

项目概述

1. 项目类别：Hadoop环境搭建
2. 学时要求：4
3. 组织形式：单人完成

术5个部分，分为5个子项目。本项目为项目1，内容为：每个学生搭建一个包括3个节点的分布式集群。

项目目的

1. 掌握Linux基本命令。
2. 了解SSH免密登录的原理以及进行SSH免密登录的原因。
3. 运用SSH工具进行集群中各个主机的免密登录配置。
4. 运用Hadoop集群安装软件进行集群的安装与配置。

项目要求

1. 创建Hadoop用户。
2. 机器名及域名配置。
3. 安装JDK
4. SSH安装与配置
5. Hadoop集群安装与配置
6. 测设Hadoop环境

项目环境

1. 硬件环境： 每台计算机内存8G，2个四核CPU，硬盘容量T级。每台计算机配置静态IP。
2. 软件： 每台计算机安装ubuntu-16.04.2操作系统

相关知识

1 Linux基本命令

1.1 ls: 显示文件或目录

1.2 mkdir: 创建目录

1.3 cd: 切换目录

1.4 touch: 创建空文件

1.5 echo: 创建带有内容的文件。

1.6 cat: 查看文件内容

1.7 cp: 复制文件或目录

1.8 mv: 移动文件或修改文件名

1.9 rm: 删除文件

1.10 grep: 在文本文件中查找某个字符串

1.11 rmdir: 删除空目录

1.12 pwd: 显示当前目录

1.13 ln: 创建链接文件

1.14 more、less: 分页显示文本文件内容

1.15 head、tail: 显示文件头、尾内容

1.16 ifconfig: 查看网络情况

1.17 ping: 测试网络连通

1.18 ps: 显示瞬间进程状态

1.19 kill: 杀死进程，可以先用ps 或 top命令查看进程的id，然后再用kill命令杀死进程。

1.20 useradd: 创建用用

1.21 adduser: 将用户添加到组 (权限管理)

1.22 tar: 打包解压文件

1.23 sudo chown [-R] owner[:group] {File|Directory}

1.24 sudo chmod [u g o a] [+增加权限 -减少权限] [r w x] 目录名

2 SSH工作原理

2.1 SSH是什么?

SSH 为 Secure Shell 的缩写, 是建立在应用层和传输层基础上的安全协议。SSH 是目前较可靠、专为远程登录会话和其他网络服务提供安全性的协议。利用 SSH 协议可以有效防止远程管理过程中的信息泄露问题。SSH最初是UNIX系统上的一个程序, 后来又迅速扩展到其他操作平台。SSH是由[客户端](#)和[服务端](#)的软件组成, 服务端是一个守护进程(daemon), 它在后台运行并响应来自客户端的连接请求, 客户端包含ssh程序以及像scp (远程拷贝)、slogin (远程登陆)、sftp (安全文件传输) 等其他的应用程序

2.2 配置SSH的原因:

Hadoop名称节点 (NameNode) 需要启动集群中所有机器的Hadoop守护进程, 这个过程需要通过SSH登录来实现。Hadoop并没有提供SSH输入密码登录的形式, 因此, 为了能够顺利登录每台机器, 需要将所有机器配置为名称节点可以无密码登录它们。

3 Hadoop架构

一个基本的Hadoop集群中的节点主要有:

- NameNode: 负责协调集群中的数据存储
- DataNode: 存储被拆分的数据块
- SecondaryNameNode: 帮助NameNode收集文件系统运行的状态信息
SecondaryNameNode在小型集群中可以 and NameNode 共用一台机器, 较大的群集可以采用与NameNode相同的硬件。

项目内容

1 创建Hadoop用户, 并为hadoop用户授权

【注意】以下标记[A,B]是指在A和B机器上执行的步骤，同理[A],[A,B,C]的写法

1.1 [A]进入终端

在远程桌面上点击右键，选择“打开终端”

1.2 [A]切换到root用户

进入终端之后，默认是ub用户，切换命令为：

```
su
```

如果出现认证失败的错误，说明root用户没有设置初始密码，可以执行

```
sudo passwd root
```

然后输入当前用户的密码

再两次输入root的密码

然后再次执行

```
su
```

然后输入刚刚设置的root密码

1.3 [A]执行下列名列查看hadoop用户是否存在。

```
cat /etc/passwd |grep hadoop
```

1.4 [A]创建用户hadoop，并设置密码为hadoop。-m建立用户登录的目录，-s定义用户登录后的shell

```
useradd -m hadoop -s /bin/bash
```

```
passwd hadoop
```

