



Systemic Software Diagnostics Introduction

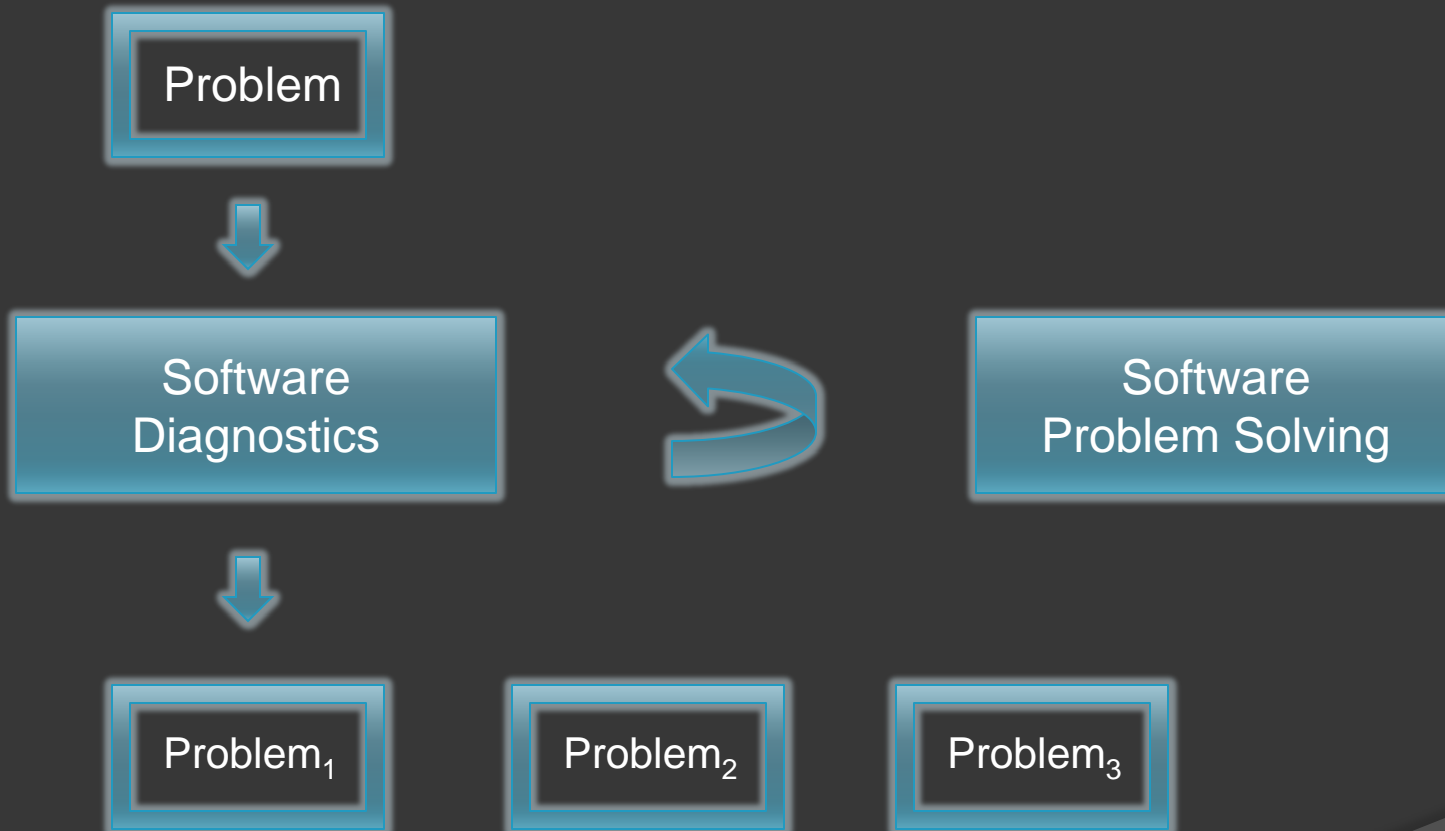
Version 1.0

Dmitry Vostokov
Software Diagnostics Services

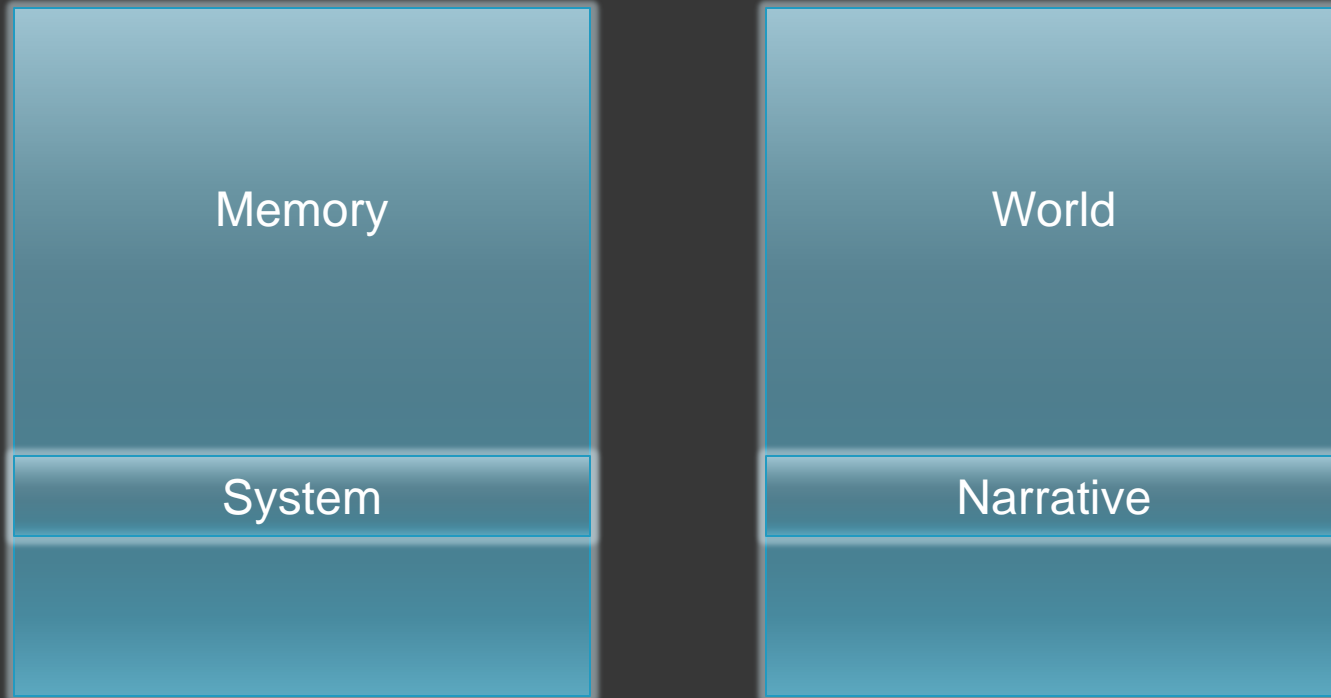
Prerequisites

Interest in software diagnostics and
in general systems theory

Software Diagnostics



General Systems-Theory



Why?

- ⦿ Organized Complexity of Software
- ⦿ Software as Human Artifact
- ⦿ Problem Solving

