

Intel VTune™ Amplifier – Platform Profiler

November 7, 2018

Platform Profiler

Identify system performance & configuration issues and headroom

Target User

- Infrastructure Architects
- Software Architects & QA



Performance metrics on system topology

- Display current configuration
- ~20 OS Metrics
- ~150 hardware Metrics

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

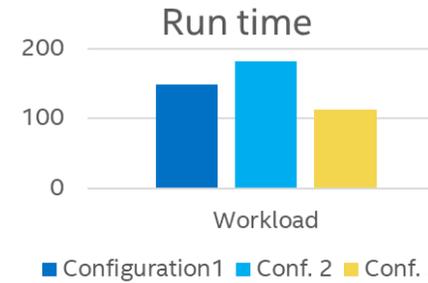
Platform Profiler

Get the big picture

Common Uses

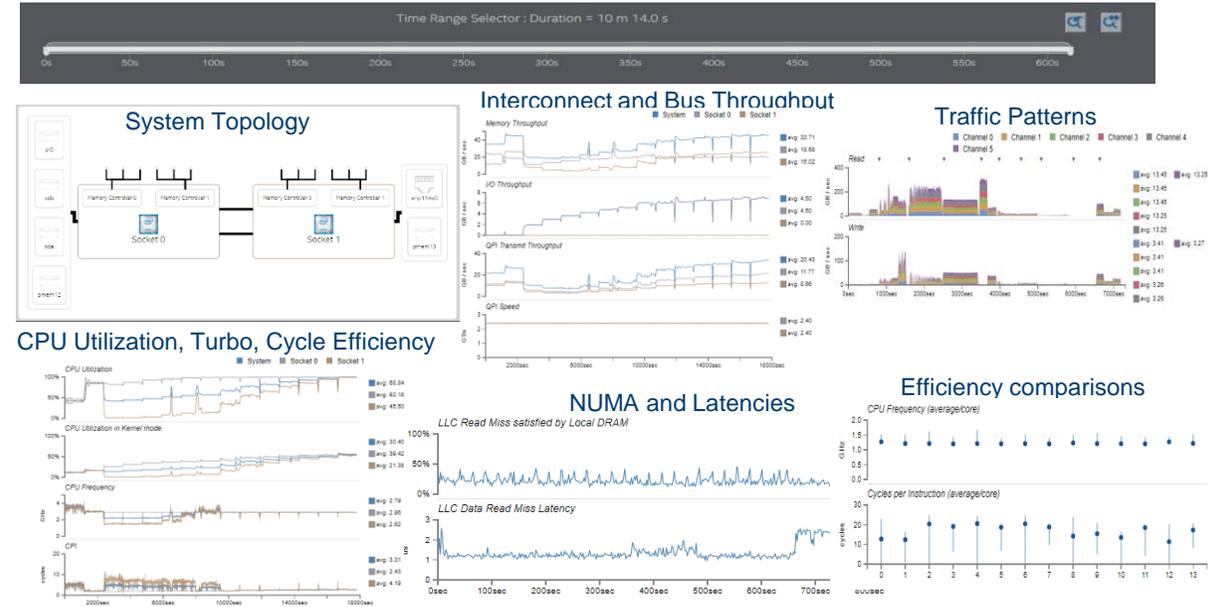
- Get more data from a timed run
 - Very low overhead ~2%
- Plan tuning strategy
 - Which app needs it most?
 - Which phase of the app?
 - Optimize cache? I/O? Threading?
- Monitor QA
 - Monitor long runs
- Optimize hardware configuration
 - Add more I/O? Add memory?

