**Topic: Building a Cluster**

Raspberry Pi Cluster Group

### Date

Saturday, December 5, 2015

### Time

9:00 a.m. to 1:00 p.m.

## Materials Needed (Per Group)

* Raspberry Pi’s (4)
* 4+ port USB Power Hub
* 4+ port Ethernet Port Switch
* USB Keyboard
* USB Mouse
* 1-4 LCD Monitors
* Wireless Adapter
* 4 microSD Cards
* Extra SD Cards (Pre-Imaged for Student Recovery)

## Why Technology is Used in This Lesson

The plan of the lesson is to teach how to build a cluster, technology will be used to teach how to use technology.

## Objectives

By the end of the lesson, workshop participants will be able to build the cluster out of the materials provided and being able to modify an existing application and if possible, develop their own parallel applications.

# **Training Content**

## Instruction Outline

Detailed instructions can be found here: <https://docs.google.com/document/d/1zaBzfi5V3jW9f9PgCKXiIEC7curzUanzc3aaeGEep_A/edit?usp=sharing>

The configuration, notes, and setup scripts on on GitHub:<https://github.com/sdsc/sandbox-cluster-guide/tree/beta-workshop>

## Part I Warm-up Activities/Review

1. Intros and overview: 20 minutes
   1. Why Parallel & Distributed Programming
   2. Clusters
   3. Raspberry Pi and Raspbian
   4. Other background information felt is needed

### Part II Cluster Setup

1. Material check (5 min)
   1. Explain the required materials
   2. Explain the purpose of the components
   3. Ensure every group has the required materials
2. Build the cluster (10 min)
   1. Connect all the components together to build a cluster
   2. Ensure everyone is finished building the cluster before moving on
   3. Turn on the Raspberry Pis
3. Raspi-Config (30 min)
   1. Configure pinode-0
      1. Boot pinode-0
      2. Change default password
      3. configure wlan0
      4. get scripts from GitHub
      5. configure pinode-0 using scripts
   2. Ensure everyone has configured the settings before moving on
4. Boot into Gui (15 min)
   1. Explain what a Gui is to the students
   2. Open Terminal
5. Setting up WIFI (15 min)
   1. Setup the wifi from the wpa\_gui, if this does not work, use step b
   2. Establish a wifi connection through terminal
   3. Make sure everyone has a stable network connection before moving on
6. Setting up multiple Raspberry Pis (30 min)
   1. Set up a static ip address on the Pi
   2. Configure Raspberry Pis 1-3

### Part III Running and Writing Parallel Applications

1. Parallel Programming example (20+ min)
   1. Run parallel programming examples to reinforce objective
   2. Run multiple examples if time allows
2. Write a parallel program (If time allows - 30+ min)
   1. Write parallel programs

Discussion

1. Review Topic (10 min)
   1. Talk about objective and how it was achieved
   2. Question and Answer
2. Feedback (10 min)
   1. Survey
   2. Feedback diagram

This Google Doc may be accessed at:

[**http://tinyurl.com/z4mjna5**](http://tinyurl.com/z4mjna5)