INTEL® VTUNE™ AMPLIFIER – PLATFORM PROFILER

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The Long & Short of Performance Analysis

Get the big picture first with a Snapshot or Platform Profiler

	Snapshot Quickly size potential performance gain. Run a test "during a coffee break".	**In-Depth** Advanced collection & analysis. Insight for effective optimization.
Application Focus • HPC App developer focus • 1 app running during test	**Intel® VTune™ Amplifier's** **Application Performance Snapshot** Metrics: • OpenMP • Vectorization • MPI • Memory • I/O L	**VTune™ Amplifier** • Many profiles S-M **Intel® Advisor** • Vectorization S **Intel® Trace Analyzer and Collector (ITAC)** • MPI Optimization S-L
System Focus • Deployed system focus • Full system load test	**VTune™ Amplifier's** **Storage Performance Snapshot** Metrics: • I/O • CPU • Memory • Network L	**VTune™ Amplifier** **- Sampling:** • System wide EBS S-M **- Platform Profiler:** Metrics: •~20 OS • ~150 hardware L

Maximum collection times: L=long (hours) M=medium (minutes) S=short (seconds-few minutes)

Performance Optimization - Big picture first, then the details

Long data collections, light on detail
When & how is hardware underutilized?

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- Plan a tuning strategy or monitor QA
  - Analyze long runs
  - Find times with low performance
  - Use metrics to plan deeper analysis
    - Low Floating Point → Optimize vectorization
    - High memory ops → Analyze memory access
- Optimize hardware configuration
  - Run a mix of your target workloads
    - High processor utilization → more cores
    - High memory use → more memory
    - I/O limited → more or faster I/O

Short data collections, lots of detail
Attribute to source, memory access patterns…

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- Cache optimization
- Load balancing
- Memory access analysis
- More…

Intel® Advisor

- Vectorization optimization

Intel® Trace Analyzer & Collector (ITAC)

- MPI optimization

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Identify system configuration issues

Target User

- Infrastructure Architects
- Software Architects & QA

Architecture overview for a dual socket system

Performance metrics on system topology

- Display current configuration
- Socket → Core → Internal Caches
- Socket → Memory Link → Memory Module

Identify system configuration issues

- Inefficient memory module placements
- Need for faster storage
- Need for larger/faster memory

Identify potential software issues

- Low CPU utilization
- NUMA-related issues (near vs. far memory accesses)
- Inefficient usage of memory/storage resources

Compare different system configurations

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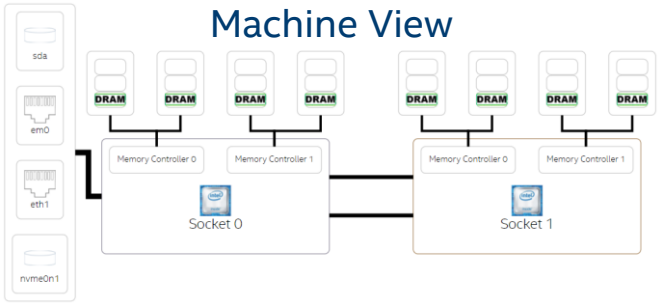
Identify system configuration issues

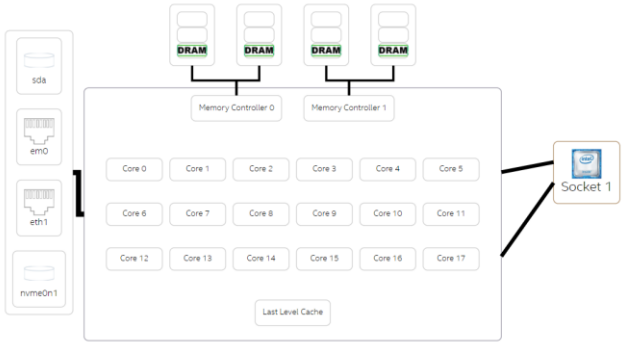
Interactive Topology Diagrams

- System configuration
- Dynamic annotations to highlight imbalances (future)

