HadoopClustersInstall

☆ Dockerfile

```
  FROM Ubuntu:18.04

  MAINTAINER amber

  # apt-get clean, update
  RUN apt-get clean all && apt-get update

  # Install
  RUN apt-get install -y python3.6 ipython3 python3-pip iputils-ping
  RUN apt-get install -y openssh-server wget git vim curl
  RUN pip3 install numpy pandas jieba

  # Install Java ( jdk-8u144 )
  RUN cd /tmp && wget https://mail-tp.fareoffice.com/java/jdk-8u144-linux-x64.tar.gz && tar -zxvf /tmp/jdk-8u144-linux-x64.tar.gz
  RUN cd /tmp && mkdir /usr/java && mv /tmp/jdk1.8.0_144 /usr/java && ln -s /usr/java/jdk1.8.0_144/ /usr/java/java

  # Create Public Key and SSH without Key
  RUN ssh-keygen -t rsa -f ~/.ssh/id_rsa -P '' && \
    cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys

  ENTRYPOINT ["/bin/bash", "-c", "service ssh start; /bin/bash"]

  ENV JAVA_HOME /usr/java/java
  ENV JRE_HOME $JAVA_HOME/jre
  ENV CLASSPATH .:$JAVA_HOME/lib/dt.jar:$JAVA_HOME/lib/tools.jar:$JRE_HOME/lib/rt.jar
  ENV PATH $PATH:$JAVA_HOME/bin

  CMD service ssh status && /bin/bash
```

☆ Build Docker Image

```
  sudo docker build -t chintz/hadoop:19.05.25 . --no-cache
  sudo docker images
```

```
REPOSITORY          TAG           IMAGE ID        CREATED        SIZE
chintz/hadoop        19.05.25      33eb2aea1132      4 hours ago    1.74GB
```

☆ Create 3 Container

```
  sudo docker run --name master --hostname master -p 50070:50070 -p 
8088:8088 -it 33eb2aea1132
  sudo docker run --name slaver1 --hostname slaver1 -it 33eb2aea1132
  sudo docker run --name slaver2 --hostname slaver2 -it 33eb2aea1132
  sudo docker ps -a
```

```
CONTAINER ID    IMAGE          COMMAND          CREATED
      STATUS                          PORTS                          NAMES
22d9ba077432    33eb2aea1132    "/bin/bash -c 'servi…"    4 hours ago
      Up 4 hours                                                     slaver2
72839ce6dd6f    33eb2aea1132    "/bin/bash -c 'servi…"    4 hours ago
      Up 4 hours                                                     slaver1
e382608548b3    33eb2aea1132    "/bin/bash -c 'servi…"    4 hours ago
      Up 4 hours    0.0.0.0:8088->8088/tcp, 0.0.0.0:50070->50070/tcp    master
```

☆ Other settings (Every Sever)

```
  apt-get clean all
  apt-get update
  apt-get -y upgrade
  apt-get install ntp
  vi /etc/profile
   export JAVA_HOME=/usr/java/java
   export JRE_HOME=$JAVA_HOME/jre
   export 
CLASSPATH=.:$JAVA_HOME/lib/dt.jar:$JAVA_HOME/lib/tools.jar:$JRE_HOME/l
ib/rt.jar
  export PATH=$PATH:$JAVA_HOME/bin
```

# 查看 Java 版本，確認是否安裝成功

```
  java -version
```

```
java version "1.8.0_144"
Java(TM) SE Runtime Environment (build 1.8.0_144-b01)
Java HotSpot(TM) 64-Bit Server VM (build 25.144-b01, mixed mode)
```

☆ SSH Connection Setting (Master)

```
# 設定主機資訊
  vi /etc/hosts
  已有 172.17.0.2      master
  加入 172.17.0.3      slaver1
  加入 172.17.0.4      slaver2

# 複製 Key 到其他兩台
  ssh-copy-id -i ~/.ssh/id_rsa.pub root@slaver1
  ssh-copy-id -i ~/.ssh/id_rsa.pub root@slaver2

# 下載 Hadoop 2.7.3
  cd /tmp; wget https://archive.apache.org/dist/hadoop/core/hadoop-2.7.3/hadoop-2.7.3.tar.gz
```

☆ Other Settings (Slaver1)

```
# 複製 Key 到 master、slaver2
  ssh-copy-id -i ~/.ssh/id_rsa.pub root@172.17.0.2
  ssh-copy-id -i ~/.ssh/id_rsa.pub root@172.17.0.4
```

