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Intel Innovation Spotlights New Products, Technology and Tools for Developers

Alibaba, Argonne, AT&T, Google Cloud, Microsoft, SiPearl and others showcase power of open ecosystem to create world-changing tech.

NEWS HIGHLIGHTS

- Announcing a unified Developer Zone, new oneAPI 2022 toolkits and new oneAPI Centers of Excellence designed to better enable developers to access reference designs, toolkits and other assets across AI, client, cloud, 5G/edge and gaming with an open, standard-based, unified programming environment.
- Introducing 12th Gen Intel® Core™ processors built on Intel 7 process technology to provide superior computing performance for every PC segment and to the edge.
- The Aurora supercomputer to exceed two exaflops of peak double precision compute performance.
- Google Cloud and Intel unveil deep partnership and joint development of Mount Evans, Intel's first ASIC-based IPU.

SAN FRANCISCO--(BUSINESS WIRE)-- Today at its inaugural Intel Innovation event, Intel returned to its developer roots, highlighting a renewed commitment to the community and a developer-first approach across software and hardware. Announcements spanning new products, developer tools and technologies underscore Intel's focus on empowering an open ecosystem, ensuring choice for developers to use the tools and environments they prefer, and building trust and partnership across cloud service providers, open source communities, startups and others.

"As the creator of the original Intel Developer Forum, it's a great honor to once again bring together people from across the ecosystem to explore the future of technology," said Intel CEO Pat Gelsinger. "Developers are the true superheroes of the digitized world – a world which is underpinned by semiconductors. We will not rest until we've exhausted the periodic table, unlocking the magic of silicon and empowering developers so that, together, we can usher in a new era of innovation."

MORE: Press Kits: Intel Innovation 2021 | 12th Gen Intel Core … **Webcast:** Intel Innovation Keynote … **News Release:** Intel Unveils 12th Gen Intel Core, Launches World's Best Gaming Processor, i9-12900K … **Intel Innovation Topic News:** Developer/oneAPI | Ubiquitous Computing | Artificial Intelligence | Cloud-to-Edge Infrastructure | Pervasive Connectivity

Intel detailed key investments for developers, including an updated, unified and more comprehensive Developer Zone, oneAPI 2022 toolkits and new oneAPI Centers of Excellence. All are intended to improve access to resources and simplify development across central processing unit (CPU) and accelerator architectures:

- **Developer Zone:** To improve ease of access to reference designs, toolkits and other assets across AI, client, cloud, 5G/edge and gaming, the new resource provides developers with access to a consolidated Intel® Developer Catalog of key Intel software offerings, as well as an improved Intel® DevCloud development environment to test and run workloads on a variety of Intel's latest hardware (CPUs, graphics processing units (GPUs), field programmable gate arrays (FPGAs) and accelerators) and software tools.
- **oneAPI 2022:** Intel is preparing to ship oneAPI 2022 toolkits with 900 new features since it shipped last year. This new release adds cross-architecture software development capabilities for CPUs and GPUs through the first unified C++/SYCL/Fortran compiler and Data Parallel Python and expands Advisor accelerator performance modeling, including VTune Flame Graph to visualize performance hot spots and improves productivity through extended Microsoft Visual Studio Code integration and Microsoft WSL 2 support.
- **oneAPI Centers of Excellence:** Eleven new partners were announced to deliver strategic code ports, additional hardware support, new technologies and services, and curriculum development to enable further ecosystem adoption of oneAPI. These include Oak Ridge National Laboratory, University of California Berkeley, University of Durham, and University of Tennessee, along with expansion of the Intel Graphics Visualization Institutes of Xellence to become oneAPI Centers of Excellence.

More: Developer/oneAPI News from Intel Innovation

Intel is executing to its product and process roadmap and accelerating the cadence of innovation across the superpowers – ubiquitous computing, cloud-to-edge infrastructure, pervasive connectivity and AI – enabling developers to push forward with disruption, discovery and impact.

Ubiquitous Computing: The Human-to-Technology Interaction Point

Computing capabilities permeate every aspect of our existence, serving as the human to technology interaction point across existing devices and emerging form factors. Soon, we will all have thousands of devices at our immediate disposal. By the end of this decade, there will be the potential for every human to have 1 petaflop of computing power and 1 petabyte of data less than 1 millisecond away.