设置hadoop用户密码为 hadoop

1.5 [A]为hadoop用户授予sudo权限。

```
adduser hadoop sudo
```

1.6 [A]修改机器名字,【注意】本步骤由于桌面云平台控制,本步骤跳过

使用自己的姓名全拼加上数字,例如zhangsan01、zhangsan02、zhangsan03, 命令如下:

```
sudo gedit /etc/hostname
```

修改名字之后重启一下主机,使用:

```
reboot
```

1.7 在另外两台主机上完成相同的操作

(1) [B]第二台机器上重复上面的操作(步骤1.1~1.6):创建用户、设置密码、设置权限、修改机器名(姓名02)、重启

(2) [C]第三台机器上重复上面的操作(步骤1.1~1.6):创建用户、设置密码、设置权限、修改机器名(姓名03)、重启

2 添加域名映射

2.1 [A,B,C]执行ifconfig命令,查看当前主机IP地址。

```
root@lixucheng01: /home/ub
文件(F) 编辑(E) 查看(V) 搜索(S) 终端(T) 帮助(H)
root@lixucheng01:/home/ub# sudo gedit /etc/hostname
** (gedit:3548): WARNING **: 16:56:27.728: Set document metadata failed: 不支持
设置属性 metadata::gedit-position
root@lixucheng01:/home/ub# ifconfig
enp2s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.22.252.3 netmask 255.255.252.0 broadcast 172.22.255.255
    inet6 fe80::f816:3eff:fed3:98d1 prefixlen 64 scopeid 0x20<link>
    ether fa:16:3e:d3:98:d1 txqueuelen 1000 (以太网)
    RX packets 5457 bytes 1296203 (1.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 5263 bytes 421618 (421.6 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (本地环回)
    RX packets 146 bytes 11584 (11.5 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 146 bytes 11584 (11.5 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@lixucheng01:/home/ub#
```

2.2 [A]将集群中所有节点的IP 地址与主机名写入所有主机的/etc/hosts中，完成域名映射的添加。

```
gedit /etc/hosts
```

例如：

```
hosts
/etc
打开(O) 保存(S)
127.0.0.1 i-00005085 i-00005085 localhost
127.0.1.1 ub-desktopVDI

# The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
172.22.252.3 lixucheng01
172.22.252.4 lixucheng02
172.22.252.5 lixucheng03
```

【注意】hosts文件的第一行 仅保留 127.0.0.1 localhost 如果中间有其他内容，全部删除

2.3 在两外两台主机上也完成相同的操作

(1) [B]在第二台主机上，编辑文件，把3行复制过去，保存

(2) [C]在第三台主机上，编辑文件，把3行复制过去，保存

3 SSH登录权限设置

3.1 [A]切换到用户hadoop

```
$ su hadoop
```

3.2 在集群所有节点上生成公钥和私钥。

(1) [A]在第一个节点上操作

```
$ ssh-keygen -t rsa
```

将在~/目录下自动创建目录.ssh，内部创建id_rsa（私钥）和id_rsa.pub（公钥）。

例如：

(2) [B]在第二个节点上完成上面的操作

(3) [C]在第三个节点上完成上面的操作

3.3 在集群的各个节点上执行下列命令：

(1) [A,B,C]安装ssh服务：分别在3台主机上完成,注意此时当前用户应为hadoop

更新软件

```
sudo apt-get update
```

更新客户端版本：

```
sudo apt-get install openssh-client=1:7.6p1-4
```

安装服务器：

```
sudo apt-get install openssh-server
```

(2) [A,B,C]复制公钥到3个主机：分别在3台主机上操作，一共复制9次

```
$cd ~/.ssh
```

```
$ssh-copy-id -i id_rsa.pub hadoop@lixucheng01
```

```
$ssh-copy-id -i id_rsa.pub hadoop@lixucheng02
```

```
$ssh-copy-id -i id_rsa.pub hadoop@lixucheng03
```

