Computer Science Department

Progress Report: Raspberry Pi Server Cluster
Embedded Linux Spring 2016
Instructor: Professor Easwaran

Description

Ansible is a free software platform used to manage multiple computers via SSH. While Ansible is used to remotely control networked devices, the software itself is installed solely onto a controlling machine which has the correct credentials to interface with the remote devices in question.

This allows the user to use Ansible to remotely control a number of devices connected to a single network. Commands in Ansible can be automated using YAML, a data oriented mark-up language. YAML is used in Ansible “playbooks” to coordinate commands to be given to the array of linked devices. In this way ansible can be used to remotely interface with a number of devices simultaneously.

Drupal is a back-end content management framework which can be used to serve web-sites, blogs, forums, as well as web applications. Drupal is written in php and can be easily installed to an NGINX server.

Goals

Our overall goal in this project is to build a raspberry pi cluster server controlled by Ansible. We will be installing Ansible on a control machine which will be used to connect to a centralized network of Raspberry Pis. By utilizing the lightweight NGINX server software we will be able to cluster the pis and use them as a single server. This will be accomplished with the use of ansible playbooks.

Once the server is operational we will be able to benchmark the server's performance given different numbers of networked pis. After preparing these analytics we will use the pi cluster as a content server by deploying a drupal website.

Project Components

Materials:

1. 4-6 x Raspberry Pi
2. Network Switch
3. Control Computer
4. Ethernet cables

Key Components:

1. Install and configure Ansible on the control PC.
2. Install and configure NGINX server on the Raspberry Pis
3. Use YAML playbook to have all pis operating as a single server.
4. Benchmark performance for varying number of remote machines
5. Deploy Drupal website to server cluster.

Project Summary

Good

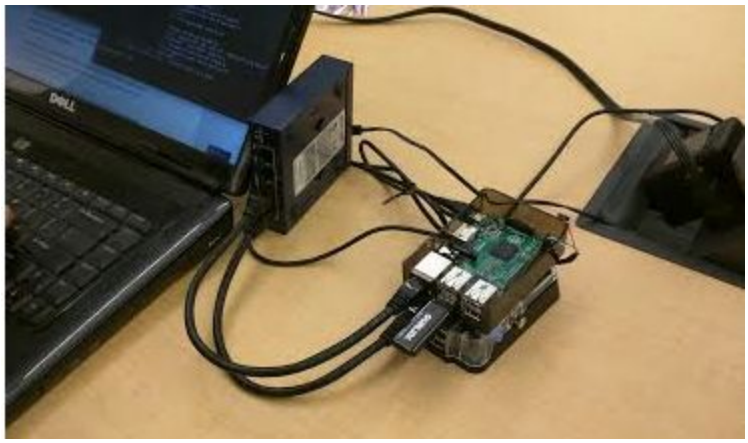
- Ansible is a user friendly software environment with good online documentation
- Drupal seems to be a strong web development platform
- Interesting project with a lot of different possible implementations

Bad

- Networking the pis, specifically on the campus network can be very difficult.
- Ansible documentation with respect to the raspberry pi is limited
- Steep learning curve with a lot of different syntaxes and protocols to learn (SSH, YAML, Ansible, Drupal, DHCP, etc.)

Plan

Week 1
Get Ansible service working to interact with two pis simultaneously. Once this is achieved that adding devices to and configuring the server will be easy. Currently default hardware settings on the pi are making interacting via wifi and ethernet difficult.



Week 2

Prepare NGINX server to utilize at least two pis. From here we can configure the server to utilize more pis and perform benchmarking tests in order to compare server performance for a given number of pis.

Week 3

Begin deployment of drupal website to the server cluster. Install drupal and prepare a placeholder website on the server cluster.

Week 4

Built in extra time just in case of delays in project progress due to troubleshooting. If server cluster is running and drupal is deployed at this point then we will have time to learn more about the drupal platform and work on drupal development.

Group

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- Ansible Implementation
- Hawks WPA Troubleshooting
- YAML
- Drupal Development

Shane Kelly

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- Drupal Installation
- NGINX Configuration
- Drupal Development
- Documentation