

# ANALYZE & TUNE APPLICATION PERFORMANCE WITH INTEL<sup>®</sup> VTUNE<sup>™</sup> PROFILER

Provides Deep Insight that Saves Time Optimizing Code

Formerly  
Intel<sup>®</sup> VTune<sup>™</sup> Amplifier

Available standalone or as a part of select editions of:

- [Intel<sup>®</sup> Parallel Studio XE](#)
- [Intel<sup>®</sup> System Studio](#)

# Optimize Performance

Intel® VTune™ Profiler

## Get the Right Data to Find Bottlenecks

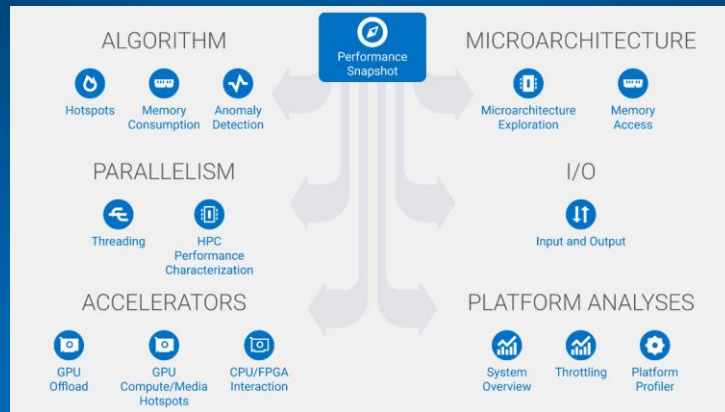
- A suite of profiling for CPU, GPU, FPGA, threading, memory, cache, storage, offload, power...
- DPC++, C, C++, Fortran, Python\*, Go\*, Java\*, or a mix
- Linux, Windows, FreeBSD, Android, Yocto and more

## Analyze Data Faster

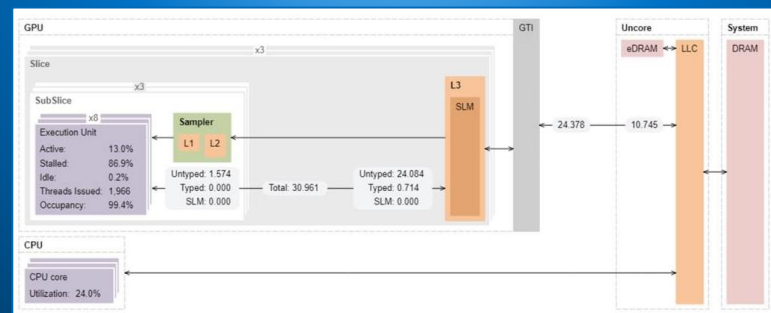
- See data on your source, in architecture diagrams, as a histogram, on a timeline...
- Filter and organize data to find answers

## Work Your Way

- User interface or command line
- Profile locally and remotely
- Install as an application
- Install as a server accessible with a web browser



Source	GPU Instructions Executed by Instruction T...
158 dx = ptr[j].pos[0] - ptr[i].pos[0];	75,002,500
159 dy = ptr[j].pos[1] - ptr[i].pos[1];	12,500,000
160 dz = ptr[j].pos[2] - ptr[i].pos[2];	12,500,000



# Rich Set of Profiling Capabilities for Multiple Markets

Intel® VTune™ Profiler



## Single Thread

Optimize single-threaded performance.



## Multithreaded

Effectively use all available cores.



## System

See a system-level view of application performance.



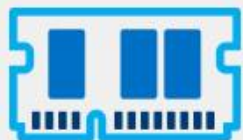
## Media & OpenCL™ Applications

Deliver high-performance image and video processing pipelines.



## HPC & Cloud

Access specialized, in-depth analyses for HPC and cloud computing.



## Memory & Storage Management

Diagnose memory, storage, and data plane bottlenecks.



