December 22, 2021

Intel Empowers Developers with oneAPI 2022 Toolkits

Updated toolkits significantly expand oneAPI's scope of cross-architecture capabilities available to developers to create what's next.

SANTA CLARA, Calif.--(BUSINESS WIRE)-- **What's New:** Intel today released oneAPI 2022 toolkits. Newly enhanced toolkits expand cross-architecture features to provide developers greater utility and architectural choice to accelerate computing.

> *"I am impressed by the breadth of more than 900 technical improvements that the oneAPI software engineering team has done to accelerate development time and performance for critical application workloads across Intel's client and server CPUs and GPUs. The rich set of oneAPI technologies conforms to key industry standards, with deep technical innovations that enable applications developers to obtain the best possible run-time performance from the cloud to the edge. Multi-language support and cross-architecture performance acceleration are ready today in our oneAPI 2022 release to further enable programmer productivity on Intel platforms."*
> –Greg Lavender, Intel chief technology officer, senior vice president and general manager of the Software and Advanced Technology Group

About New Capabilities: New capabilities include the world's first unified compiler implementing C++, SYCL and Fortran, data parallel Python for CPUs and GPUs, advanced accelerator performance modeling and tuning, and performance acceleration for AI and ray tracing visualization workloads. The oneAPI cross-architecture programming model provides developers with tools that aim to improve the productivity and velocity of code development when building cross-architecture applications.

Why It Matters: According to an Evans Data survey, 40% of developers target heterogeneous systems that use more than one type of processor, processor core or coprocessor.[1] The pace of innovation is only accelerating with cross-architecture computing driven forward with oneAPI across heterogeneous fabrics of CPUs, GPUs, FPGAs and other accelerators — all of which require software to bind these elements into a complete solution. With oneAPI, developers have the freedom to choose the best hardware for a given solution without the economic and technical burdens of proprietary programming models.

More Details: The 2022 Intel® oneAPI toolkits deliver performance and productivity through a complete set of advanced tools including compilers, libraries, pre-optimized frameworks, analyzers and debuggers. There are more than 900 new and enhanced features added over the past year that strengthen every tool in the foundational and domain-specific toolkits. They are now available to download or use in the Intel® DevCloudfor free. Highlights include:

Cross-architecture programming

- Intel created the world's first unified compiler implementing C++, SYCL and Fortran for CPUs and GPUs utilizing a common LLVM backend.
- Accelerated compute on CPUs and GPUs for Python, today's most popular programming language.
- The Intel® DPC++ Compatibility Tool was improved to automatically migrate 90% to 95% of CUDA code to SYCL/DPC++. [2]

Performance on the latest hardware

- **Hardware support** – Intel oneAPI Toolkits are optimized to enable advanced features of the latest and upcoming new hardware, including 12th Gen Intel® Core™ processors with AVX-VNNI, Next Gen Intel® Xeon® Scalable processors, codenamed Sapphire Rapids with Intel® Advanced Matrix Extension (Intel® AMX), and upcoming X^e client and data center GPUs.

AI performance optimizations

- Deep learning framework performance is accelerated up to 10 times over earlier versions with the latest Intel® Optimization for TensorFlow and Intel® Optimization for PyTorch.[3]
- New Intel® Extension for Scikit-learn speeds up machine learning algorithms more than 100 times on Intel CPUs over the stock open source version.[4]
- Introduced Intel® Neural Compressor to achieve increased inference performance through post-training optimization techniques across multiple deep learning frameworks.

Advanced tools for development productivity

- **Expert performance analysis for CPUs and accelerators**– Intel® VTune™ Profiler's flame graph display helps improve the ability to visualize performance hot spots. Intel® Advisor's accelerator performance modeling allows developers to estimate performance benefits of offloading to a GPU before making code changes.
- **Advanced ray tracing** – New features including cone telemetry, auxiliary feature denoising and FP16 support provide more robust shapes and shorten rendering times, improving overall rendering performance. Support for upcoming Intel X^e GPUs as well as real-time denoising further improve industry-leading, final frame, production-quality rendering.
- **Expanded development environment support** including deeper Microsoft Visual Studio Code integration, support for Microsoft Visual Studio 2022, and Microsoft WSL2 for Linux development on Windows.

More Context: Introducing Intel oneAPI 2022 | Intel Innovation (Press Kit) | Intel® oneAPI Toolkits | oneAPI initiative | oneAPI Reviews | Intel oneAPI Toolkits (Fact Sheet) | Intel oneAPI Centers of Excellence (Fact Sheet)

About Intel oneAPI Toolkits: Intel oneAPI toolkits deliver the tools needed to efficiently develop high-performance applications and solutions across a variety of Intel architectures (CPUs, GPUs, FPGAs). Its set of complementary toolkits — a base toolkit and domain-specific add-ons — simplify programming and help developers improve productivity, deliver

uncompromised performance and accelerate innovation. The toolkits include advanced optimized compilers, libraries, frameworks and analysis tools for performant heterogeneous computing. They implement the oneAPI specifications and work alongside complementary optimization tools.

About oneAPI: oneAPI is an open, unified and cross-architecture programming model for CPUs, GPUs, FPGAs and other accelerators. Based on standards, the programming model simplifies software development and delivers uncompromised performance for accelerated computing without proprietary lock-in, while enabling the integration of legacy code.

About Intel

Intel (Nasdaq: INTC) is an industry leader, creating world-changing technology that enables global progress and enriches lives. Inspired by Moore's Law, we continuously work to advance the design and manufacturing of semiconductors to help address our customers' greatest challenges. By embedding intelligence in the cloud, network, edge and every kind of computing device, we unleash the potential of data to transform business and society for the better. To learn more about Intel's innovations, go to newsroom.intel.com and intel.com.

Notices and Disclaimers

[1]Evans Data Global Development Survey 2020, Volume 2

[2]Intel® DPC++ Compatibility Tool workflow migration: Intel estimates as of September 2021. Based on measurements on a set of 70 HPC benchmarks and samples, with examples like Rodinia, SHOC, PENNANT migrated to Data Parallel C++ (DPC++). Results may vary.

[3]*Accelerate your AI Today* solution brief, Intel, 2021.

[4]*New 3rd Gen Intel® Xeon® Scalable Processors Demonstrate Machine Learning Performance Leadership with Intel® Extension for Scikit-learn*, Intel, 2021.

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Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details.

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Source: Intel Corporation