Goals

- ⦿ Ideas from General Systems-Theory
- ⦿ Applications to Software Diagnostics

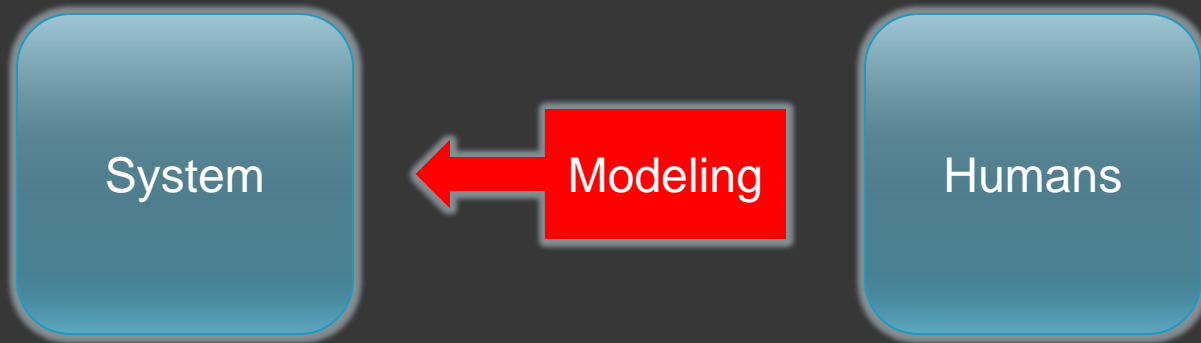
Software Diagnostics

- ⦿ Pattern-driven
- ⦿ **Systems approach**

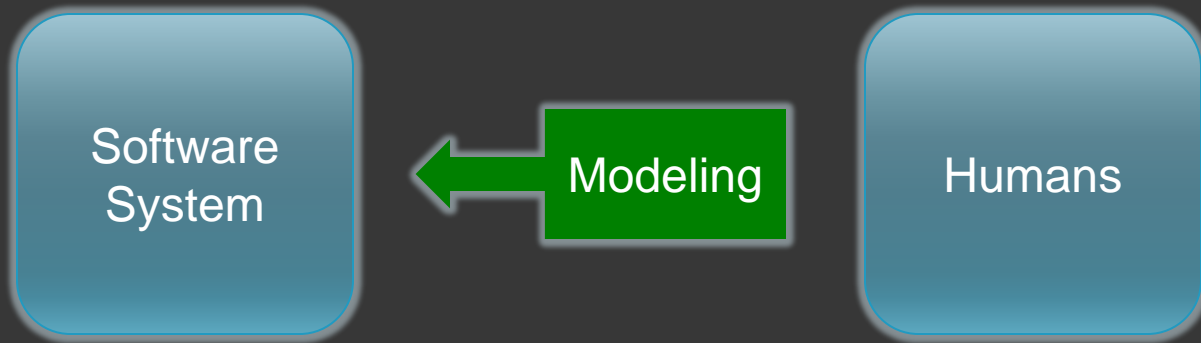
System and Environment

- ◎ Not My Version
- ◎ Changed Environment
- ◎ Hooksware

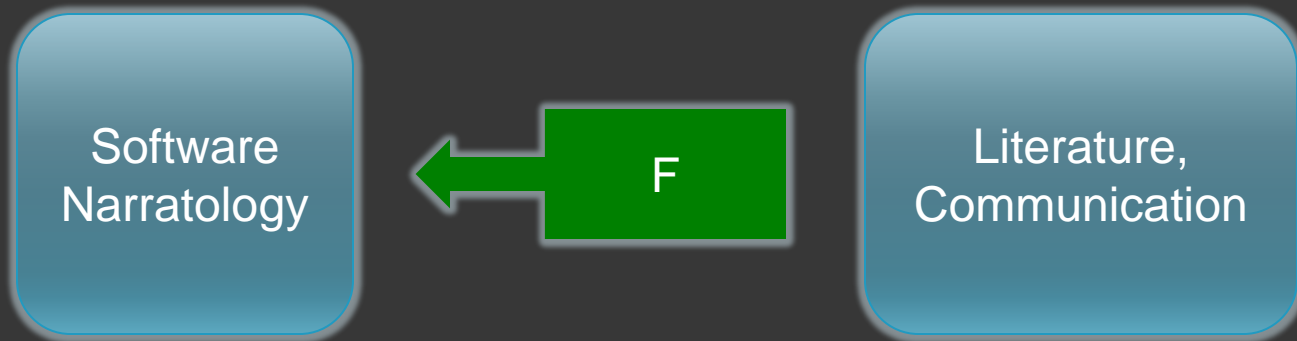
Using Humanities (Past)



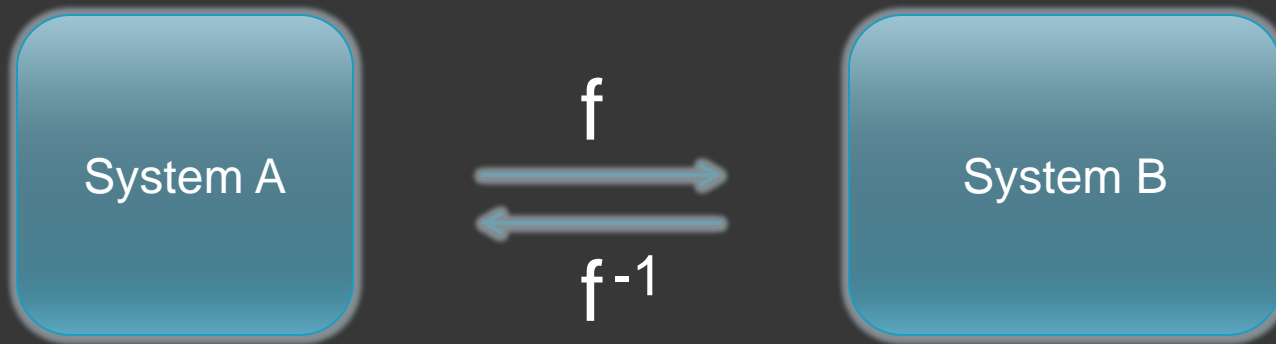
Using Humanities (Now)



