ""

Captured at: 21:55:14:633

Parent: 505b4

ID: 401

Client rectangle (l,t,r,b): (0,0,402,20)

Position changed at 21:55:16:936 to (l,t,r,b): (0,0,1024,20)

Position changed at 21:55:26:259 to (l,t,r,b): (0,0,402,20)

Visible: false

Window style: WS_CHILD WS_CHILDWINDOW WS_CLIPSIBLINGS

Extended window style:

Relationship (Z-order and owner):

GW_CHILD: 00000000

GW_HWNDFIRST: 000405C4

GW_HWNDLAST: 000505C6

GW_HWNDNEXT: 00000000

GW_HWNDPREV: 000405C4

GW_HWNDOWNER: 00000000

CtxHideEx32

- <http://support.citrix.com/article/CTX110341>
- WindowHistory log (hiding and showing Notepad window):

Handle: 0004057A Class: "Notepad" Title: "Untitled - Notepad"

Captured at: 22:24:4:710

Process ID: d50

Thread ID: 434

Parent: 0

Screen position (l,t,r,b): (319,322,729,689)

Visible: true

Visibility changed at 22:24:13:383 to false

Visibility changed at 22:24:22:946 to true

Window placement command: SW_SHOWNORMAL

Foreground: false

HungApp: false

Minimized: false

Maximized: false

Window style: WS_BORDER WS_CAPTION WS_CLIPSIBLINGS WS_DLGFRAME WS_GROUP WS_MAXIMIZEBOX WS_MINIMIZEBOX WS_OVERLAPPEDWINDOW WS_POPUPWINDOW WS_SIZEBOX WS_SYSMENU WS_TABSTOP WS_THICKFRAME WS_TILEDWINDOW WS_VISIBLE

Style changed at 22:24:13:383 to WS_BORDER WS_CAPTION WS_CLIPSIBLINGS WS_DLGFRAME WS_GROUP WS_MAXIMIZEBOX WS_MINIMIZEBOX WS_OVERLAPPEDWINDOW WS_POPUPWINDOW WS_SIZEBOX WS_SYSMENU WS_TABSTOP WS_THICKFRAME WS_TILEDWINDOW

Style changed at 22:24:22:946 to WS_BORDER WS_CAPTION WS_CLIPSIBLINGS WS_DLGFRAME WS_GROUP WS_MAXIMIZEBOX WS_MINIMIZEBOX WS_OVERLAPPEDWINDOW WS_POPUPWINDOW WS_SIZEBOX WS_SYSMENU WS_TABSTOP WS_THICKFRAME WS_TILEDWINDOW WS_VISIBLE

Extended window style: WS_EX_ACCEPTFILES WS_EX_OVERLAPPEDWINDOW WS_EX_PALETTEWINDOW WS_EX_WINDOWEDGE

Intro: Messages

- Message ID (WM_xxx, EM_xxx, LB_xxx, ...)
- 2 parameters (wParam and lParam)

Example (from MSDN): **WM_LBUTTONDOWN**

wParam

MK_CONTROL	The CTRL key is down.
MK_LBUTTON	The left mouse button is down.
MK_MBUTTON	The middle mouse button is down.
MK_RBUTTON	The right mouse button is down.
MK_SHIFT	The SHIFT key is down.

lParam

The low-order word specifies the x-coordinate of the cursor. The coordinate is relative to the upper-left corner of the client area.
The high-order word specifies the y-coordinate of the cursor. The coordinate is relative to the upper-left corner of the client area.

Note: MessageHistory unpacks parameters for some messages like keyboard and mouse and shows them in user-friendly manner

RepairCBDChain

- <http://support.citrix.com/article/CTX106226>
- <http://support.citrix.com/article/CTX109234> (64-bit)

Immediately restores clipboard functionality on client and server.

This has been already implemented on client side (not activated by default):

Occasionally, copying content from the client device and pasting it in a published application fails. The issue is caused by a third party application that prevents the client from receiving notification when new content was copied to the local clipboard.

This fix introduces support for a mechanism to check at periodic intervals the client's ability to receive clipboard change notifications. If the mechanism finds the client unable to receive such notifications, the client attempts to register itself to receive future notifications. To enable this functionality, you must modify users' appsrv.ini files as follows:

1. Open the appsrv.ini file located in the user profile directory using a text editor.
2. In the [WFClient] section, locate or add the entry:

CbChainInterval=<value>, where value is the interval, in milliseconds, at which checks are to be performed. Supported values range from 0 to 2,000, inclusive.

Note: The detection takes at least twice the amount of time specified in this setting.

3. Save your changes and close the file.

[From 9.100][#112636]

RepairCBDChain (...)

Repairing clipboard chain for individual ICA sessions:

```
C:\>RepairCBDChain.exe "Sent Items - Microsoft Outlook - \\Remote"  
C:\>RepairCBDChain.exe "Weekly report - Message - \\Remote"
```

Repairing clipboard chain for RDP sessions on the client machine:

```
HWND: 0x000000000000318A8  
Class: "RdpClipRdrWindowClass"  
Title: ""  
20:31:59:562 S WM_DRAWCLIPBOARD (0x308) wParam: 0x31986 lParam: 0x0
```

