Software Trace and Memory Dump Analysis

PATTERNS, TOOLS, PROCESSES AND BEST PRACTICES

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Memory Dump Analysis Services

Prerequisites

Experience in software troubleshooting and reading software logs

Advantage: Citrix CDF and Microsoft ETW trace analysis including Process Monitor logs

Agenda

- Memory Dump Analysis Services
- Root Cause Analysis Methodology
- Software Traces and Memory Dumps
- Examples

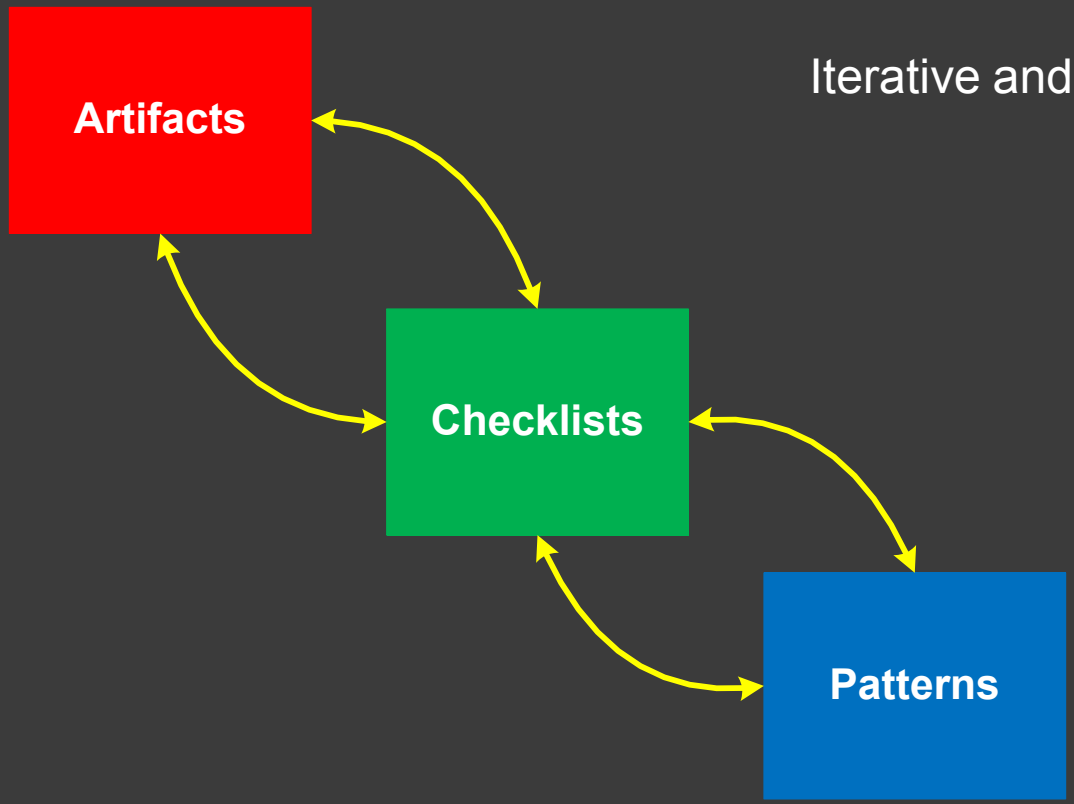
MDA Services

- Memory Dump Analysis Audit
- Software Trace Analysis Audit (New)
- Software Error Reporting Audit
- Remote Training
- Debugging Bureau
- Tool Objects and EasyDbg

