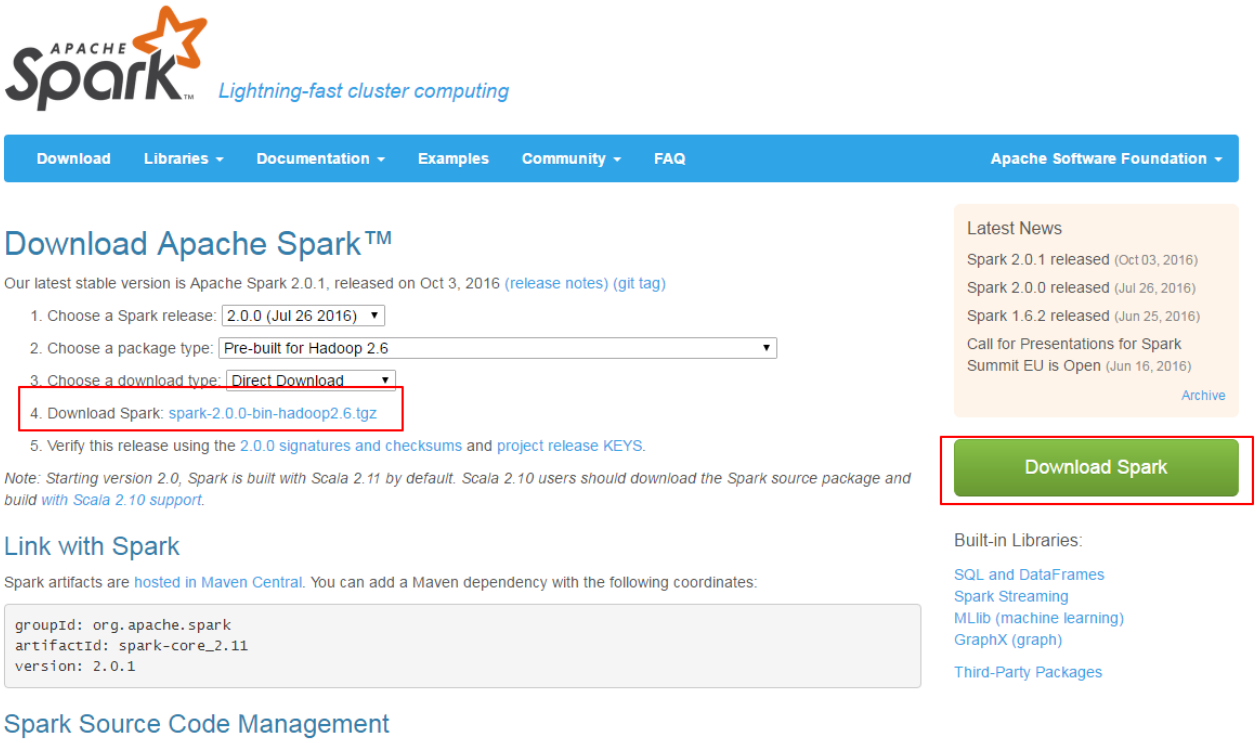
Spark安装配置

下载

进入Apache Spark官网的下载页，截止我写这篇文章的日期，spark的最新版本为2.0.0，因为我的**hadoop版本是2.6.4**的，所以我选择spark的版本是2.0.0，Hadoop是2.6。



环境配置

集群环境：

主机名	IP	hadoop环境	Scala环境	Java环境
master	192.168.146.146	/usr/local/hadoop-2.6.4	/usr/local/scala	/usr/local/jdk1.7.0_79
node1	192.168.146.145	/usr/local/hadoop-2.6.4	/usr/local/scala	/usr/local/jdk1.7.0_79
node2	192.168.146.144	/usr/local/hadoop-2.6.4	/usr/local/scala	/usr/local/jdk1.7.0_79
node3	192.168.146.143	/usr/local/hadoop-2.6.4	/usr/local/scala	/usr/local/jdk1.7.0_79

