Hadoop Hive Lab

The goal of this lab is to gain familiarity with Hadoop and Hive. Additional documentation that is useful for this homework is available at: https://hive.apache.org/.

Access to Hadoop

1) Option #1: Amazon Elastic MapReduce (Amazon EMR) is a web service that makes it easy to quickly and cost-effectively process vast amounts of data. Amazon EMR uses Hadoop, an open source framework, to distribute your data and processing across a resizable cluster of Amazon EC2 instances. Please register an Amazon AWS account using your IUPUI email and request student credit. You should be able to receive $40 credit for your account. Please remember to terminate your cluster when you finish using it to avoid unnecessary charges.
2) Option #2: Download and install on your desktop or laptop Hortonworks HDP Sandbox, a self-contained VM image pre-loaded with all the needed Hadoop software.
3) Option #3: Download and install on your desktop or laptop Cloudera QuickStart Virtual Machines.

   If you choose Option #2 or Option #3, the machine you install Hadoop virtual machine is usually required to have at least 8G-10G of RAM.

Exercise : Calls and Messages Data Analysis

In this homework, a calls.csv and a messages.csv are given. The calls.csv file has the following fields:

```
1       callernumber          phone number of the caller
2       receivernumber        phone number of the receiver
3       duration              the duration of the call
4       year                  the year when the call was made
5       month                 the month when the call was made
6       day                   the day when the call was made
7       hour                  the hour when the call was made
8       minute                the minute when the call started
```

The messages.csv file has the following fields:

```
1       callernumber          phone # of the person who sends the message
2       receivernumber        phone # of the person who receives the msg
3       length                the length of the message
4       year                  the year when the message was sent
5       month                 the month when the message was sent
6       day                   the day when the message was sent
7       hour                  the hour when the message was sent
8       minute                the minute when the message was sent
```

Based on these files, write HIVE scripts for the following queries:

1. Find the number of distinct callernumbers in calls.csv.

2. Find callernumbers which have made more than 10 calls.

3. Find callernumbers which have called for the longest period of time (the sum of the duration of the calls.)

4. Find the receivernumber which has received the most calls.

5. Find the top 10 longest messages.

6. Find the peak messaging hour, i.e. the hour when most messages were sent.

7. Find the average duration of calls of each hour.

8. Identify which numbers made calls as well as sent messages, where number of calls made should be more than 3 and the number of messages should be more than 2.

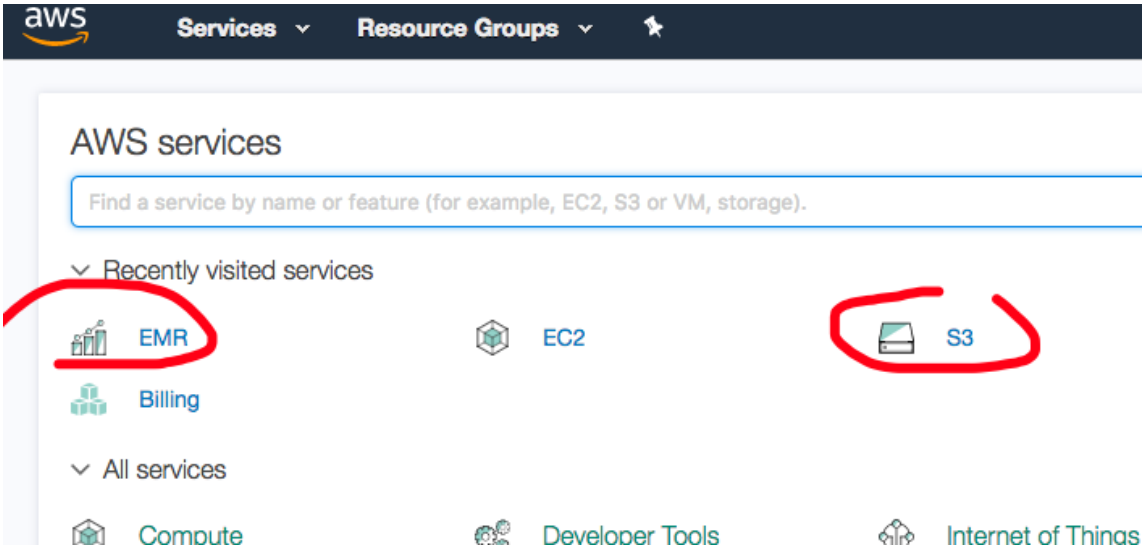
This assignment should be completed independently. No collaboration is allowed.

