Artifact Evaluation - Mitosis: Transparently Self-Replicating Page-Tables for Large-Memory Machines

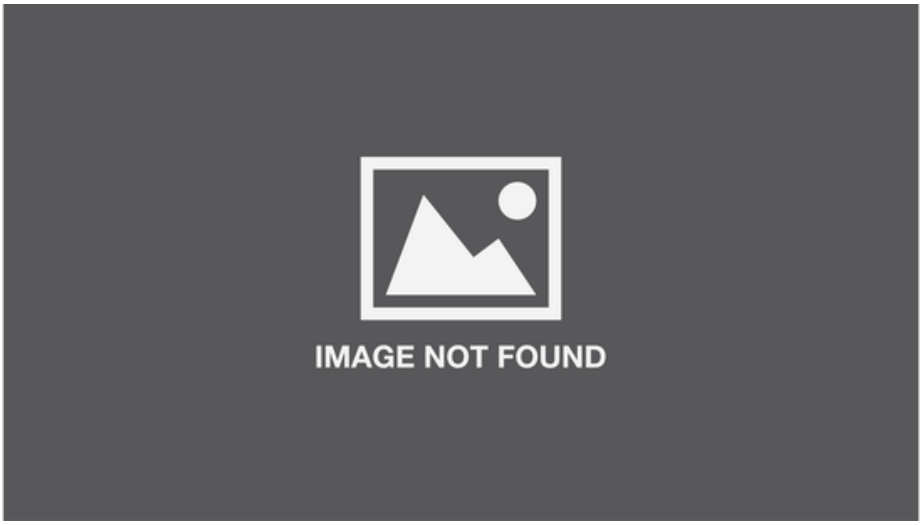
Artifact Evaluation Report.

Figure 1 - Teaser Figure

Script: `./run_f1.sh`

Description: Percentage of local and remote leaf PTEs as observed from each socket on a TLB miss and Bottom Graph: Normalized runtime, for two workloads showing multi-socket (left) and workload migration (right) scenarios with their respective improvement using Mitosis.

Reference



Reproduction

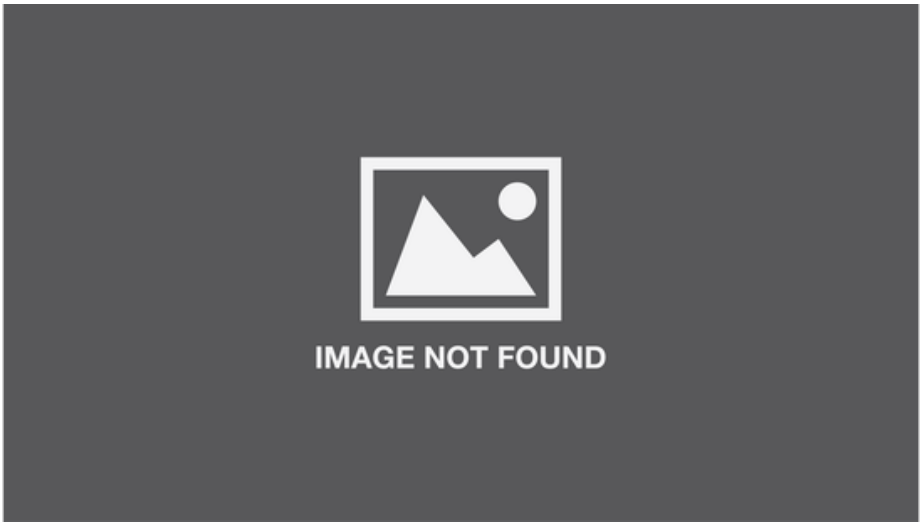
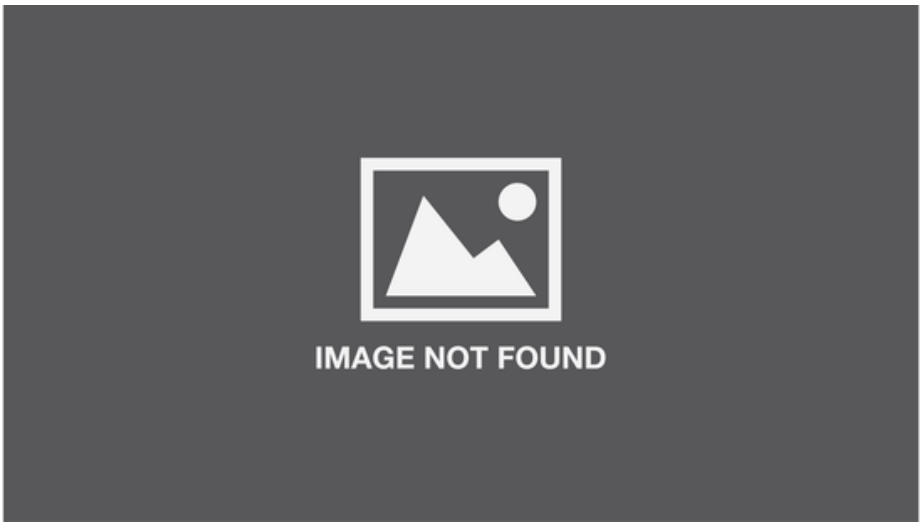