## Analyze & Filter Data

Mine data for answers.



## Environment

Fits your environment and workflow.

# What's New? Partial list of improvements

## Accelerator Profiling

- Offload cost profiling identifies unnecessary data transfers
- GPU analysis adds: DPC++ and multi-GPU support, SIMD metrics, OpenMP offload pragma awareness, and a new memory diagram. It also has simplified driver requirements
- Application Performance Snapshot adds GPU analysis
- FPGA analysis adds DPC++ support and a simplified workflow

## New Profiles

- Processor Trace finds short performance anomalies like page faults, system calls or thread switches
- CPU/GPU/FPGA power analysis debugs throttling, optimizes for a power budget, tunes flops/watt

## Better Workflow

- VTune Profiler server improves security and is easier to deploy with pre-installed collection agents
- Platform Profiler gains a simplified setup and remote workflow
- Open source communication agent simplifies adding performance analysis to RTOSs

## Better Data

- I/O analysis has a better summary and additional DDIO metrics for Sky Lake and Cascade Lake servers.
- Docker containers have more meaningful IDs

See [What's New?](#) for a more complete and up to date list.

# INTEL® VTUNE™ PROFILER

## TUNE FOR CPU, GPU & FPGA

### Analyze Data Parallel C++ (DPC++)

See the lines of DPC++ that consume the most time

### Tune for CPU, GPU & FPGA

Optimize for any supported hardware accelerator

### Optimize Offload

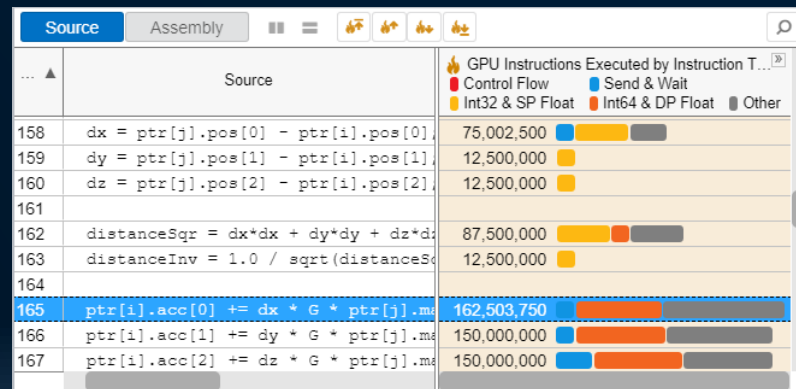
Tune DPC++ and OpenMP\* offload performance

### Wide Range of Performance Profiles

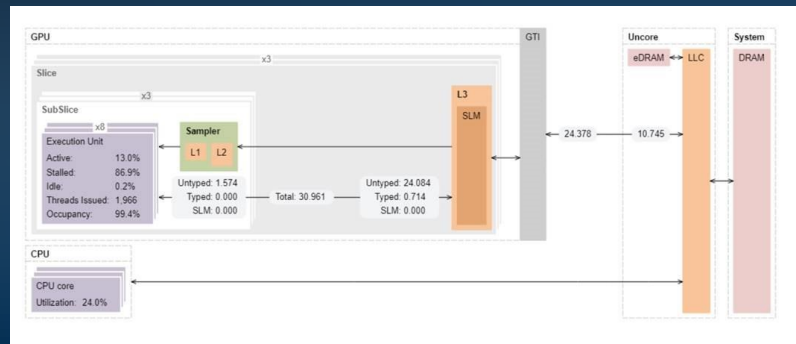
CPU, GPU, FPGA, threading, memory, cache, storage...