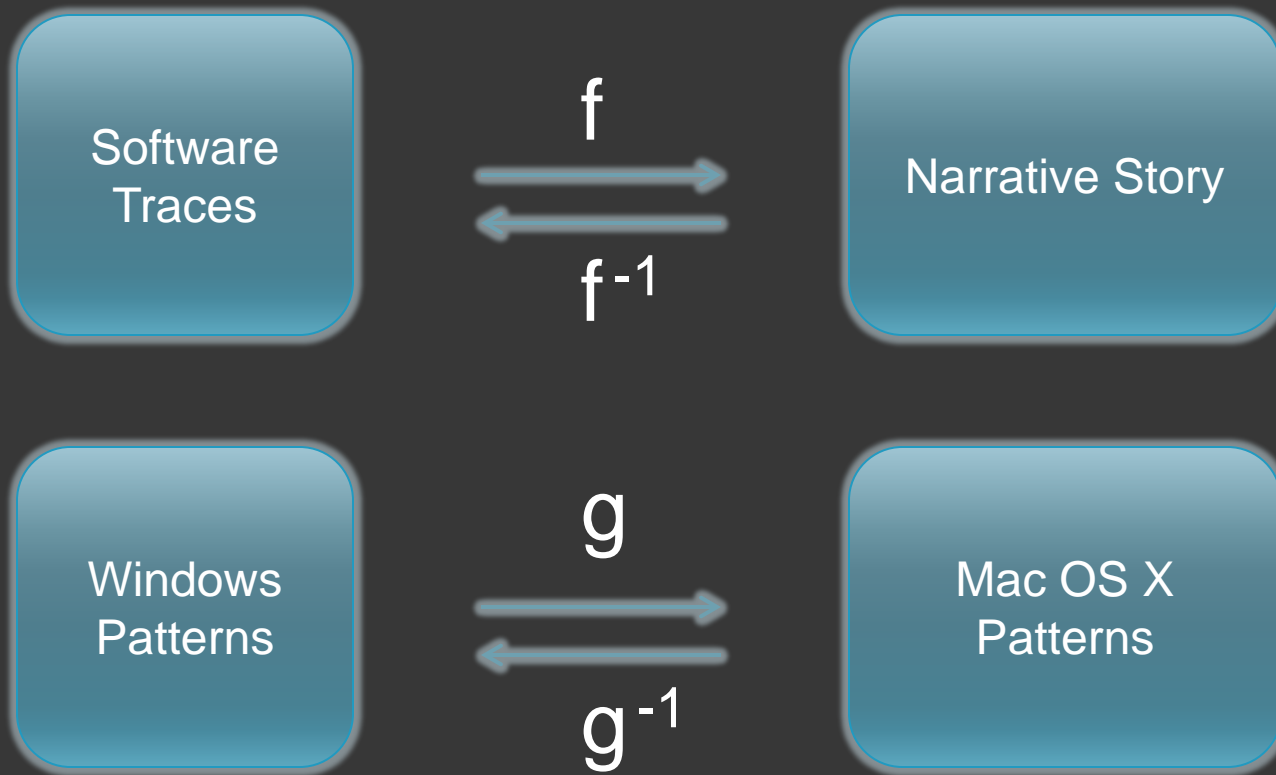
Using Humanities (Example)



