

Product Brief

Accelerate Development of Smart, Connected Devices Intel® oneAPI Base and IoT Toolkit



Solutions That Run at the Network's Edge



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The **Intel® oneAPI Base and Intel® oneAPI IoT Toolkit** is a comprehensive suite of development tools tailored for developers who are building fast and efficient intelligent Internet of Things (IoT) devices and need to bring the power of big data technology to global IoT innovations—healthcare, smart homes, industrial, retail, aerospace, security, and more. These modern IoT edge workloads are incredibly diverse, and so are the architectures used in solutions that run at the network's edge. Combining the core set of tools from the Intel oneAPI Base Toolkit and adding tools focused on IoT design simplifies development and deployment across Intel® CPU, GPU, FPGA, and other accelerators.

Who needs it

- **IoT software developers** who are using C, C++, SYCL*, OpenMP, and Python to efficiently deliver innovations in new devices and solutions.
- **System integrators** who need fast software stack integration and optimizations.
- **Enterprises** that are moving to the edge to capture more data, analyze it faster, and act on it sooner.

What it does

Benefit from faster integration across the software stack, optimized performance and power efficiency, and improved time to market.

- **Build:** Implement efficient, high-performance multi-architecture code for IoT applications that exploits all the cutting-edge features of powerful Intel® architectures (CPU, GPU, FPGA). Optimize and efficiently debug code early in the design cycle.
- **Analyze:** Quickly pinpoint code-tuning opportunities with deep analysis of performance characteristics— including system behavioral analysis, power-related metrics, and hardware-specific optimizations.
- **Work seamlessly with other Intel® domain-specific tools:** Accelerate specialized IoT applications and workloads (e.g., AI analytics, video processing, deep learning inference).
- **Take advantage of Priority Support:** Connect directly to Intel engineers for confidential answers to technical questions.

Intel® oneAPI Base + IoT Toolkit

Direct Programming

Intel® oneAPI DPC++/C++ Compiler
 Intel® C++ Compiler Classic
 Intel® DPC++ Compatibility Tool
 Intel® FPGA Add-On for oneAPI Base Toolkit
 Yocto Project* and OpenEmbedded* Meta-Intel Layer

API-Based Programming

Intel® oneAPI DPC++ Library
 Intel® oneAPI Math Kernel Library
 Intel® oneAPI Data Analytics Library
 Intel® oneAPI Threading Building Blocks
 Intel® oneAPI Video Processing Library
 Intel® oneAPI Collective Communications Library
 Intel® oneAPI Deep Neural Network Library
 Intel® Integrated Performance Primitives

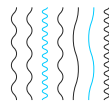
Analysis and Debugging Tools

Intel® Advisor
 Intel® Inspector
 Intel® VTune™ Profiler
 Intel® Distribution for GDB*

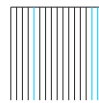
*Hardware support varies by individual oneAPI tool.

Additional architecture support will be expanded over time.

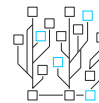
*Other names and brands may be claimed as the property of others.



CPU



GPU



FPGA

Highlights

Powerful tools for optimized cross-architecture edge solutions

The Intel oneAPI Base and IoT Toolkit gives you the tools to target multiple architectures, whether you're running the applications on IoT endpoint devices or large-scale edge deployments.

SYCL for direct programming

C++ with SYCL provides easy multi-architecture development of flexible and performant edge solutions.. It allows code reuse across hardware targets and enables high productivity and performance across CPU, GPU, and FPGA architectures while permitting accelerator-specific tuning. The unified C/C++/ SYCL Compiler (LLVM-based) also includes full modern C and C++ languages and OpenMP support.

Libraries for API-based programming

Powerful libraries—including deep learning, math, video, and media processing—are preoptimized for domain-specific functions and custom-coded to accelerate compute-intensive workloads.