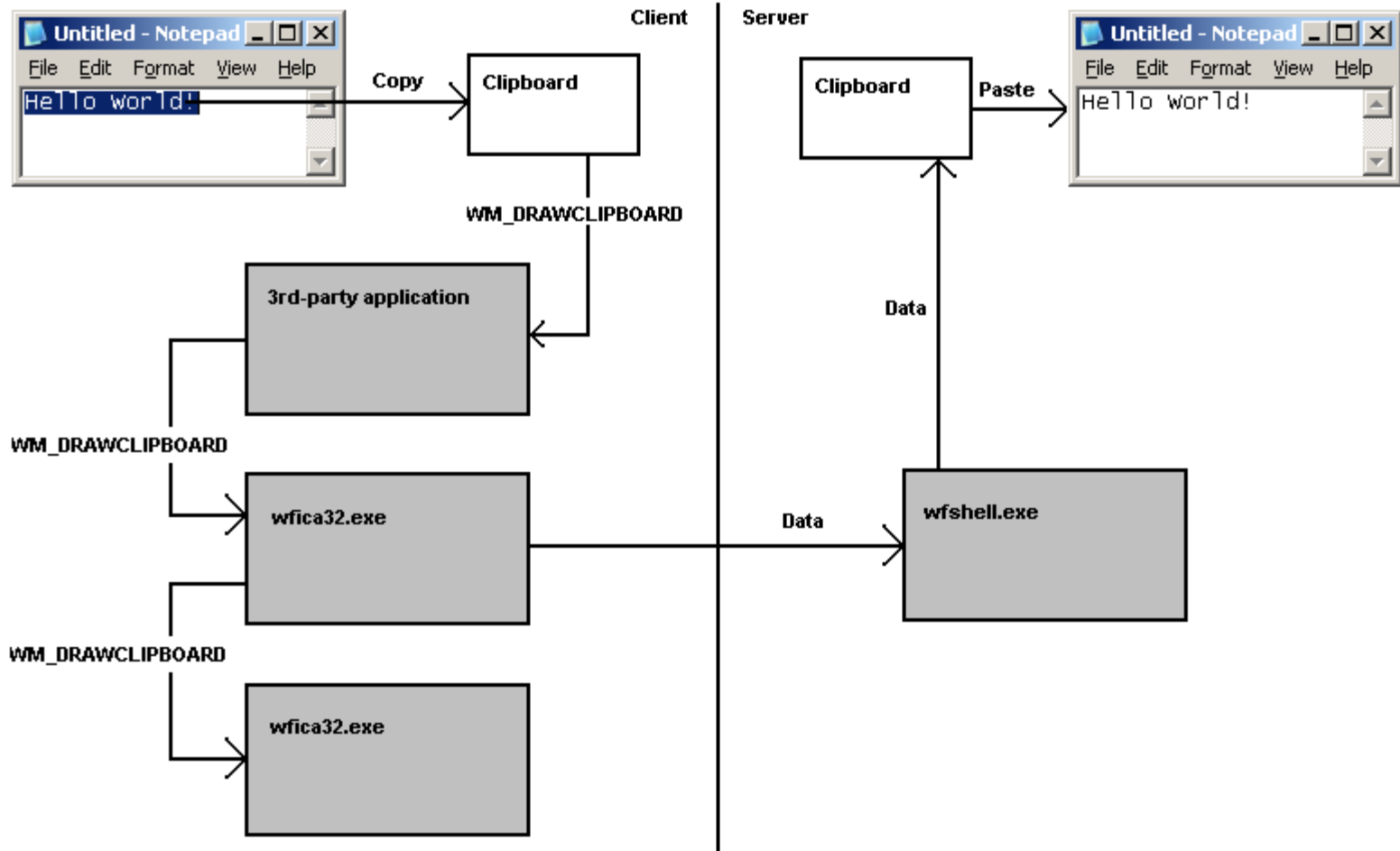
```
C:\>RepairCBDChain.exe "" "RdpClipRdrWindowClass"
```

Inside RDP session on Windows XP the following rdclip.exe window receives clipboard change notifications:

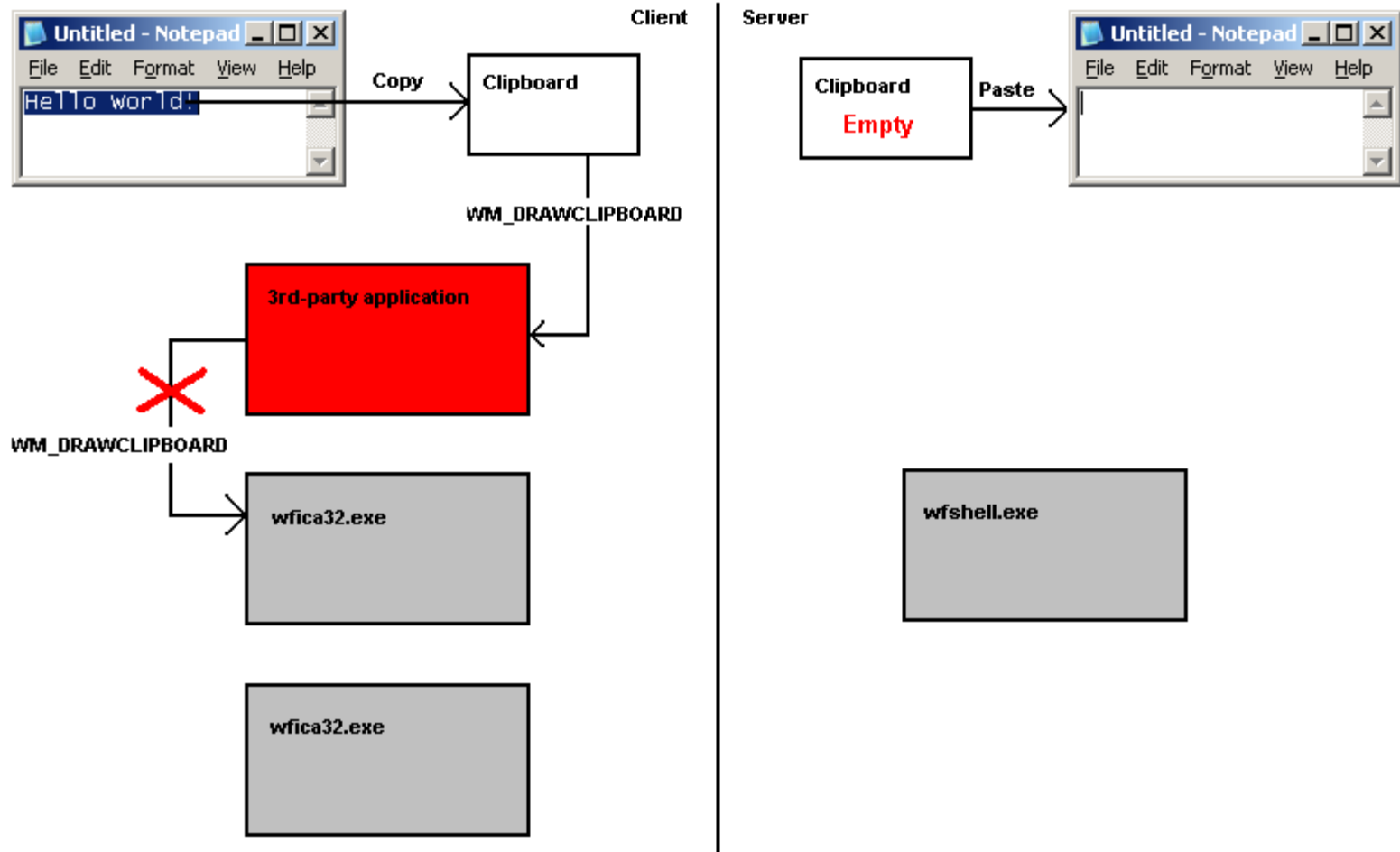
```
HWND: 0x0004003A  
Class: "CBMonitorClass"  
Title: "CB Monitor Window"  
19:36:57:484 S WM_DRAWCLIPBOARD (0x308) wParam: 0x50142 lParam: 0x0
```

```
C:\>RepairCBDChain.exe "CB Monitor Window" "CBMonitorClass"
```