例如：

```
hadoop@lixucheng01:~/.ssh$ ssh-copy-id -i id_rsa.pub hadoop@lixucheng01
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "id_rsa.pub"
The authenticity of host 'lixucheng01 (172.22.252.3)' can't be established.
ECDSA key fingerprint is SHA256:7gTMsLmKEviD242bE/7hFLEGEebmKtOxrAj9DwtCL3c.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter
out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompt
ed now it is to install the new keys
hadoop@lixucheng01's password:
Number of key(s) added: 1
Now try logging into the machine, with: "ssh 'hadoop@lixucheng01'"
and check to make sure that only the key(s) you wanted were added.
```

输入口令，不显示

```
hadoop@lixucheng01:~/.ssh$ ssh-copy-id -i id_rsa.pub hadoop@lixucheng02
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "id_rsa.pub"
The authenticity of host 'lixucheng02 (172.22.252.4)' can't be established.
ECDSA key fingerprint is SHA256:vxAYwse1Av+hCfpLm+c3xsH+talW327VTrNpwkkBq98.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter
out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompt
ed now it is to install the new keys
hadoop@lixucheng02's password:
Number of key(s) added: 1
Now try logging into the machine, with: "ssh 'hadoop@lixucheng02'"
and check to make sure that only the key(s) you wanted were added.
```



```
hadoop@lixucheng01:~/.ssh$ ssh-copy-id -i id_rsa.pub hadoop@lixucheng03
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "id_rsa.pub"
The authenticity of host 'lixucheng03 (172.22.252.5)' can't be established.
ECDSA key fingerprint is SHA256:QQ8ZjxFJ3Fek42BUxWYELBmrQLvGMjnIfSZcBHGLTpU.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter
out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompt
ed now it is to install the new keys
hadoop@lixucheng03's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh 'hadoop@lixucheng03'"
and check to make sure that only the key(s) you wanted were added.
```

3.4 [A,B,C]测试SSH免密码登录（在每台主机上都要测试能否连接到3台主机，需要执行9次验证）

```
$ssh hadoop@lixucheng01
$ssh hadoop@lixucheng02
$ssh hadoop@lixucheng03
```

测试成功后，执行exit命令结束远程登录：

```
$ssh exit
```

例如：

```

hadoop@lixucheng01:~/.ssh$ ssh hadoop@lixucheng02
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 4.18.0-15-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

0 个可升级软件包。
0 个安全更新。

Your Hardware Enablement Stack (HWE) is supported until April 2023.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

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individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

hadoop@lixucheng02:~$ exit
注销
Connection to lixucheng02 closed.
hadoop@lixucheng01:~/.ssh$ ssh hadoop@lixucheng03

```

4 安装Java环境

4.1 [A]进入安装位置所在的文件夹

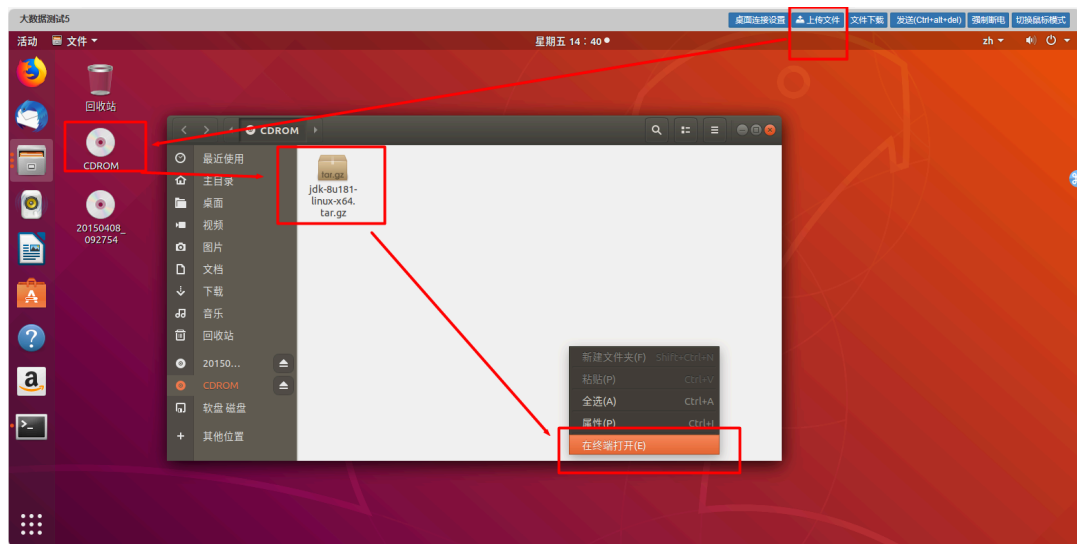
- 【实验室云桌面环境下】安装文件通过云桌面的上传文件上传，或者使用mobaxteam软件通过ssh上传,或者访问老师的ftp下载

