FEDGEN Testbed: A Federated Genomics Private Cloud Infrastructure for Precision Medicine and Artificial Intelligence Research

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Abstract

The cloud computing space is enjoying a renaissance. Not long ago, cloud computing was confined to the wall of high-revenue companies, but in recent times a growing number of businesses, public and private institutions are turning to the cloud computing platform to reap the benefits of a self-service, scalable, and flexible infrastructure. Moreover, with the increased implementation, advantages, and popularity of artificial intelligence, the demand for computing environments to solve age-old problems such as malaria and cancer is on the rise. This paper presents the implementation of a cloud computing infrastructure, the FEDerated GENomics (FEDGEN) Testbed, to provide an adequate IT environment for cancer and malaria researchers. The cloud computing environment is built using Openstack middleware. OpenStack is deployed using Metal-As-A-Service (MAAS) and Juju. Virtual Machines (Instances) were deployed, and services (JupiterHub) were installed on the FEDGEN testbed. The built infrastructure would allow the running of models requiring high computing power and would allow for collaboration among teams.

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