Figure 3 - Remote Page-Table Entries

Script: `./run_f3.sh`

Description: Analysis of page-table pointers from a page-table dump for a multi-socket workload: Memcached.

Reference



Reproduction

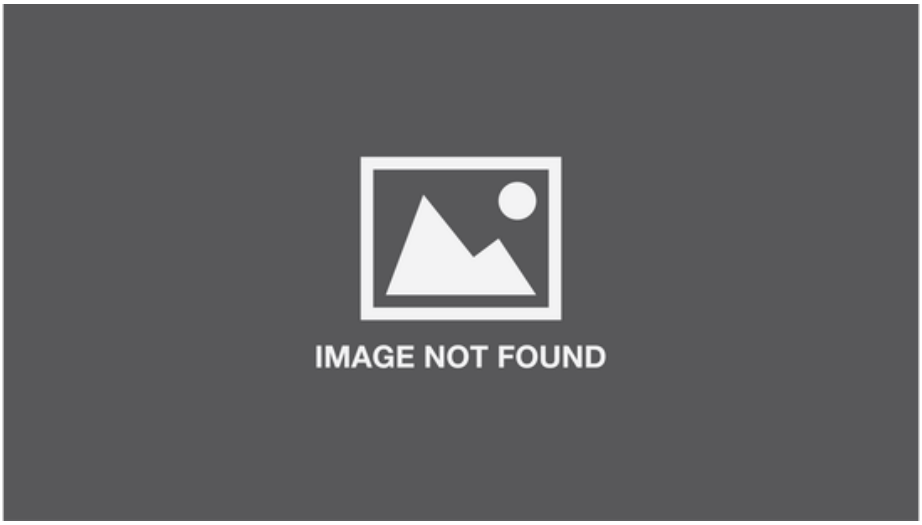
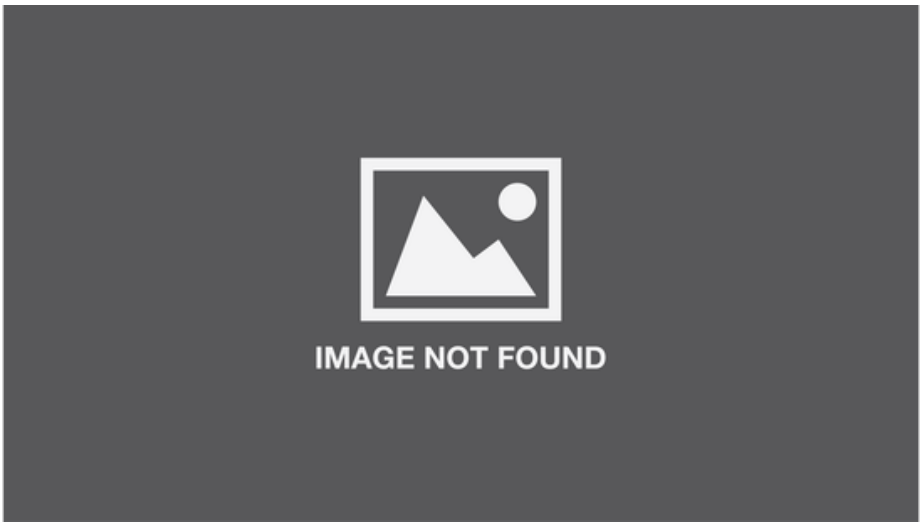


Figure 4 - Remote Page-Tables

Script: `./run_f4.sh`

Description: Percentage of remote leaf PTEs as observed from each socket for our multi-socket workloads.

