

Structural Memory Patterns

Dmitry Vostokov
[Software Diagnostics Services](#)

Pattern Catalog Idea

- ⦿ Existing memory analysis patterns:

abnormal structure and behavior

- ⦿ Normal structure:

system-independent structural entities and relationships visible in memory

Memory Snapshot

- Structured Memory Snapshot

various memory dump types: process, kernel, physical

- BLOB Memory Snapshot

.writemem

Aggregate Snapshot

- Examples

minidump

combined BLOB Memory Snapshots

Snapshot Collection

- Collection of Memory Snapshots or Aggregate Snapshots
- Each element is saved at different time
- Example

Several process memory dump files saved sequentially from a process growing in memory consumption

Memory Region

- Open

normal heap entry

- Closed (cannot be read past boundary)

thread stack

Region Boundary

- ⦿ Inaccessible range of memory surrounding Closed Region

page heap entry

pages surrounding stack memory region

Memory Hierarchy

- Example:

Physical memory

Virtualized physical memory

Virtual memory

Anchor Region

- Describes memory layout of a memory snapshot

`.dumpdebug`

Region Strata

- Memory region changes at different times
- Execution Residue** memory analysis pattern