使用老师的ftp下载方法如下

虚拟机的火狐浏览器输入：<ftp://172.22.252.7/software>，用户名ub，密码123



如果通过云桌面上传：



- 【VMware虚拟机环境下】安装文件可以直接从windows复制，粘贴到虚拟机中，， 或者使用mobaxteam软件ssh上传

进入到安装文件所在的目录

```
$ cd /path/to/文件所在目录
```

注意，以下在hadoop用户下执行

4.2 [A]解压缩

使用tar命令解压安装jdk-8u181-linux-x64.tar.gz文件到目录/usr/local。（使用root用户）

```
$sudo tar -zxvf jdk-8u181-linux-x64.tar.gz -C /usr/local
```

4.3 [A]为用户赋权限

将加压缩后的Java目录所有者修改为hadoop用户，此步骤需要在root用户下

```
$sudo chown -R hadoop:hadoop /usr/local/jdk1.8.0_181
```

4.3 [A]配置JDK环境变量，使其生效。

切换**hadoop用户**使用vi命令打开用户的配置文件 ~/.bashrc。如果出现无法连接，就在前面加sudo

```
$gedit ~/.bashrc
```

在文件中加入以下内容：

```
export JAVA_HOME=/usr/local/jdk1.8.0_181
export JRE_HOME=$JAVA_HOME/jre
export PATH=$JAVA_HOME/bin:$JAVA_HOME/jre/bin:$PATH
export CLASSPATH=$CLASSPATH:.$JAVA_HOME/lib:$JAVA_HOME/jre/lib
```

使环境变量生效，并验证JDK 是否安装成功。

```
$ source ~/.bashrc
$ java -version
```

4.4 将Java复制到另外两台机器

(1) [B,C]在另外两台机器上（B、C）为hadoop用户设置/usr/local的权限

```
$ sudo chown -R hadoop:hadoop /usr/local
```

(2) [A]在A上复制Java文件

```
sudo scp -r /usr/local/jdk1.8.0_181/ hadoop@lixucheng02:/usr/local/
```

```
sudo scp -r /usr/local/jdk1.8.0_181/ hadoop@lixucheng03:/usr/local/
```

(3) [B,C]在B、C上配置环境变量，使环境生效，验证是否成功

将下面的内容复制到~/.bashrc中

```
export JAVA_HOME=/usr/local/jdk1.8.0_181
export JRE_HOME=$JAVA_HOME/jre
export PATH=$JAVA_HOME/bin:$JAVA_HOME/jre/bin:$PATH
export CLASSPATH=$CLASSPATH:.$JAVA_HOME/lib:$JAVA_HOME/jre/lib
```

```
hadoop@lixucheng02:/usr/local$ sudo gedit ~/.bashrc
** (gedit:4557): WARNING **: 09:07:03.041: Set document metadata failed: 不支持
设置属性 metadata::gedit-spell-language
** (gedit:4557): WARNING **: 09:07:03.041: Set document metadata failed: 不支持
设置属性 metadata::gedit-encoding
** (gedit:4557): WARNING **: 09:07:04.498: Set document metadata failed: 不支持
设置属性 metadata::gedit-position
hadoop@lixucheng02:/usr/local$ source ~/.bashrc
hadoop@lixucheng02:/usr/local$ java -version
java version "1.8.0_181"
Java(TM) SE Runtime Environment (build 1.8.0_181-b13)
Java HotSpot(TM) 64-Bit Server VM (build 25.181-b13, mixed mode)
```

