PFN, IIJ and JAIST to Launch Joint Research Project on Ultra-High-Efficiency AI Computing Infrastructure

Participants aim to build large-scale commercial AI computing infrastructure powered by ultra-high-efficiency AI accelerators

TOKYO and NOMI, Japan – December 5, 2023 – Preferred Networks, Inc. (PFN), Internet Initiative Japan Inc. (IIJ) and Japan Advanced Institute of Science and Technology (JAIST) will launch a joint research project on ultra-high-efficiency AI computing infrastructure. The project has been selected by Japan's New Energy and Industrial Technology Development Organization (NEDO) to participate in its "Research and Development Project of the Enhanced Infrastructures for Post-5G Information and Communication Systems/Development of post-5G information and communication systems (Commission)."

The three participants will launch the joint research project in response to the exponential increase in demand for computing power that supports AI technologies. The joint project will focus on energy efficiency of AI accelerators and density of arithmetic devices in data centers, which are essential for sustainable development of AI technologies.

PFN, as the project's lead, will develop hardware and software including compilers that can efficiently process practical workloads of AI systems including foundation models. PFN will lead the joint project based on its expertise including its MN-Core™ series of AI accelerators, MN-3 supercomputer which has topped the Green500 list of the world's most energy-efficient supercomputers three times, and its deep insight in foundation model and AI workloads. PFN's other roles will include:

- Research and development of ultra-high-efficiency AI accelerator system and its control technology
- Research and development of water-cooled high-density servers

IIJ will use its expertise in building and operating large-scale data centers and cloud services to conduct research on high-density data center infrastructure that will support large-scale commercial services. IIJ's other roles will include:

- Development of data center reference model with economy, continuity and readiness for practical use
- Establishment of hybrid cooling system that combines cooling and air-conditioning technologies for high-heat IT devices
- Development of assessment method and metrics for energy efficiency for AI computing infrastructure

In addition, PFN, IIJ and JAIST will jointly conduct research on operation efficiency of commercial AI computing infrastructure in a multi-tenancy environment as well as streamlining of practical AI workloads. Other roles of the three participants will include:

- Development of technology for efficient AI workload execution
- Development of technologies that enhance efficiency of data center facilities
- Assessment metrics and method for effective efficiency on AI computing infrastructure testbed

Through the joint project, PFN, IIJ and JAIST plan to collaborate to build an environment where companies and organizations can build internationally competitive next-generation AI foundation models.

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About Preferred Networks
Preferred Networks (PFN) was established in March 2014 with the goal to develop practical, real-world applications of deep learning, robotics and other advanced technologies. PFN's business domains include transportation, manufacturing, life sciences, robots, plant optimization, materials discovery, education and entertainment. In 2015, PFN developed Chainer™, the open-source deep learning framework. PFN's MN-3 supercomputer, which is equipped with the MN-Core™ deep learning processor, topped the Green500 list three times in 2020 and 2021. https://www.preferred.jp/en/

About Internet Initiative Japan Inc. (IIJ)
Founded in 1992, IIJ is one of Japan's leading Internet-access and comprehensive network solutions providers. IIJ and its group companies provide total network solutions that mainly cater to high-end corporate customers. IIJ's services include high-quality Internet connectivity services, systems integration, cloud computing services, security services and mobile services. Moreover, IIJ has built one of the largest Internet backbone networks in Japan that is connected to the United States, the United Kingdom and Asia. IIJ listed on the First Section of the Tokyo Stock Exchange ("TSE") in 2006 and transitioned to the Prime Market of TSE from April 2022. For more information about IIJ, visit the IIJ Web site at https://www.iij.ad.jp/en/.

About JAIST
Founded in 1990 in Ishikawa prefecture, the Japan Advanced Institute of Science and Technology (JAIST) was the first independent national graduate school in Japan. After 30 years of steady progress, JAIST has become one of Japan's top-ranking universities. JAIST counts with multiple satellite campuses and strives to foster capable leaders with a state-of-the-art education system where diversity is key; about 40% of its alumni are international students. The university has a unique style of graduate education based on a carefully designed coursework-oriented curriculum to ensure that its students have a solid foundation to conduct cutting-edge research. JAIST also works closely both with local and overseas communities by promoting industry–academia collaborative research. Website: https://www.jaist.ac.jp/english/

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