IBM Newsroom

IBM Demonstrates Commitment to Open Hardware Movement

Contributes Open Source Designs to Move Data More Quickly, Accelerating AI and Hybrid Cloud Workloads

Endorses move of OpenPOWER to The Linux Foundation to Expand Innovation Ecosystem

SAN DIEGO, Aug. 21, 2019 /PRNewswire/ -- IBM (NYSE: IBM) announced today at The Linux Foundation Open Source Summit that it will be contributing implementation rights to key technologies to the open community, further building upon IBM's long legacy of open source development. IBM is opening the POWER Instruction Set Architecture (ISA), which is critical to how hardware and software work together on POWER. With the ISA and other technologies being contributed to the open community, developers will have the tools to build innovative new hardware that takes advantage of POWER's enterprise-leading capabilities to process data-intensive workloads and create new software applications for AI and hybrid cloud built to take advantage of the hardware's unique capabilities.

IBM will also contribute other technologies including a softcore implementation of the POWER ISA, as well as reference designs for the architecture-agnostic Open Coherent Accelerator Processor Interface (OpenCAPI) and the Open Memory Interface (OMI). The OpenCAPI and OMI technologies help maximize memory bandwidth between processors and attached devices, critical to overcoming performance bottlenecks for emerging workloads like AI.

"With today's announcement IBM is taking another significant step in driving innovation across the industry through open technology and open source," said IBM's OpenPOWER General Manager Ken King. "With our recent Red Hat acquisition and today's announcement, IBM becomes the only processor vendor and POWER becomes the only commercially-available architecture with a completely open system stack, from the foundation of the hardware through the software stack."

To help guide these technologies through the next phase of their open journey, IBM also collaborated with the OpenPOWER Foundation to announce that OpenPOWER will move under the Linux Foundation, and will operate consistently with the Linux Foundation's open governance principles.

IBM co-founded OpenPOWER in 2013, and since then the organization has grown to over 350 members that have produced hundreds of innovations around the POWER architecture. Collaborating with OpenPOWER

members Red Hat, NVIDIA, and Mellanox, IBM led the delivery of the two most powerful supercomputers in the world, the US Dept of Energy's Summit and Sierra. IBM has contributed over 2 million lines of open source system firmware and system reference designs with extensive documentation around the POWER architecture to enable OpenPOWER system developers and will continue to work with OpenPOWER and the Linux Foundation to innovate on POWER.

"Back in 2013 we were excited to see that IBM took the first steps in opening the company's POWER architecture," said Jim Zemlin, Executive Director of the Linux Foundation. "The Linux Foundation itself has seen rising interest in open hardware communities and working with OpenPOWER Foundation will continue to make the OpenPOWER and open hardware technologies available to a growing, global audience."

Open POWER ISA Gives More Options to Develop Compute Hardware

As the demand rises for more and more compute-intensive workloads like AI and in-memory analytics, commodity systems vendors have struggled to improve performance with the looming predictions of the end of Moore's Law. Central processing units (CPUs) may no longer handle the rising demands alone, and IBM's heterogeneous systems are built to maximize the flow of data between CPUs and attached devices for specialized workloads. This approach was validated by the US Dept of Energy's Summit and Sierra supercomputers, the #1 and #2 most powerful supercomputers in the world.

By accepting IBM's contribution of implementation rights to the POWER ISA and moving under the Linux Foundation, the OpenPOWER Foundation will be empowering this technology to be driven within a broad open community allowing for innovations to be brought forward and adopted by the ecosystem.

IBM's opening of the implementation rights, inclusive of patents, to the POWER ISA give hardware developers a royalty-free approach to build around a commercially-driven CPU architecture with enterprise-ready features and security. The governance model within the Linux Foundation gives software developers assurance of compatibility while developing AI and hybrid cloud native applications that take advantage of POWER's rich feature set and best of breed open compute hardware and software ecosystems.

"IBM and the OpenPOWER Foundation have been long-standing partners with Red Hat in delivering open source innovation to enterprise IT organizations," said Chris Wright, CTO, Red Hat. "We're excited to see what the community ecosystem can build with today's newly contributed technologies."

Architecture Agnostic Open Interface Implementations

OpenCAPI is an open interface architecture that enables low-latency coherent attachment for hardware accelerators, network and storage controllers, as well as advanced memories such as emerging storage class memories. Open Memory Interface (OMI) is a subset of OpenCAPI that provides industry-leading memory bandwidth, with extremely low latency, between CPUs and attached memory devices within a system. Leveraging over 20 years of IBM experience in disaggregated memory controllers, OpenCAPI Consortium member Microchip Technology recently announced the industry's first commercially available universal serial memory controller, the SMC 1000 8x25G, which uses and interfaces to the OMI designs IBM is contributing. According to Microchip, the new controller enables CPUs and other compute-centric devices to utilize four times the memory channels within the same device footprint. Microchip and other partners shared their excitement around this news.