配置项	值	说明

将下载好的**spark-2.0.0-bin-hadoop2.6.tgz**拷贝到主机master上的/usr/local目录中，并执行命令解压到当前目录中：**tar -zxf spark-2.0.0-bin-hadoop2.6.tgz** ，解压后的目录结构如下：

```
总用量 88
drwxr-xr-x. 2 hadoop hadoop  4096 7月  20 05:28 bin
drwxr-xr-x. 2 hadoop hadoop  4096 7月  20 05:28 conf
drwxr-xr-x. 5 hadoop hadoop    47 7月  20 05:28 data
drwxr-xr-x. 4 hadoop hadoop    27 7月  20 05:28 examples
drwxr-xr-x. 2 hadoop hadoop  8192 7月  20 05:28 jars
-rw-r--r--. 1 hadoop hadoop 17811 7月  20 05:28 LICENSE
drwxr-xr-x. 2 hadoop hadoop  4096 7月  20 05:28 licenses
-rw-r--r--. 1 hadoop hadoop 24749 7月  20 05:28 NOTICE
drwxr-xr-x. 6 hadoop hadoop  4096 7月  20 05:28 python
drwxr-xr-x. 3 hadoop hadoop    16 7月  20 05:28 R
-rw-r--r--. 1 hadoop hadoop  3828 7月  20 05:28 README.md
-rw-r--r--. 1 hadoop hadoop   120 7月  20 05:28 RELEASE
drwxr-xr-x. 2 hadoop hadoop  4096 7月  20 05:28 sbin
drwxr-xr-x. 2 hadoop hadoop    41 7月  20 05:28 yarn
```

修改目录conf中的配置文件来配置spark的运行环境，conf目录中包含的文件有：

```
总用量 32
-rw-r--r--. 1 hadoop hadoop  987 7月  20 05:28 docker.properties.template
-rw-r--r--. 1 hadoop hadoop 1105 7月  20 05:28 fairscheduler.xml.template
-rw-r--r--. 1 hadoop hadoop 2025 7月  20 05:28 log4j.properties.template
-rw-r--r--. 1 hadoop hadoop 7239 7月  20 05:28 metrics.properties.template
-rw-r--r--. 1 hadoop hadoop  865 7月  20 05:28 slaves.template
-rw-r--r--. 1 hadoop hadoop 1292 7月  20 05:28 spark-defaults.conf.template
-rwxr-xr-x. 1 hadoop hadoop 3861 7月  20 05:28 spark-env.sh.template
```

我们主要修改**spark-env.sh**这个文件。拷贝spark-env.sh.template并重命名为spark-env.sh：
cp spark-env.sh.template spark-env.sh，结果如下：

```
总用量 36
-rw-r--r--. 1 hadoop hadoop  987 7月  20 05:28 docker.properties.template
-rw-r--r--. 1 hadoop hadoop 1105 7月  20 05:28 fairscheduler.xml.template
-rw-r--r--. 1 hadoop hadoop 2025 7月  20 05:28 log4j.properties.template
-rw-r--r--. 1 hadoop hadoop 7239 7月  20 05:28 metrics.properties.template
-rw-r--r--. 1 hadoop hadoop  865 7月  20 05:28 slaves.template
-rw-r--r--. 1 hadoop hadoop 1292 7月  20 05:28 spark-defaults.conf.template
-rwxr-xr-x. 1 hadoop hadoop 3861 10月 11 11:39 spark-env.sh
-rwxr-xr-x. 1 hadoop hadoop 3861 7月  20 05:28 spark-env.sh.template
```