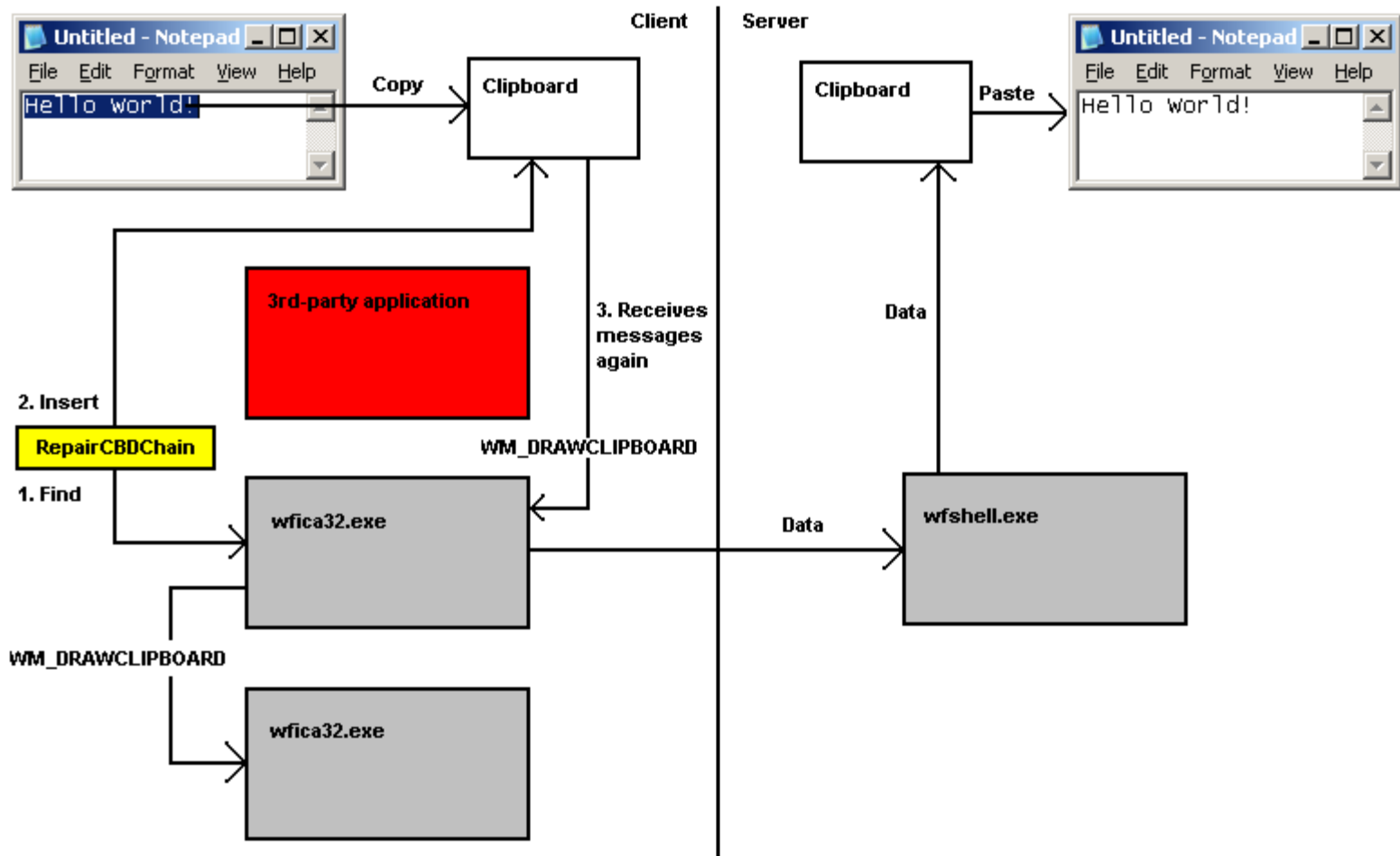
RepairCBDChain (.....)



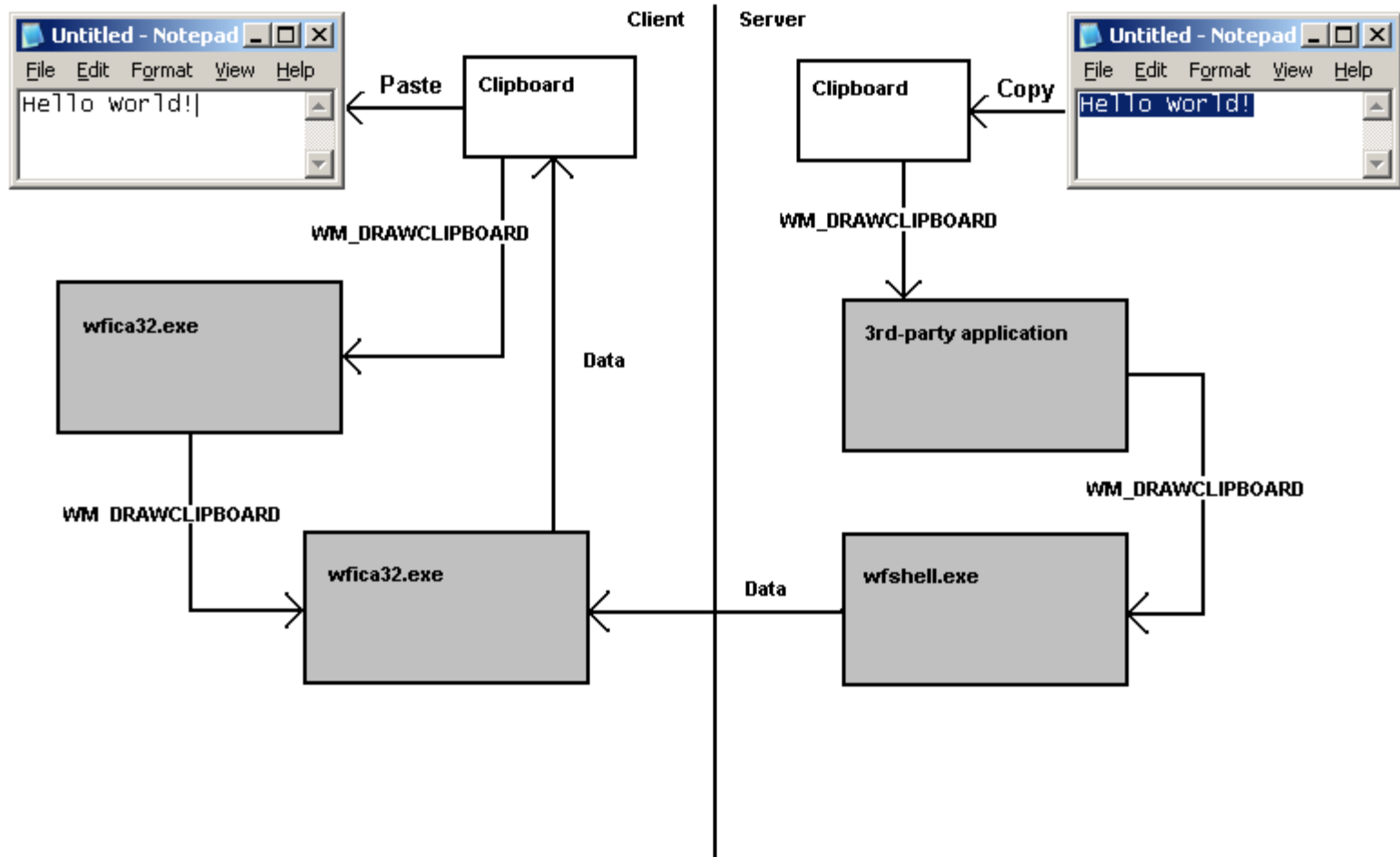
RepairCBDChain (.....)