Reference



Reproduction

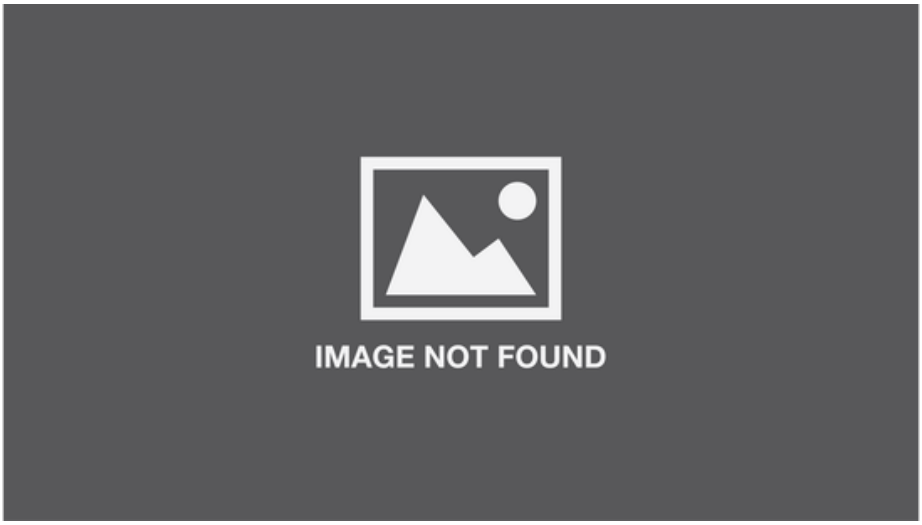
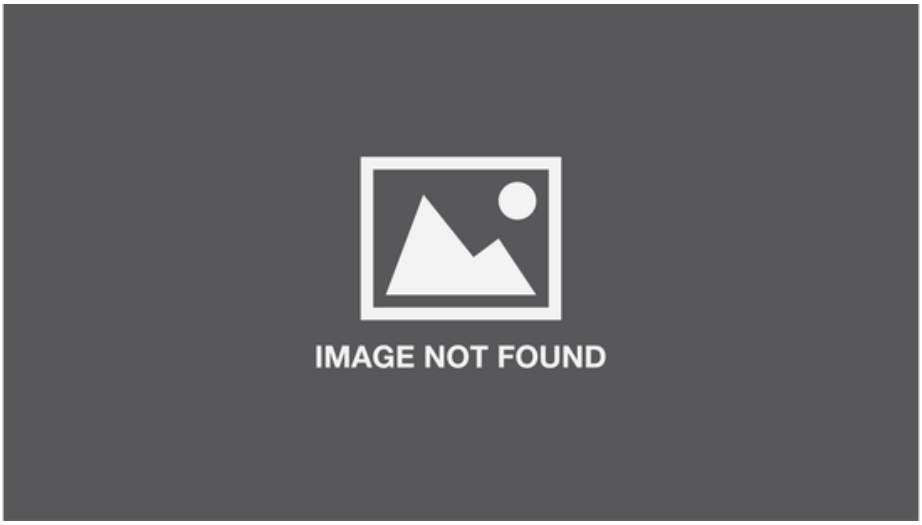


Figure 6 - Page-Table Placement Analysis

Script: `./run_f6.sh`

Description: Normalized runtime of our workloads in workload migration scenario with 4KB page size. The lower hashed part of each bar is time spent in walking the page-tables. All configurations are shown in Table 2.

