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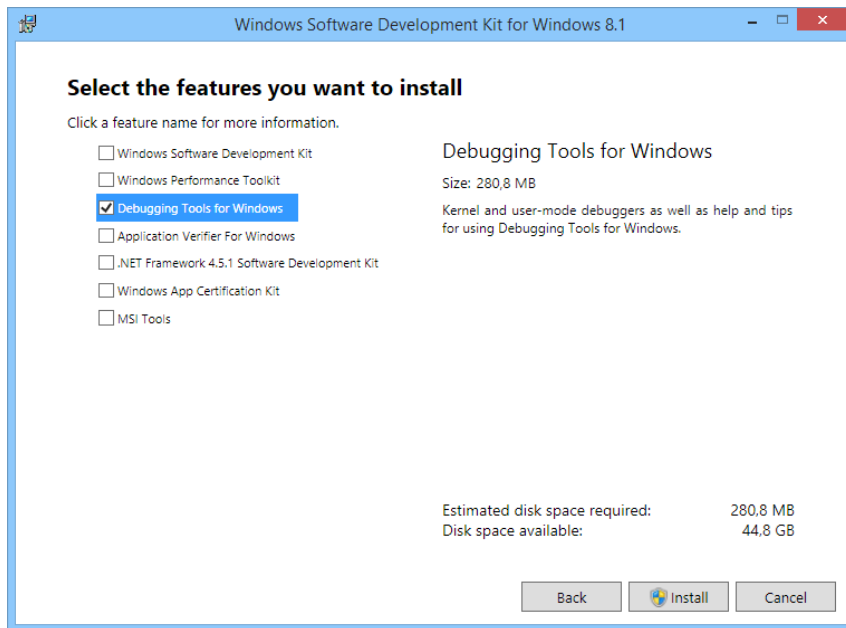
Advanced Debugging Stories .NET

StackOverflow – DebugDiag, WinDbg

DEMO



Debugging Tools for Windows



- WinDbg – „GUI“
- NTSD – new console
- CSD – classic console

- DebugDiag - samostatné

součást Windows SDK
www.windbg.org



Debugger Extensions pro .NET

`.load C:\path\to\extension.dll`

SOS.dll – Son of Strike, součást .NET

`.loadby sos mscorwks (.NET < 4)`

`.loadby sos clr (.NET >= 4)`

PSSCOR2/PSSCOR4 – širší SOS (web)

SOSEX, NetEx – 3rd party

`!help [<command>]`



Záludnosti použití Debuggeru

Platform - x86 vs. x64 vs. ...

Symbols

`.symfix` (MSFT Symbols Server)

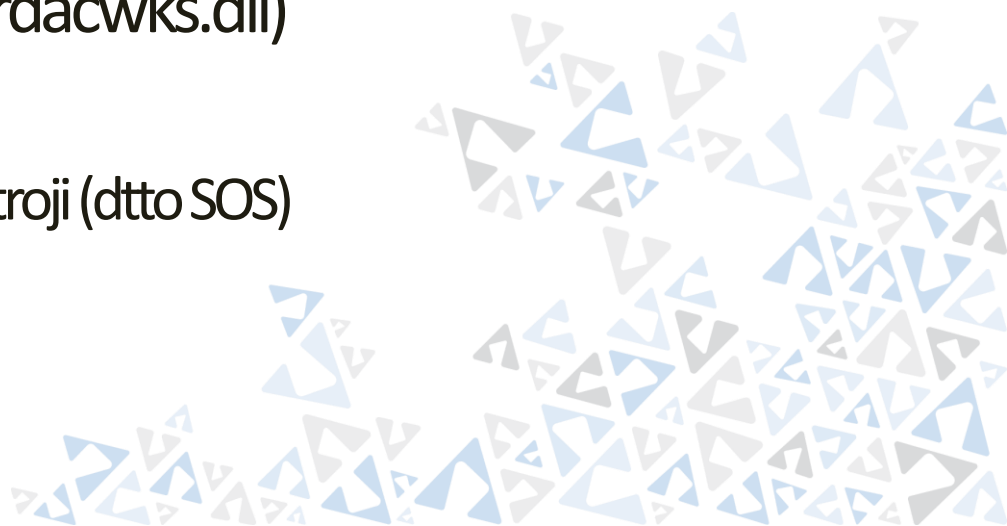
`.sympath`, `.sympath+`

`.reload`

.NET Data Access Layer (mscordacwks.dll)

`.cordll -ve -u -l`

stejná verze, jako na laděném stroji (dtto SOS)



Režimy práce s Debuggerem

Open Executable... (**g** pro Run)

Attach to a Process...

