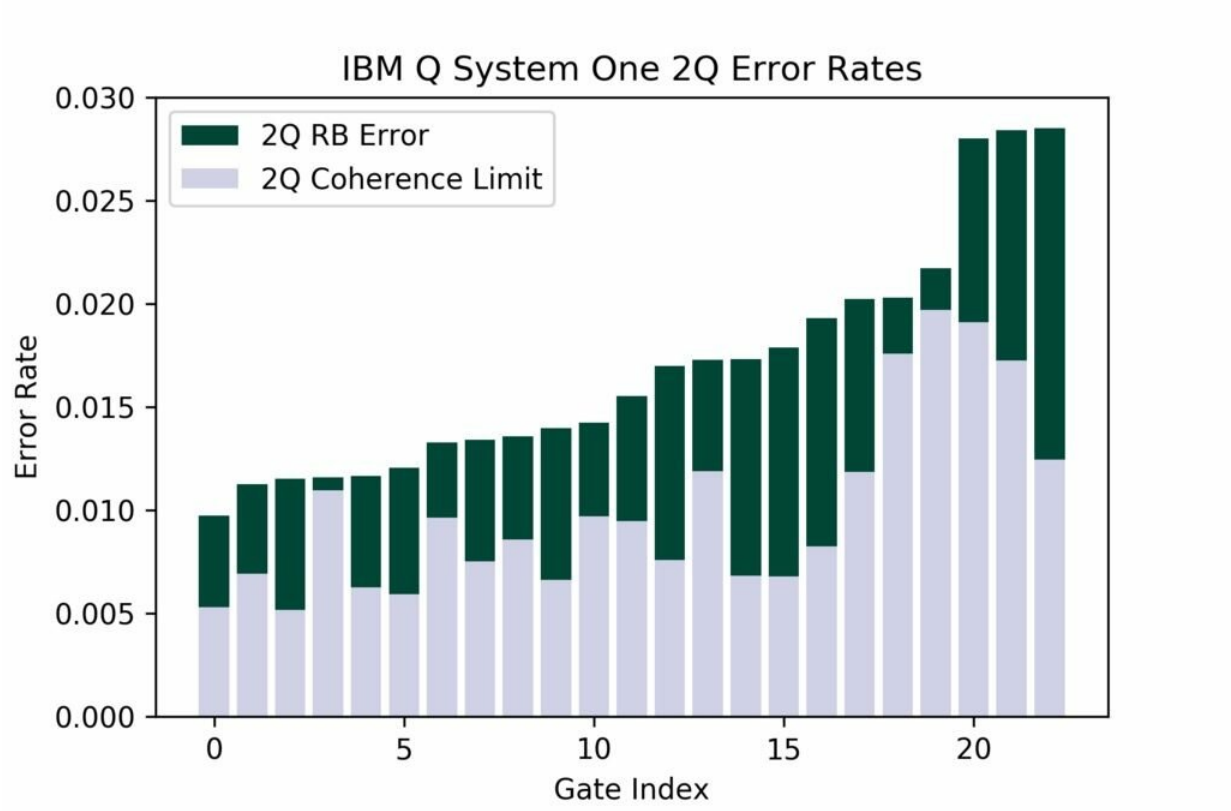
IBM announces that its System Q One quantum computer has reached its 'highest quantum volume to date'