Please submit your HIVE scripts for all queries. Your scripts should be clearly written and ready for the TA to run.

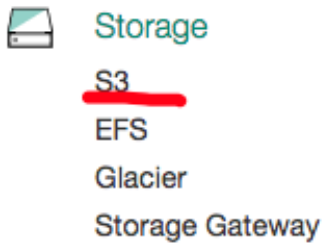
More Information:

If you choose to use Amazon AWS, the very first step you should apply for Amazon EMR account at: https://aws.amazon.com/emr/

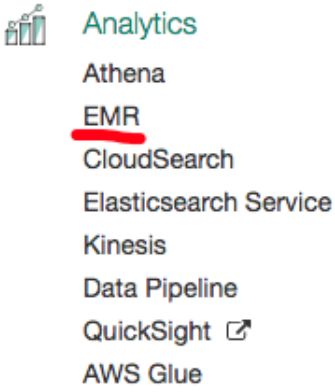
Once you have your account and enter the AWS main page, the service you need to use for this homework is S3 and EMR.



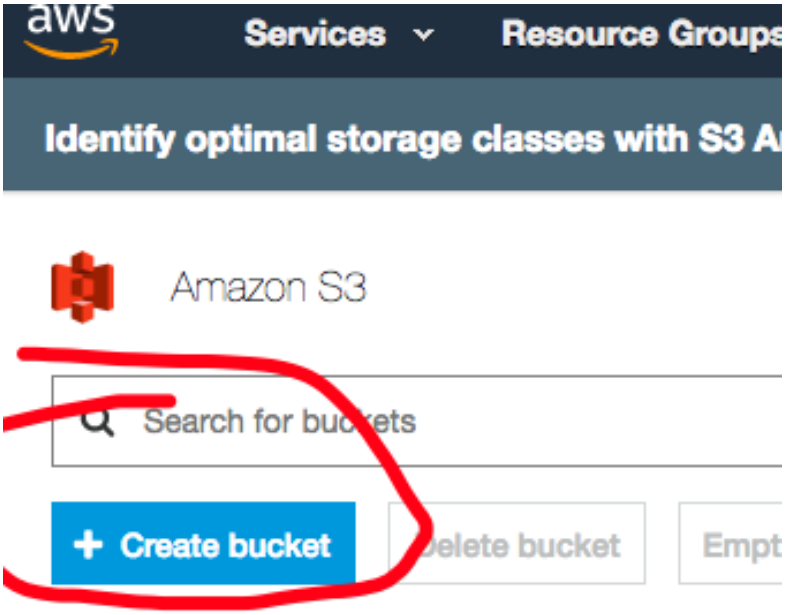
S3 is the storage system in AWS, it is under storage service:



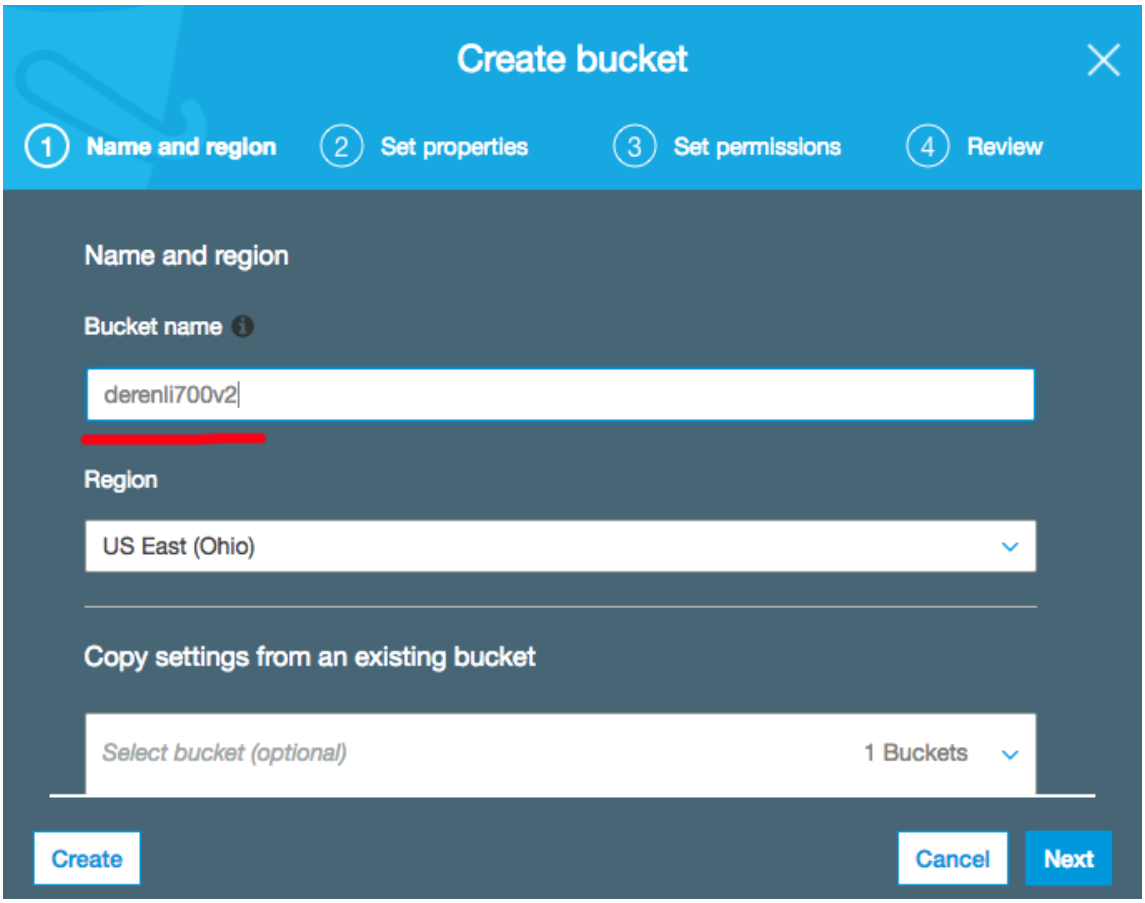
Amazon EMR is a managed cluster platform that simplifies running big data frameworks, such as Apache Hadoop. It is under “Analytics”:



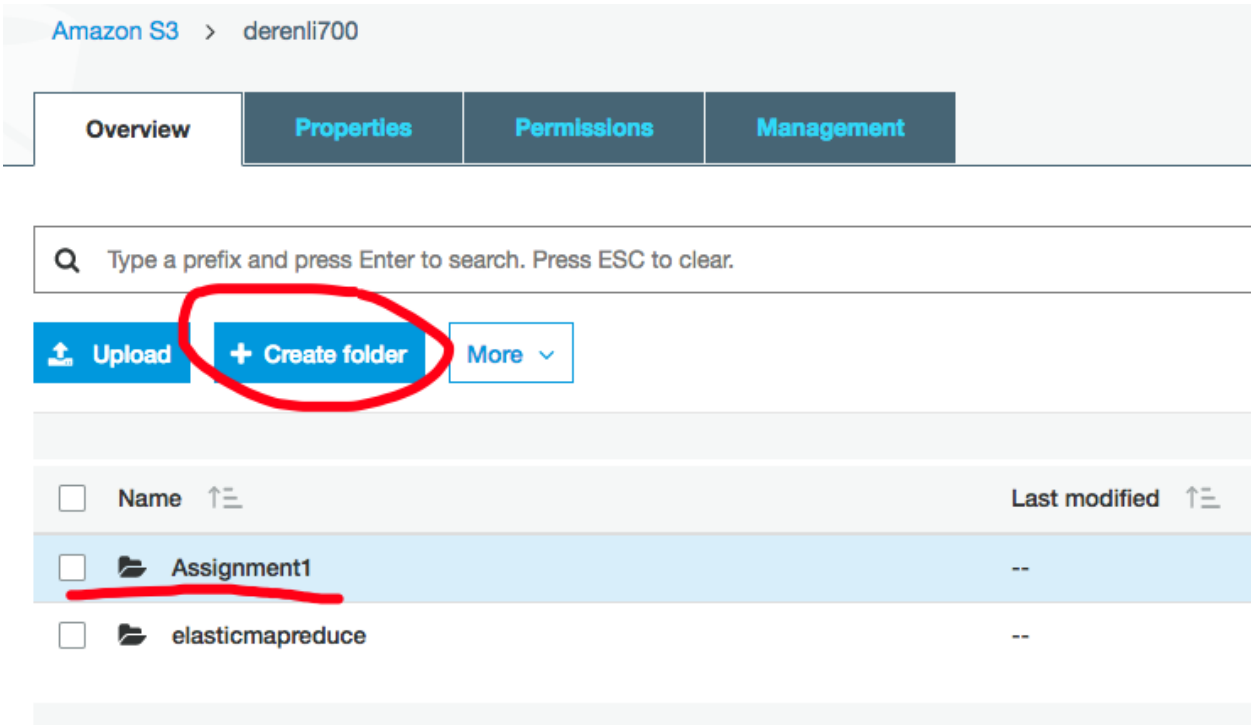
If you go to S3, just click the “create bucket” button:



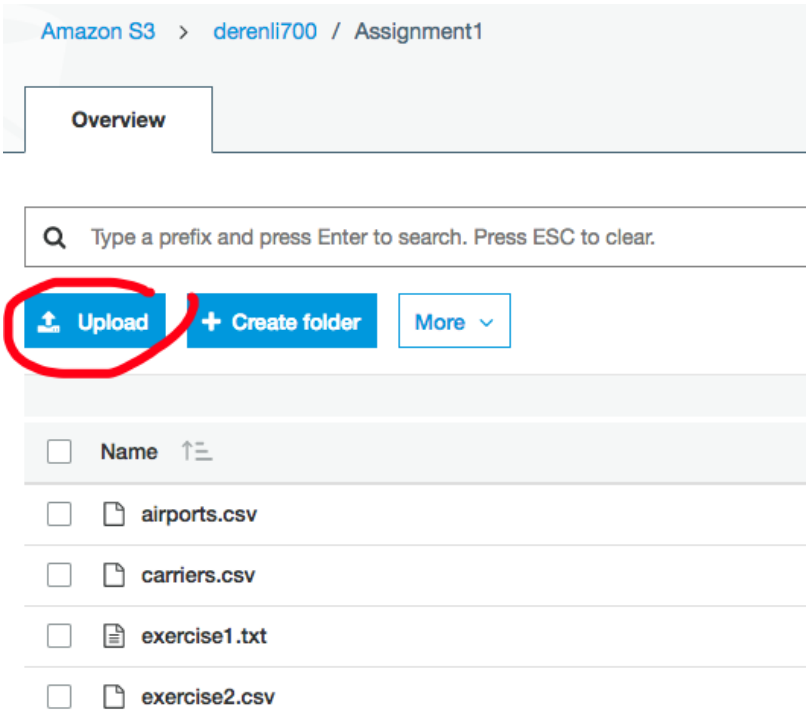
Type a bucket name you want and then keep clicking “next” until finished.