Machine View



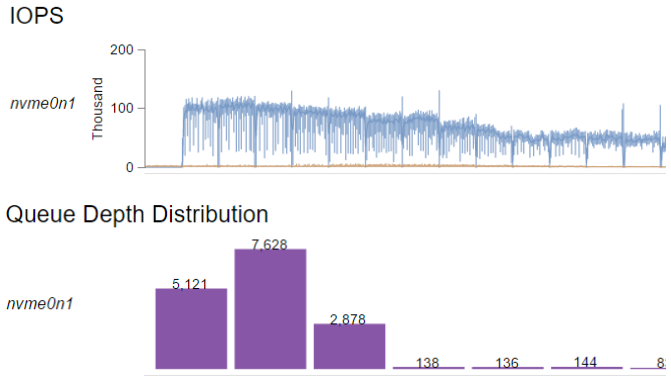
Socket View



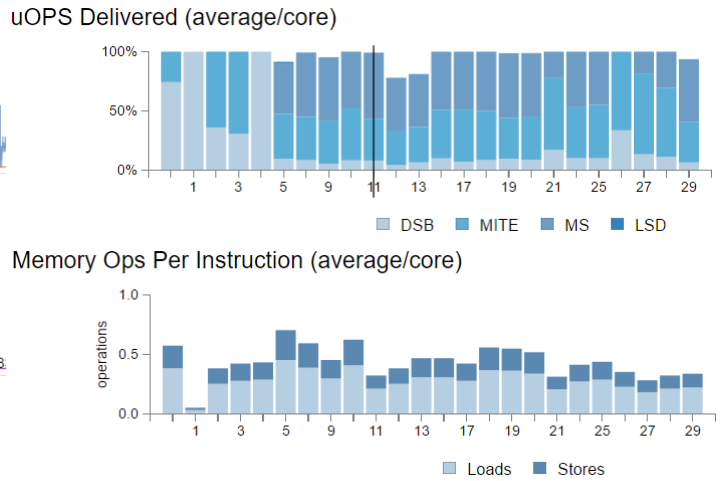
Performance metrics

- Low overhead (targeting < 1%) – coarse grain
- Sampling OS and HW performance counters
- Extended capture (min. to hours)
- RESTful API for easy analysis by scripts
- Single system (today), cloud (future)

Timelines and Histograms



Core to Core Comparisons



Workflow overview

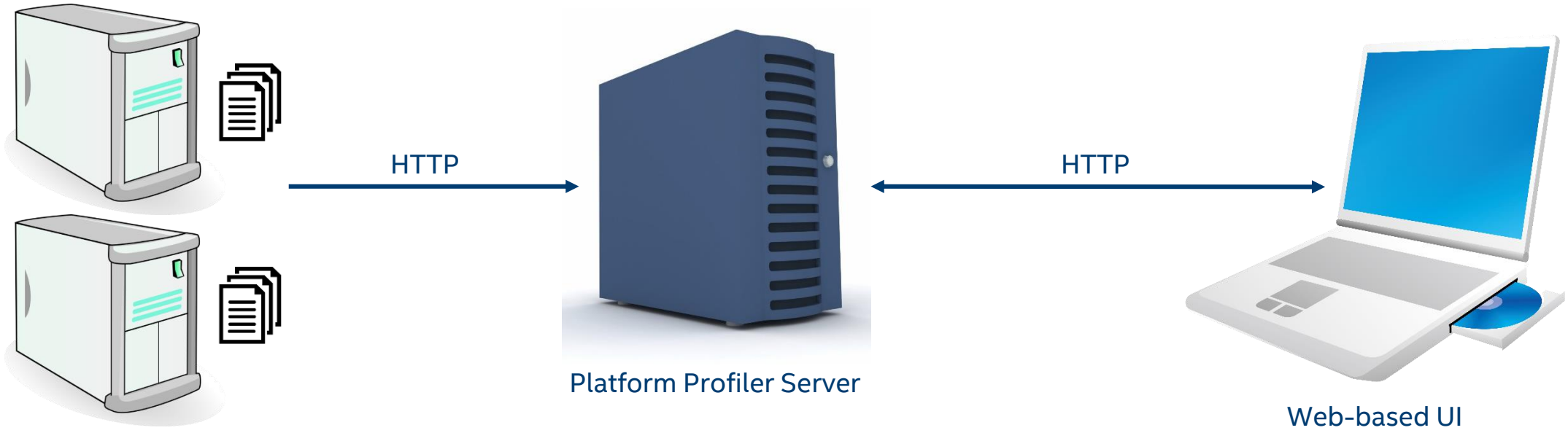
2. Install data collector on “targets”

