HW2 – Provisioning and Using Virtual Resources in the Cloud

Excepted Effort: 12 hours

Objectives

- Become familiar with setting up and using computation resources in a cloud, such as AWS.
- Become familiar with setting up a simply name service.

Overview

In this assignment, you will setup access to a cloud and provision the necessary resources to run the experimental distributed system that you created in first assignment. You'll also implement or adopt setup a simple name server, and get it setup.

Instructions

This homework assignment can be broken up into three parts: implementing a simple name server; setting up virtual machines on Amazon's EC2; and setting up "mostly" automated deployment and execution scripts.

Name Server

For this part, you need to implement or adopt a name server, and get it setup for your distributed system. The main problem we are solving is that the virtual machines on which you will run your system could end up have different IP addresses every time you start them. So, in general, launching your distributed system should include having each process register itself with a name server. Then, anytime a process needs to know the address of another process, it could ask that name server do the necessary name resolution.

There are many alternate solutions to the name resolution problem. For example, you could use *bind 9*, a popular DNS implementation. If you take this approach, you will learn how to configuration Bind9 and how to communication with the bind server using the DNS protocol. In particularly, you learn how send the bind server both dynamic update and query messages and then implement that communicate in your programs.

Another choice would be to implement you own simple name server using web services. This could be down using a node.js web server with services for process registration and name resolution. The server could be generated by express, similar to the HDS component in HW1.

A third choice would be to implement a name server using UDP-based of your own design. As with the other two approaches, the name server would have to process registration and query communication protocols.

Virtual Machines

For this part, you need to become familiar with starting up instances on EC2. Specifically, you need to be able to startup at least 6 instances and could start up as many as 16. All of the instances should to be Linux machines and need to be configured with Node.js, as well as any other software that you need to run your system.

You may also want to look into setting up a bucket under S3 so you can access shared files.

Deployment and Execution Scripts

Finally, for this part you need to build at least two scripts: one that deploys a new version of your system to the virtual machines and another that starts up the system on those virtual machines.   Each virtual machines needs to run at least one process, but could run multiple processes.

Consider using AWS CLI to move files to/from S3 and for managing your instances. You may the “ssh” and “scp” commands also very useful.

Grading Criteria

	Points
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A good solution to the name resolution problem	30
Probably configured VM’s that are easy to launch	20
Deployment and execution script	25