

SoftSource

Consulting

Portland .NET User Group

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Production Debugging of ASP.NET and Silverlight

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Introduction

- Debugging Challenges in Production Environment
- Debugging Tools in Production Environment
- How to use them?
- Demos

DEMO

We will be using demo from

<http://debuggingblog.com/demos>

Common Production Issues

- Crash
- Worker Process Recycle
- Hang
- Slow Response
- High CPU Usage
- High Memory Usage
- Exceptions – Unknown
- I have no clue, what's going on
- I can't even reproduce it on my machine

Tools for Production Debugging

- WinDbg
- DebugDiag
- Performance Monitor
- PAL – Performance Analysis of Logs
- WinDbg Extension – sos.dll and sos2.dll
- Sysinternals from <http://technet.microsoft.com/en-us/sysinternals/default.aspx> for example Process Explorer, Process Monitor

Demo - ADPlus

```
C:\WINDOWS\system32\cmd.exe

C:\WinDbg>cscript.exe adplus.vbs -crash -p 4652 -quiet
Microsoft (R) Windows Script Host Version 5.7
Copyright (C) Microsoft Corporation. All rights reserved.

Attaching the debugger to: ACRORD32.EXE
                        (Process ID: 4652)

C:\WinDbg>
```

```
C:\WinDbg\cdb.exe

50;.echo;.dump -u /mdt /c 1st_chance_stack_buffer_overflow_exception_in_ACRORD32
.EXE_running_on_PRASHANTD830 C:\WinDbg\Crash_Mode__Date_05-29-2009__Time_22-57-3
7PM\PID-4652__ACRORD32.EXE__1st_chance_stack_buffer_overflow__mini.dmp; GN" -c2
0".echo ---;.echo --- 2nd chance Stack_buffer_overflow exception ---;.echo ---
-----;.echo;.echo Occurren
ce happened at: ;.time;.echo;.echo Faulting stack below ---;~#kun250;.echo;.dump
-u /ma /c 2nd_chance_stack_buffer_overflow_exception_in_ACRORD32.EXE_running_on
_PRASHANTD830 C:\WinDbg\Crash_Mode__Date_05-29-2009__Time_22-57-37PM\PID-4652__A
CRORD32.EXE__2nd_chance_stack_buffer_overflow__full.dmp;!elog_str ADPlus detecte
d a 2nd chance Stack_buffer_overflow exception in process ACRORD32.EXE and has t
aken the following actions at the time of the crash: Log Time Stack FullDump Eve
ntLog. The output directory is C:\WinDbg\Crash_Mode__Date_05-29-2009__Time_22-57
-37PM; GN" sbo
0:006> *
0:006> * ADPlus is monitoring: ACRORD32.EXE
0:006> * for 1st chance and 2nd chance exceptions as configured above.
0:006> * To change ADPlus configuration please refer to ADPlus.Doc. This file ca
n be found
0:006> * in the same folder as ADPlus.vbs
0:006> *
0:006> g
```