接下来修改spark-env.sh，主要添加以下几项配置：

配置项	值	说明
JAVA_HOME	/usr/local/jdk1.7.0_79	指向jdk的安装路径
HADOOP_HOME	/usr/local/hadoop-2.6.4	指向hadoop的安装路径
SCALA_HOME	/usr/local/scala	scala的安装
HADOOP_CONF_DIR	/usr/local/hadoop-2.6.4/etc/hadoop	hadoop配置文件所在的目录
SPARK_MASTER_HOST	192.168.146.146	spark集群master运行主机

```
# - SPARK_NICENESS       The scheduling priority for daemons. (Default: 0)
JAVA_HOME=/usr/local/jdk1.7.0_79
SPARK_MASTER_HOST=192.168.146.146
HADOOP_HOME=/usr/local/hadoop-2.6.4
SCALA_HOME=/usr/local/scala
HADOOP_CONF_DIR=/usr/local/hadoop-2.6.4/etc/hadoop
~
```

执行sbin/start-all.sh命令，查看是否能够启动spark，查看是否有Worker和Master进程。

```
[hadoop@master spark2.0]$ jps
21655 Worker
3232 NameNode
3389 SecondaryNameNode
3569 ResourceManager
21704 Jps
21568 Master
[hadoop@master spark2.0]$
```