Powered by DA+TA

DumpAnalysis.org + TraceAnaysis.org

A.C.P. Root Cause Analysis



Iterative and Incremental

Checklists and patterns
as best practices

DA+TA

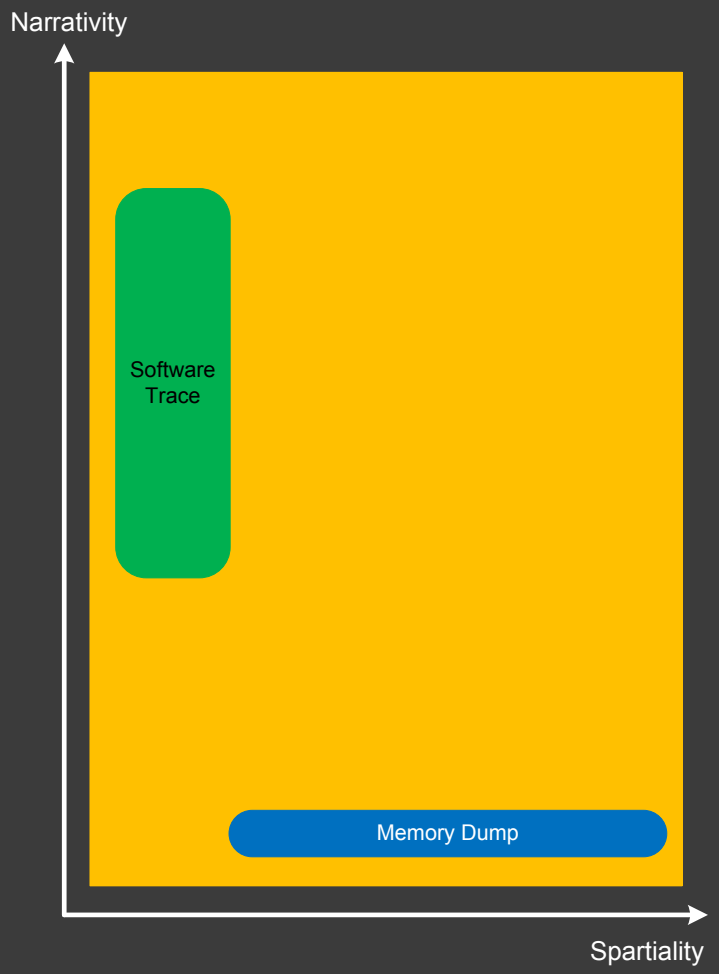
- DA: Dump Artifact / Dump Analysis

Memory snapshots: process, kernel, physical memory dumps

- TA: Trace Artifact / Trace Analysis

Software traces: Event Tracing for Windows, logs

Spatiality vs. Narrativity



Software trace as software narrative, the story of a computation

Tools for Artifact Analysis

Memory dumps:

- WinDbg from Debugging Tools for Windows
- Notepad (textual debugger logs)

Software traces:

- CDFAnalyzer* / CDFControl from Citrix
- Process Monitor* from Microsoft

* supports adjoint threads

Checklists for Analysis

Memory dumps:

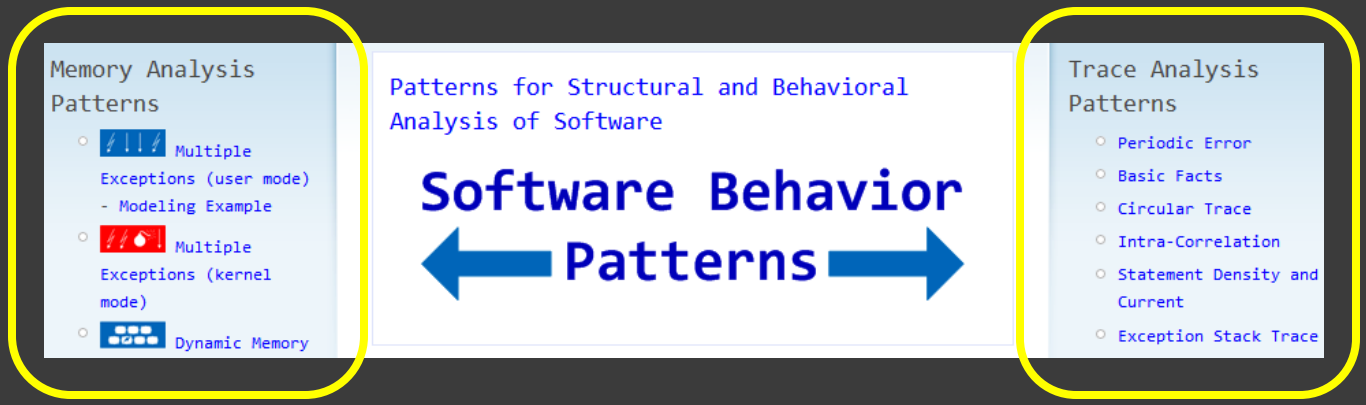
http://www.dumpanalysis.org/blog/index.php/2007/06/20/crash-dump-analysis-checklist/