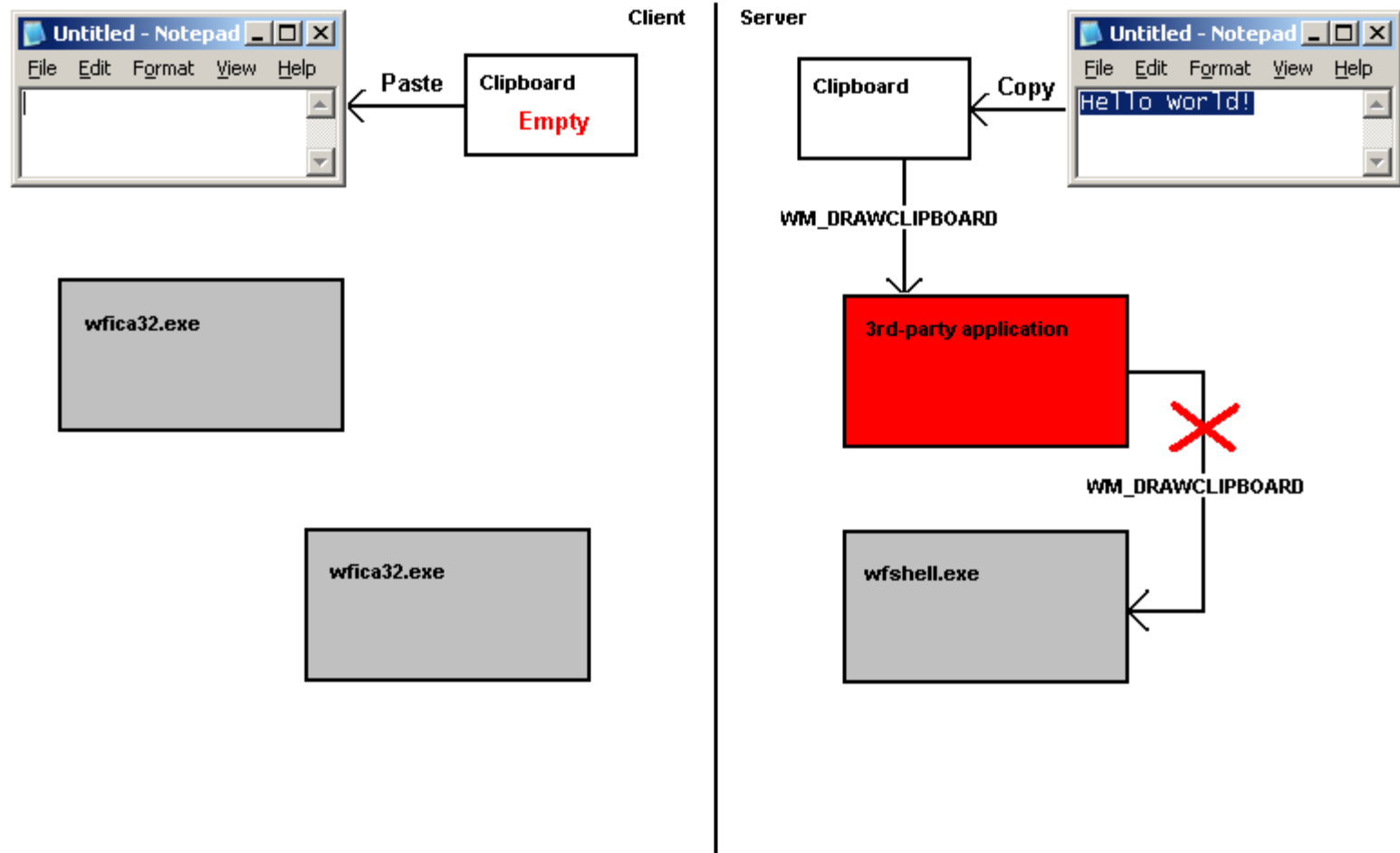
RepairCBDChain (.....)



RepairCBDChain (.....)



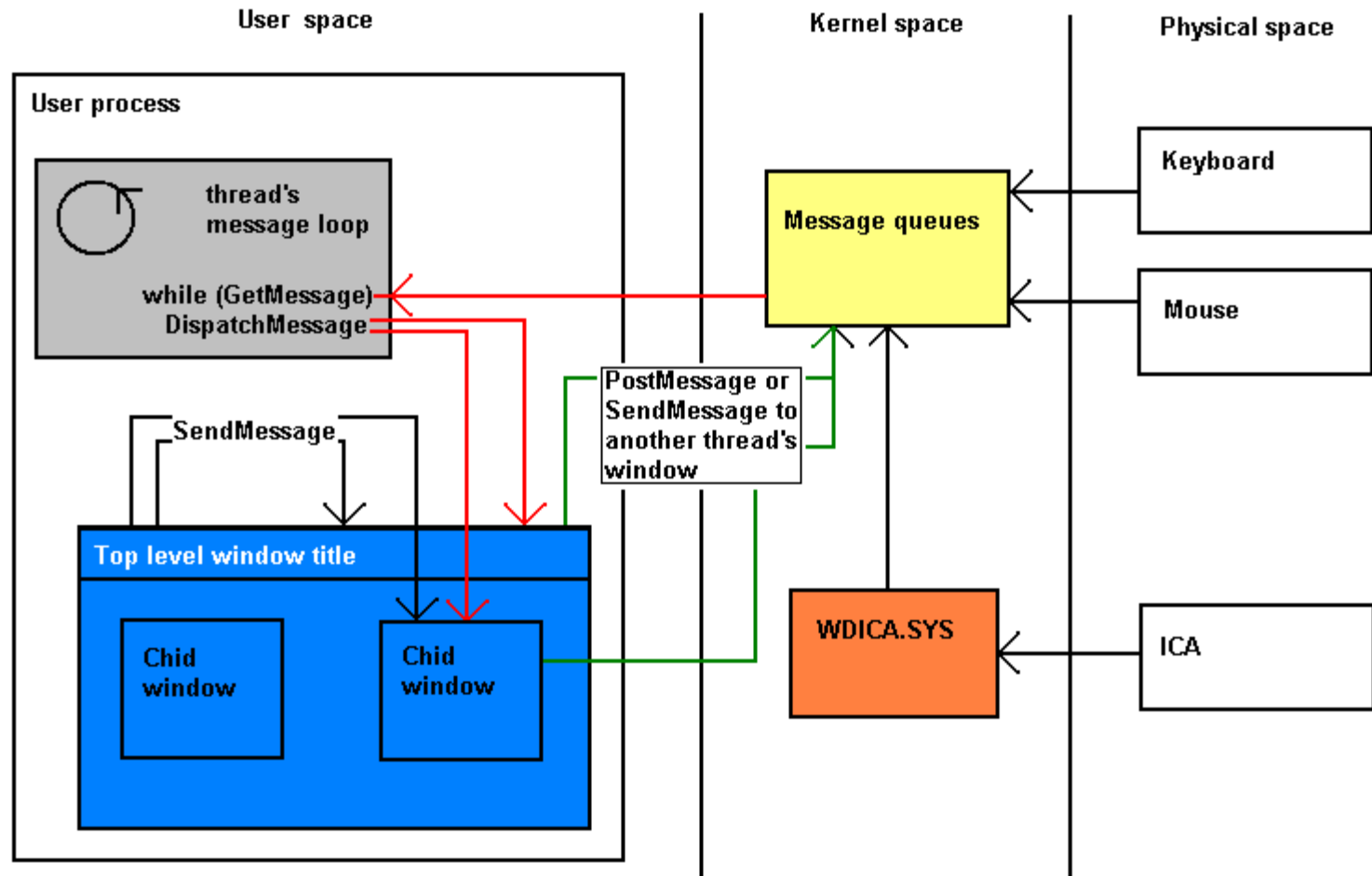
RepairCBDChain (.....)



