New Report by Hyperion Research and Alice & Bob Recommends Strategies for HPC Centers to Prepare for Quantum Integration

Report concludes HPC community must prepare for early fault-tolerant quantum computing to accelerate current workloads and advance new solutions

ST. PAUL, MN, UNITED STATES, September 9, 2025 /EINPresswire.com/ -- Alice & Bob, a global leader in the race for fault-tolerant quantum computing, and Hyperion Research, the premier industry analysis and market intelligence firm for high performance computing (HPC), today announced the release of a joint report detailing how early fault-tolerant quantum computing (eFTQC) will accelerate solutions in critical HPC applications beyond classical supercomputing capabilities within the next five years.

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> *Bob Sorensen, Sr VP & Chief Analyst, Quantum Computing at Hyperion Research*

The study, "Seizing Quantum's Edge: Why and How HPC Should Prepare for eFTQC," [link to study] provides guidance on how HPC professionals can investigate today in the design and integration of useful hybrid workflows for near-term applications.

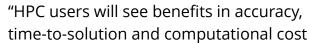According to the report, up to 50% of current HPC workloads at top U.S. government research institutions like Los Alamos National Laboratory, the National Energy Research Scientific Computing Center and U.S. Department of Energy leadership computing facilities could benefit from eFTQC .

"Quantum technologies are a pivotal opportunity for the HPC community, offering the potential to significantly accelerate a wide range of critical science and engineering applications in the near-term," said Bob Sorensen, Senior Vice President and Chief Analyst for Quantum Computing at Hyperion Research. "However, these machines won't be plug-and-play, so HPC centers should begin preparing for integration now, ensuring they can both influence system design and gain early operational expertise."

The report describes how physical limits on transistor size and chip energy capacity have

considerably slowed performance gains in classical HPC systems in the past 10 years. Meanwhile, the timeline to useful quantum applications has shortened, as evidenced by the 1000x reduction in the estimated resources required to run Shor's algorithm.

In the next 5 years, the report projects that quantum computers with 100 to 1,000 logical qubits and a logical error rate between 10-6 and 10-10 will significantly accelerate scientific computing applications starting with materials science and rapidly reaching quantum chemistry and fusion energy simulations.

"HPC users will see benefits in accuracy, time-to-solution and computational cost as hybrid HPC-quantum workflows shift some computationally complex subproblems to quantum processors," said Théau Peronnin, CEO of Alice & Bob. "HPC centers that want to lead have to co-design these hybrid workflows with users and vendors, shape efficient software and hardware infrastructure and deploy eFTQC prototypes to secure first-mover advantage."

The report describes how to integrate eFTQC, GPUs, and CPUs into an existing supercomputing center and includes recommendations for building application codes for HPC users, developing the hybrid software stack, and training the HPC user base for eFTQC adoption.

To establish a quantum-ready workforce and infrastructure and maximize the benefits of quantum processing, the report recommends that HPC centers explore heterogeneous workloads by collaborating with quantum vendors today.

"The HPC community has always been quick to adopt disruptive architectures - from vector processors to GPUs - and quantum computing is no exception," said Juliette Peyronnet, US General Manager at Alice & Bob, who co-authored the report. "This work is a call to action for HPC centers to begin preparing for eFTQC integration now, so they are ready to harness the next major HPC accelerator and task enabler."

Read the full report here: https://alice-bob.com/wp-content/uploads/2025/08/Seizing-Quantum-Edge-eFTQC-HPC-Report-Alice-Bob.pdf

About Hyperion Research

Hyperion Research is the premier industry analysis and market intelligence firm for high performance computing (HPC) and associated emerging markets. Hyperion Research analysts provide timely, in-depth mission-critical insight across a broad portfolio of advanced computing market segments, including High Performance Computing (HPC), Advanced Artificial Intelligence (AI), High-Performance Data Analysis (HPDA), Quantum Computing (QC), Cloud, and advanced technologies. The industry analysts at Hyperion Research have been at the forefront of helping private and public organizations and government agencies make intelligent, fact-based decisions related to business impact and technology direction in the complex and competitive landscape of advanced computing and emerging technologies for over 39 years.

About Alice & Bob□□□□
Alice & Bob is a quantum computing company based in Paris and Boston whose goal is to create the first universal, fault-tolerant quantum computer. Founded in 2020, Alice & Bob has already raised €130 million in funding, hired over 150 employees and demonstrated experimental results surpassing those of technology giants such as Google or IBM. Alice & Bob specializes in cat qubits, a pioneering technology developed by the company's founders and later adopted by Amazon. Demonstrating the power of its cat architecture, Alice & Bob recently showed that it could reduce the hardware requirements for building a useful large-scale quantum computer by up to 200 times compared with competing approaches. Follow Alice & Bob on LinkedIn, X or YouTube, visit their website www.alice-bob.com, or join The Cat Tree on Slack to learn more.

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