# YARN Experiments for Data Locality

We run the experiments with a 7 node cluster with 2x replication(1 master, 6 data nodes/node managers)

Hardware configurations

Master (hostname: simple37)：

CPU: 2 x Intel(R) Xeon(R) E5-2620 v2 @ 2.10GHz /15M Cache 6-Core 12-Thread

Memory: 32GB (4x8GB) 1600MHz

Disk: 2TBx2 3.5-inch with RAID-1

Network bandwidth: 968Mb/s

Slaves（hostname: simple27~simple33）：

CPU: 2 x Intel(R) Xeon(R) E5-2620 v2 @ 2.10GHz /15M Cache 6-Core 12-Thread

Memory: 32GB (4x8GB) 1600MHz

Disk: 2TBx2 3.5-inch with RAID-1

Network bandwidth: 968Mb/s

Software configurations

Spark-1.6.2 Hadoop-2.7.1（see the detailed configurations in the other attachments of the JIRA ticket）

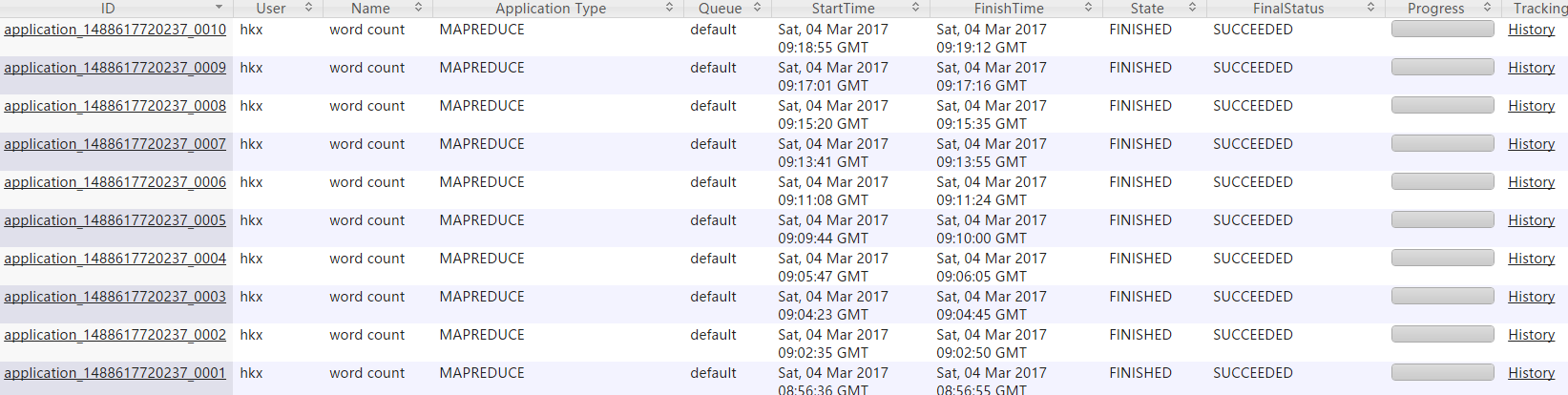
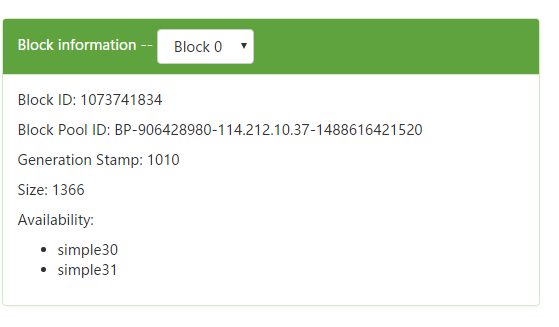
Experiment1:

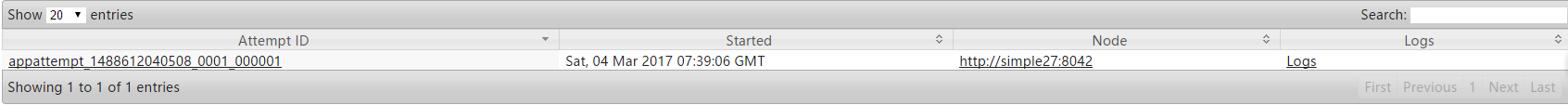
* 7node Hadoop cluster (1 master, 6 data nodes/node managers)

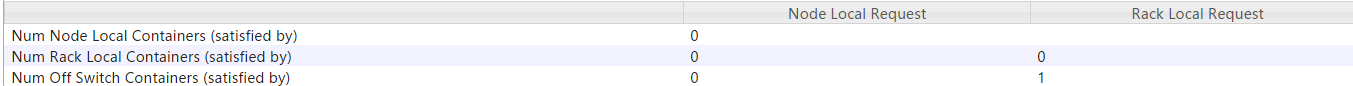
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| HostName | Simple37 | Simple27 | Simple28 | Simple30 | Simple31 | Simple32 | Simple33 |
| Role | Master | Node1 | Node2 | Node3 | Node4 | Node5 | node6 |

* Configure HDFS with replication factor 2
* File has a single block in HDFS
* Configure Spark to use dynamic allocation
* Configure Yarn for both mapreduce shuffle service and Spark shuffle service
* Add a single small file (few bytes) to HDFS
* Run wordcount on the file (using Spark/MapReduce)
* Inspect if the single task for the map stage was scheduled on the node with the data

The results are shown in theWebUIin the following way:







Results of experiment (run 10 times):

7 node cluster(1 master, 6 data nodes/node managers), 2x replication, 1 block file, MapReduce wordcount

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Round NO. | Data location | Scheduled node | Hit | Time Cost |
| 1 | Node3/Node4 | Node6 | No | 20s |
| 2 | Node5/Node3 | Node6 | No | 17s |
| 3 | Node3/Node5 | Node1 | No | 21s |
| 4 | Node2/Node3 | Node6 | No | 18s |
| 5 | Node1/Node2 | Node1 | Yes | 15s |
| 6 | Node4/Node5 | Node3 | No | 19s |
| 7 | Node2/Node3 | Node2 | Yes | 14s |
| 8 | Node1/Node4 | Node5 | No | 16s |
| 9 | Node1/Node6 | Node6 | Yes | 15s |
| 10 | Node3/Node5 | Node4 | NO | 17s |

7 node cluster(1 master, 6 data nodes/node managers), 2x replication, 1 block file, Spark wordcount

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Round NO. | Data location | Scheduled node | Hit | Time cost |
| 1 | Node3/Node4 | Node4 | Yes | 24s |
| 2 | Node2/Node3 | Node5 | No | 30s |
| 3 | Node3/Node5 | Node4 | No | 35s |
| 4 | Node2/Node3 | Node2 | Yes | 24s |
| 5 | Node1/Node2 | Node4 | No | 26s |
| 6 | Node4/Node5 | Node2 | No | 25s |
| 7 | Node2/Node3 | Node4 | No | 27s |
| 8 | Node1/Node4 | Node1 | Yes | 22s |
| 9 | Node1/Node6 | Node2 | No | 23s |
| 10 | Node1/Node2 | Node4 | No | 33s |