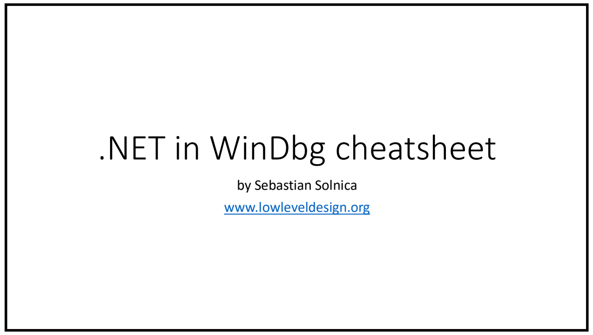

# .NET in WinDbg cheatsheet

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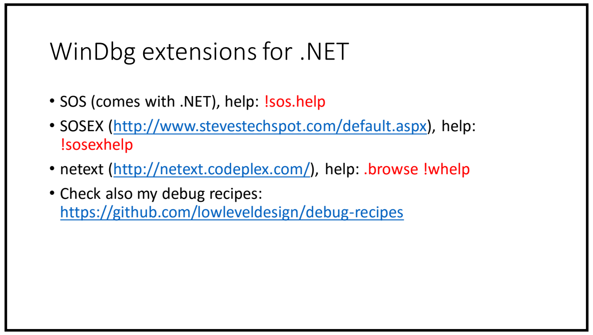
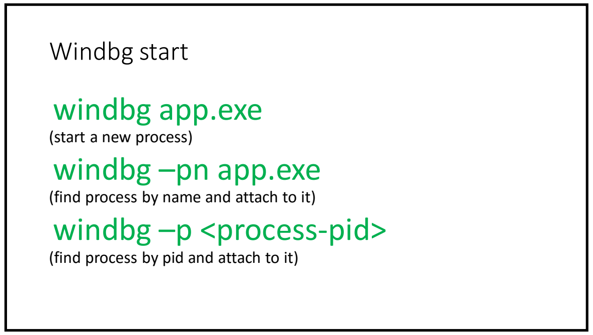


## WinDbg extensions for .NET

- SOS (comes with .NET), help: !sos.help
- SOSEX (http://www.stevestechspot.com/default.aspx), help: !sosexhelp
- netext (http://netext.codeplex.com/), help: .browse !whelp
- Check also my debug recipes: https://github.com/lowleveldesign/debug-recipes



## Windbg start

windbg app.exe

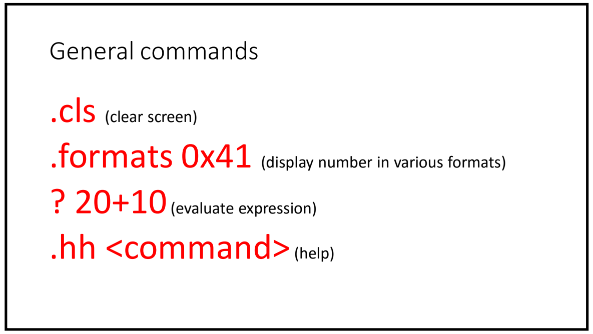
(start a new process)

windbg –pn app.exe

(find process by name and attach to it)

windbg –p <process-pid>

(find process by pid and attach to it)



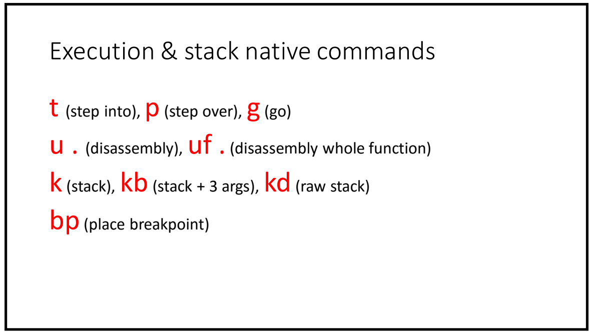
## General commands

.cls (clear screen)

.formats 0x41 (display number in various formats)

? 20+10 (evaluate expression)

.hh <command> (help)



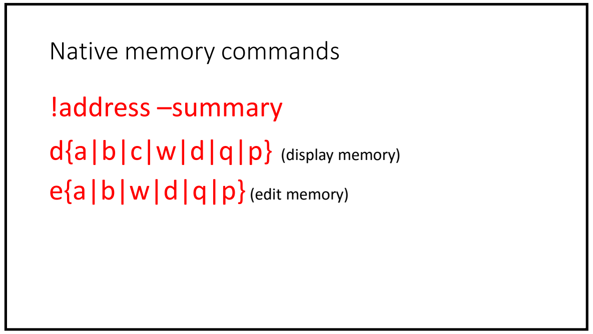
## Execution & stack native commands

t (step into), p (step over), g (go)

u . (disassembly), uf . (disassembly whole function)

k (stack), kb (stack + 3 args), kd (raw stack)

bp (place breakpoint)

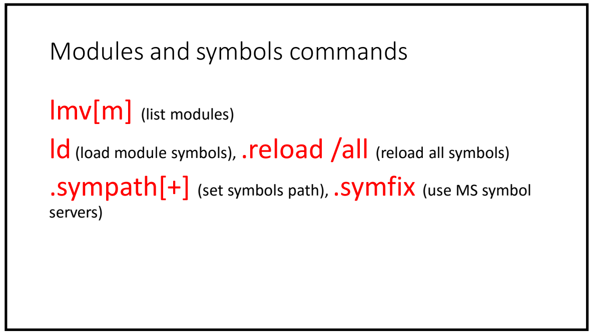


## Native memory commands

!address –summary

d{a|b|c|w|d|q|p} (display memory)

e{a|b|w|d|q|p} (edit memory)

