BLACKSTONE from Black Brane

Tomorrow's quantum computer today.

The BLACKSTONE Virtual Quantum Machine (VQM) service by Black Brane Systems Inc (http://blackbrane.com) is a cloud-based, virtualized, *128-qubit universal quantum computer*. It acts as a plug-and-play alternative target machine for the Microsoft Quantum Developer Kit and Q# programs. Underlying Blackstone is a proprietary break though in data structures that allows an unprecedented level of scalability for quantum calculations on classical computers.

BLACKSTONE is available through the Azure marketplace and includes integration and extension libraries for: Microsoft's Quantum Development Kit (QDK); Azure services; and the .NET Core runtime. The QDK integration library includes an API-compatible drop-in replacement for *Quantum Simulator* target machines, enabling Q# developers to build and run quantum programs on BLACKSTONE without modification. The system executes up to data-flow complexity of 128 qubits in *constant-factor time* over the expected performance of a physical 128-qubit quantum chip, versus the *exponential-factor* time of state-vector simulators.

FAQ

What is a Virtual Quantum Computer?

- **Simulated quantum computers** - Every matrix multiplication is explicitly modeled
- **Emulated quantum computers** - An abstraction of quantum computers with some level of implied approximation
- **Virtual quantum computers** - The quantum circuit is transformed into an efficiently calculable data structure

What is the science behind Blackstone?

- Blackstone is based on proprietary methods around the transformation of quantum computing scenarios
- Many of these methods are on our scientific publication roadmap
- In the meantime, we encourage interested parties to explore Blackstone's capabilities empirically