1. Install the Platform Profiler Server

3. Collect data

4. Upload data

5. View and analyze results



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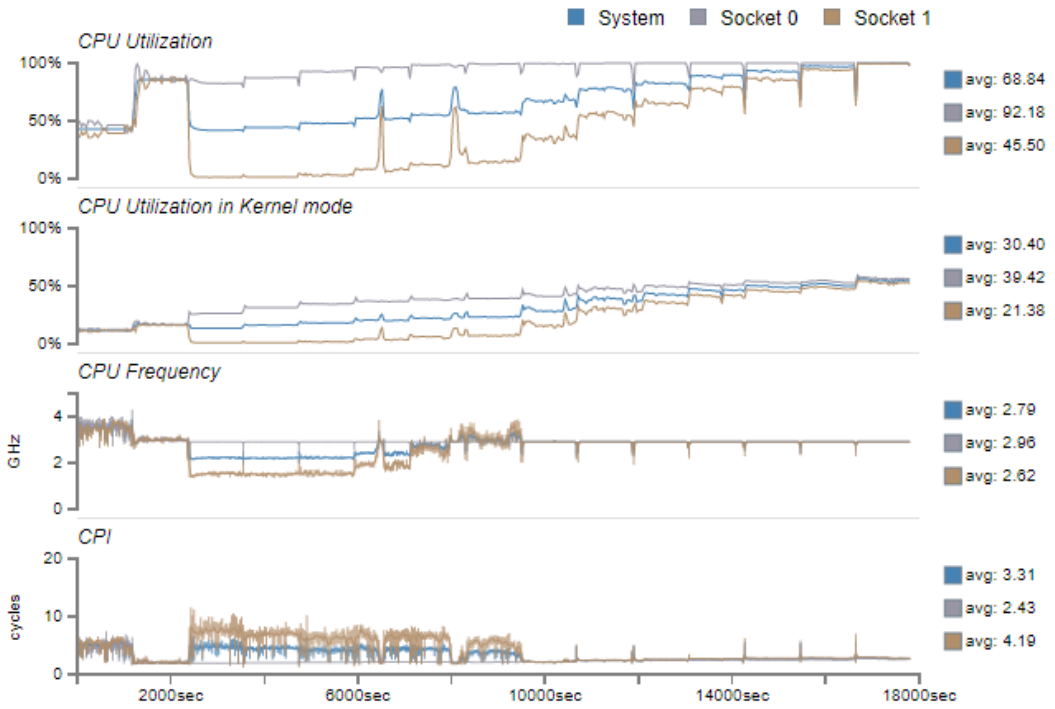
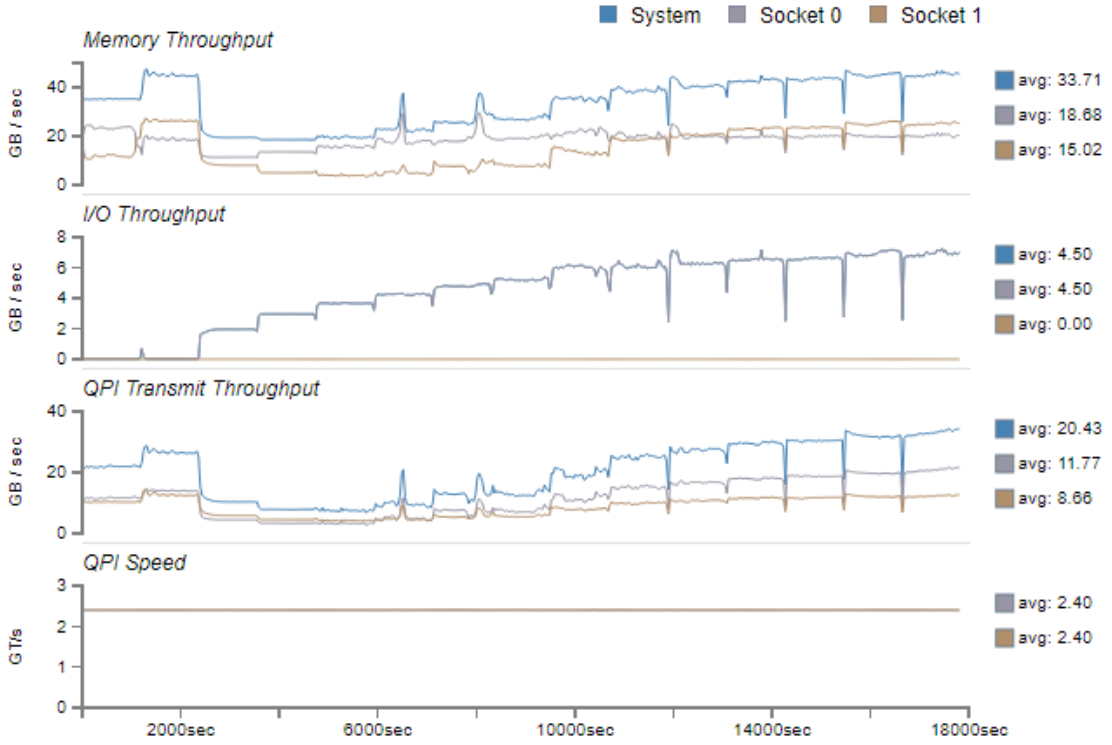
Identify system usage imbalances