5 分布式集群安装配置

5.1 [A]按照4.1中进入终端的方式进入桌面对应的终端

5.2 [A]把hadoop解压缩到/usr/local下面

使用tar命令解压安装到目录/usr/local，并重命名为hadoop。

```
$ cd /hadoop安装包所在路径
```

注意上面这个步骤，是指进入安装文件所在的目录，以你自己实际目录为准，不要照抄

```
$ ls
```

```
$ sudo tar -zxvf hadoop-3.1.3.tar.gz -C /usr/local
```

```
$ cd /usr/local
```

```
$ ls
$ sudo mv /hadoop-3.1.3 /hadoop
```

5.3 [A]在节点1上，将目录/usr/local/hadoop的所有者修改为hadoop用户。

```
$ sudo chown -R hadoop:hadoop /usr/local/hadoop
```

5.4 [A,B,C]修改环境变量，并使其生效：在集群的3个节点中都需要操作。

切换hadoop用户修改环境变量

```
$ su hadoop
$ gedit ~/.bashrc
```

在配置文件.bashrc中写入下列hadoop配置信息。

```
export HADOOP_HOME=/usr/local/hadoop
export HADOOP_CONF_DIR=${HADOOP_HOME}/etc/hadoop
export YARN_HOME=/usr/local/hadoop
export YARN_CONF_DIR=${YARN_HOME}/etc/hadoop
export PATH=$HADOOP_HOME/sbin:$HADOOP_HOME/bin:$PATH
```

生效环境变量

```
$ source ~/.bashrc
```

5.5 [A]在节点配置Hadoop文件

进入Hadoop配置目录，使用vi命令对7个文件分别进行配置。

```
$ cd /usr/local/hadoop/etc/hadoop
```

(1) [A]配置hadoop-env.sh

主要配置JAVA_HOME

```
$gedit hadoop-env.sh
```

写入以下内容：

```
export JAVA_HOME=/usr/local/jdk1.8.0_181
```

(2) [A]配置yarn-env.sh

主要配置JAVA_HOME

```
$gedit yarn-env.sh
```

写入以下内容：

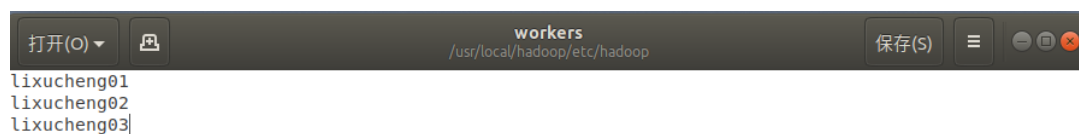
```
export JAVA_HOME=/usr/local/jdk1.8.0_181
```

(3) [A]配置workers

将所有节点的主机名写入该文件中。

```
$gedit workers
```

例如：



(4) [A]配置core-site.xml

三个节点中，选取第一节点为NameNode节点（名称节点），3个节点都作为DataNode节点（数据节点）。

写入以下内容（注意修改为自己的主机名，把第一个节点作为namenode了）：

```
<configuration>  
<property>
```

```
<name>fs.defaultFS</name>
<value>hdfs://lixucheng01:8020</value>
</property>
<property>
  <name>hadoop.tmp.dir</name>
  <value>file:/usr/local/hadoop/tmp</value>
</property>

</configuration>
```

(5) [A]配置hdfs-site.xml

修改hdfs-site.xml文件。（使用NameNode节点名替换）

```
$gedit hdfs-site.xml
```

写入下列内容（注意configuration）：把第二个节点作为secondary namenode

```
<configuration>
<property>
  <name>dfs.namenode.secondary.http-address</name>
  <value>lixucheng02:9868</value>
</property>
<property>
  <name>dfs.namenode.name.dir</name>
  <value>file:///usr/local/hadoop/dfs/name</value>
</property>

<property>
  <name>dfs.datanode.data.dir</name>
  <value>file:///usr/local/hadoop/dfs/data</value>
</property>

<property>
  <name>dfs.replication</name>
  <value>3</value>
</property>

</configuration>
```

(6) [A]配置mapred-site.xml

进入编辑

```
$gedit mapred-site.xml
```

写入以下内容:

```
<configuration>
<property>
  <name>mapreduce.framework.name</name>
  <value>yarn</value>
</property>
</configuration>
```