Reference



Reproduction

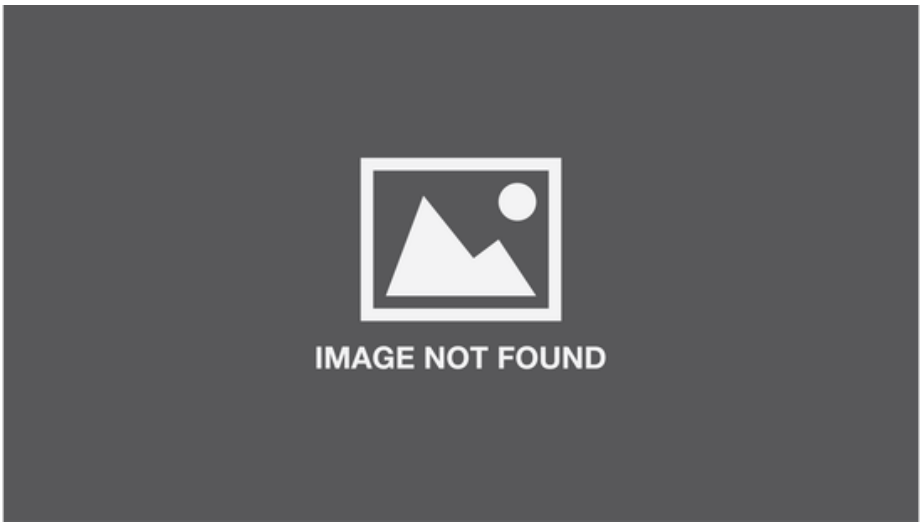
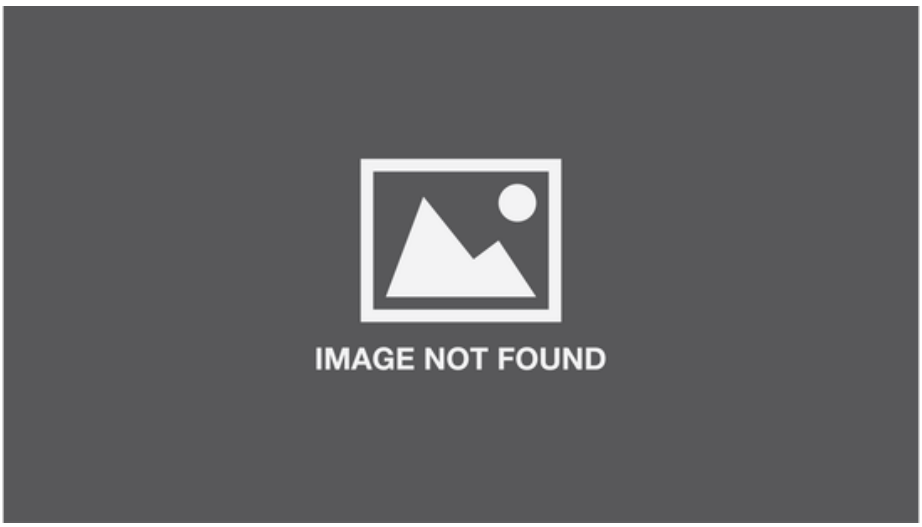


Figure 9 - Multi-Socket Scenario

Script: `./run_f9.sh`

Description: Normalized performance with Mitosis for multi-socket workloads with 4KB and 2MB page size. The lower hashed part of each bar is execution time spent in walking the page-tables.