Intro: Message Processing

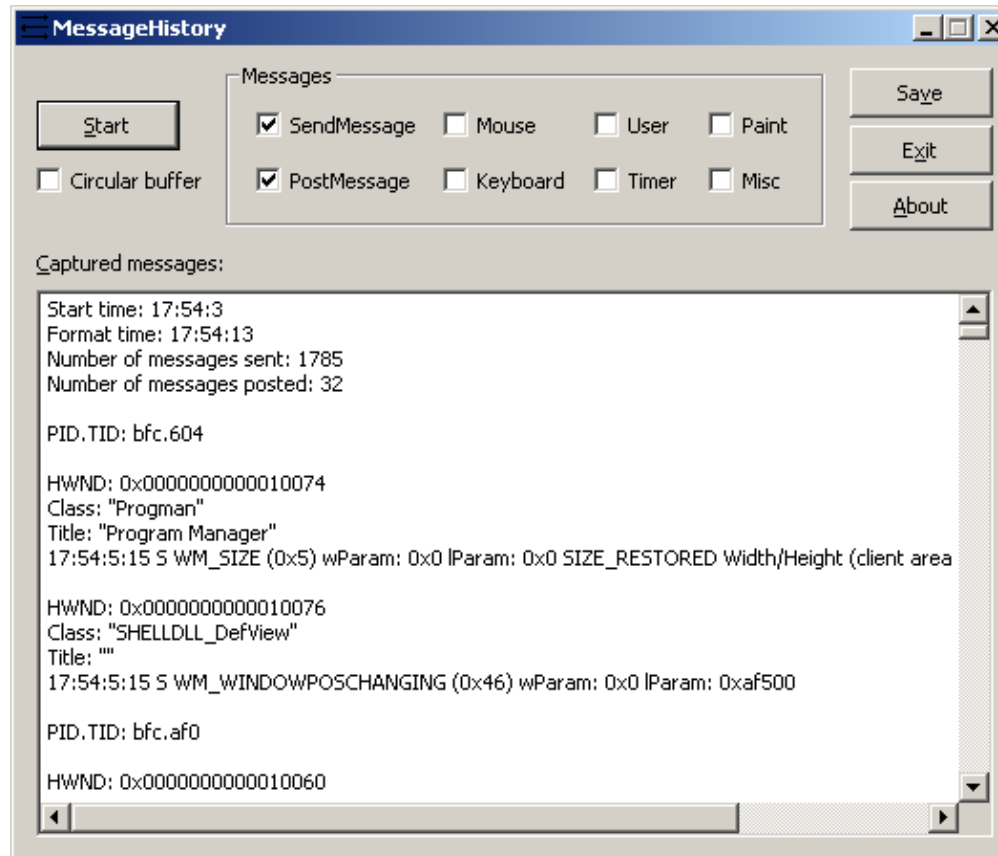
- Synchronous: window **sends** a message to itself or another window and waits for a return (**SendMessage**)
- Asynchronous: window **posts** a message to itself or another window and continues to execute its own code (**PostMessage**)

Intro: Message Processing (...)



MessageHistory

<http://support.citrix.com/article/CTX111408>



MessageHistory (...)

PID.TID: c20.c0c

HWND: 0x002501D4

Class: "WMFService006600CA004"

Title: "Microsoft Outlook7718 - MetaFrame Presentation Server Client [SpeedScreen On]"

17:58:53:671 S WM_WINDOWPOSCHANGING (0x46) wParam: 0x0 lParam: 0x12ef6c

17:58:53:671 S WM_WINDOWPOSCHANGING (0x46) wParam: 0x0 lParam: 0x12ef58

HWND: 0x003F08DC

Class: "Transparent Windows Client"

Title: "^P ^b24 of 24 - Clipboard^b^Sitem collected. - \\Remote"

17:58:53:671 S WM_NCCREATE (0x81) wParam: 0x0 lParam: 0x12ea78

17:58:53:671 S WM_NCCALCSIZE (0x83) wParam: 0x0 lParam: 0x12ea64

17:58:53:671 S WM_CREATE (0x1) wParam: 0x0 lParam: 0x12ea78

17:58:53:671 S WM_SIZE (0x5) wParam: 0x0 lParam: 0x230087 SIZE_RESTORED Width/Height (client area): 135/35

17:58:53:671 S WM_MOVE (0x3) wParam: 0x0 lParam: 0x48b05b7 Left/Top: 1463/1163

17:58:53:671 S WM_SHOWWINDOW (0x18) wParam: 0x1 lParam: 0x0 Window in being shown

17:58:53:671 S WM_WINDOWPOSCHANGING (0x46) wParam: 0x0 lParam: 0x12ef6c

17:58:53:671 S WM_WINDOWPOSCHANGED (0x47) wParam: 0x0 lParam: 0x12ef6c

17:58:53:671 S WM_WINDOWPOSCHANGING (0x46) wParam: 0x0 lParam: 0x12ef58

HWND: 0x004E0332

Class: "WFClip"

Title: "WFclip"

17:58:53:484 S WM_DRAWCLIPBOARD (0x308) wParam: 0xd0aa0 lParam: 0x0

HWND: 0x0094036E

Class: "TWI Link"

Title: ""

17:58:53:671 S WM_WINDOWPOSCHANGING (0x46) wParam: 0x0 lParam: 0x12ef6c

17:58:53:671 S WM_WINDOWPOSCHANGING (0x46) wParam: 0x0 lParam: 0x12ef58

MessageHistory (.....)