(7) [A]配置yarn-site.xml

修改yarn-site.xml文件。

```
$gedit yarn-site.xml
```

写入以下内容:

```
<configuration>
<property>
  <name>yarn.nodemanager.aux-services</name>
  <value>mapreduce_shuffle</value>
</property>

<property>
  <name>yarn.nodemanager.auxservices.mapreduce.shuffle.class</name>
  <value>org.apache.hadoop.mapred.ShuffleHandler</value>
</property>

<property>
  <name>yarn.resourcemanager.address</name>
  <value>lixucheng01:8032</value>
</property>

<property>
  <name>yarn.nodemanager.env-whitelist</name>
  <value>JAVA_HOME,HADOOP_COMMON_HOME,HADOOP_HDFS_HOME,
HADOOP_CONF_DIR,CLASSPATH_PREPEND_DISTCACHE,HADOOP_YARN_HOME,
HADOOP_HOME,PATH,LANG,TZ,HADOOP_MAPRED_HOME</value>
```

```
</property>  
</configuration>
```

5.6 将NameNode节点上配置好的hadoop文件夹分发给所有的DataNode节点。使用scp远程发送文件夹的基本格式为：

(1) [B,C]在另外两个节点上的/usr/local下面创建hadoop文件夹

```
$sudo mkdir hadoop
```

(2) [B,C]为hadoop用户赋访问hadoop文件夹的权限

```
sudo chown -R hadoop:hadoop hadoop
```

(3) [A]将hadoop文件夹发送到另外两个节点上

例如：

```
# 复制到其他节点    hadoop用户  
sudo scp -r /usr/local/hadoop  hadoop@lixucheng02:/usr/local/  
sudo scp -r /usr/local/hadoop  hadoop@lixucheng03:/usr/local/
```

5.7 [A]切换到hadoop用户格式化NameNode节点。

只在NameNode节点上执行以下操作：

```
$cd /usr/local/hadoop  
  
$bin/hdfs namenode -format
```

5.8 [A]在主节点启动Hadoop服务

```
$cd /usr/local/hadoop  
  
$sbin/start-dfs.sh  
  
$sbin/start-yarn.sh
```

5.9 [A,B,C]验证是否安装成功。

执行jps命令查看服务

节点1:

```
hadoop@lixucheng01:/usr/local/hadoop$ jps
21297 NameNode
24130 ResourceManager
21507 DataNode
24317 NodeManager
26223 Jps
```

节点2:

```
hadoop@lixucheng02:/usr/local/hadoop$ jps
8560 SecondaryNameNode
8390 DataNode
10073 NodeManager
11388 Jps
```

节点3:

```
hadoop@lixucheng03:/usr/local/hadoop$ jps
30720 DataNode
32258 NodeManager
1373 Jps
```

[A]停止服务方法

```
$ stop-dfs.sh
$ stop-yarn.sh
```

停止服务后，你可以做其他配置修改，排错等工作

[A]排错完成后，可以再次启动，但启动前需要删除缓存文件

```
$ cd /usr/local/hadoop
$ ls
$ rm -r dfs/ logs/ tmp/
```

然后重新格式化namenode

```
$ hdfs namenode -format
$ start-dfs.sh
$ start-yarn.sh
```

5.10 [A]运行MapReduce程序

```
$cd /usr/local/hadoop
$bin/hadoop jar share/hadoop/mapreduce/
hadoop-mapreduce-examples-3.1.3.jar pi 2 1000
```