Reference



Reproduction

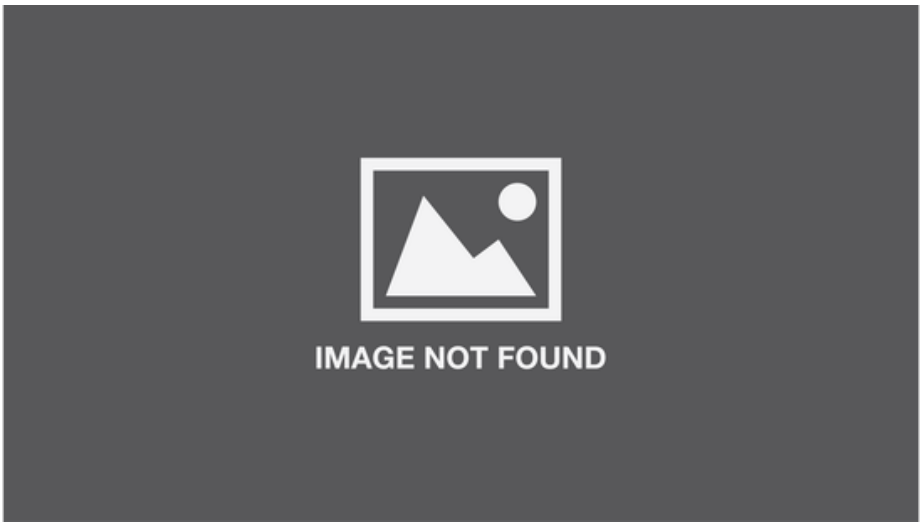
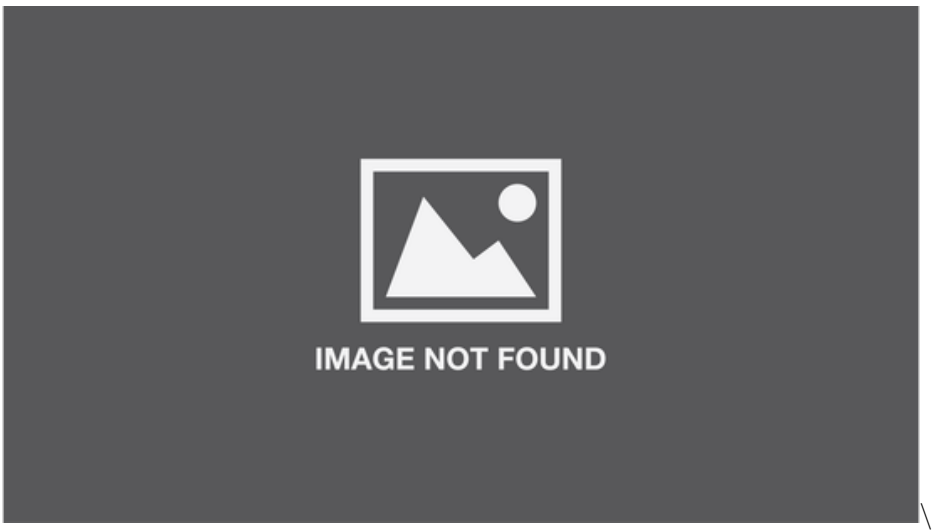


Figure 10 - Workload Migration Scenario

Script: `./run_f10.sh`

Description: Normalized performance with Mitosis for workloads in workload migration scenario with 4KB and 2MB page size. The lower hashed part of each bar is execution time spent in walking the page-tables.

Reference



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Reproduction

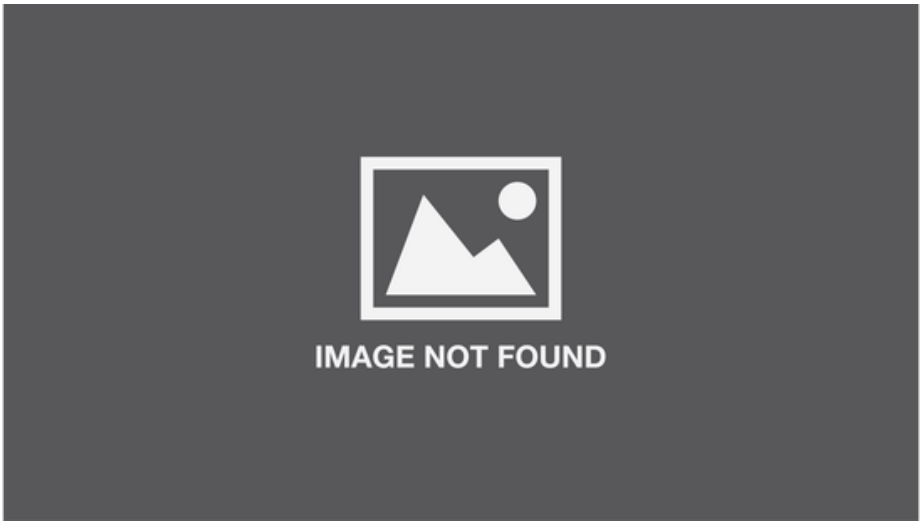
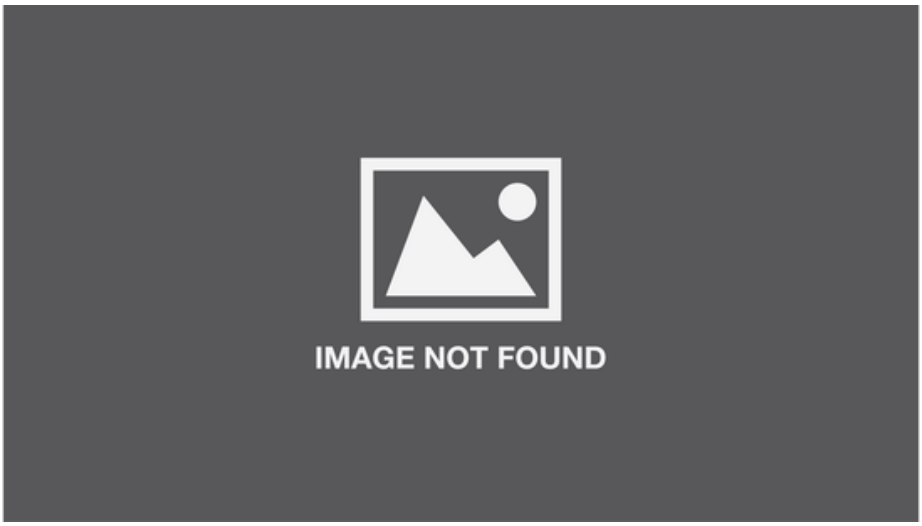


