# NTU Q

SELECTED NEWS

IBM Unveils 400 Qubit-Plus Quantum Processor and Next-Generation IBM Quantum System Two

IBM kicked off the IBM Quantum Summit 2022 on 11/9, announcing breakthrough advancements in quantum hardware and software and outlining its pioneering vision for quantum-centric supercomputing. The annual IBM Quantum Summit showcases the company's broad quantum ecosystem of clients, partners, and developers and their continued progress in bringing useful quantum computing to the world.
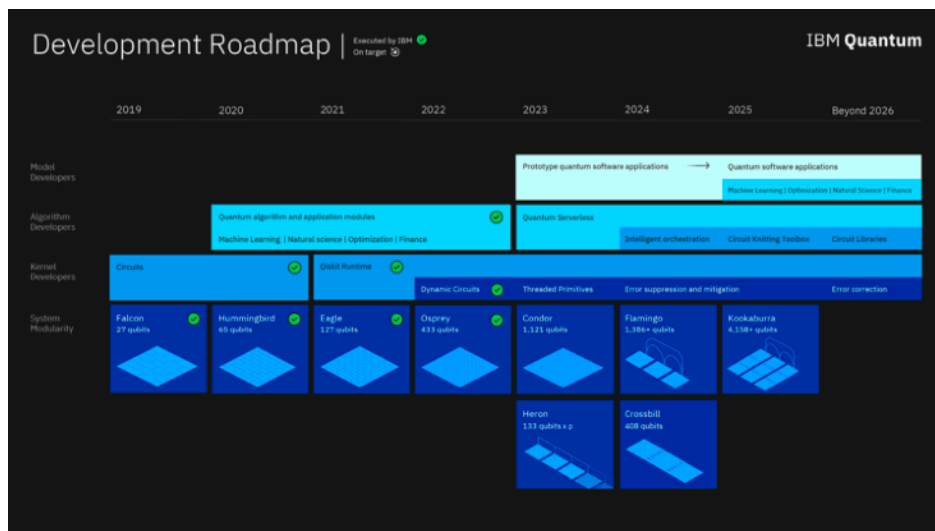
- **'IBM Osprey' - IBM's new 433-quantum bit (qubit) processor**
  This new processor is more than triples the 127 qubits unveiled last year on the IBM Eagle. It can run complex quantum computations well beyond any classical computer.

- **Error reduction**
  Noise is troublesome because it can cause errors. How using error suppression and error mitigation techniques to manage noise is not a complete solution. IBM announced the release of a beta update to Qiskit Runtime. It simplifies error mitigation by allowing users to choose how much accuracy is desired.

- **Dynamic circuits**
  Dynamic circuits are a powerful and important technology. It fundamentally changes what is

executable on IBM Quantum systems. Explore executing circuits with feedback and feedforward operations to extend what is possible with quantum circuits.

- **Quantum Safe**

  Quantum computers create an urgent need for global institutions to rethink how they secure their digital infrastructure. IBM announced its first Quantum safe partnership, Vodafone, and they're putting the world-leading Quantum Safe cybersecurity methods to understand its application for the telecom industry.

- **Quantum serverless and circuit knitting**

  The Circuit Knitting Toolbox allows developers to decompose large circuits into smaller circuits suitable for current quantum computers. Quantum Serverless will use an orchestrated solution that enables circuit knitting to decompose and recombine with classical CPUs efficiently.

- **Quantum-centric supercomputing**

  IBM Quantum System Two is the next stage in quantum systems evolution. This system integrates the classical computing resources necessary to serve Osprey and future quantum processors.

IBM Quantum Challenge Fall 2022

Welcome back for another bi-annual IBM Quantum Challenge this fall. This time we are taking you through an interactive intergalactic storyline and introducing you to a new programming model for building algorithmic routines - The Qiskit Primitives. Qiskit Primitives showcases two of the currently available primitive constructs: Sampler and Estimator - building on core common algorithmic routines in the domain of Optimization, Chemistry, and Machine Learning, while also using them as an interface to explore the offerings of the Qiskit Runtime service.

Starting on Friday, November 11, embark with us on an 8-day space journey of learning and exploring the latest cutting-edge capabilities of Qiskit and Qiskit Runtime service to help you build on skills and tackle constructing quantum algorithmic routines accommodating a few real-life deployment practices. You can read more about the challenge in the announcement blog here.