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Ask Bigger Questions

CAP - Developing with Spark and Hadoop:

Homework Assignment Guide for Students

Homework: Run a YARN Job

Files and Data Used in this Homework

Exercise directory: `$DEV1/exercises/yarn`

Dataset (HDFS): `/loudacre/kb`

In this assignment you will submit an application to the YARN cluster, and monitor the application using both the Hue Job Browser and the YARN Web UI.

The application you will run is provided for you. It is a simple Spark application written in Python that counts the occurrence of words in Loudacre's customer service Knowledge Base (which you uploaded in the last exercise). The focus of this exercise is not on what the application does, but on how YARN distributes tasks in a job across a cluster, and how to monitor an application and view its log files.

Explore the YARN cluster

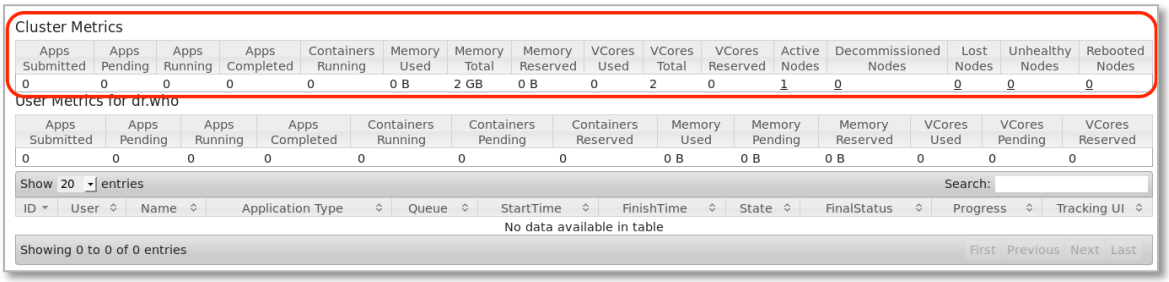
1. Visit the YARN Resource Manager (RM) UI in Firefox using the provided bookmark, or by going to URL `http://localhost:8088`

   No jobs are currently running so the current view shows the cluster "at rest".

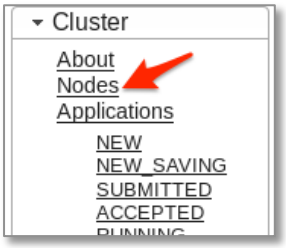
Who is Dr. Who?

You may notice that YARN says you are logged in as `dr.who`. This is what is displayed when user authentication is disabled for the cluster, as it is on the training VM. If user authentication were enabled, you would have to log in as a valid user to view the YARN UI, and your actual user name would be displayed, together with user metrics such as how many applications you had run, how much system resources your applications used and so on.

2. Take note of the values in the Cluster Metrics section, which displays information about applications, memory utilization, and the status of worker nodes in the cluster.

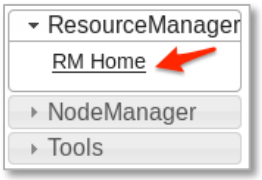


3. Click on the **Nodes** link in the Cluster menu on the left. The bottom section will display a list of worker nodes in the cluster. The pseudo-distributed cluster used for training has only a single node, which is running on the local machine. In the real world, this list would show multiple worker nodes.



4. Click on the **Node HTTP Address** to open the Node Manager UI on that specific node. This displays statistics about the selected node, including amount of available memory, currently running applications (none, currently) and so on.

5. To return to the Resource Manager, expand ResourceManager → RM Home on the left.



Submit an application to the YARN cluster

6. In a terminal window, change to the exercise directory:

```
$ cd $DEV1/exercises/yarn
```

7. Run the example wordcount.py program on the YARN cluster to count the frequency of words in the knowledge dataset:

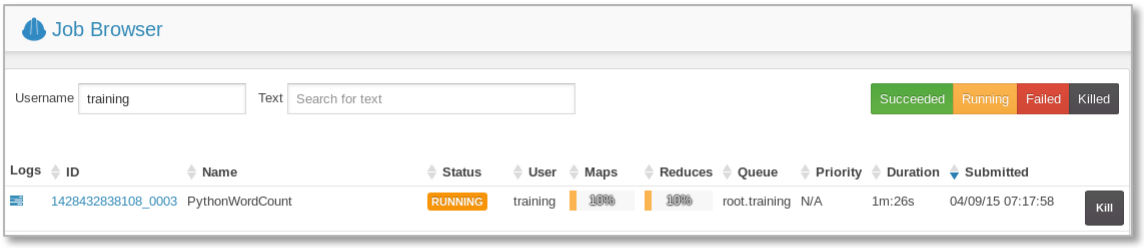
```
$ spark-submit --master yarn-cluster \
  wordcount.py /loudacre/kb/*
```