CPU Utilization, Turbo, Cycle Efficiency



Interconnect and Bus Throughput



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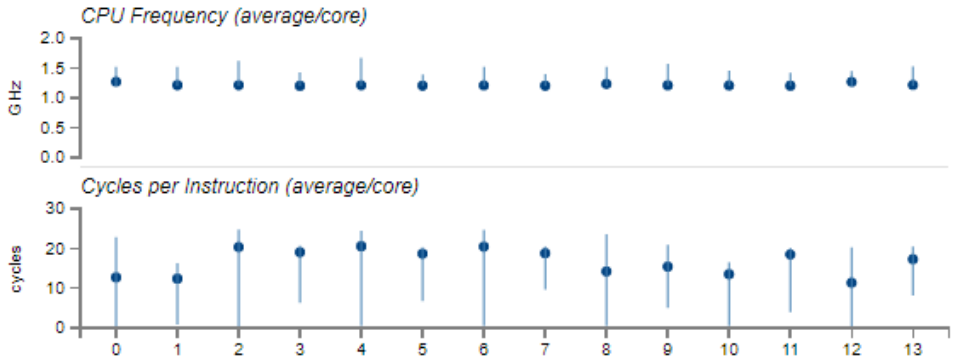
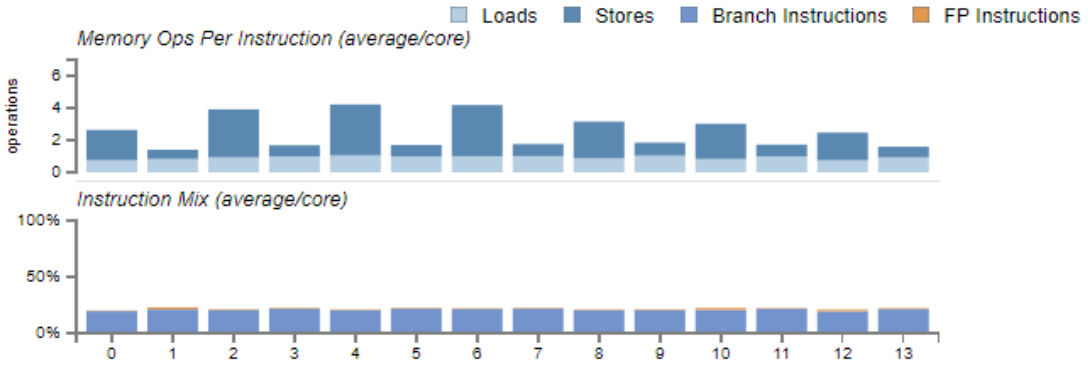
Identify Core-to-Core level usage imbalances

