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Enabling quantum computation for EOSC users

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Quantum computing is a new emerging paradigm allowing the solution of problems not resolvable with traditional computing approaches. With hardware resources becoming available, interested researches have the possibility to experiment with quantum resources at small scale. Providers like D-Wave (Leap) or AWS (Braket) offer cloud-like access to their quantum resources. Different types of quantum hardware is available: annealing systems, trapped-ion quantum computers (gate-based machines), or computers using superconducting qubits. Access to these resources is usually available by using some sort of API or SDK, depending on the provider. For example, D-Wave offers the Python-based Ocean SDK, while AWS has the Python-based Braket SDK. Beyond APIs and SDKs offering access to these services, additional libraries were created in order to support a given scientific domain over quantum resources. For example PennyLane is a Python library for differentiable programming of quantum computers.

The presentation gives an overview of the above technologies, and shows a container-based reference architecture providing playground for quantum computing. The RA has JupyterLab deployed with a number of quickstart examples showing the usage and advantage of quantum computing, along with all the necessary dependencies deployed. Using this RA, EOSC users can start experimenting with quantum resource within minutes.

Any relevant links

Topic

EOSC Compute Platform

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