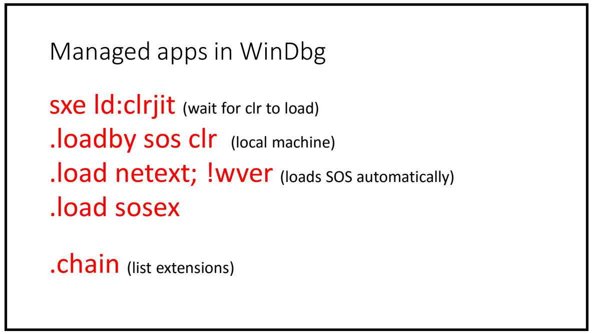


## Modules and symbols commands

lmv[m] (list modules)

ld (load module symbols), .reload /all (reload all symbols)

.sympath[+] (set symbols path), .symfix (use MS symbol servers)



## Managed apps in WinDbg

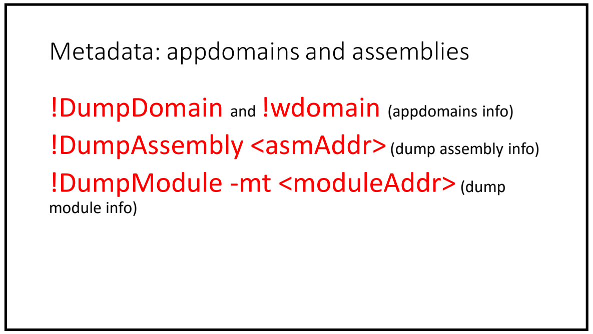
sxe ld:clrjit (wait for clr to load)

.loadby sos clr (local machine)

.load netext; !wver (loads SOS automatically)

.load sosex

.chain (list extensions)



## Metadata: appdomains and assemblies

!DumpDomain and !wdomain (appdomains info)

!DumpAssembly <asmAddr> (dump assembly info)

!DumpModule -mt <moduleAddr> (dump module info)

## Metadata: types

!Name2EE <Module> <TypeName> or
!mx <TypeName*> (find type address)

!DumpClass <EEClass> (dump EEClass info) or
!DumpMT -md <MT> or !mdt (dump type or object info)

## Metadata: methods

!DumpMD <MD> (method description info)
!DumpIL <MD> (show IL)
!U <code address> or !mu <code address> or !muf <MD|code address> (show assembly and IL code)

## Object instances

!DumpObject <address> (!do) or
!wdo <address> or
!mdt <address> (dump object info)
!DumpVC <MT> <address> (dump value object info)
!wselect (select properties of an object or items in an array)

## Managed stack

!ClrStack –a or !mk –a or !wclrstack (print call stack)
!wstack or !DumpStackObjects (!dso) or !mdso (dump object references on stack)

~*e!mk –a (print call stacks for all the threads)

## Exceptions

!sxe clr (enable notifications for manager exceptions)
!PrintException (!pe) or !wpe (dump the exception info for the current thread)
!Threads or !wthreads (list threads with exception info)
!wdae (dump all exceptions on the heap)

## Threads and locks

!Threads or
!wthreads (list threads with exception info)
!ThreadPool (thread pool info)

## Locks

!SyncBlk (list Sync Blocks acquired on objects)
!mwaits (list all waiting threads), !dlk (list deadlocks between SyncBlocks or RWlocks)
!mlocks (list all managed locks), !rwlock (list all RWlocks)
!DumpHeap –thinlock (show thin locks acquired on objects from the heap)

## Breakpoints

!bpmd –md <MD> or !mbm <method> (set breakpoint on a method)
!mbl,!mbe,!mbd,!mbc (managed breakpoints control)
!mbp <source-file> <line> (set breakpoint at the source code)

## General heap information

!EEHeap [-loader] [-gc] (shows details about GC and loader heaps)
!EEVersion (shows the mode in which the GC runs)

## GC heap (SOS)

!DumpHeap [-stat] [-mt|-type] (lists object on the heap)

!TraverseHeap <file> (dumps heap graph for CLR Profiler)

!ObjSize <address> (total size of an object)

## GC heap (SOSEX)

!bhi [file] (builds the heap index)

!lhi [file] (loads the heap index)

!dumpgen <genNum> [-type <typeName] [-stat] (dump objects in a given generation)

!gcgen <address> (GC gen in which object exists)

## GC heap (netext)

!windex –save <file> (builds the heap index)

!windex –load <file> (loads the heap index)

!windex [–type <type*>|-implement <type*>|-mt <MT>] (loads the heap index)

!wfrom (very powerful heap querying, check !whelp)

## Object GC roots

!GCRoot [-all] <address> or

!mroot [-all] <address> (list object roots)

!refs [-target|-source] <address> (displays all references from and to the object)

## GC Handles

!GCHandles (shows statistics of used GC handles)

!GCHandleLeaks (tracks down GC handle leaks)

!gch [HandleType] … [-stat] (shows information about GC handles)

!wgchandle (lists GC handles)

## Finalization queue

!FinalizeQueue [-detail] (displays objects on the Finalization queue)

!finq [GenNum] [-stat] (display objects on the Finalization queue)

!frq [-stat] (display objects on the Freachable queue)

## Misc commands (netext)

!wdict (displays dictionary objects)

!whash (displays HashTable objects)

!whttp (lists HttpContext objects)

!wconfig (shows all .config file lines in memory)

!wservice (lists WCF service objects)

## Misc commands (netext)

!wkeyvalue (displays pair key/value for NameObjectCollection type objects)

!wcookie (displays HTTP cookies)

!wruntime (display HTTP Runtime Info including Active Requests)

!wtoken (displays WIF tokens and cookies)