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Japan's Fujitsu, Leading the Way in Advanced HPC/QC Development

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August 2025

RECENT DEVELOPMENT

Japan's Fujitsu recently announced the development of a superconducting quantum computer (QC) targeted for 10,000 physical qubits and scheduled for competition in 2030. The system aims for 250 logical qubits implemented in Fujitsu's STAR architecture, an internal Fujitsu initiative that seeks to reduce qubit requirements for any given computation, potentially lowering the cost and complexity of building quantum computers. This effort is part of a Tokyo-funded initiative that centers on QC industrialization and is being run in conjunction with two leading Japanese HPC/QC research entities: Riken, Japan's largest comprehensive research institute, and the National Institute of Advanced Industrial Science and Technology (AIST). This follows closely on the announcement of a Fujitsu contract to design and build the next generation flagship HPC for Riken, provisionally named "FugakuNEXT," expected to be operational around 2030 as well. This classical HPC will replace Riken's current Fugaku system, currently the fastest HPC in Japan and a global top 10 HPC for the last five years. As part of this effort, Fujitsu has also been tasked with the development of the CPU processor for the system, called the Fujitsu-Monaka-X. That chip likely will be a specialized version of Fujitsu's Arm-based Monaka chip slated for 2027 availability that is designed to address HPC and AI workloads in both on-premises and cloud environments.

ANALYST COMMENT

Fujitsu and Riken have strong and enduring ties in the research on hybrid HPC/QC systems, and these near-simultaneous announcements portend the advent of one of the most powerful HPC/QC testbeds in the world. For its part, Fujitsu will likely benefit significantly from the unique position of being the main technology source for both the quantum and classical systems, gaining key experience in designing and operating such hybrid systems. Fujitsu is the only major HPC developer in the world that has a counterpart in-house QC development program as well as being one of the few HPC system developers working on proprietary CPU designs. Near-term Fujitsu rollouts of the commercially-focused Monaka chip could fine tune Fujitsu's capabilities in managing combined HPC and AI requirements that may apply to an HPC/QC environment. This project is but one aspect of Tokyo's strategy of exploring a range of QC options; Riken has already installed QCs from US-based IBM and Quantinuum, while AIST has installed a US-based QuEra machine and has a collaborative effort with Orca, a UK-Based QC supplier.

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