Timed run



Only captures the duration of the run

Platform Profiler Timed Run



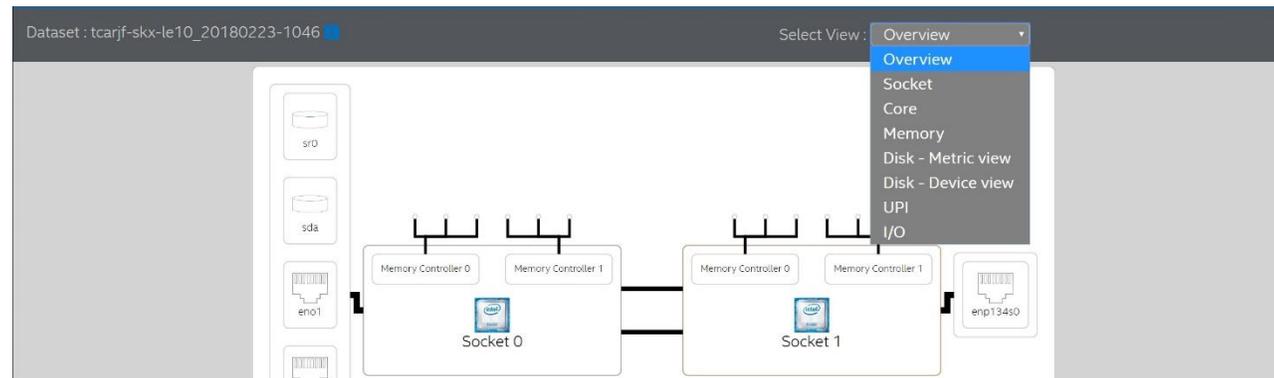
Duration of the run + everything that happened on the system during that run