### Supports Popular Languages & OSs

DPC++, C, C++, Fortran, Python\*, Go\*, Java\*, or a mix  
Linux, Windows, FreeBSD, Android, Yocto and more



Source	GPU Instructions Executed by Instruction T...
158 dx = ptr[j].pos[0] - ptr[i].pos[0],	75,002,500
159 dy = ptr[j].pos[1] - ptr[i].pos[1],	12,500,000
160 dz = ptr[j].pos[2] - ptr[i].pos[2],	12,500,000
161	
162 distanceSqr = dx*dx + dy*dy + dz*dz;	87,500,000
163 distanceInv = 1.0 / sqrt(distanceSqr);	12,500,000
164	
165 ptr[i].acc[0] += dx * G * ptr[j].ma	162,503,750
166 ptr[i].acc[1] += dy * G * ptr[j].ma	150,000,000
167 ptr[i].acc[2] += dz * G * ptr[j].ma	150,000,000



Refer to [software.intel.com/articles/optimization-notice](https://software.intel.com/articles/optimization-notice) for more information regarding performance & optimization choices in Intel software products.

Copyright ©, Intel Corporation. All rights reserved.

\*Other names and brands may be claimed as the property of others.

# INTEL® VTUNE™ PROFILER

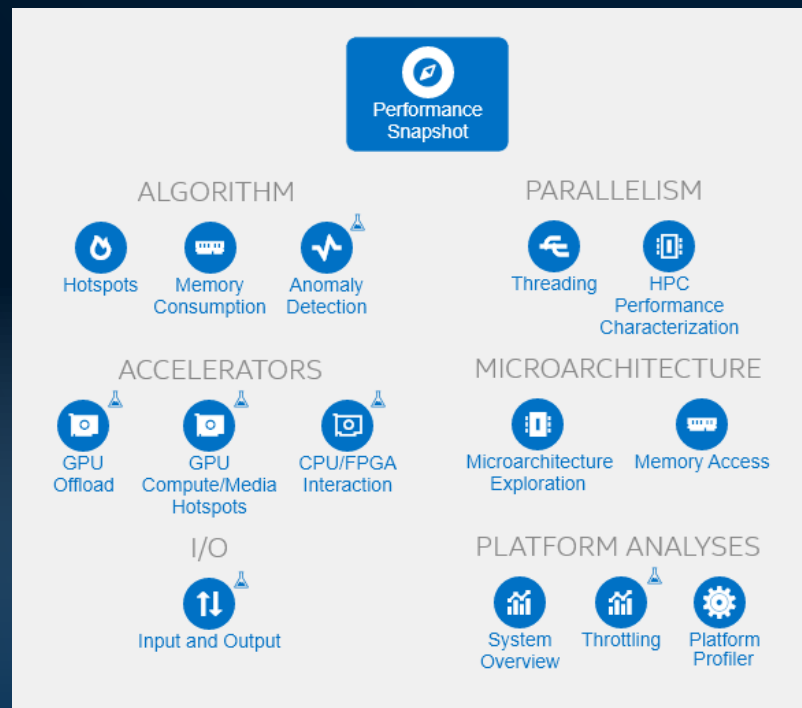
## A SUITE OF PERFORMANCE PROFILERS

System and Application Overview Profiles Identify:

- Where to focus application optimization
- The best system configuration

Focused Profiles Find Bottlenecks In:

- CPU, GPU and FPGA compute
- Threading
- Accelerator offload
- I/O
- Power/Thermal Throttling



There will still be a need to tune for each architecture.

Refer to [software.intel.com/articles/optimization-notice](https://software.intel.com/articles/optimization-notice) for more information regarding performance & optimization choices in Intel software products.

Copyright ©, Intel Corporation. All rights reserved.

\*Other names and brands may be claimed as the property of others.

# INTEL® VTUNE™ PROFILER SERVER

NEW!

## Three great ways to use VTune Profiler:

- As an application with a user interface
- As a command line
- As a server

## Server Features:

### Access with a web browser

- no install required by users

### Share results

- all results available to all users with server access

### Profile any target

- pre-install collector agent or push from server via SSH

### Cluster Friendly

- user interface works with a low-bandwidth connection