Efficiency comparisons



Workload differences



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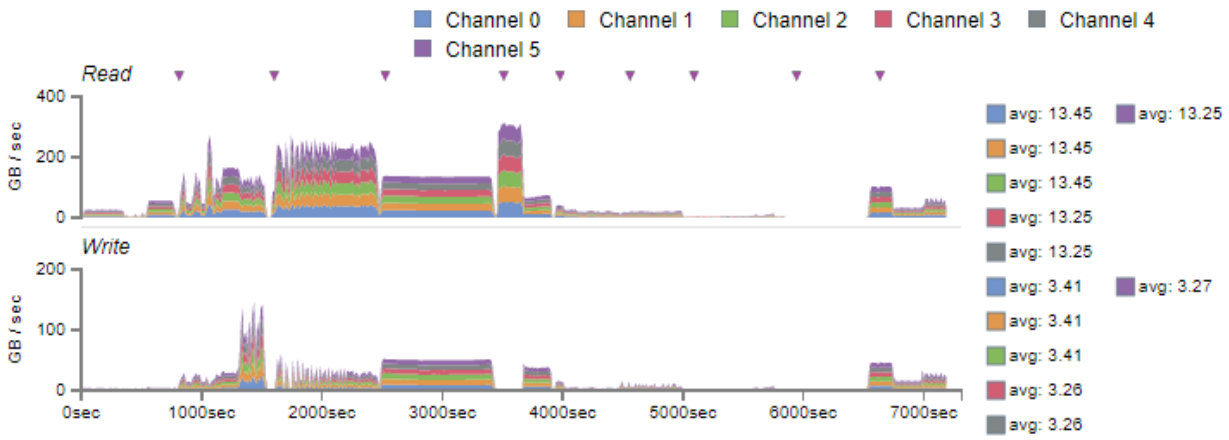
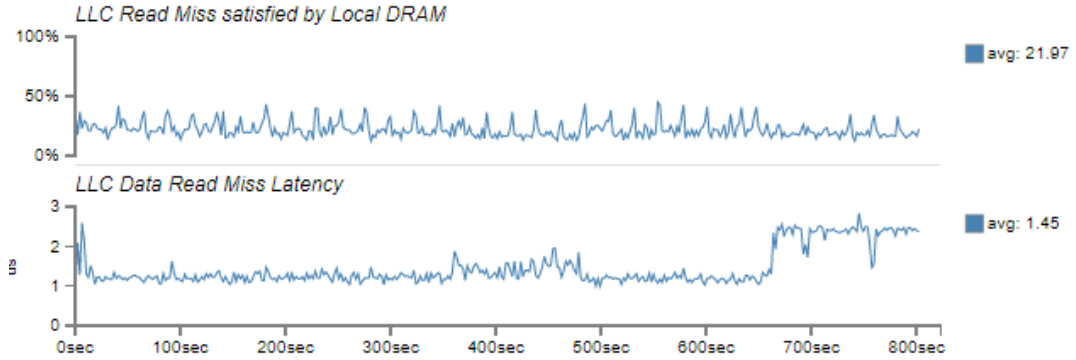
Identify Memory usage imbalances

