Covalent: A tool for orchestrating large scale heterogeneous scientific workflows

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Abstract

Covalent is an open-source workflow orchestration platform designed to help users manage and execute tasks on high performance and quantum computing resources. Covalent is a cross-platform, cross-language pythonic tool and includes a browser-based user interface to visualize, monitor and reproduce workflows across a wide spectrum of hardware resources. Covalent is developed and maintained by the team at Agnostiq. You can learn more at the Covalent website [1] or by visiting the github repository [2] to see the code.

References

[1]   Agnostiq (2022), Covalent www.covalent.xyz.
[2]   Agnostiq (2022), Covalent [Source code] https://github.com/ AgnostiqHQ/covalent
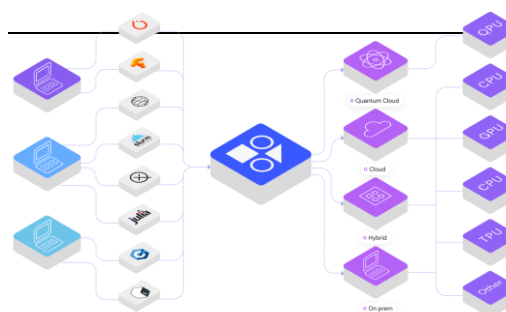
Figures

Figure 1: Users of quantum & HPC must work in a complex landscape due to numerous hardware modalities & software frameworks. To reduce effort & costs, users abstract away that complexity via a single interface, unifying hardware types, instances, environments & languages.
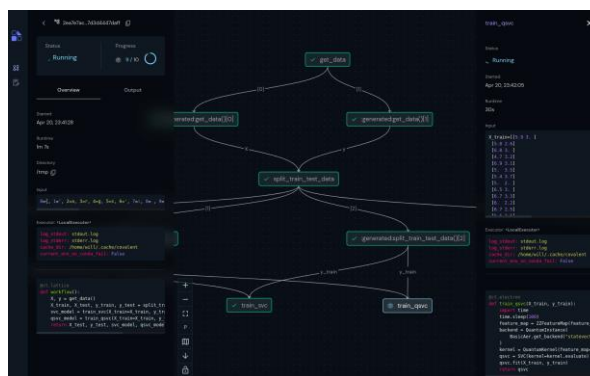

Figure 2: The dependency graph of tasks within a workflow is useful to both the user & the computer to parallelize operations. Independent tasks may be executed concurrently. The Covalent UI displays the execution progress of each workflow at the level of individual tasks.