Figure 11 - Memory Fragmentation

Script: `./run_f11.sh`

Description: Performance of Mitosis in workload migration scenario with 2MB pages under heavy memory fragmentation.

Reference



Reproduction

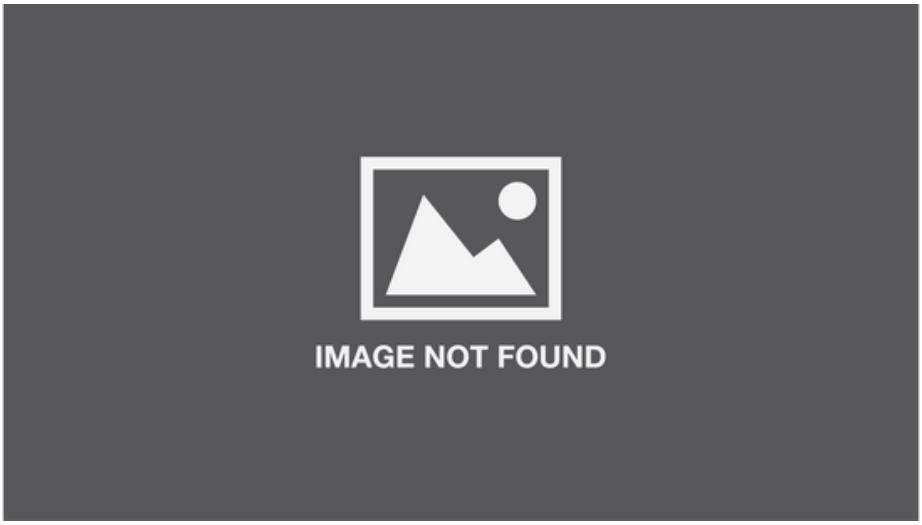
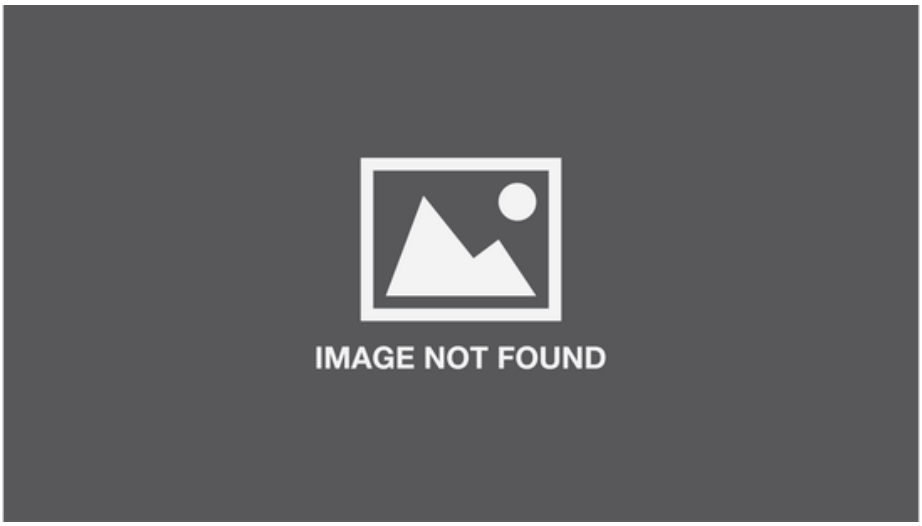


