**PROJECT PROPOSAL**

**PI CLUSTER**

**REVISION HISTORY**

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| --- | --- | --- | --- |
| Revision # | Author | Revision Date | Comments |
| 1.0 | Darrin McAdams | August 29, 2019 | initiated |
| 1.1 | Darrin McAdams | August 30, 2019 | Wrote background and requirements sections |
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Table of Contents

[Project Abstract 4](#_Toc440365550)

[High Level Requirement 4](#_Toc440365551)

[Conceptual Design 4](#_Toc440365552)

[Background 4](#_Toc440365553)

[Required Resources 4](#_Toc440365554)

## Project Abstract

This document proposes creating a Raspberry Pi compute cluster for testing purposes. Using single-board computers provides an affordable way to build a compute computer cluster, while also being small enough that it can be easily moved around and reconfigured. The would then be used to run a variety of tests such as matrix multiplication and performing database operations and compare how the results change across different configurations.

## High Level Requirement

The hardware requirements are: 16 Raspberry Pi computers, a 16-port network switch, 16 sets of micro USB cables and ethernet cables, 16 microSD cards, and a testing suite for analyzing performance.

## Conceptual Design

To create the compute cluster, the Raspberry Pis would be connected to each other over a network switch, with one pi being a dedicated master node for the cluster. A testing suite would then be designed using the C language to test the performance of the cluster in a variety of configurations. The results of the testing would then be graphed and compared to a single Raspberry Pi as well as other computer set ups.

## Background

The idea of using Raspberry Pis for cluster computing has been around for a while, and is even featured as an official Raspberry Pi project (<https://projects.raspberrypi.org/en/projects/octapi-brute-force-enigma>). The most common setups use Slurm, an open source workload manager for Linux based clusters, to control the compute cluster (https://slurm.schedmd.com/overview.html). There is also OpenMPI, which is an open source library for message passing that is frequently used in high performance computing (<https://www.open-mpi.org/>).

## Required Resources

To develop this project the team would need access to 16 Raspberry Pis and a network switch with at least 16 ethernet ports to connect them together.