By breaking down walled gardens and building an open environment, Intel is driving the future of the PC – new CPUs, GPUs and platform advancements – creating huge opportunities for developers to create amazing experiences:

- **12th Gen Intel Core Processors:** The performance hybrid architecture of this new family[1] represents an architectural shift made possible by close co-engineering of software and hardware and will deliver new levels of leadership performance for generations. The 12th Gen Intel Core family will include 60 processors set to power more than 500 designs from high-performance desktops to ultra-thin-and-light laptops.

The company is currently shipping 28 SKUs to OEM partners, and launching the first six desktop processors today, headlined by the unlocked Intel Core i9-12900K – the world's best gaming processor.[2]

- **Data Science Solution:** Data scientists can now iterate, visualize and analyze complex data at scale with the highest memory configuration of any similar offerings with this new solution powered by Intel® Core™ and Intel® Xeon® architectures. Combining workstation hardware and Intel oneAPI AI Analytics toolkit to enable "out of the box" AI development, this solution is now available on Linux-based workstation PCs from Dell, HP and Lenovo. Additionally, Microsoft and Intel have partnered to bring a complete data science tool chain to Windows 11, which will be available first on the new Surface Laptop Studio.
- **Intel® Arc™ Alchemist Family of Graphics SoCs:** Designed to be gaming first, the first generation of Intel Arc high-performance discrete GPUs (code-name "Alchemist") will offer X^e Super Sampling (X^{e}SS) – a novel upscaling technology that game developers are now integrating into their games. X^{e}SS takes advantage of machine learning and Alchemist's built-in XMX AI accelerators to deliver high-performance and high-fidelity visuals. X^{e}SS is implemented using open standards to ensure wide availability on many games and across a broad set of hardware. In addition, Alchemist will support Deep Link technology on Intel platforms, with new computing capabilities including Hyper Encode, allowing simultaneous acceleration of a single video file transcode across integrated and discrete graphics engines.

More: 12th Gen Intel Core/Ubiquitous Computing News from Intel Innovation

Cloud-to-Edge Infrastructure: Unlimited Scale and Capacity in the Cloud Combines with Unlimited Reach through the Intelligent Edge

Computing is spreading across heterogeneous fabrics of CPUs, GPUs, application accelerators, interconnect processors, edge-computing devices and FPGAs – all of which require persistent memory and software to bind these elements into a complete solution. The race to zettascale is on to generate, store and analyze data at scale. It took over 12 years to get from petascale to exascale computing. Intel has challenged itself to make it to zetta in five years: zetta 2027. Central to this goal is Intel's work with the open ecosystem to ensure developers have optimized tools and software environments to accelerate their deployments:

- **Ponte Vecchio and oneAPI Support SiPearl's Microprocessors:** SiPearl is designing a microprocessor that will be used in European exascale supercomputers and has selected Intel's Ponte Vecchio GPUs as the high performance computing (HPC) accelerator within the system's HPC node. To tie compute environments together, SiPearl is adopting oneAPI as the open software specification to increase developer productivity and workload performance.
- **Next-Generation Intel® Xeon® Scalable Processors (Code-named "Sapphire Rapids") Optimization:** Intel is working with the open source community and its large pool of ecosystem partners to make it easy for developers to build on its next-generation processor. It will integrate several new acceleration engines designed to tackle overhead in data-center-scale deployment models, while enabling greater processor core utilization and reducing power and area costs.

Intel also highlighted that cloud developers have broad access to the latest 3rd Gen Intel®

Xeon® Scalable processors within major cloud service providers, including Alibaba, AWS, Baidu, Google, Microsoft, Oracle and Tencent.

More: Cloud-to-Edge Infrastructure News from Intel Innovation

Pervasive Connectivity: Everyone and Everything is Connected

With networks programmable top-to-bottom and end-to-end, the future lies in a fully programmable network that is truly open – where developers have the freedom to move at the speed of software. Intel is the only company offering a comprehensive set of hardware and software to create an end-to-end programmable network – from Intel Xeon Scalable processors and next-generation Xeon-D to new P4-programmable infrastructure processing units (IPUs) and switches:

- **Intel® Intelligent Fabric** is an end-to-end programmable platform leveraging Intel's unique hardware and software offerings to advance business opportunities and put control in the hands of the developers.
    - **ASIC-based IPU (Code-named "Mount Evans"):** Intel and Google Cloud announced deep collaboration on the design and development of this first-of-its-kind open solution supported by industry-standard programming language and open sourced Infrastructure Programmer Development kit to simplify developer access to the technology in Google Cloud data centers.
    - **Intel® Tofino™ 3 Intel fabric processor** (IFP) adds intelligence to switching through P4 programmability and acceleration of AI workloads. Additionally, IFP is fully P4-programmable, placing the power back in the hands of the network programmer and paving the way to more secure and self-healing cloud fabric.
- **AT&T**, supported by an established ecosystem of solution providers, will use Intel as a silicon provider for deployment of its forthcoming virtualized radio access network (vRAN), giving it the flexibility to bring automation and cloud-like capabilities into its network, along with optimizations for performance, cost and operational efficiency.
- **DEKA Research & Development Corporation is collaborating with FedEx to develop Roxo™, the FedEx SameDay Bot®,** designed for reliable, autonomous last-mile delivery to a customer's door. Roxo is being tested with 11th Gen Intel® Core™ i7 processors, Intel® RealSense™ depth cameras and uses OpenVINO™ as the AI inferencing engine. With the 11th Gen Intel Core i7 processors, Intel is helping DEKA create a power-efficient and high-performing compute platform.

More: Pervasive Connectivity News from Intel Innovation

Artificial Intelligence: Making AI More Accessible and Scalable for Developers

Intel's deep investments in developer ecosystems, tools, technology and an open platform are clearing the path forward to scale AI everywhere. Intel's role is to responsibly scale this technology. Intel has made AI more accessible and scalable for developers through extensive optimizations of popular libraries and frameworks on Intel Xeon Scalable processors. Intel's investment in multiple AI architectures to meet diverse customer requirements, using an open standards-based programming model, makes it easier for developers to run more AI workloads in more use cases. Many of the world's leading organizations leverage Intel AI to solve complex tasks, as evidenced by today's announcements:

- **The Aurora Supercomputer at Argonne National Laboratoryto Exceed 2 Exaflops of Peak Performance:** The co-designed Aurora supercomputer featuring next-gen Intel Xeon Scalable processors (code-named “Sapphire Rapids”) and next-gen Intel GPUs (code-named “Ponte Vecchio”) will exceed two exaflops of peak double precision compute performance. Aurora is designed to handle high-performance computing, AI/ML and big data analytics workloads. Argonne National Laboratory is a U.S Department of Energy national laboratory and is at the forefront of the nation's efforts to deliver future exascale computing capabilities.
- **Intel AI powers Alibaba Recommendation Engine:** Alibaba and Intel partnered building an end-to-end toolkit called DeepRec, to facilitate deep learning training and deployment of recommendation systems – a workload which consumes a significant portion of all data center and cloud AI cycles and has diverse compute, memory, bandwidth, and network needs. DeepRec developers can easily load and update models, process embedding layers, leverage existing model zoos and deploy extremely-large-scale recommendation-based services with trillions of samples.
- **AI Toolkits Optimized for Intel Xeon Scalable Processors:**Intel-optimized AI toolkits provide data scientists greater performance and productivity out of the box. Intel has partnered with the open source community, as well as Amazon, Baidu, Facebook, Google and Microsoft to ensure the most popular data science software – including Pandas, scikit-learn, MXNet, PaddlePaddle, PyTorch, TensorFlow, ONNX Runtime and more – is optimized to run on Intel hardware.
- **Accelerating AI Performance in Next-Gen Intel Xeon Scalable Processors:**Intel is targeting to deliver up to a 30 times total AI performance gain over its prior generation with its next-generation Intel Xeon Scalable processor (“Sapphire Rapids”). These performance gains are achieved through both extensive software optimizations and the forthcoming processor’s built-in AMX engine and will enable even more AI use cases without the need for discrete GPUs.

More: Artificial Intelligence News from Intel Innovation

“Innovation thrives in open environments where developers connect, communicate and collaborate freely. Technology is a human creation and builds what is possible,” said Greg Lavender, chief technology officer, senior vice president and general manager of the Software and Advanced Technology Group at Intel. “Technology is also inherently neutral. It is up to everyone to use it in a way that is more responsible, inclusive, sustainable and ethical. Intel has doubled down on its deep legacy in open platforms and massive inventory of foundational software technologies with the specific intention of enabling software innovation."

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.

[1] Not available on certain 12th Gen Intel Core processors. More details at

www.Intel.com/InnovationEventClaims.

[2] As measured by unique features and superior in-game benchmark mode performance (score or frames per second) on majority of the 31 game titles tested (as of Oct 1, 2021), including in comparison to AMD Ryzen 5950X. See intel.com/12thgen for additional details. Results may vary.

Performance varies by use, configuration and other factors. See www.intel.com/InnovationEventClaims for workloads and configurations. Results may vary.

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. No product or component can be absolutely secure.

Your costs and results may vary.

Intel technologies may require enabled hardware, software or service activation.

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