Advanced .NET Debugging

Kamran Bilgrami
WindowsDebugging.com
Agenda

- Challenges
- Debugging Approaches
  - Conventional
  - Best Practices
- Tools of the Trade
- Demo
  - Contention Problem
- Reality Check
- Q & A
What is the Challenge?
Production Issues

• ONLY seen in live environment
• Cannot reproduced in house
Production Debugging Constraints

- Minimize Service interruptions
- Restricted Actions
  - No code changes
  - No tools Installation
  - Limited Physical Access
- High Stress Situation
Conventional Approaches

- Gather information via Logs
- Code Profiling
- Get Repro Steps
Post-Mortem approach

Capture Memory Dump

Analyze Dump File
Post-Mortem approach Cont'd.

- Proven techniques
Process/Tools

- Capture Dump
  - Task Manager
  - ADPlus
- Analyze Dump
  - Windbg
Supporting Tools/Data

- SOS
  
  Windbg  
  SOS  
  Managed Code

- OS Symbols
• Capturing dump
Contention
Problems

- Infinite Loop
- High CPU in GC
- Busy Server

Find which thread(s) are taking CPU. Investigate why thread is busy

- Locks
- Critical Section
- Wait handles
- External resources

Find threads that are waiting or sleeping. Investigate what these threads are doing
- Contention Problem
**Recap - Commands**

<table>
<thead>
<tr>
<th>Command</th>
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<tbody>
<tr>
<td>.loadby sos mscorwks</td>
</tr>
<tr>
<td>!ThreadPool</td>
</tr>
<tr>
<td>!runaway</td>
</tr>
<tr>
<td>.time</td>
</tr>
<tr>
<td>~12s</td>
</tr>
<tr>
<td>!CLRStack</td>
</tr>
<tr>
<td>!threads -special</td>
</tr>
<tr>
<td>!dumpheap -stat</td>
</tr>
<tr>
<td>!SyncBlk</td>
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<tr>
<td>~* e !CLRStack</td>
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Limitations

• Windbg not Visual Studio replacement

• Process dump is just a snapshot
  • No trends

• Snapshot Timing

• Learning curve
Reality Check

• Development/QA process

• Test Driven Development

• Automate QA Tests
References

• Video: Advanced .NET Debugging
  Kamran Bilgrami @Techdays 2010

• Blogs: Easy to follow Labs
  Tess Ferrandez @ MSDN

• PDF: Production Debugging for .NET Applications
  Best Practices Document (Old but still useful)
Resources
Thank you!

Kamran@WindowsDebugging.com