18:8:3:125 P WM_KEYDOWN (0x100) wParam: 0x10 lParam: 0x2a0001 Virtual key code: VK_SHIFT Previous key state: "up before" Repeat count: 1 Scan code: 0x2a
18:8:3:359 P WM_KEYDOWN (0x100) wParam: 0x48 lParam: 0x230001 Virtual key code: VK_H Previous key state: "up before" Repeat count: 1 Scan code: 0x23
18:8:3:359 P WM_CHAR (0x102) wParam: 0x48 lParam: 0x230001 Character code: 0x48 'H' Previous key state: "up before" Transition state: "pressed" Repeat count: 1 Scan code: 0x23
18:8:3:437 P WM_KEYUP (0x101) wParam: 0x48 lParam: 0xc0230001 Virtual key code: VK_H Repeat count: 1 Scan code: 0x23
18:8:3:484 P WM_KEYUP (0x101) wParam: 0x10 lParam: 0xc02a0001 Virtual key code: VK_SHIFT Repeat count: 1 Scan code: 0x2a
18:8:3:578 P WM_KEYDOWN (0x100) wParam: 0x45 lParam: 0x120001 Virtual key code: VK_E Previous key state: "up before" Repeat count: 1 Scan code: 0x12
18:8:3:578 P WM_CHAR (0x102) wParam: 0x65 lParam: 0x120001 Character code: 0x65 'e' Previous key state: "up before" Transition state: "pressed" Repeat count: 1 Scan code: 0x12
18:14:34:46 P WM_KEYUP (0x101) wParam: 0x45 lParam: 0xc0120001 Virtual key code: VK_E Repeat count: 1 Scan code: 0x12
18:8:3:812 P WM_KEYDOWN (0x100) wParam: 0x4c lParam: 0x260001 Virtual key code: VK_L Previous key state: "up before" Repeat count: 1 Scan code: 0x26
18:8:3:812 P WM_CHAR (0x102) wParam: 0x6c lParam: 0x260001 Character code: 0x6c 'l' Previous key state: "up before" Transition state: "pressed" Repeat count: 1 Scan code: 0x26
18:8:3:890 P WM_KEYUP (0x101) wParam: 0x4c lParam: 0xc0260001 Virtual key code: VK_L Repeat count: 1 Scan code: 0x26
18:8:3:968 P WM_KEYDOWN (0x100) wParam: 0x4c lParam: 0x260001 Virtual key code: VK_L Previous key state: "up before" Repeat count: 1 Scan code: 0x26
18:8:3:968 P WM_CHAR (0x102) wParam: 0x6c lParam: 0x260001 Character code: 0x6c 'l' Previous key state: "up before" Transition state: "pressed" Repeat count: 1 Scan code: 0x26
18:8:4:46 P WM_KEYUP (0x101) wParam: 0x4c lParam: 0xc0260001 Virtual key code: VK_L Repeat count: 1 Scan code: 0x26
18:8:4:125 P WM_KEYDOWN (0x100) wParam: 0x4f lParam: 0x180001 Virtual key code: VK_O Previous key state: "up before" Repeat count: 1 Scan code: 0x18
18:8:4:125 P WM_CHAR (0x102) wParam: 0x6f lParam: 0x180001 Character code: 0x6f 'o' Previous key state: "up before" Transition state: "pressed" Repeat count: 1 Scan code: 0x18
18:8:4:203 P WM_KEYUP (0x101) wParam: 0x4f lParam: 0xc0180001 Virtual key code: VK_O Repeat count: 1 Scan code: 0x18
18:8:4:250 P WM_KEYDOWN (0x100) wParam: 0x10 lParam: 0x2a0001 Virtual key code: VK_SHIFT Previous key state: "up before" Repeat count: 1 Scan code: 0x2a
18:8:4:453 P WM_KEYDOWN (0x100) wParam: 0x31 lParam: 0x20001 Virtual key code: VK_1 Previous key state: "up before" Repeat count: 1 Scan code: 0x2
18:8:4:453 P WM_CHAR (0x102) wParam: 0x21 lParam: 0x20001 Character code: 0x21 '!' Previous key state: "up before" Transition state: "pressed" Repeat count: 1 Scan code: 0x2
18:8:4:562 P WM_KEYUP (0x101) wParam: 0x31 lParam: 0xc0020001 Virtual key code: VK_1 Repeat count: 1 Scan code: 0x2
18:8:4:593 P WM_KEYUP (0x101) wParam: 0x10 lParam: 0xc02a0001 Virtual key code: VK_SHIFT Repeat count: 1 Scan code: 0x2a
18:8:5:890 P WM_KEYDOWN (0x100) wParam: 0xd lParam: 0x1c0001 Virtual key code: VK_RETURN Previous key state: "up before" Repeat count: 1 Scan code: 0x1c
18:8:5:890 P WM_CHAR (0x102) wParam: 0xd lParam: 0x1c0001 Character code: 0xd '
' Previous key state: "up before" Transition state: "pressed" Repeat count: 1 Scan code: 0x1c
18:8:5:968 P WM_KEYUP (0x101) wParam: 0xd lParam: 0xc01c0001 Virtual key code: VK_RETURN Repeat count: 1 Scan code: 0x1c
18:8:6:437 P 0x118 wParam: 0xffff lParam: 0xffff97fff114360
18:8:6:484 P WM_KEYDOWN (0x100) wParam: 0x90 lParam: 0x1450001 Virtual key code: VK_NUMLOCK Previous key state: "up before" Extended key Repeat count: 1 Scan code: 0x45
18:8:6:578 P WM_KEYUP (0x101) wParam: 0x90 lParam: 0xc1450001 Virtual key code: VK_NUMLOCK Extended key Repeat count: 1 Scan code: 0x45
18:8:6:968 P 0x118 wParam: 0xffff lParam: 0xffff97fff114360
18:8:7:156 P WM_KEYDOWN (0x100) wParam: 0x90 lParam: 0x1450001 Virtual key code: VK_NUMLOCK Previous key state: "up before" Extended key Repeat count: 1 Scan code: 0x45
18:8:7:218 P WM_KEYUP (0x101) wParam: 0x90 lParam: 0xc1450001 Virtual key code: VK_NUMLOCK Extended key Repeat count: 1 Scan code: 0x45

MessageHistory (.....)

New in version 2.0:

Bulk messages sorted by time:

```
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x000E0480 Class: "Notepad" Title: "Untitled - Notepad" WM_ACTIVATEAPP (0x1c) wParam: 0x1 lParam: 0x7b8 Activated / TID of deactivated window: 0x7b8
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x000E0480 Class: "Notepad" Title: "Untitled - Notepad" WM_NCACTIVATE (0x86) wParam: 0x1 lParam: 0x0
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x000E0480 Class: "Notepad" Title: "Untitled - Notepad" WM_ACTIVATE (0x6) wParam: 0x1 lParam: 0x0 WA_ACTIVE Window deactivated: 0x0
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x000E0480 Class: "Notepad" Title: "Untitled - Notepad" WM_SETFOCUS (0x7) wParam: 0x0 lParam: 0x0 Window which has lost focus: 0x0
1:42:45:317 S PID: c18 TID: 7b8 HWND: 0x00040554 Class: "Button" Title: "&Start" WM_NCHITTEST (0x84) wParam: 0x0 lParam: 0xd80139
1:42:45:317 S PID: c18 TID: 7b8 HWND: 0x00040554 Class: "Button" Title: "&Start" WM_SETCURSOR (0x20) wParam: 0x40554 lParam: 0x2000001
1:42:45:317 S PID: c18 TID: 7b8 HWND: 0x000704B4 Class: "#32770" Title: "MessageHistory" WM_SETCURSOR (0x20) wParam: 0x40554 lParam: 0x2000001
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x000E0480 Class: "Notepad" Title: "Untitled - Notepad" WM_KILLFOCUS (0x8) wParam: 0x20580 lParam: 0x0 Window which receives focus: 0x20580
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x00020580 Class: "Edit" Title: "" WM_KILLFOCUS (0x8) wParam: 0x20580 lParam: 0x0 Window which receives focus: 0x20580
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x000E0480 Class: "Notepad" Title: "Untitled - Notepad" WM_COMMAND (0x111) wParam: 0x200000f lParam: 0x20580 ID: 0xf
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x00020580 Class: "Edit" Title: "" WM_SETFOCUS (0x7) wParam: 0xe0480 lParam: 0x0 Window which has lost focus: 0xe0480
1:42:45:317 S PID: e80 TID: ea8 HWND: 0x000E0480 Class: "Notepad" Title: "Untitled - Notepad" WM_COMMAND (0x111) wParam: 0x100000f lParam: 0x20580 ID: 0xf
1:42:45:427 S PID: 328 TID: 3f4 HWND: 0x0001007E Class: "CiceroUIWndFrame" Title: "TF_FloatingLangBar_WndTitle" WM_WINDOWPOSCHANGING (0x46) wParam: 0x0 lParam: 0xc4fce8
1:42:45:858 S PID: 77c TID: 780 HWND: 0x000101E2 Class: "Static" Title: " " WM_GETTEXT (0xd) wParam: 0x100 lParam: 0x12e3c0
1:42:45:858 S PID: 77c TID: 780 HWND: 0x000101E8 Class: "Static" Title: " " WM_GETTEXT (0xd) wParam: 0x100 lParam: 0x12e3c0
1:42:45:858 S PID: 77c TID: 780 HWND: 0x000101E0 Class: "Static" Title: "No Link" WM_GETTEXT (0xd) wParam: 0x100 lParam: 0x12e3c0
1:42:45:858 S PID: 77c TID: 780 HWND: 0x000101EA Class: "Static" Title: "" WM_GETTEXT (0xd) wParam: 0x100 lParam: 0x12e3c0
```

Forthcoming version 2.1 will have 64-bit version capable of capturing messages from both 32-bit and 64-bit windows