Demo - WinDbg

The screenshot shows the WinDbg interface for a process with PID 2148. The 'Command' window displays a list of loaded modules with their addresses and file paths. Below the list, a debugger exception is shown: a break instruction exception with code 80000003 (first chance). The register dump shows: eax=7ffdf000, ebx=00000001, ecx=00000002, edx=00000003, esi=00000004, edi=00000005, eip=7c90120e, esp=01c1ffcc, ebp=01c1fff4, iopl=0, and various status flags. The exception message is 'ntdll!DbgBreakPoint: 7c90120e cc int 3'. Three messages follow: 'Missing image name, possible paged-out or corrupt data.' The status bar at the bottom indicates 'Ln 0, Col 0', 'Sys 0: <Local>', 'Proc 000:864', 'Thrd 001:1268', and various keyboard shortcuts (ASM, OVR, CAPS, NUM).

```
Pid 2148 - WinDbg:5.11.0001.404 X86
File Edit View Debug Window Help
Command
ModLoad: 763b0000 763f9000 C:\WINDOWS\system32\comdlg32.dll
ModLoad: 65000000 65086000 C:\Software\SmidgeonSoft\PEBrowsePro2\PEFILE.DLL
ModLoad: 76c90000 76cb8000 C:\WINDOWS\system32\imagehlp.dll
ModLoad: 76b40000 76b6d000 C:\WINDOWS\system32\winmm.dll
ModLoad: 76390000 763ad000 C:\WINDOWS\system32\IMM32.DLL
ModLoad: 773d0000 774d3000 C:\WINDOWS\WinSxS\x86_Microsoft.Windows.Common-Controls_6595b64144ccf1df_6.0.2600.5512
ModLoad: 74720000 7476c000 C:\WINDOWS\system32\MSCTF.dll
ModLoad: 755c0000 755ee000 C:\WINDOWS\system32\msctfime.ime
ModLoad: 03000000 03121000 C:\Software\SmidgeonSoft\PEBrowsePro2\DBGHELP.DLL
ModLoad: 5ad70000 5ada8000 C:\WINDOWS\system32\uxtheme.dll
ModLoad: 76fd0000 7704f000 C:\WINDOWS\system32\CLBCATQ.DLL
ModLoad: 77050000 77115000 C:\WINDOWS\system32\COMRes.dll
ModLoad: 01d00000 01d47000 C:\Software\SmidgeonSoft\PEBrowsePro2\symsrv.dll
(864.1268): Break instruction exception - code 80000003 (first chance)
eax=7ffdf000 ebx=00000001 ecx=00000002 edx=00000003 esi=00000004 edi=00000005
eip=7c90120e esp=01c1ffcc ebp=01c1fff4 iopl=0          nv up ei pl zr na pe nc
cs=001b  ss=0023  ds=0023  es=0023  fs=0038  gs=0000             efl=00000246
ntdll!DbgBreakPoint:
7c90120e cc          int     3
Missing image name, possible paged-out or corrupt data.
Missing image name, possible paged-out or corrupt data.
Missing image name, possible paged-out or corrupt data.
0:001>
```


Worker Process Recycle

- logEventOnRecycle attribute
- Memory Based Recycling
- Memory Threshold
- Overlapped Recycling and their problems
- Rapid Fail Protection
- Process Orphaning
- Periodic Recycle

ASP.NET Worker Process - Crash

Unhandled Exception

System.OutOfMemoryException

System.StackOverflowException

System.ExecutionEngineException

Heap Corruption

Demo – Crash/Unhandled Exception

Performance/Hang

- Long Running Requests
- Thread Starvation
- Context Switching
- Deadlock/WaitHandle
- Low CPU hang – lock/external resources/database/web services
- High CPU Hang – Heavy load on Server/Infinite loop/Too Much GC/Native Thread spinning on Lock

Analyze Performance Issues in Production

- Identify the Server/Process
- Use Performance Counter logs
- Memory Dump of a Process
- Thread Stacks
- CPU Usage Stats
- Memory Statistics
- Managed Heap statistics
- ThreadPool Stats

Demo – Hang

High Memory Usage(OOM Exception)

- Managed Heap
 - JIT Code Heap
 - GC Heap
 - LOB Heap
 - Loader Heap
- Stack
- Unmanaged Heap
- Memory Fragmentation

Analyze High Memory Usage

- Performance Counters Logs– if there is one
- Memory Dumps
- Thread Statistics – Dead Threads, Blocking Finalizer
- Loader Heap Stats
- GC Heap Stats
- LOB Heap Stats
- Cache/Session/ViewState in ASP.NET
- GDI Handles
- GCHandles

Demo – High Memory Usage

Silverlight Debugging

- CoreCLR
- Silverlight Spy – courtesy <http://silverlightspy.com/silverlightspy/download-silverlight-spy/>
- Fiddler – HTTP Debugging Proxy
- Browser Memory Dump
- WinDbg and sos for silverlight

Silverlight Debugging in Action

File Edit View Favorites Tools Help

★ Favorites SilverlightApplication1

Home RSS Print Page Safety Tools

Jennifer Aniston

Show Angelina

Prev



Next



Cool Features in CoreCLR SOS

- DML support
- AnalyzeOOM
- VerifyObj
- FindRoots
- GCWhere
- ListNearObj
- HeapStat
- GC History

Demo - Silverlight

Debugging Resources

Debugging Tidbits

<http://www.debuggingblog.com>

The best ASP.NET Debugging Blog

<http://blogs.msdn.com/tess>

My Favorite blog in Native Debugging

<http://www.dumpanalysis.org>

Debugging ToolBox/Scripts/Cool Debugging Tips

<http://blogs.msdn.com/debuggingtoolbox>

Advanced Windows Debugging Blog

<http://blogs.msdn.com/ntdebugging/>

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