Software traces:

http://www.dumpanalysis.org/blog/index.php/2011/03/10/software-trace-analysis-checklist/

Software Behavior Patterns

- Memory dump and software trace
- Examples: Spiking Thread, Discontinuity
- +200 patterns (DA+TA)
- DumpAnalysis.org



DA: Software Behavior

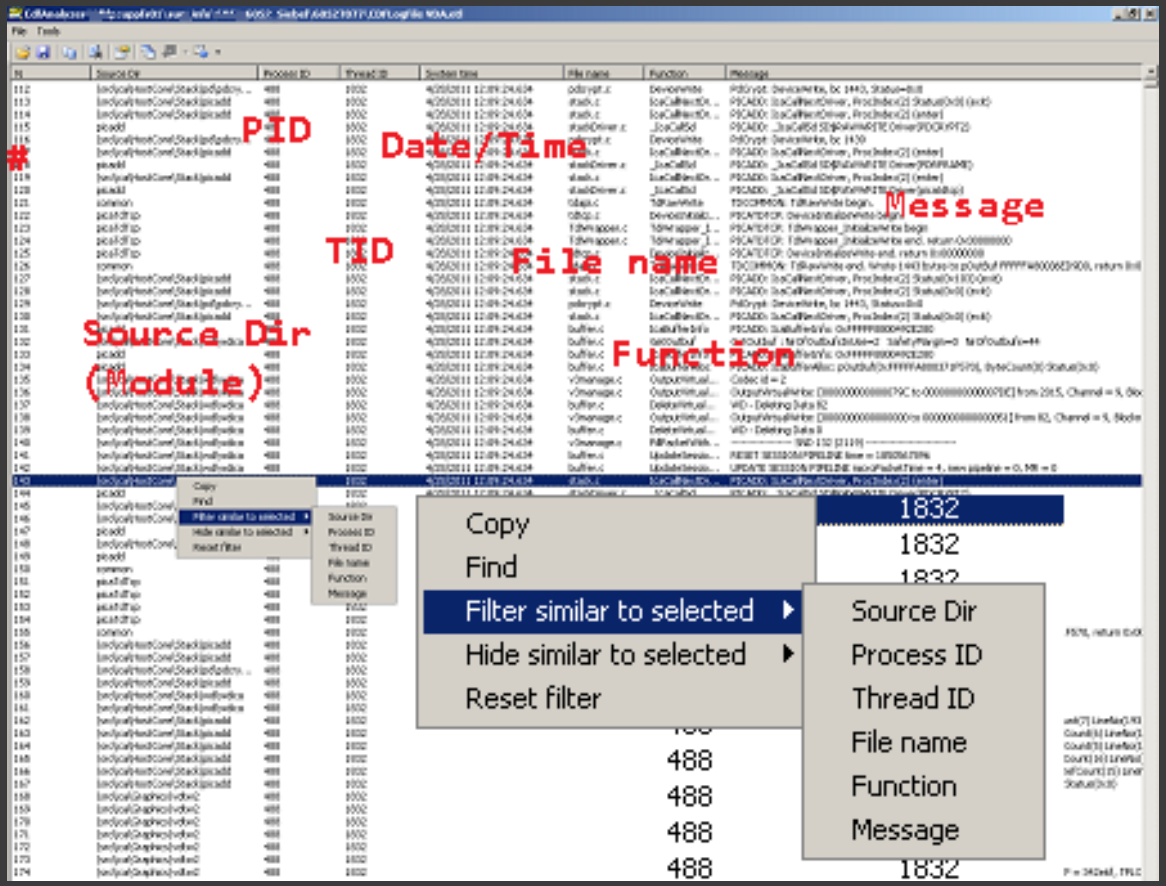
- Memory dump: a memory snapshot
- Definition, partial classification and historical list
- Pattern identification case studies