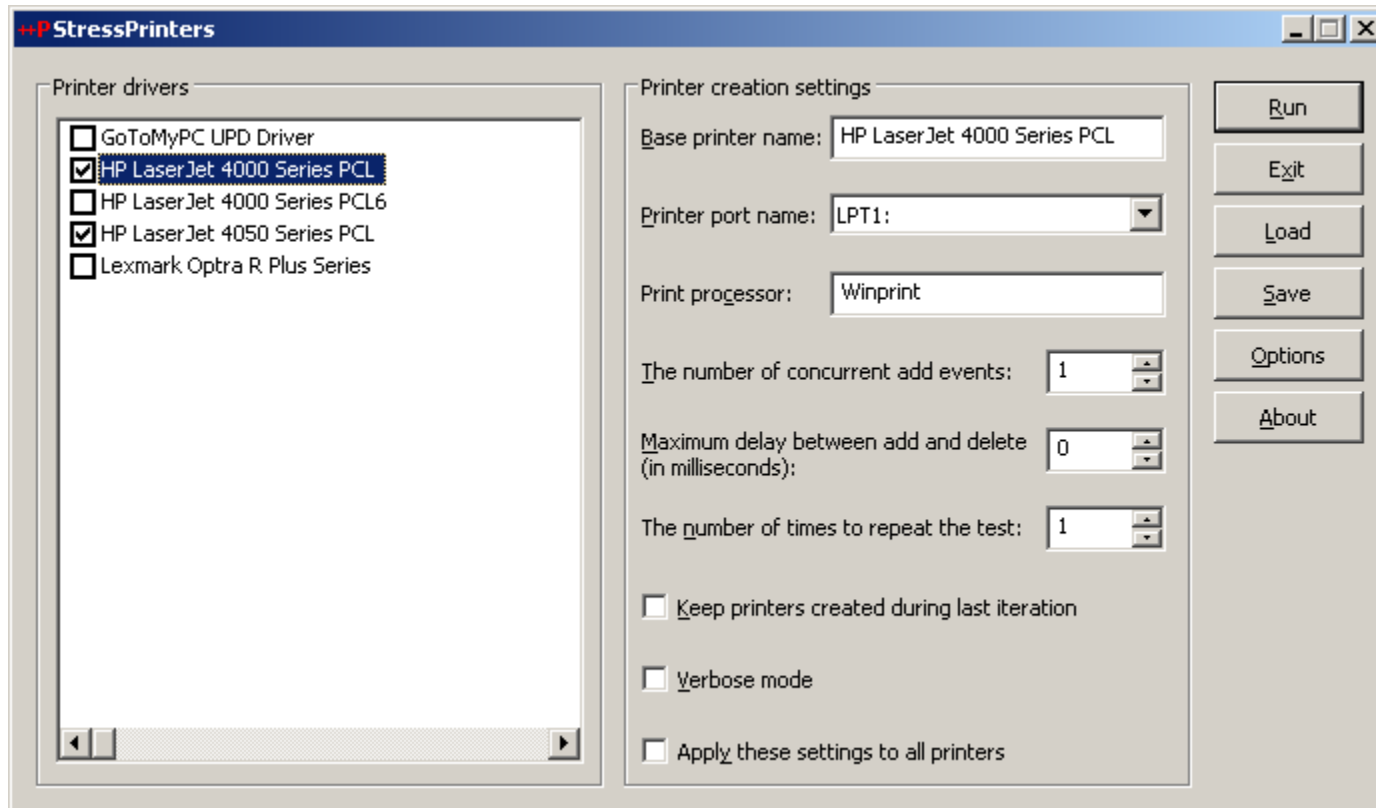
Printing tools

- StressPrinters

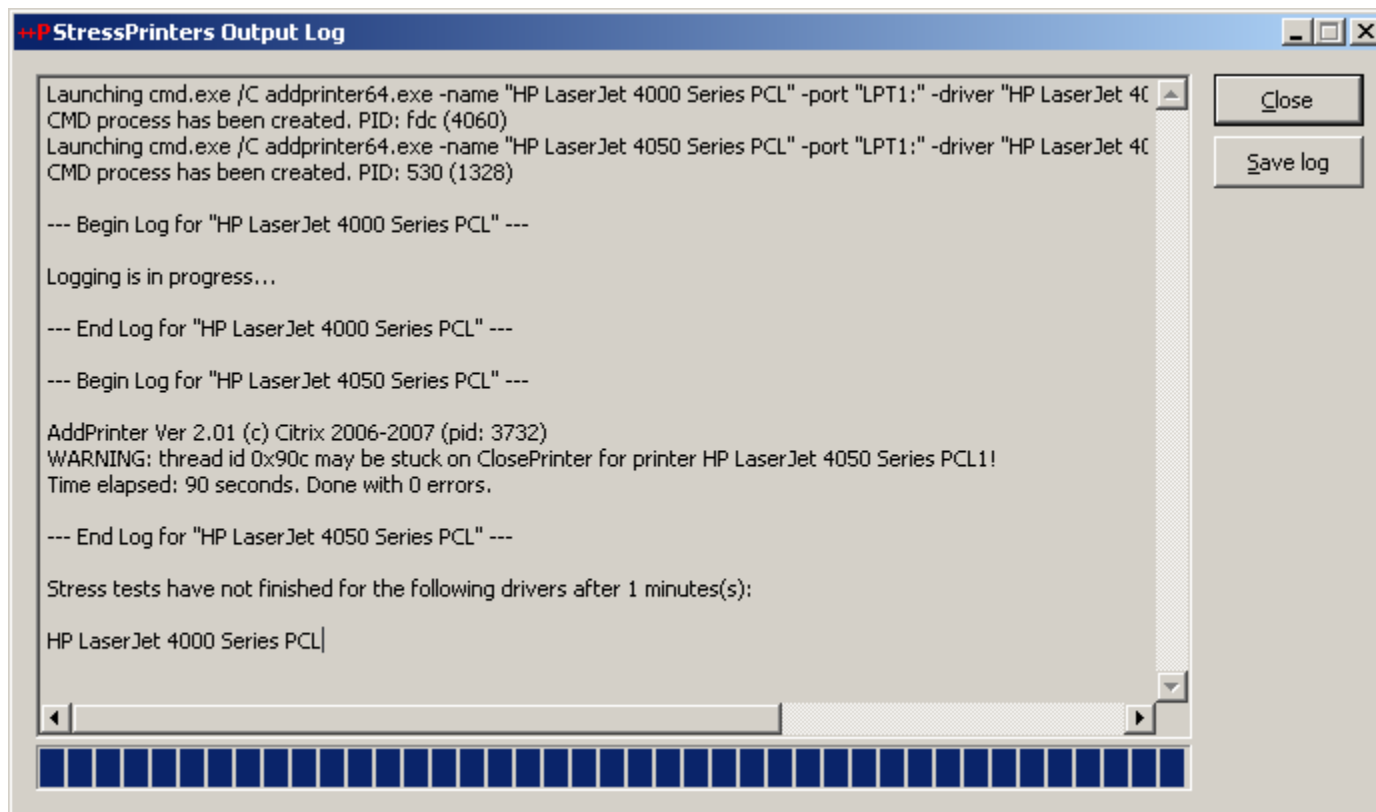
StressPrinters

StressPrinters for 32-bit and 64-bit platforms

<http://support.citrix.com/article/CTX109374>



StressPrinters (...)



Miscellaneous tools

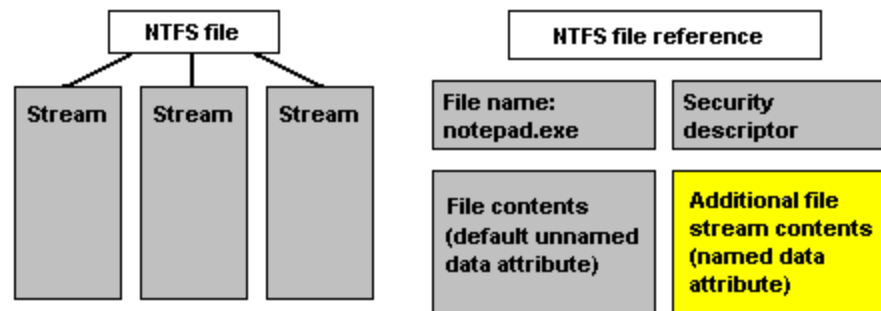
- ADSCleaner

ADSCleaner

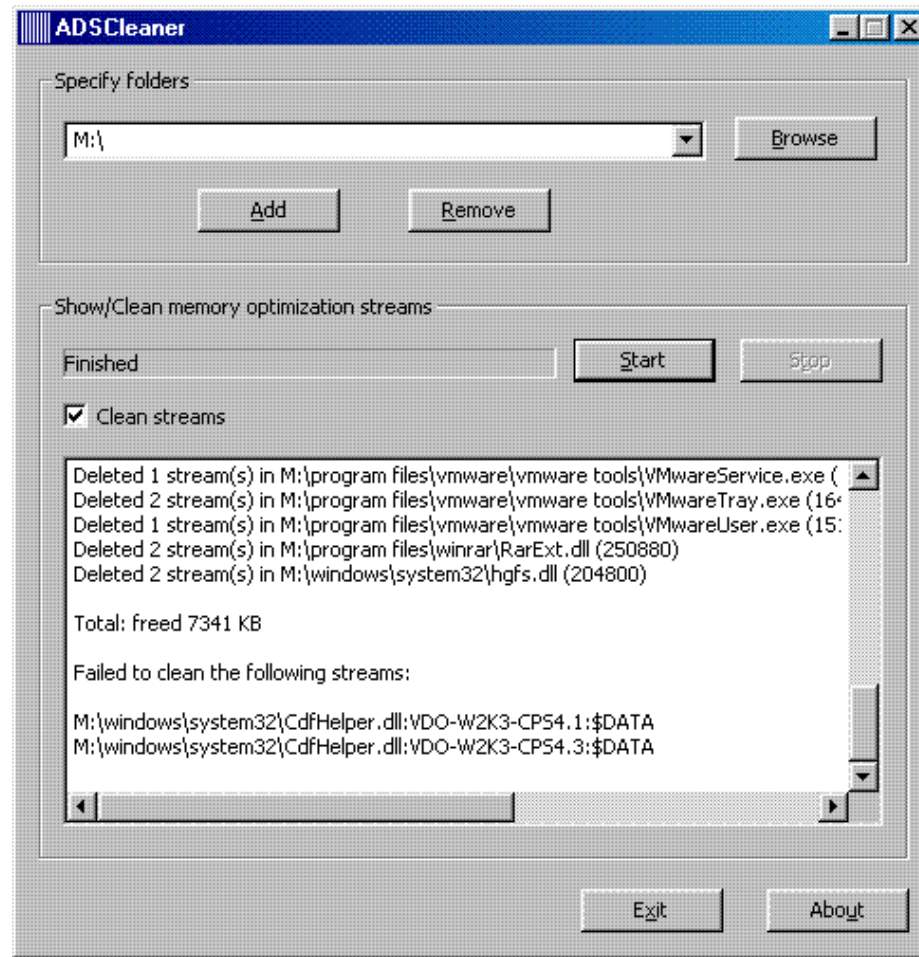
- <http://support.citrix.com/article/CTX108542>
- <http://support.citrix.com/article/CTX109602> (64-bit)

Lists and (optionally) cleans file streams created by Citrix memory optimization code

File streams (attributes)



ADSCleaner (...)



Questions?



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