"Microchip is excited to introduce the industry's first universal serial memory controller device to the market," said Pete Hazen, Vice President of the Data Center Solutions business unit at Microchip Technology. "New memory interface technologies such as Open Memory Interface (OMI) enable a broad range of applications to support the increasingly demanding memory requirements of high-performance data center applications."

To learn more about the newly opened technology, please read more on the IBM Systems blog at: http://www.ibm.com/blogs/systems/embracing-and-expanding-the-open-hardware-ecosystem.

Additional Supporting Quotes

"Our mission for the OpenPOWER Foundation is to foster collaborative innovation across our ecosystem and our more than 350 members around the world," said OpenPOWER Foundation Executive Director Hugh Blemings. "We're ready to take the next step in our journey by advancing the POWER Architecture under an open model and making it available to a growing community with the guidance of the Linux Foundation."

"For over 15 years, Samsung and IBM have had a strategic partnership based on a shared commitment to open collaboration and cutting-edge innovation," said Ryan Lee, Vice President of Foundry Marketing at Samsung Electronics. "With IBM opening the POWER ISA and contributing OpenCAPI and OMI reference implementations for use in any platform, we expect the industry will be able to innovate in new and unique ways to deliver value for the customers."

"Hitachi joined the OpenPOWER Foundation because we believe that an open ecosystem enabled with the latest technology will drive client value," said Nobuhiro Kato, Vice President, IoT & Cloud Services

Business Division, Hitachi, Ltd. "Today's announcement from IBM underscore the open momentum and we look forward to accelerating open innovation to help our clients succeed."

"Mellanox and IBM have had deep technological collaborations over the years, culminating in building the world's fastest supercomputers and leading cloud and enterprise data centers," said Chuck Tybur, Senior Vice President of worldwide OEM & channel sales at Mellanox Technologies. "Mellanox is a top open-source software contributor and believes in open standards and community development efforts. We are proud members of the OpenPOWER and OpenCAPI organizations and are looking forward to continue our contributions in the future."

"As one of the first public clouds to offer the POWER architecture for High Performance Computing and Deep Learning applications, and the first to support unique CAPI-accelerated workloads, we are excited to see the next big evolution as these technologies move to open source," said Steve Hebert, CEO, Nimbix. "The Nimbix JARVICE XE multi-cloud platform and HyperHub marketplace have day one support for both POWER and OpenCAPI workloads."

"NVIDIA's support of open ecosystems has helped ignite an era of innovation powered by our GPU-accelerated computing platform," said Marc Hamilton, vice president of Solutions Architecture and Engineering at NVIDIA. "IBM's continued efforts to enable the open community with enterprise-grade hardware designs provides welcome flexibility and choice to NVIDIA's community of more than 1.3 million active developers worldwide."

"As our industry continues to evolve, the open hardware communities will grow as evidenced in IBM's announcement," said Zvonimir Bandic, Chairman of the OpenCAPI Consortium and Chairman of the CHIPS Alliance. "Since its inception in 2016, the OpenCAPI Consortium has been a supporter of this direction while we also continue to investigate how we grow this community and further this strategy through engagement with other open source hardware organizations."

"Xilinx believes that an open community spawns more innovation," said Donna Yasay, Vice President of Marketing, Data Center Group, Xilinx, Inc. "We believe that IBM's move to contribute its POWER ISA and key hardware reference designs to the open source community, and now under the guidance of the Linux Foundation, will enable a broader ecosystem with better technology and platforms to solve critical computing challenges today and in the future."

"The slowing down of Moore's Law provides the open source community with the opportunity to develop

innovative hardware that improves performance while reducing development and manufacturing costs," said Bapi Vinnakota, director of silicon architecture at Netronome and the Open Compute Project's (OCP) Open Domain Specific Architecture (ODSA) Sub-Project Lead. "IBM's opening of the POWER ISA, along with open sourcing reference designs, shares the ODSA's mission of enabling customers to bring open, cost-efficient, low-power accelerator products to market."

"The opening of the Power ISA, an architecture with a long and distinguished history, will help the open hardware movement continue to gain momentum," said Mateo Valero, Director of Barcelona Supercomputing Center. "BSC, which has collaborated with IBM for more than two decades, is excited that IBM's announcements today provide additional options to initiatives pursuing innovative new processor and accelerator development with freedom of action."

Contact:
Sam Ponedal
IBM Media Relations
sponeda@us.ibm.com
916-217-0145

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