

# Red Hat

## Scope

This Statement of Work (SOW) defines work to be performed by Harvard Data Analytics Group for Red Hat Enterprise Neurosystem. This work consists of training models across various hyperparameters and accelerators to compare which models fit well for a specific hardware. This effort is in support of Red Hat's open source efforts in helping companies be competitive by creating a centralized AI framework that can be autonomously managed.

## Overview

Red Hat is an IBM software company based in North Carolina, USA. that provides open source software products to enterprises. Being the world's leading provider of open source software solutions, Red Hat is known for being a top contributor to the Linux kernel through Red Hat Enterprise Linux. Today, Red Hat leads projects like Docker container engine, Kubernetes, and OpenStack, in addition to contributing to many other communities.

In continuing the commitment to open source, Red Hat is developing methods to support AI/ML technologies that enterprises around the world are quickly adopting. Currently, the Red Hat Enterprise Neurosystem has three workstreams: Hardware Analytics, Central Intelligence, and Federated Learning.

To help in these initiatives, HDAG will be supporting the Hardware Analytics workstream with Stanford's Linear Accelerator (SLAC) as a Proof of Concept

## Deliverables:

- **Machine Learning Deployment and Benchmarking**
  - HDAG will lead ML deployment and benchmarking on heterogeneous hardware. This includes identifying the time to train on various hyperparameters on different kinds of accelerators that will be provided by Red Hat. The data will be X-ray image data from the Stanford Linear Accelerator and the autoencoder model that will be employed is CookieNet. This work will begin with a GPU demonstration of model inference, and then expand the analysis to other accelerators like FPGA or others.

**Skills:** Machine Learning, GPU programming, Hardware Familiarity