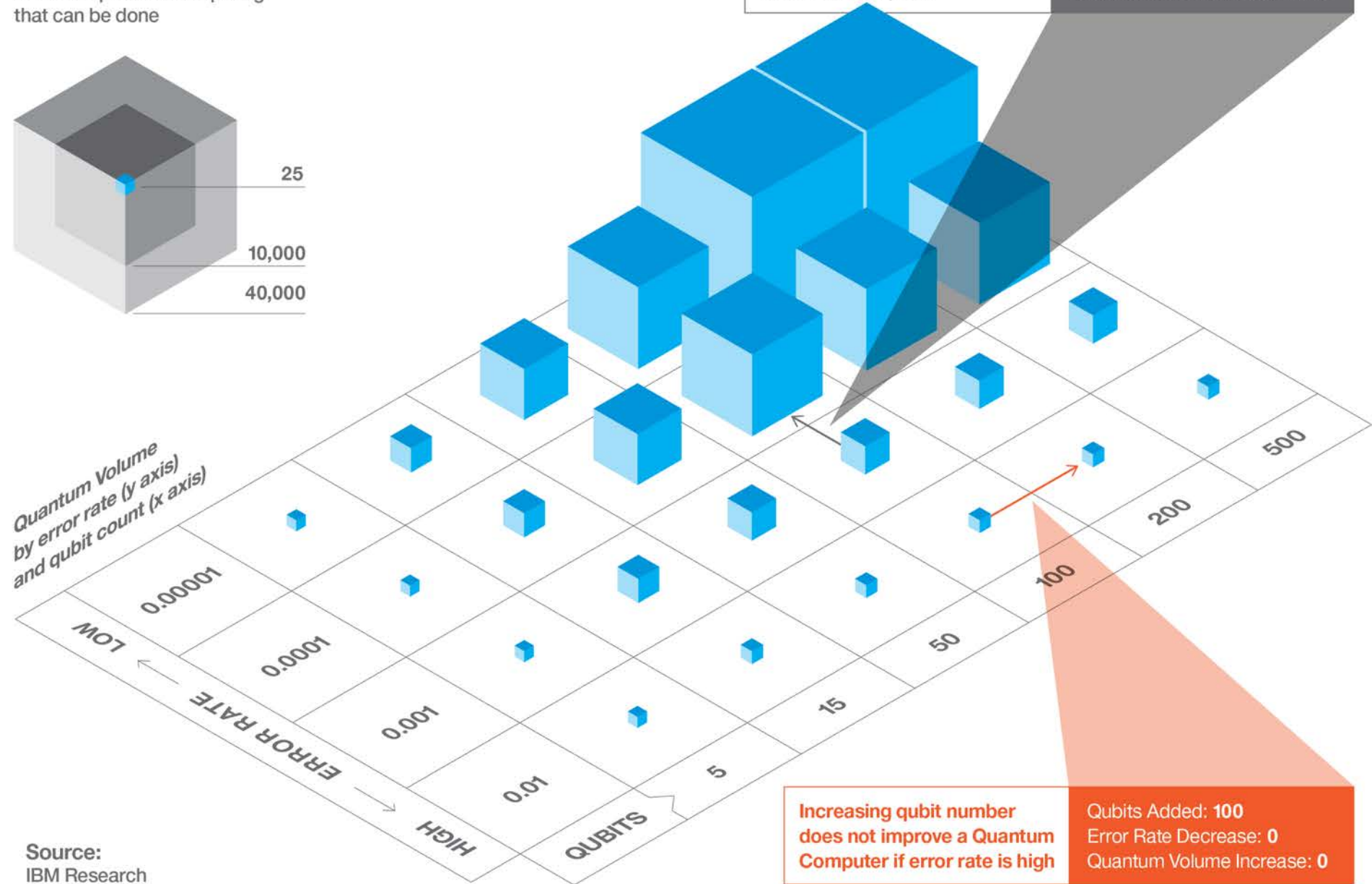
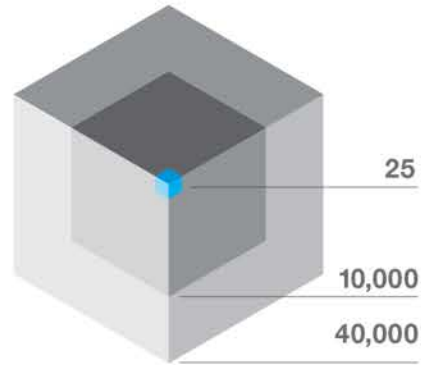


A Quantum Computer's power depends on more than just adding qubits

If we want to use quantum computers to solve real problems, they will need to explore a large space of quantum states. The number of qubits is important, but so is the error rate. In practical devices, the effective error rate depends on the accuracy of each operation, but also on how many operations it takes to solve a particular problem as well as how the processor performs these operations. Here we introduce a quantity called **Quantum Volume** which accounts for all of these things. Think of it as a representation of the problem space these machines can explore.

Quantum Volume
Volume of cube proportional to useful quantum computing that can be done



Improving the error rate will result in a more powerful Quantum Computer
Qubits Added: 0
Error Rate Decrease: 10x
Quantum Volume Increase: 24x

Increasing qubit number does not improve a Quantum Computer if error rate is high
Qubits Added: 100
Error Rate Decrease: 0
Quantum Volume Increase: 0

Source: IBM Research