Once you create the bucket, click on the bucket and you can create a folder:

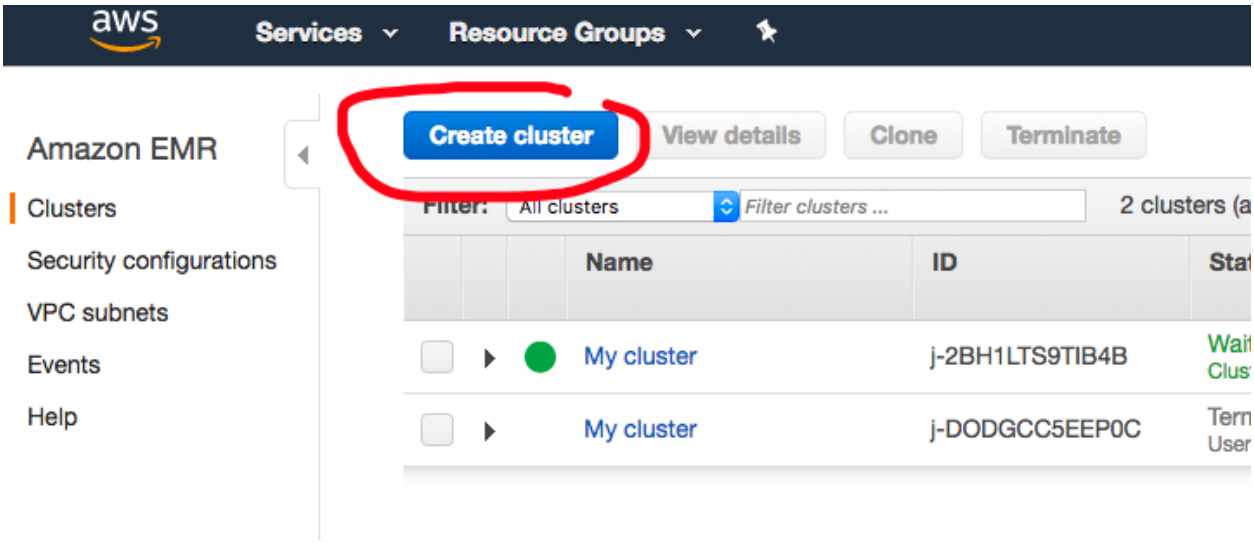


You can then upload all your data and script files here:

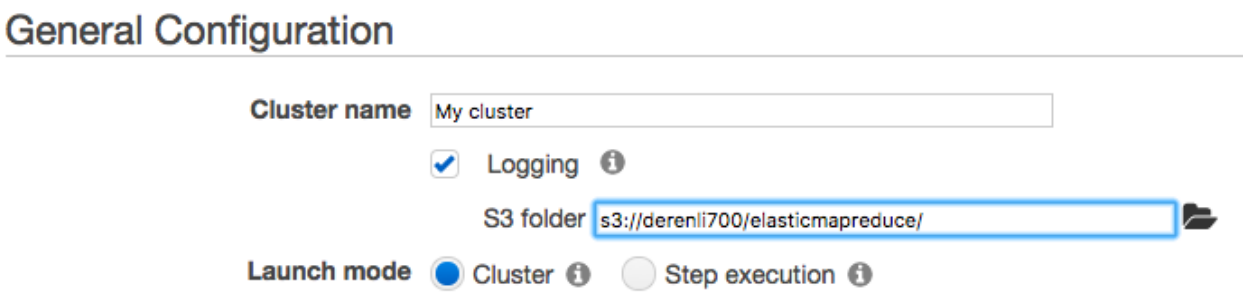


After uploading the data files and scripts, you can go to EMR to run the job.