运行spark提供的示例检测：**bin/run-example JavaSparkPi 5 2**

```
[hadoop@master spark2.0]$ bin/run-example JavaSparkPi 5 2
16/10/11 12:29:36 INFO spark.SparkContext: Running Spark version 2.0.0
16/10/11 12:29:36 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes
 where applicable
16/10/11 12:29:36 INFO spark.SecurityManager: Changing view acls to: hadoop
16/10/11 12:29:36 INFO spark.SecurityManager: Changing modify acls to: hadoop
16/10/11 12:29:36 INFO spark.SecurityManager: Changing view acls groups to:
16/10/11 12:29:36 INFO spark.SecurityManager: Changing modify acls groups to:
16/10/11 12:29:36 INFO spark.SecurityManager: SecurityManager: authentication disabled; ui acls disabled; users  with view permiss
ions: Set(hadoop); groups with view permissions: Set(); users  with modify permissions: Set(hadoop); groups with modify permission
s: Set()
16/10/11 12:29:37 INFO util.Utils: Successfully started service 'sparkDriver' on port 50756.
16/10/11 12:29:37 INFO spark.SparkEnv: Registering MapOutputTracker
16/10/11 12:29:37 INFO spark.SparkEnv: Registering BlockManagerMaster
16/10/11 12:29:37 INFO storage.DiskBlockManager: Created local directory at /tmp/blockmgr-fa6a376a-ea7f-47c3-bda5-f28160292907
16/10/11 12:29:37 INFO memory.MemoryStore: MemoryStore started with capacity 413.9 MB
16/10/11 12:29:37 INFO spark.SparkEnv: Registering OutputCommitCoordinator
16/10/11 12:29:37 INFO util.log: Logging initialized @2505ms
16/10/11 12:29:38 INFO server.Server: jetty-9.2.z-SNAPSHOT
16/10/11 12:29:38 INFO handler.ContextHandler: Started o.s.j.s.ServletContextHandler@c3fc233{/jobs,null,AVAILABLE}
16/10/11 12:29:38 INFO handler.ContextHandler: Started o.s.j.s.ServletContextHandler@2de6a88d{/jobs/json,null,AVAILABLE}
16/10/11 12:29:38 INFO handler.ContextHandler: Started o.s.j.s.ServletContextHandler@243d886{/jobs/job,null,AVAILABLE}
16/10/11 12:29:38 INFO handler.ContextHandler: Started o.s.j.s.ServletContextHandler@343c4693{/jobs/job/json,null,AVAILABLE}
16/10/11 12:29:38 INFO handler.ContextHandler: Started o.s.j.s.ServletContextHandler@613d77af{/stages,null,AVAILABLE}
16/10/11 12:29:38 INFO handler.ContextHandler: Started o.s.j.s.ServletContextHandler@a7cb409{/stages/json,null,AVAILABLE}
16/10/11 12:29:38 INFO handler.ContextHandler: Started o.s.j.s.ServletContextHandler@10fc040{/stages/stage,null,AVAILABLE}
16/10/11 12:29:38 INFO handler.ContextHandler: Started o.s.j.s.ServletContextHandler@3116aa4b{/stages/stage/json,null,AVAILABLE}
```

```
16/10/11 12:29:41 INFO executor.Executor: Running task 1.0 in stage 0.0 (TID 1)
16/10/11 12:29:41 INFO scheduler.TaskSetManager: Finished task 0.0 in stage 0.0 (TID 0) in 1923 ms on localhost (1/2)
16/10/11 12:29:42 INFO executor.Executor: Finished task 1.0 in stage 0.0 (TID 1). 945 bytes result sent to driver
16/10/11 12:29:42 INFO scheduler.TaskSetManager: Finished task 1.0 in stage 0.0 (TID 1) in 653 ms on localhost (2/2)
16/10/11 12:29:42 INFO scheduler.TaskSchedulerImpl: Removed TaskSet 0.0, whose tasks have all completed, from pool
16/10/11 12:29:42 INFO scheduler.DAGScheduler: ResultStage 0 (reduce at JavaSparkPi.java:52) finished in 2.341 s
16/10/11 12:29:42 INFO scheduler.DAGScheduler: Job 0 finished: reduce at JavaSparkPi.java:52, took 2.938450 s
Pi is roughly 3.14522
16/10/11 12:29:42 INFO server.ServerConnector: Stopped ServerConnector@7e9237f3{HTTP/1.1}{0.0.0.0:4040}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@14eee870{/stages/stage/kill,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@617c0410{/api,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@3f06f3fb{/,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@467dd9f{/static,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@84373ce{/executors/threadDump/json,null,UNAVA
ILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@2ad6fc23{/executors/threadDump,null,UNAVAILAB
LE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@41685d91{/executors/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@7abbd432{/executors,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@28e3aa36{/environment/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@155b7aee{/environment,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@633a7ecf{/storage/rdd/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@3fc0329b{/storage/rdd,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@193e282f{/storage/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@57552dfc{/storage,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@6a124c63{/stages/pool/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@47063b1a{/stages/pool,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@3116aa4b{/stages/stage/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@10fc040{/stages/stage,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@a7cb409{/stages/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@613d77af{/stages,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@343c4693{/jobs/job/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@243d886{/jobs/job,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@2de6a88d{/jobs/json,null,UNAVAILABLE}
16/10/11 12:29:42 INFO handler.ContextHandler: Stopped o.s.j.s.ServletContextHandler@c3fc233{/jobs,null,UNAVAILABLE}
16/10/11 12:29:42 INFO ui.SparkUI: Stopped Spark web UI at http://192.168.146.146:4040
16/10/11 12:29:42 INFO spark.MapOutputTrackerMasterEndpoint: MapOutputTrackerMasterEndpoint stopped!
16/10/11 12:29:42 INFO memory.MemoryStore: MemoryStore cleared
16/10/11 12:29:42 INFO storage.BlockManager: BlockManager stopped
16/10/11 12:29:42 INFO storage.BlockManagerMaster: BlockManagerMaster stopped
16/10/11 12:29:42 INFO scheduler.OutputCommitCoordinator$OutputCommitCoordinatorEndpoint: OutputCommitCoordinator stopped!
16/10/11 12:29:42 INFO spark.SparkContext: Successfully stopped SparkContext
16/10/11 12:29:42 INFO util.ShutdownHookManager: Shutdown hook called
16/10/11 12:29:42 INFO util.ShutdownHookManager: Deleting directory /tmp/spark-27729e64-3449-474d-a688-19f2689f0347
[hadoop@master spark2.0]$
```

至此，单个节点的Spark环境配置结束。

多个节点的集群环境配置

在上述单个节点启动成功的基础上，配置多个节点集群环境是比较简单的一件事情。

- 修改master上节点的slaves配置文件来配置Worker节点的位置，这里我将node1、node2、node3作为Worker节点的运行机器，在conf/slaves(复制slaves.template)中添加node1、node2和node3。

```
# A Spark Worker will be started on each of the machines listed below.
#
node1
node2
node3
~
```