Advanced analysis and debug tools

For profiling, design advice, and debug, Intel oneAPI products include the foremost analysis tools:

- **Intel® VTune™ Profiler** to find performance bottlenecks fast in CPU, GPU, and FPGA systems.
- **Intel® Advisor** for vectorization, threading, and accelerator offload design.
- **Intel® Inspector** to debug threading, memory, and persistent memory errors.
- **Intel® Distribution** of GDB for efficient debug of IoT applications using a standards-based debugger.

Linux kernel build with OpenEmbedded or Yocto Project

For developing custom Linux kernels, developers can take advantage of the meta-intel layer provided through **OpenEmbedded** or **Yocto Project** to integrate essential oneAPI tools to quickly create and customize Linux kernels based on the Yocto Project for edge devices and systems.

What you get

- **Intel® oneAPI DPC++/C++ Compiler:** A standards-based CPU, GPU, and FPGA compiler supporting C++, C, SYCL, and OpenMP. It leverages well-proven LLVM compiler technology and Intel's history of compiler leadership in performance.

Experience seamless compatibility with popular compilers, development environments, and operating systems.

- **Intel® C++ Compiler Classic:** A standards-based C/ C++ compiler supporting OpenMP, focused on CPU development. Take advantage of more cores and built-in technologies in platforms based on Intel® CPU architectures. Experience seamless compatibility with popular compilers, development environments, and operating systems.
- **Intel® DPC++ Compatibility Tool:** Migrate legacy CUDA code to a multi architecture application in ISO C++ with SYCL code with this assistant.
- **Intel® oneAPI DPC++ Library:** Speed up data parallel workloads with these key productivity algorithms and functions.
- **Intel® oneAPI Threading Building Blocks:** Simplify parallelism with this advanced threading and memory-management template library.
- **Intel® oneAPI Math Kernel Library:** Accelerate math processing routines, including matrix algebra, fast Fourier transforms (FFT), and vector math.
- **Intel® oneAPI Data Analytics Library:** Boost machine learning and data analytics performance.
- **Intel® oneAPI Video Processing Library:** Deliver fast, real-time video decoding, encoding, transcoding, and processing for broadcasting, livestreaming and VOD, cloud gaming, and more.
- **Intel® oneAPI Deep Neural Network Library:** Develop fast neural network frameworks on Intel CPUs and GPUs with performance-optimized building blocks.
- **Intel® oneAPI Collective Communications Library:** Implement optimized communication patterns in deep learning frameworks. Use the components separately or together as the foundation of deep learning frameworks.
- **Intel® Integrated Performance Primitives:** Speed performance of imaging, signal processing, data compression, and more.
- **Intel® FPGA Add-on for oneAPI Base Toolkit (optional):** Program these reconfigurable hardware accelerators to speed specialized, data-centric workloads. Requires installation of the Intel oneAPI Base Toolkit.

Priority Support

Every paid version of Intel® oneAPI Software Development Toolkits automatically includes Priority Support at our Online Service Center for a duration starting with your purchase, typically one year.

You get:

- **Direct and private interaction with Intel's support engineers**, including the ability to submit confidential support requests.
- **Accelerated response time** for toolkit-related technical questions and other product needs.
- **Priority oneAPI Toolkit Support** for older versions, defect escalation, and feature requests.
- **Free download access** to all new product updates and continued access to older versions of the product.

- **Access to a vast library** of self-help documentation that builds off decades of experience with creating.
- **Additional services** at a reduced cost, including on-site or online training and consultation by Intel technical consulting engineers.

Try your code in the Intel® Developer Cloud

Develop, run, and optimize your Intel oneAPI code in the Intel® DevCloud—a free development sandbox with access to the latest Intel® CPU, GPU, and FPGA hardware and Intel oneAPI software.

Get started

Learn More about [Intel® oneAPI Products](#) ›

Get the [Intel® oneAPI Base & IoT Toolkit with Priority Support](#) ›

Check out the [Intel® Developer Cloud](#) ›



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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. See backup for configuration details. For more complete information about performance and benchmark results, visit intel.com/benchmarks.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See configuration disclosure for details. No product or component can be absolutely secure.

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