Open Crash Dump...

- Task Manager / Create Dump File (pozor na 32-bit proces na x64 stroji)
- DebugDiag / ADPLUS
- Windows Error Reporting
- Windows Crash Dump
- WIN32 API (extern v .NET)

...



DebugDiag

- „user“-friendly UI
- připravené analýzy
- sběr dat/dumpů
- pod pokličkou debugger services
- voláno např. i z Azure Web Apps KUDU



MemoryLeaks, Heap

DEMO



Heap Examination

!DumpHeap [-stat] [-type <name>]
 [-mt <MTaddr>] [-live|dead]

!HeapStat [-inclUnrooted]

!GCRoot <ObjAddr> !GCHandles

!EEHeap -gc

!FinalizationQueue [-allReady]

!FindAppDomain <ObjAddr>



Object Inspection

!DumpObject <ObjAddr>

!DumpArray <ObjAddr>

!DumpVC <MTaddr> <ObjAddr>

dd <addr>

dq <addr>

!ObjSize <ObjAddr>



Diagnostika - postup

1. neodkladné kroky, typicky memory dump
2. systematizace
 - symptoms (základní vs. odvozené)
 - steps to reproduce
 - od kdy? co se změnilo?
3. zkušenosti + Google + ...
4. hypotézy + jejich testování
5. verifikace řešení



Doporučení

validujte

ořezávejte problém, zužujte pracovní pole

porovnávejte



CrashDump, WER

DEMO



Stack Examination

`!ClrStack [-a] [-l] [-p]`

`!DumpStack [-EE]`

`!EEStack [-EE] (all threads)`

`!DumpStackObjects (typy)`



Error Diagnostics

`!PrintException [ObjAddr] [-nested]`

`!DumpAllExceptions` (PSSCOR4)

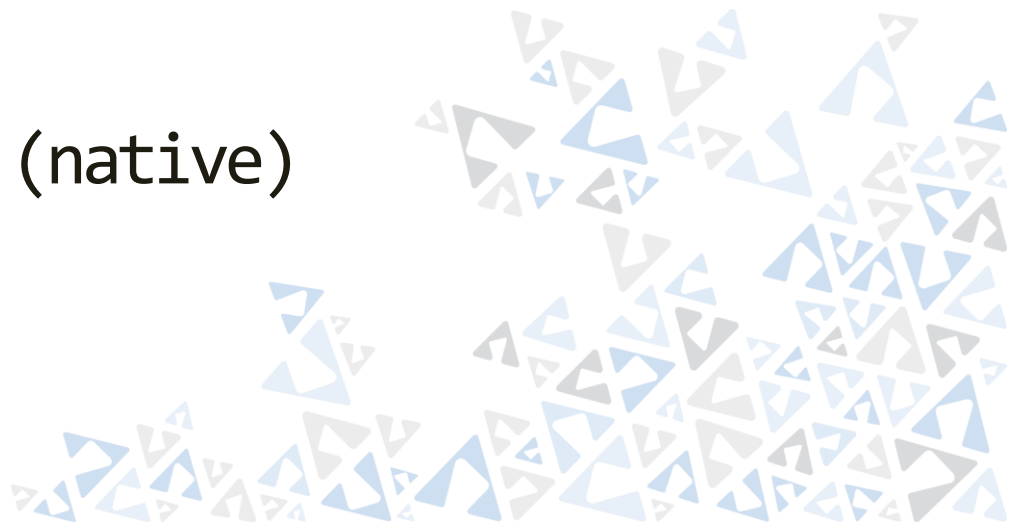
`!wdae` (NETEXT)

`!wpe` (NETEXT)

`!VerifyHeap`

`!VerifyObj <ObjAddr>`

`!analyze -v` (native)



BSOD Crash Dump

DEMO



Hang Analysis (100% CPU), Stack

DEMO



Threads

!Threads

~123s

!ThreadPool

!ThreadState <state>



Q & A

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<http://knowledge-base.havit.cz>