- 将master上配置好的spark目录文件全部分别拷贝到node1、node2和node3所在机器上(可以通过**ansible**这个工具来操作)。

- 通过命令sbin/start-all.sh启动spark集群

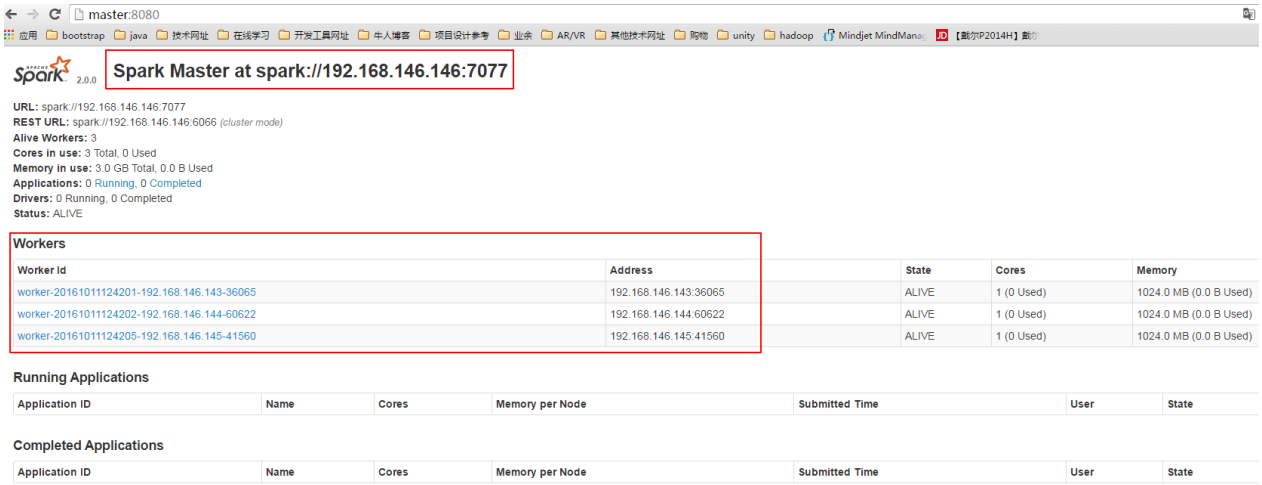
```
[hadoop@master spark-2.0]$ sbin/start-all.sh
starting org.apache.spark.deploy.master.Master, logging to /usr/local/spark-2.0/logs/spark-hadoop-org.apache.spa
aster-1-master.out
node3: starting org.apache.spark.deploy.worker.Worker, logging to /usr/local/spark-2.0/logs/spark-hadoop-org.apa
orker.Worker-1-node3.out
node2: starting org.apache.spark.deploy.worker.Worker, logging to /usr/local/spark-2.0/logs/spark-hadoop-org.apa
orker.Worker-1-node2.out
node1: starting org.apache.spark.deploy.worker.Worker, logging to /usr/local/spark-2.0/logs/spark-hadoop-org.apa
orker.Worker-1-node1.out
[hadoop@master spark-2.0]$ jps
3232 NameNode
3389 SecondaryNameNode
3569 ResourceManager
21948 Master
22020 Jps
[hadoop@master spark-2.0]$
```

```
[hadoop@node1 root]$ jps
3057 NodeManager
11676 Jps
11618 Worker
2947 DataNode
```

```
[hadoop@node2 local]$ jps
11342 Worker
11393 Jps
3141 NodeManager
3030 DataNode
```

```
[hadoop@node3 root]$ jps
11107 Worker
3091 NodeManager
2982 DataNode
11155 Jps
```