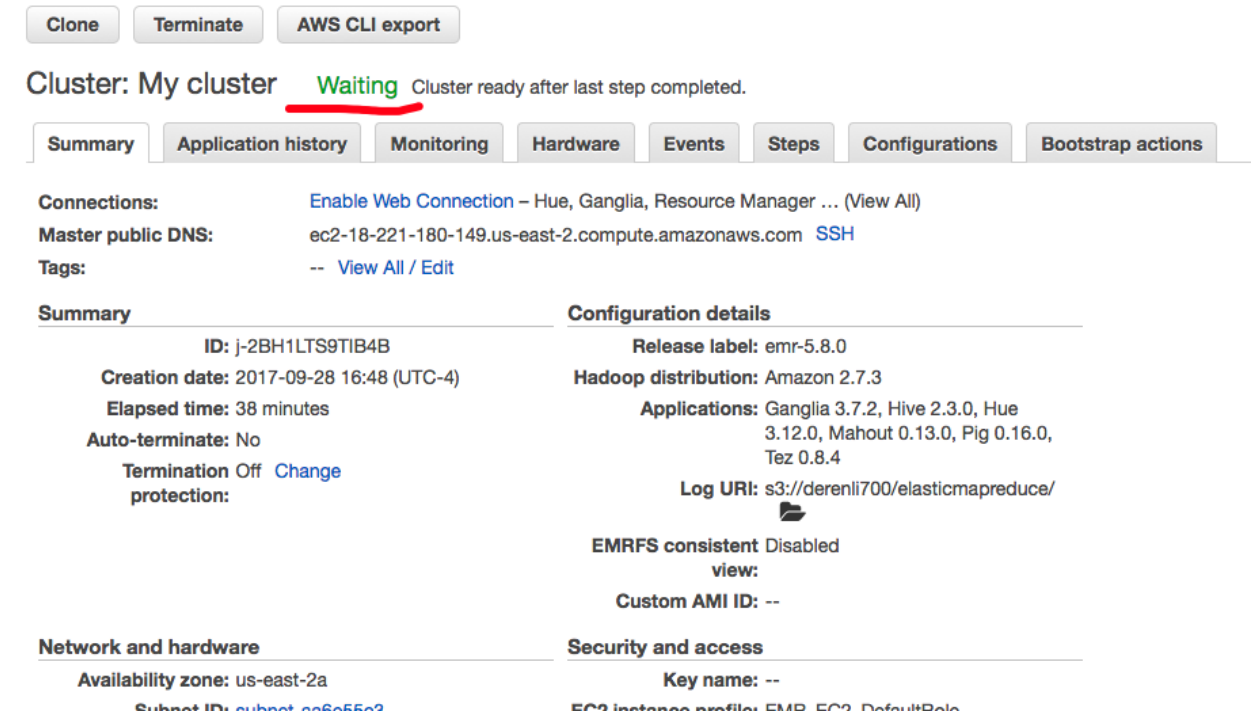
In EMR, click on “create a cluster”:



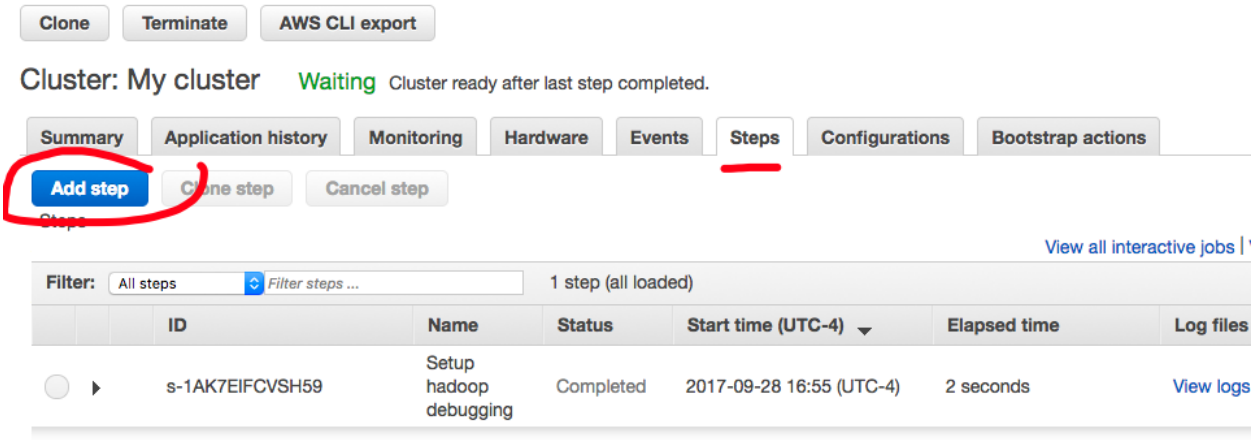
Once you click “create cluster”, you will see:



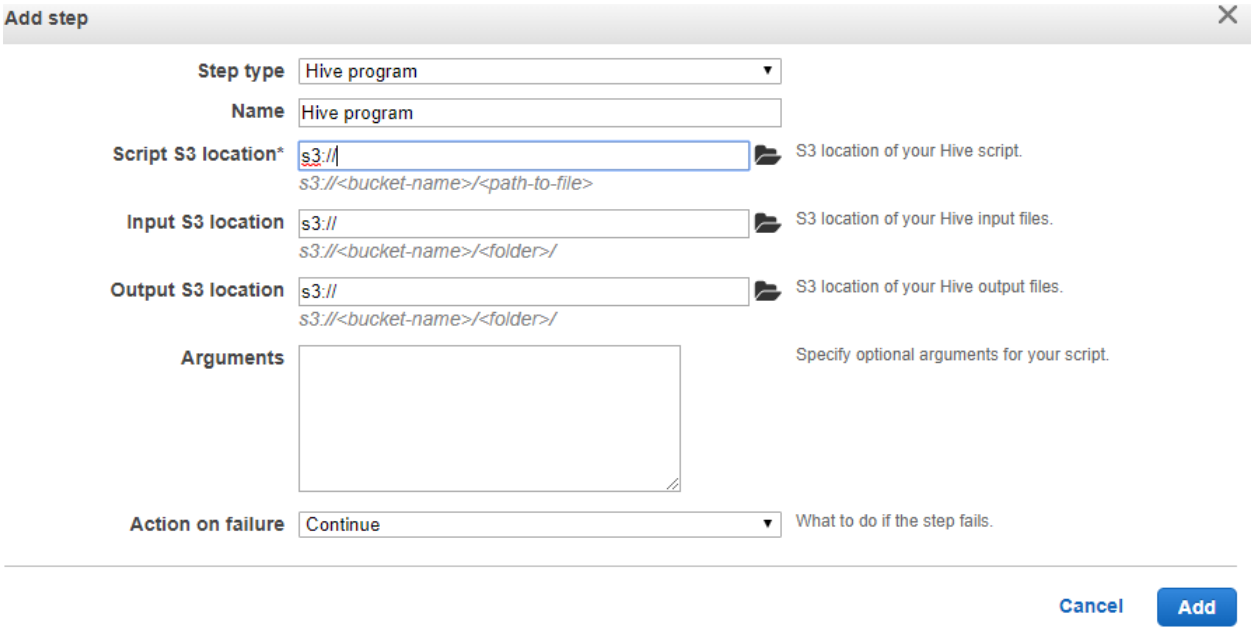
After you create the cluster, you may still need to wait for a while to get the status to waiting, which means your cluster is ready for use:



Then click on step panel and click “add step”:



Then choose “Hive program” and choose your script file, input location and output location, then click add. You job is now running. (You will need upload your script and datasets on S3 server first.)



You can always track your status under event panel. Once you terminate your cluster, you may not able to "restart" it again. However, as all your files are on S3 server, so next time when you need, simply start a new cluster again.

You can find lots of useful information here:

http://docs.aws.amazon.com/emr/latest/ManagementGuide/emr-manage.html