TA: Software Behavior

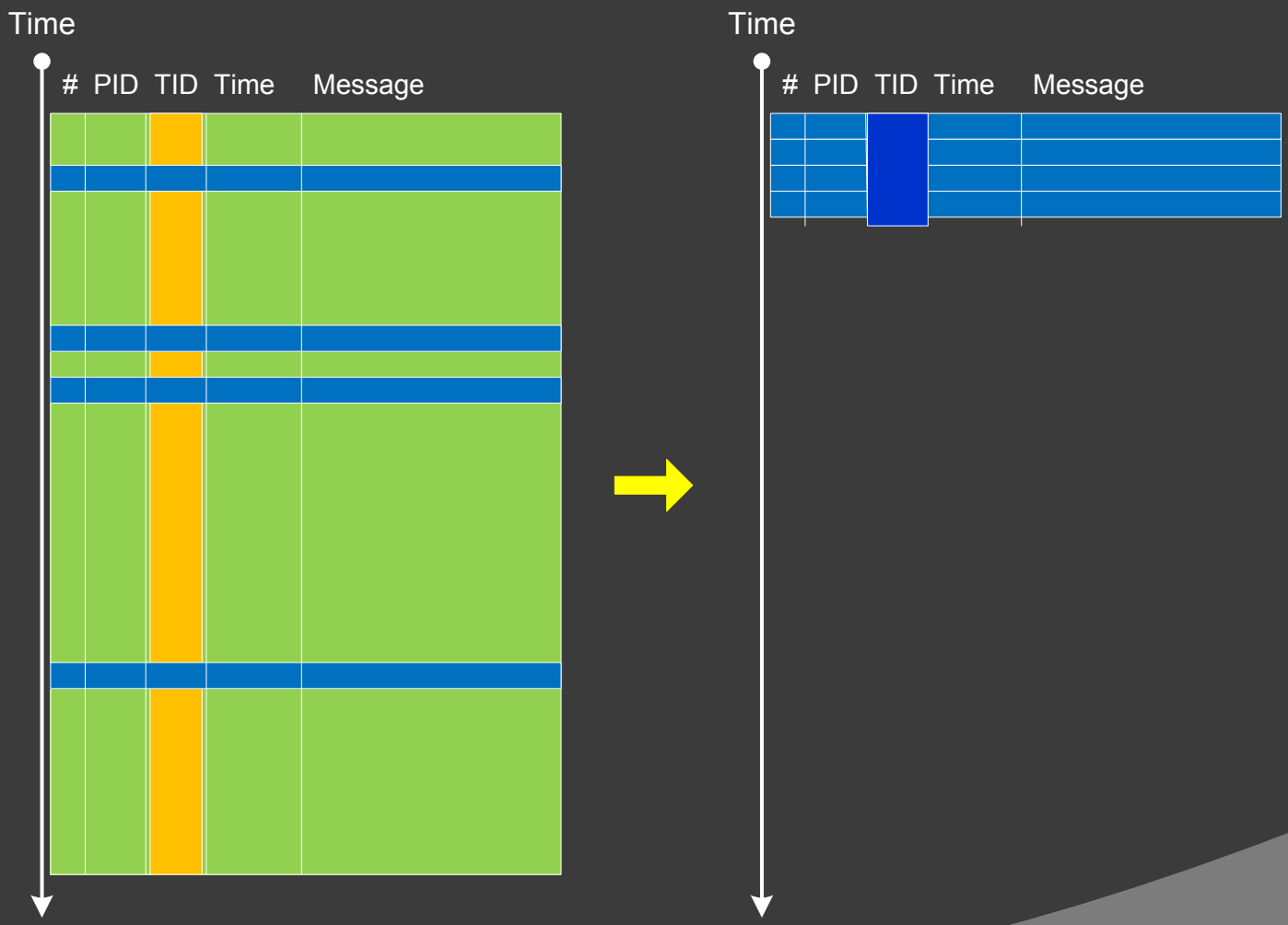
"Imagine you got a software trace from hundreds of modules you haven't written or haven't seen source code of..."