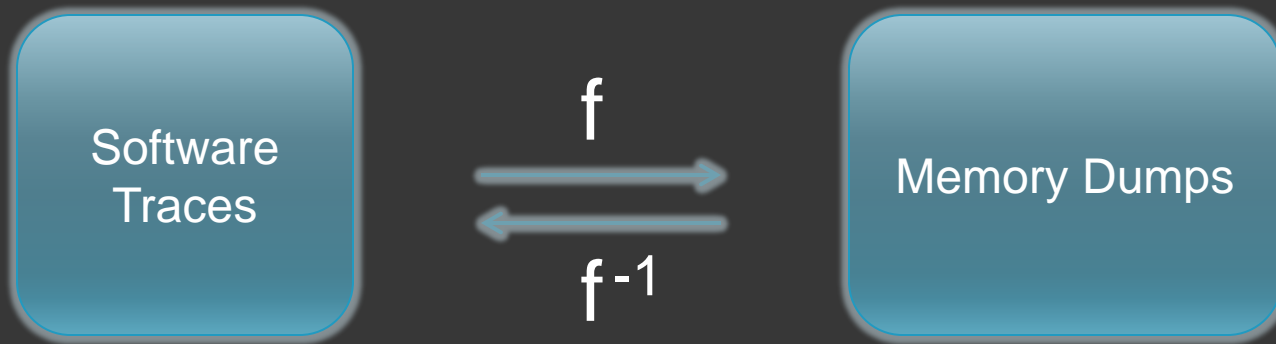
Isomorphic Systems



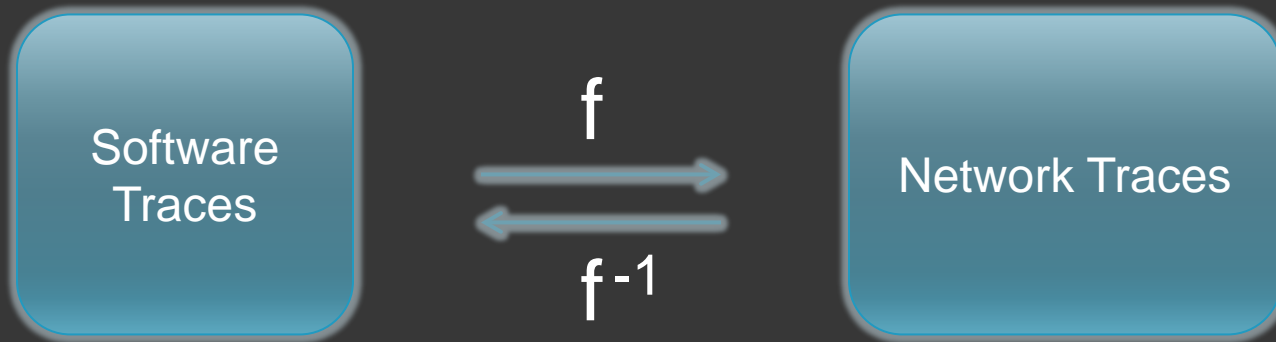
Isomorphic Patterns



Isomorphic Diagnostics

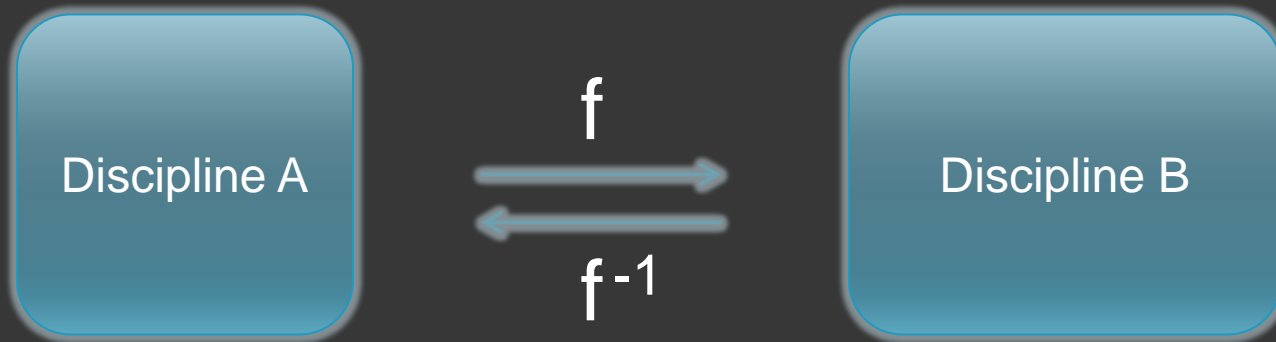


Isomorphic Diagnostics 2