March 5 2019, by Bob Yirka



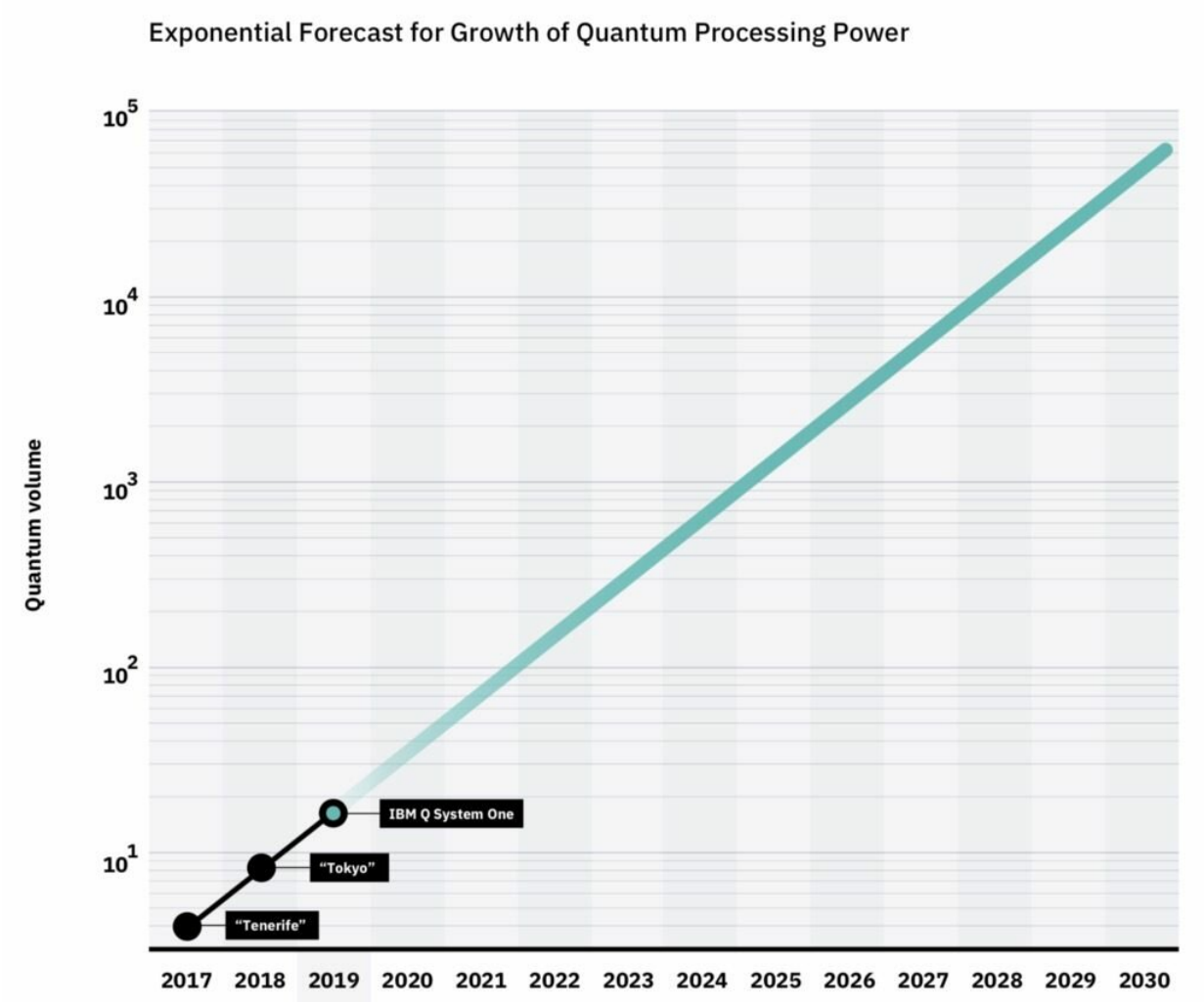
Credit: IBM

IBM has announced at this year's American Physical Society meeting that its System Q One quantum computer has reached its "highest

quantum volume to date"—a measure that the computer has doubled in performance in each of the past two years, the company reports.

Quantum computers are, as their name implies, computers based on quantum bits. Many physicists and computer scientists believe they will soon outperform traditional computers. Unfortunately, reaching that goal has proven to be a difficult challenge. Several big-name companies have built quantum computers, but none are ready to compete with traditional hardware just yet. These companies have, over time, come to use the number of qubits that a given quantum computer uses as a means of measuring its performance—but most in the field agree that such a number is not really a good way to compare two very different quantum computers.

IBM is one of the big-name companies working to create a truly useful quantum computer, and as part of that effort, has built models that they sell or lease to other companies looking to jump on the quantum bandwagon as soon as they become viable. As part of its announcement, IBM focused specifically on the term "quantum volume"—a metric that has not previously been used in the quantum computing field. IBM claims that it is a better measure of true performance, and is therefore using the metric to show that the company's System Q One quantum computer advancement has been following Moore's Law.



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As part of its announcement, IBM published an overview of the results of testing several models of its System Q One machine on its corporate blog. One such metric, notably, was "quantum volume," a metric created by a team at IBM, which is described as accounting for "gate and measurement errors as well as device cross talk and connectivity, and circuit software compiler efficiency." The team that created the metric wrote a paper describing the metric and how it is calculated and

uploaded it to the *arXiv* preprint server last November. In that paper, they noted that the new metric "quantifies the largest random circuit of equal width and depth that the computer successfully implements," and pointed out that it is also strongly tied to error rates.

Credit: IBM

More information: www.ibm.com/blogs/research/201 … ower-

quantum-device/