Platform Profiler

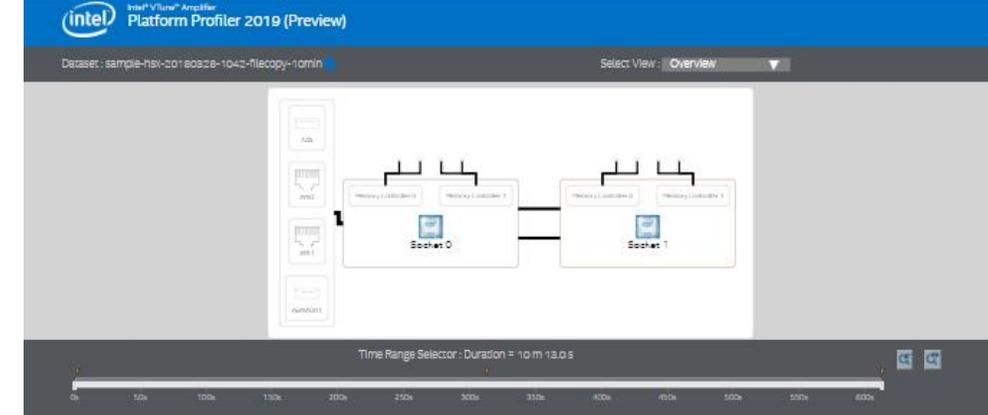
Progressive disclosure methodology

- Start with Overview and Topology
- Views covering different aspects of system

Socket, Core, Memory, Disk, UPI, I/O



- Socket → Core → Internal Caches
- Socket → Memory Link → Memory Module

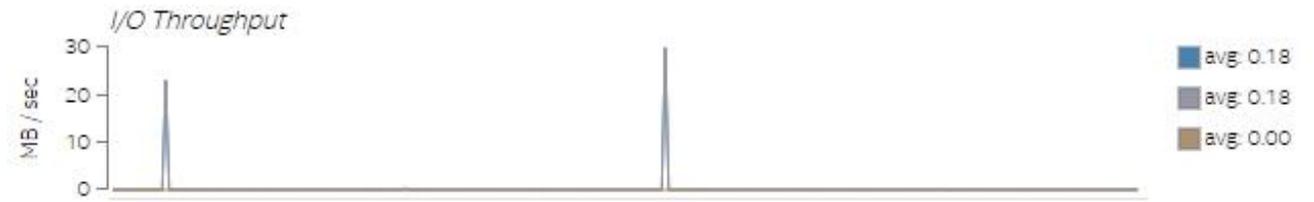


Optimization Notice

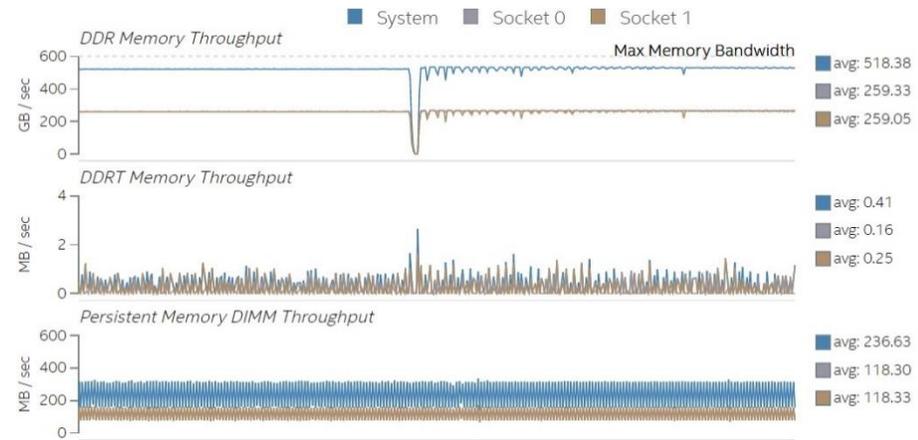
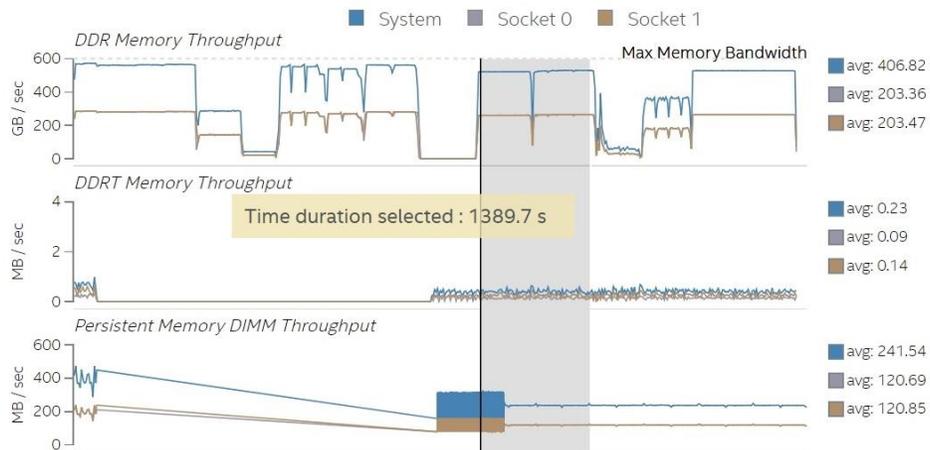
Platform Profiler

Telemetry data collected (and displayed) at a granularity of 100ms

- Supports long collection durations
- Does not reveal confidential application info
- Average won't hide erratic behavior



- Select and zoom to desired execution region (all graphs and averages adjust to selection)



Optimization Notice

Platform Profiler

Web browser UI makes it easy to store, manage and share profiled data

Folders to manage datasets

Name	Creation Date	Comment
Sample Folder	10/26/2018	
sample-hsx-20180326-1050-dgemm-te-10min	4/2/2018	This sample was collected using an application derived from the Intel (R) Math Kernel Library Matrix Multiplication C Sample. The sample is not heavily CPU-bound and demonstrates efficient memory usage and throughput. However, the application is only running on a few cores and could benefit from parallelization. The sample was collected on an Ubuntu* Linux system with 64GB of DRAM and 36 cores.
sample-hsx-20180328-1042-filecopy-10min	4/2/2018	This sample was collected while continuously copying 30+ randomly sized files for five minutes on socket 1 followed by five minutes on socket 0. It shows a marked increase in efficiency when using socket 0 and demonstrates that applications that use a lot of file operations can benefit from using the socket closest to storage. The sample was collected on an Ubuntu* Linux system with two sockets and one NVMe disk.
sample-hsx-20180407-133-mem32-8min	4/7/2018	This sample monitors a memory traversal program that walks a 32GB allocation in varying steps. The same program is run five times using different core combinations and has a 10 second delay between each run. The sample was collected on an Ubuntu* Linux system with 64GB of DRAM and 200GB swap space.

Name of the dataset includes hostname and date of creation

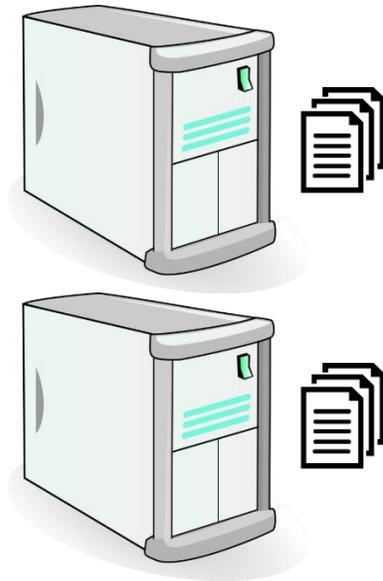
Comments to include any relevant information about the run