Traffic Patterns



NUMA and Latencies



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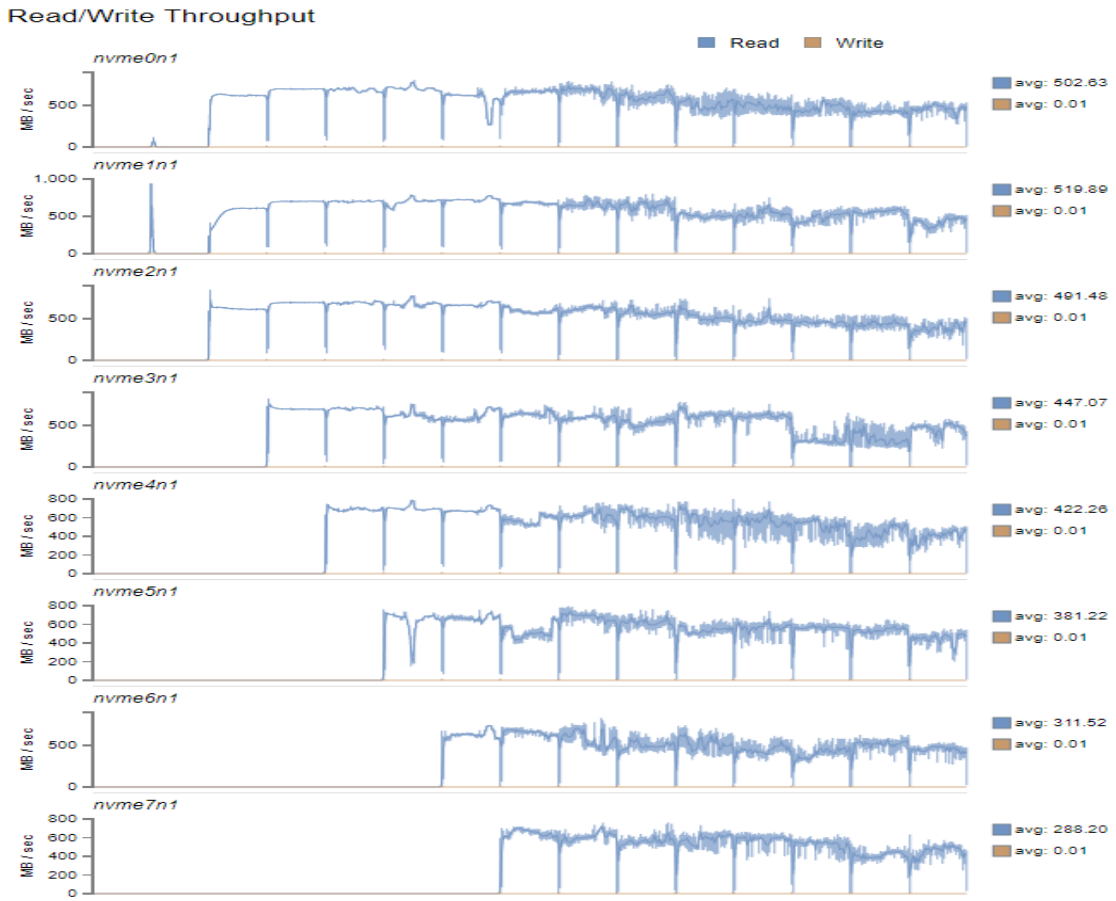
Identify disk utilization imbalances

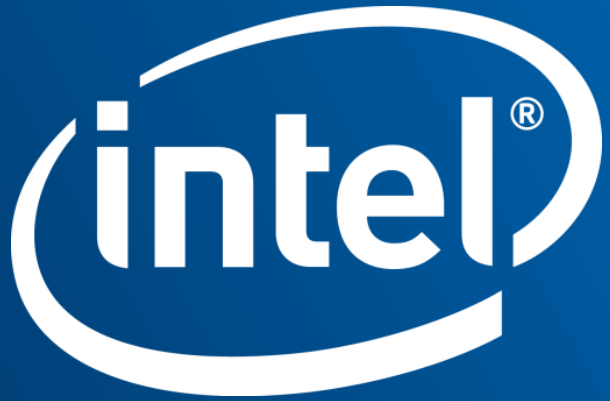
Traffic Patterns



And a lot more….

Try It Today

- Intel® VTune™ Amplifier - Platform Profiler is available today
  https://software.intel.com/en-us/articles/vtune-amplifier-platform-profiler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