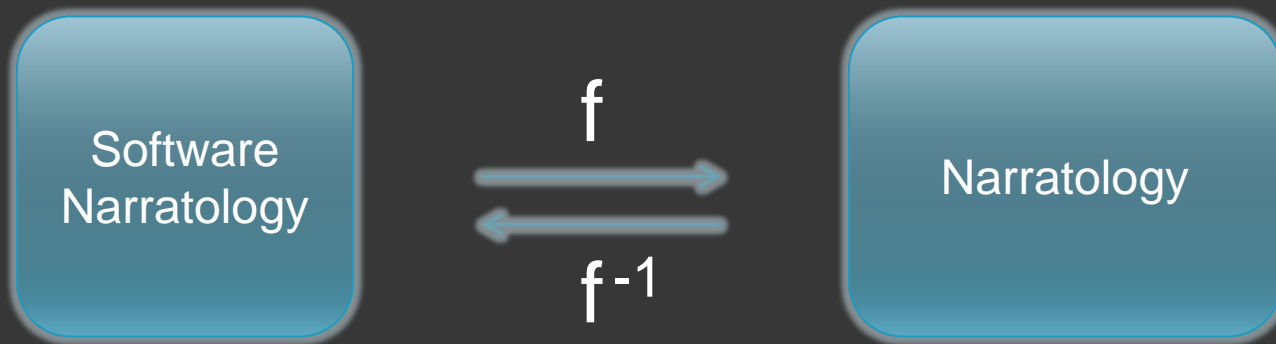
[Network Trace Analysis Patterns](#)

Isomorphic Disciplines



Metaphorical Bijection

Metaphorical Bijection



[Software Narratology](#)

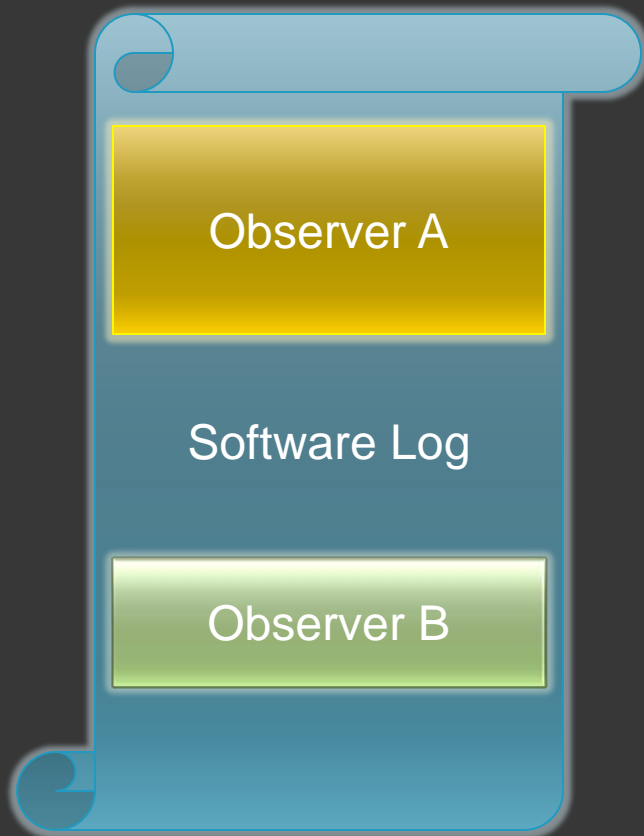
Complementarity (Artifacts)