Table 5 - Runtime Overhead VMA Operations

Script: `./run_t5.sh`

Description: Runtime overhead of Mitosis for virtual memory operation system calls using 4-way Replication

Reference



Reproduction

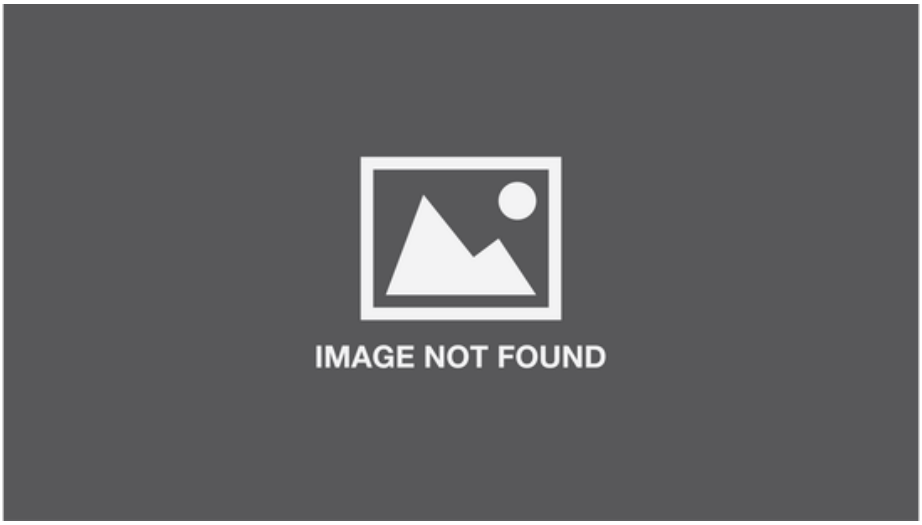
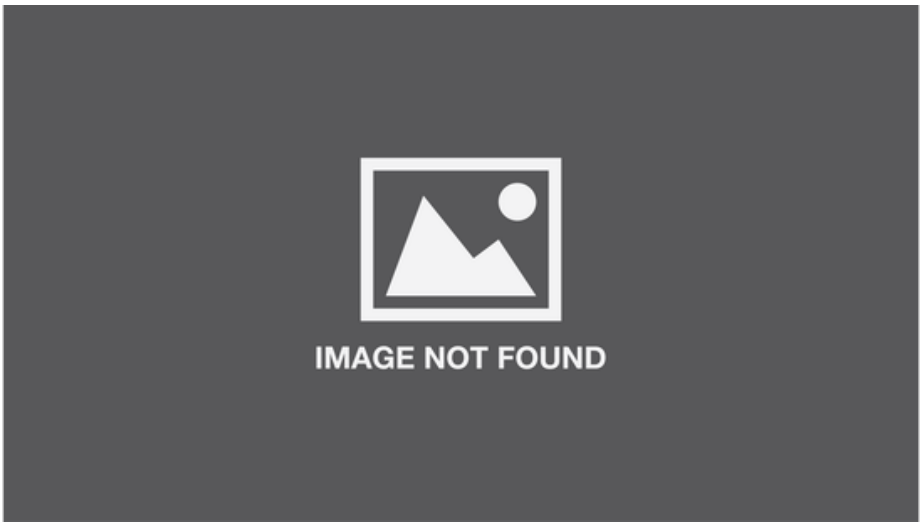


Table 6 - Runtime Overhead End-to-End

Script: `./run_t6.sh`

Description: Runtimes with LP-LD setting, including initialization with and without Mitosis. Standard Deviation in Brackets.

Reference



Reproduction