- Software trace: a sequence of memory fragments ordered in time
- Definition, and historical list
- Pattern identification case studies

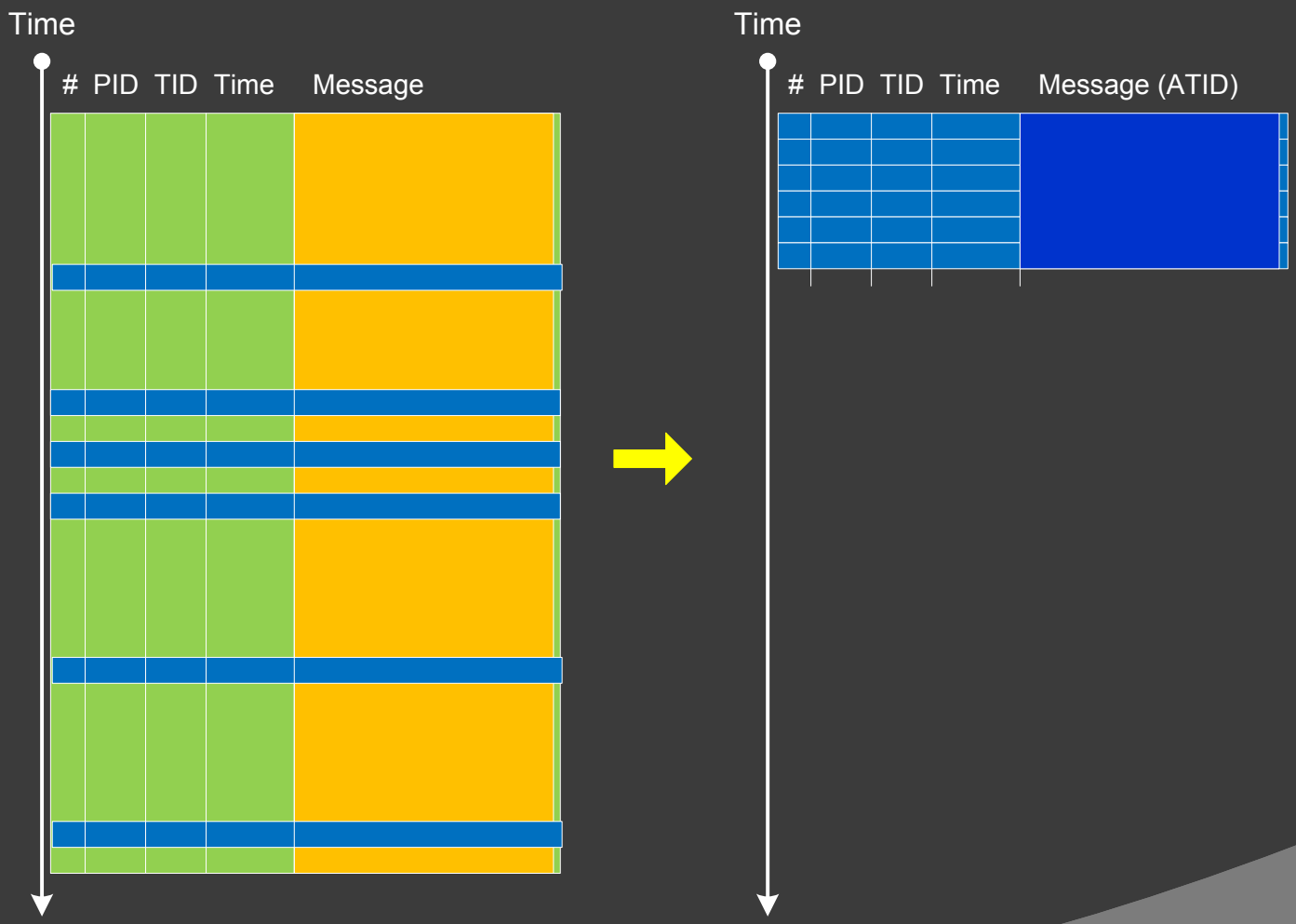
CDFAnalyzer Filters



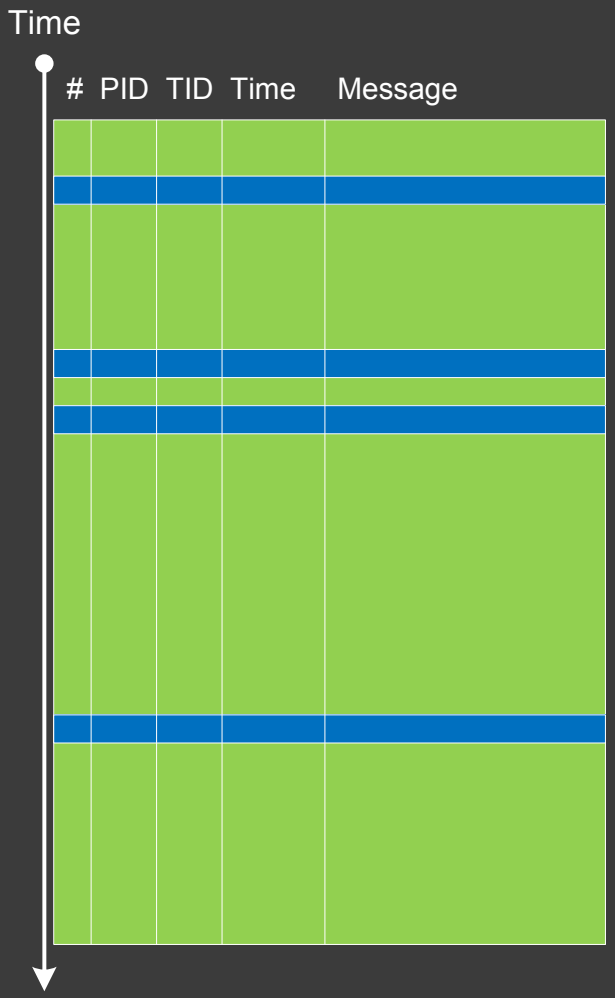
Threads



Adjoint Threads



Significant Event



csrss.exe

winlogon.exe

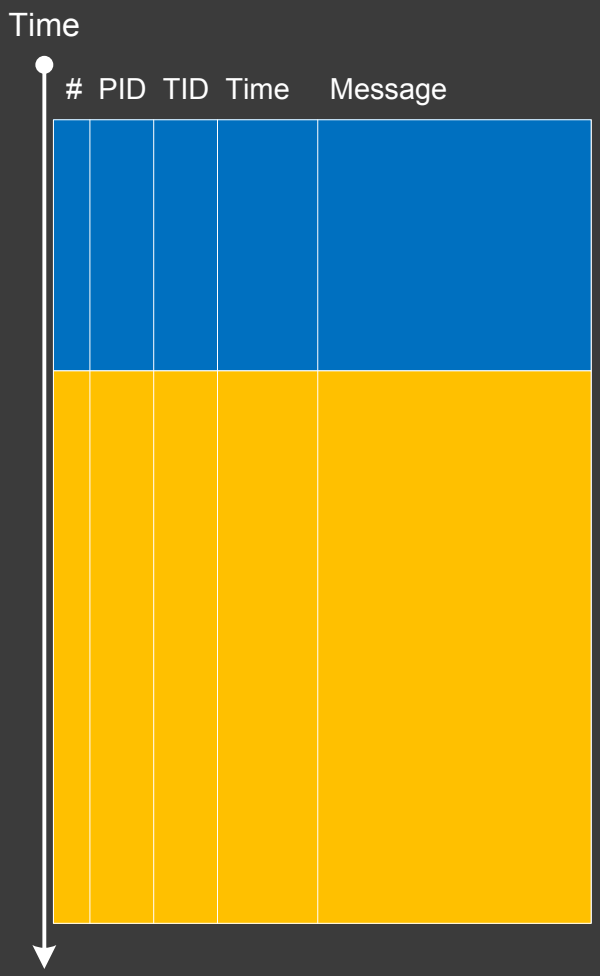
LogonUI.exe

userinit.exe

…

Custom events: CDFMarker

Discontinuity



…

14:23:02.146

14:23:02.345

14:31:10.254

14:31:10.341

…

No Activity

Expecting messages from Module X

Absence of such messages may suggest that a process or a thread was hang / blocked