Quantum Mechanics
and observables: x / p_x

Memory
Dump

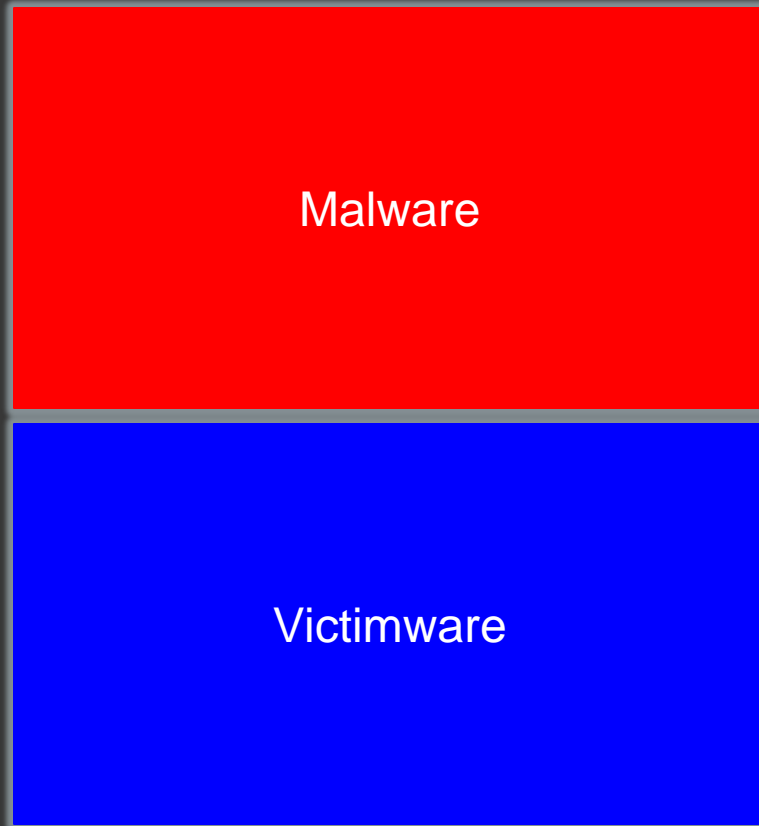
Software
Trace

Complementarity (Reports)



Solution: Pattern Checklists

Complementarity (Analysis)



Decomposition of Behavior

- ⦿ GUI state changes
- ⦿ GUI messages
- ⦿ Product specific messages
- ⦿ System messages
- ⦿ Memory dumps
- ⦿ Network traces
- ⦿ Screenshots

Holistic Approach

- ⦿ Complete (or fiber bundled) dump
 - All processes and threads
- ⦿ Full trace
 - All modules

Diagnostics Complexity

Memory Dump Analysis

$$C \sim F (C_{\text{Mem}}, C_{\text{Tool}}^{-1}, C_{\text{Pat}}^{-1})$$

C_{Mem} structural complexity

C_{Tool} the number of commands

C_{Pat} the number of patterns in a catalog

First Fault Diagnosis

- Most diagnostic patterns are first fault
- First fault vs. second fault tools

Software Diagnostics Tools

Software Diagnostics Workbench

Diagnostics by Mhole ☺

HUMINT and SIGINT approach to software diagnostics
(moles or memory holes)

Mhole In a **Whole**

Further Reading

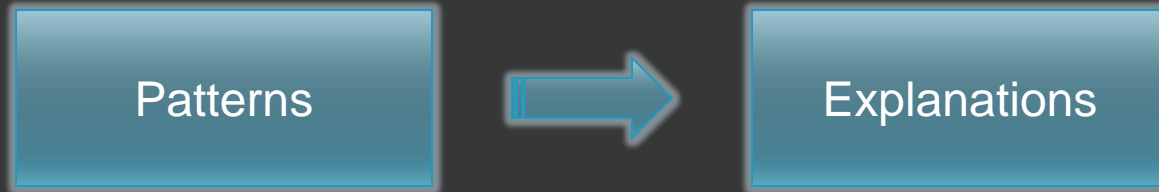
Systems Thinking and Science

- ◉ [An Introduction to General Systems Thinking \(by Weinberg\)](#)
- ◉ [Facets of Systems Science \(by Klir\)](#)

Software Diagnostics

- ◉ [Software Diagnostics Institute](#)
- ◉ [Memory Dump Analysis Anthology: Volumes 1, 2, 3, 4, 5, 6, 7, ...](#)
Volume 6 is in preparation (September, 2012)
Volume 7 is planned for the end of 2012
- ◉ [Software Trace and Memory Dump Analysis: Patterns, Tools, Processes and Best Practices](#)
- ◉ [Introduction to Pattern-Driven Software Problem Solving](#)
- ◉ [Introduction to Software Narratology](#)
- ◉ [Introduction to Pattern-Driven Software Diagnostics](#)
- ◉ [Victimware](#)

Next Webinar



Abductive Reasoning in Software Diagnostics

December, 2012

Q&A

Please send your feedback using the contact form on DumpAnalysis.com

Thank you for attendance!