Optimization Notice

Platform Profiler

Collect and manage data from multiple targets easily

Data Collector



Data Collection “Targets”

Platform Profiler Server
Web-based user interface



Platform Profiler Server

Web-based UI
Chrome works best

Optimization Notice

Workflow overview

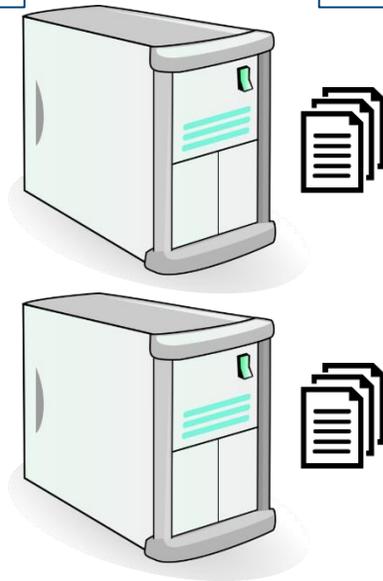
1. Install VTune and launch the Platform Profiler Server

2. Install data collector on “targets” (Linux or Windows)
Ivy Bridge or Later

3. Collect data

4. Upload data

5. View and analyze results



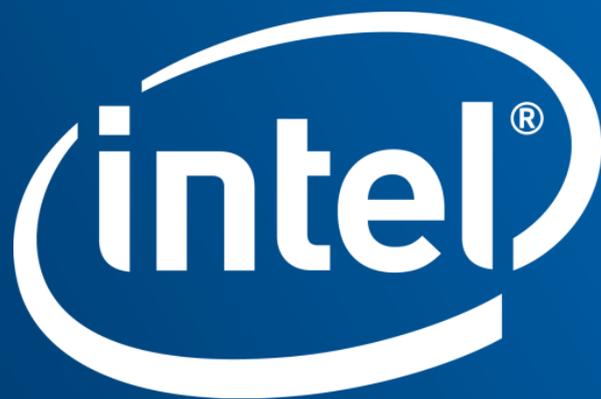
Data Collection “Targets”



Platform Profiler Server

Web-based UI
Chrome works best

Optimization Notice



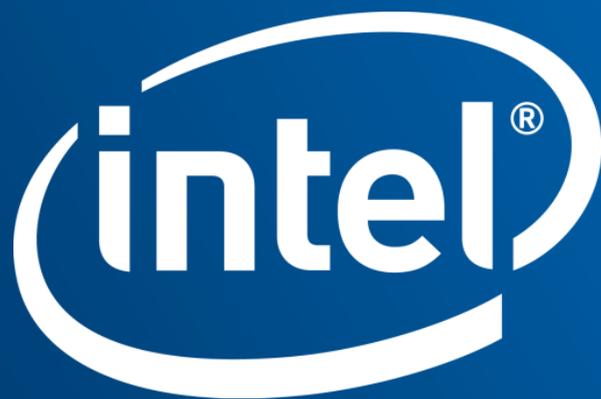
Backup

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	VTune Amplifier’s Application Performance Snapshot Metrics: • OpenMP • Vectorization • MPI • Memory • I/O L 🕒	VTune Amplifier • Many profiles S-M 🕒 Intel Advisor • Vectorization S 🕒 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 S-M 🕒 - Sampling • System wide EBS - Platform Profiler: L 🕒 Metrics: • ~20 OS • ~150 hardware

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



Legal Disclaimer & Optimization Notice

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit www.intel.com/benchmarks.

INFORMATION IN THIS DOCUMENT IS PROVIDED "AS IS". NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. INTEL ASSUMES NO LIABILITY WHATSOEVER AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO THIS INFORMATION INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

Copyright © 2018, Intel Corporation. All rights reserved. Intel, Pentium, Xeon, Xeon Phi, Core, VTune, Cilk, and the Intel logo are trademarks of Intel Corporation in the U.S. and other countries.

Optimization Notice

Intel's compilers may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include SSE2, SSE3, and SSSE3 instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessor-dependent optimizations in this product are intended for use with Intel microprocessors. Certain optimizations not specific to Intel microarchitecture are reserved for Intel microprocessors. Please refer to the applicable product User and Reference Guides for more information regarding the specific instruction sets covered by this notice.

Notice revision #20110804