- 也可以通过浏览器来查看集群状态，在浏览器中通过spark主节点的8080端口可以查看集群状态，在浏览器中输入：http://master:8080



运行测试

Standalone模式的测试

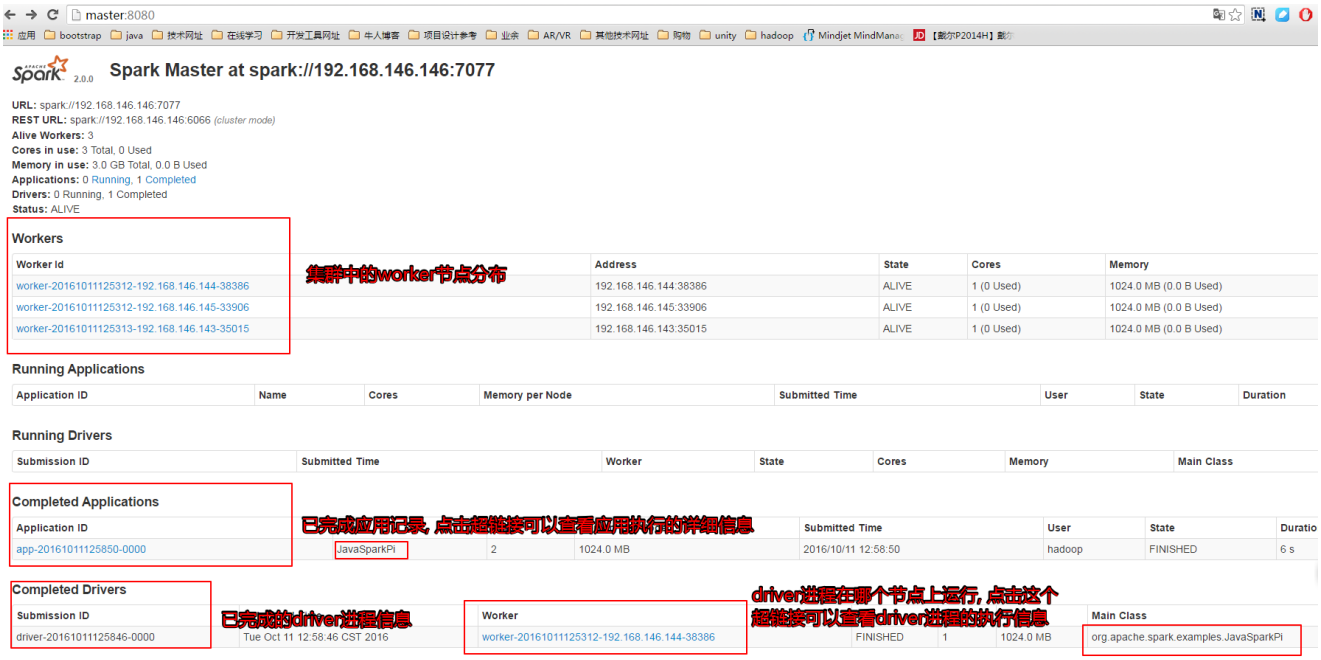
在shell环境下运行Spark提供的案例程序JavaSparkPi，通过如下命令：

bin/spark-submit --class org.apache.spark.examples.JavaSparkPi --deploy-mode cluster examples/jars/spark-examples_2.11-2.0.0.jar 10 4