上面第二上和第三行之间不折行。

如下图所示：

```
hadoop@lxucheng01: /usr/local/hadoop$ bin/hadoop jar share/hadoop/mapreduce/hadoop-mapreduce-examples-3.1.3.jar pi 2 1000
Number of Maps = 2
Samples per Map = 1000
2024-02-23 10:07:05,981 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
Wrote input for Map #0
2024-02-23 10:07:06,111 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
Wrote input for Map #1
Starting Job
2024-02-23 10:07:06,186 INFO client.RMProxy: Connecting to ResourceManager at lxucheng01/172.22.252.3:8032
2024-02-23 10:07:06,556 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hadoop/.staging/job_1708653987930_0001
2024-02-23 10:07:06,580 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2024-02-23 10:07:06,648 INFO Input.FileInputFormat: Total input files to process : 2
2024-02-23 10:07:06,663 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2024-02-23 10:07:06,690 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2024-02-23 10:07:06,709 INFO mapreduce.JobSubmitter: number of splits:2
2024-02-23 10:07:06,807 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2024-02-23 10:07:06,827 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1708653987930_0001
2024-02-23 10:07:06,827 INFO mapreduce.JobSubmitter: Executing with tokens: []
2024-02-23 10:07:06,985 INFO conf.Configuration: resource-types.xml not found
2024-02-23 10:07:06,985 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2024-02-23 10:07:07,228 INFO Impl.VarnClientImpl: Submitted application application_1708653987930_0001
2024-02-23 10:07:07,268 INFO mapreduce.Job: The url to track the job: http://lxucheng01:8088/proxy/application_1708653987930_0001/
2024-02-23 10:07:07,269 INFO mapreduce.Job: Running job: job_1708653987930_0001
2024-02-23 10:07:14,355 INFO mapreduce.Job: Job job_1708653987930_0001 running in uber mode : false
2024-02-23 10:07:14,356 INFO mapreduce.Job: map 0% reduce 0%
2024-02-23 10:07:19,409 INFO mapreduce.Job: map 100% reduce 0%
2024-02-23 10:07:23,433 INFO mapreduce.Job: map 100% reduce 100%
2024-02-23 10:07:24,445 INFO mapreduce.Job: Job job_1708653987930_0001 completed successfully
2024-02-23 10:07:24,529 INFO mapreduce.Job: Counters: 53
File System Counters
  FILE: Number of bytes read=50
  FILE: Number of bytes written=653682
  FILE: Number of read operations=0
  FILE: Number of large read operations=0
  FILE: Number of write operations=0
  HDFS: Number of bytes read=532
  HDFS: Number of bytes written=215
  HDFS: Number of read operations=13
  HDFS: Number of large read operations=0
  HDFS: Number of write operations=3

Map-Reduce Framework
  Map input records=2
  Map output records=4
  Map output bytes=36
  Map output materialized bytes=56
  Input split bytes=296
  Combine input records=0
  Combine output records=0
  Reduce input groups=2
  Reduce shuffle bytes=56
  Reduce input records=4
  Reduce output records=0
  Spilled Records=8
  Shuffled Maps=2
  Failed Shuffles=0
  Merged Map outputs=2
  GC time elapsed (ms)=251
  CPU time spent (ms)=1550
  Physical memory (bytes) snapshot=748457984
  Virtual memory (bytes) snapshot=7968858112
  Total committed heap usage (bytes)=648544256
  Peak Map Physical memory (bytes)=280768512
  Peak Map Virtual memory (bytes)=2655289344
  Peak Reduce Physical memory (bytes)=186945536
  Peak Reduce Virtual memory (bytes)=2661109760

Shuffle Errors
  BAD_ID=0
  CONNECTION=0
  IO_ERROR=0
  WRONG_LENGTH=0
  WRONG_MAP=0
  WRONG_REDUCE=0

File Input Format Counters
  Bytes Read=236
File Output Format Counters
  Bytes Written=97
Job Finished in 18.411 seconds
2024-02-23 10:07:24,587 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
Estimated value of Pi is 3.144600000000000000000000
```

5.11 [A]访问管理页面

yarn管理页面

<http://mashuai01:8088/cluster>

HDFS管理页面

<http://mashuai01:9870/>

Namenode Information - Mozilla Firefox

Namenode information x <ftp://172.22.252.7/soft...> x +

← → ↻ 🏠 [mashuai01:9870/dfshealth.html#tab-datanode](#) ... 📄 ☆ 🗑 📄 ☰

In operation

Show entries Search:

Node	Http Address	Last contact	Last Block Report	Capacity	Blocks	Block pool used	Version
✓ mashuai01:9866 (172.22.252.6:9866)	http://mashuai01:9864	2s	0m	97.44 GB <div><div></div></div>	0	32 KB (0%)	3.1.3
✓ mashuai02:9866 (172.22.252.7:9866)	http://mashuai02:9864	1s	0m	97.44 GB <div><div></div></div>	0	32 KB (0%)	3.1.3
✓ mashuai03:9866 (172.22.252.8:9866)	http://mashuai03:9864	1s	0m	97.44 GB <div><div></div></div>	0	32 KB (0%)	3.1.3

Showing 1 to 3 of 3 entries

Previous **1** Next