Later in the course you will learn how to write and submit your own Spark applications, as you are doing here, including what the various options mean. For now, focus on learning about the YARN UI.

View the application in the Hue Job Browser

8. Go to Hue in Firefox, and select the Job Browser. (Depending on the width of your browser, you may see the whole label, or just the icon.)

9. The Job Browser displays a list of currently running and recently completed applications. (If you don't see the application you just started, wait a few seconds, the page will automatically reload; it can take some time for the application to be accepted and start running.)

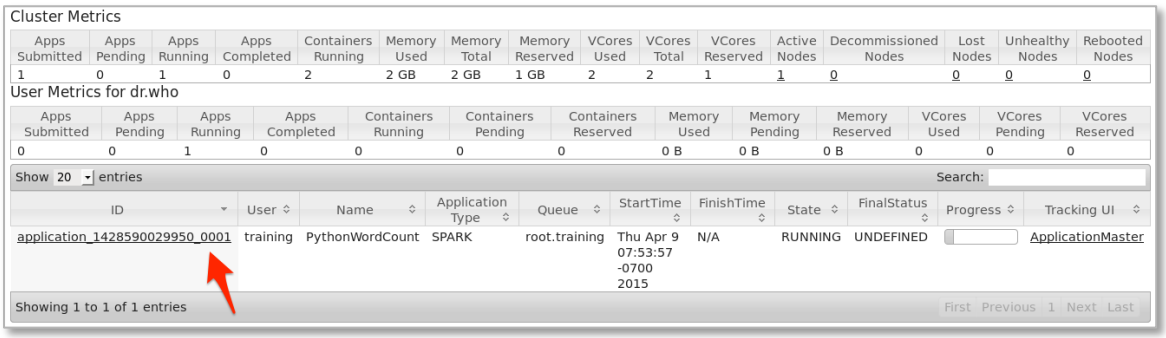


10. This page allows you to click the application ID to see details of the running application, or to kill a running job. (Don't do that now though!)

View the application in the YARN UI

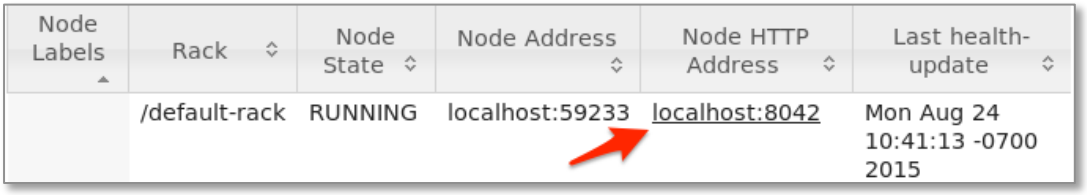
To get a more detailed view of the cluster, use the YARN UI.

11. Reload the YARN RM page in Firefox. You will now see the application you just started in the bottom section of the RM home page.

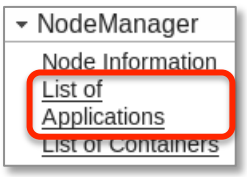


12. As you did in the first exercise section, select **Nodes**.

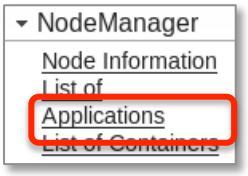
13. Select the **Node HTTP Address** to open the Node Manager UI.



14. Now that an application is running, you can click on **List of Applications** to see the application you submitted.



15. If your application is still running, try clicking on **List of Containers**.



This will display the containers the Resource Manager has allocated on the selected node for the current application. (No containers will show if no applications are running; if you missed it because the application completed, you can run the application again.)

This is the end of the Homework