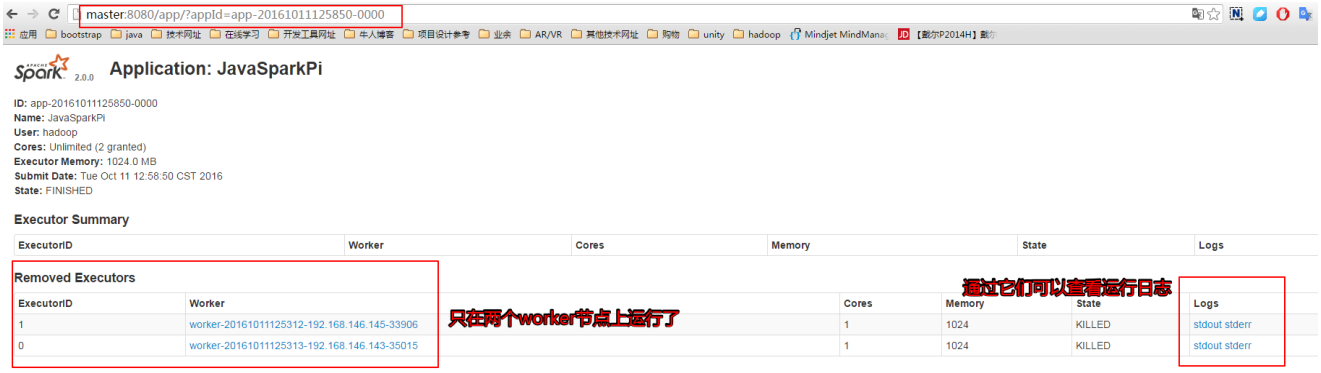
shell 界 面 输 出 如 下 信 息 ：

```
[hadoop@master spark-2.0]$ bin/spark-submit --class org.apache.spark.examples.JavaSparkPi --master spark://master:7077 --deploy-mo
de cluster examples/jars/spark-examples_2.11-2.0.0.jar 10 4
Running Spark using the REST application submission protocol.
16/10/11 12:58:34 INFO rest.RestSubmissionClient: Submitting a request to launch an application in spark://master:7077.
16/10/11 12:58:44 WARN rest.RestSubmissionClient: Unable to connect to server spark://master:7077.
Warning: Master endpoint spark://master:7077 was not a REST server. Falling back to legacy submission gateway instead.
16/10/11 12:58:45 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes
 where applicable
[hadoop@master spark-2.0]$
```

从shell界面我们不能得到什么信息，我们可以通过浏览器来查看执行这个应用的具体信息，在浏览器中输入http://master:8080，我们将看到如下信息：

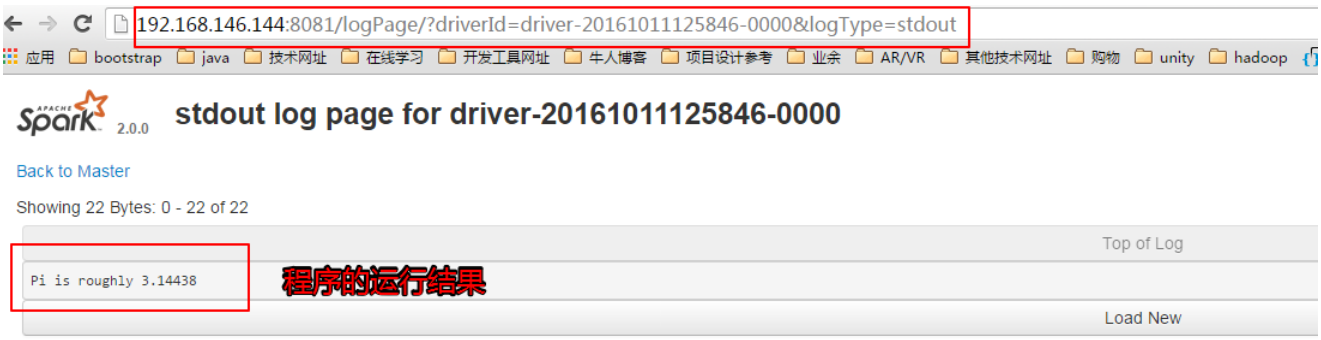


点击**Completed Applications**中的链接，我们可以查看运行这个应用所消耗的资源情况：



点击Completed Drivers下的超链来查看应用程序driver进程所在节点的信息，通过这个节点我们也可以查看整个应用程序的输入结果信息。

点击上图中的**stdout**，我们可以查看整个应该程序的输出结果。如下：



在yarn上的运行测试这里不再记录，请自行测试