Guest Component

Sudden appearance of an unexpected module, for example, werfault.exe or faultrep.dll

Statement Current

The flood of messages

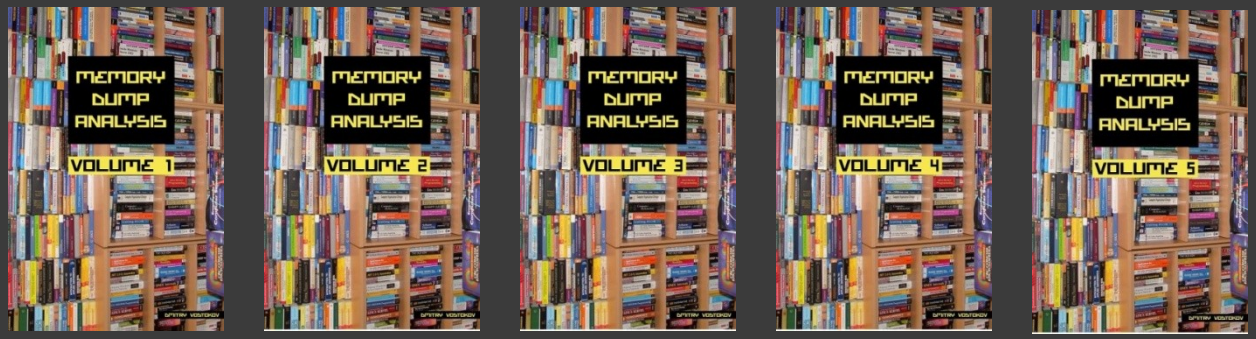
Normal case: 15 msg/s

Abnormal case: 3500 msg/s

May point to a CPU spike

Resources

- DumpAnalysis.org
- Pattern-Driven Memory Dump Analysis
- Memory Dump and Trace Analysis: A Unified Pattern Approach
- Introduction to Pattern-Driven Software Problem Solving
- Advanced Software Debugging Reference:



- OpenTask publishes this talk with extra case studies (ISBN: 978-1908043238)

More Resources

August remote training season:

- Accelerated Windows Memory Dump Analysis
- Complete Physical Memory Dump Analysis

Visit Memory Dump Analysis Services for registration details:

www.DumpAnalysis.com

Free Summer Webinars

- The Old New Crash: Cloud Memory Dump Analysis (June 6th)
- Cyber Warfare Memory Dump Analysis (forthcoming in July-August)

Visit Memory Dump Analysis Services for registration details:

www.DumpAnalysis.com

Q&A

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Thank you!

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