☆ Install Hadoop (Master)

```
# 安裝 Hadoop
  tar -zxvf /tmp/hadoop-2.7.3.tar.gz
  mv hadoop-2.7.3 /opt

# 新增環境變數
  vi /etc/profile
  export HADOOP_HOME=/opt/hadoop/
  export HADOOP_MAPRED_HOME=$HADOOP_HOME
  export HADOOP_COMMON_HOME=$HADOOP_HOME
  export HADOOP_HDFS_HOME=$HADOOP_HOME
  export YARN_HOME=$HADOOP_HOME
  export HADOOP_CONF_DIR=$HADOOP_HOME/etc/hadoop
  export YARN_CONF_DIR=$HADOOP_HOME/etc/hadoop
  export PATH=$PATH:$HADOOP_HOME/bin:$HADOOP_HOME/sbin
  export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
  export HADOOP_OPTS="-Djava.library.path=$HADOOP_HOME/lib"

  vi /opt/hadoop-2.7.3/libexec/hadoop-config.sh
  export JAVA_HOME=/usr/java/java
```

```
vi /opt/hadoop-2.7.3/etc/hadoop/hadoop-env.sh
export JAVA_HOME=/usr/java/java
export HADOOP_HOME=/opt/hadoop
export PATH=$PATH:$HADOOP_HOME/bin
export PATH=$PATH:$HADOOP_HOME/sbin
export HDFS_NAMENODE_USER=root export HDFS_DATANODE_USER=root
export HDFS_JOURNALNODE_USER=root
export YARN_RESOURCEMANAGER_USER=root
export YARN_NODEMANAGER_USER=root export HDFS_ZKFC_USER=root
export HADOOP_MAPRED_HOME=$HADOOP_HOME
export HADOOP_COMMON_HOME=$HADOOP_HOME
export HADOOP_HDFS_HOME=$HADOOP_HOME
export YARN_HOME=$HADOOP_HOME
export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
export HADOOP_OPTS="-Djava.library.path=$HADOOP_HOME/lib"
```

# Git Clone 設定檔

```
cd /tmp
git clone https://github.com/orozcohsu/hadoop-2.7.3-ha.git
cd /tmp/hadoop-2.7.3-ha
cp * /opt/hadoop-2.7.3/etc/hadoop/
```

# Install Zookeeper

## 先在本機將 Zookerper 放進 Master

```
sudo docker cp ~/Templates/zookeeper-3.4.9.tar.gz e382608548b3:/tmp
```

# 回到 Msater

```
cd /tmp
tar -zxvf zookeeper-3.4.9.tar.gz
mv zookeeper-3.4.9 /opt
ln -s /opt/zookeeper-3.4.9 /opt/zookeeper
cp /opt/zookeeper/conf/zoo_sample.cfg /opt/zookeeper/conf/zoo.cfg
```

```
vi /opt/zookeeper/conf/zoo.cfg
dataDir=/tmp/zookeeper   # 將 /tmp 改成 /opt
```

# 找到這一行 clientPort=2181 後加入

```
server.1=master:2888:3888
server.2=slaver1:2888:3888
server.3=slaver2:2888:3888
```

```
vi /opt/zookeeper/myid
```

輸入 1

# 複製到其他兩台 (完成後，個別編輯 vi /opt/zookeeper/myid 檔案編號為 2、3)

```
scp -rp /opt/zookeeper root@slaver1:/opt/zookeeper
scp -rp /opt/zookeeper root@slaver2:/opt/zookeeper
```

# 建立 Slaver 資訊

```
vi /opt/hadoop-2.7.3/etc/hadoop/slaves
master
slaver1
slaver2
```

# 複製檔案到其他兩台

```
scp -rp /etc/hosts root@slaver1:/etc/hosts
scp -rp /etc/hosts root@slaver2:/etc/hosts
scp -rp /opt/hadoop-2.7.3/ root@slaver1:/opt/hadoop-2.7.3
scp -rp /opt/hadoop-2.7.3/ root@slaver2:/opt/hadoop-2.7.3
scp -rp /etc/profile root@slaver1:/etc/profile
scp -rp /etc/profile root@slaver2:/etc/profile
```

# 建立 Hadoop 軟連結 (!!!在每台電腦做!!!)

```
ln -s /opt/hadoop-2.7.3 /opt/hadoop

service ntp start
```

# 啟動 Zookeeper (!!!在每台電腦做!!!)

```
/opt/zookeeper/bin/zkServer.sh start
```

# 待三台 ZK 皆開啟後，查看每台 ZK 狀態

```
/opt/zookeeper/bin/zkServer.sh status
```

# 啟動 Journalndoe (!!!在每台電腦做!!!)

```
hadoop-daemon.sh start journalnode
```

# 建立 tmp 目錄

```
mkdir -p $HADOOP_HOME/tmp
mkdir -p $HADOOP_HOME/tmp/dfs/name
mkdir -p $HADOOP_HOME/tmp/dfs/data
mkdir -p $HADOOP_HOME/tmp/journal
```

# 修改權限

```
chmod 777 $HADOOP_HOME/tmp
```

# 複製到其他兩台

```
scp -rp $HADOOP_HOME/tmp slaver1:/opt/hadoop
scp -rp $HADOOP_HOME/tmp slaver2:/opt/Hadoop
```

# HDFS 格式化

```
hdfs namenode -format
```

# ZK 格式化

```
hdfs zkfc -formatZK
```

# 確定 ZK 格式化成功

```
/opt/zookeeper/bin/zkCli.sh -server 127.0.0.1:2181
```

# 進入交談視窗後

```
ls /
```

## 會看到[zookeeper, hadoop-ha]

# Format 失敗 (!!!三台都要做!!!)

Step 1. 進入交談視窗，刪除 hadoop-ha

```
rmr /hadoop-ha
```

Step 2. 砍掉目錄

```
rm -r -f /opt/hadoop/tmp
```

Step 3. 關閉所有服務

```
stop-all.sh
jps  # 查看服務
kill -p 服務代號  # 移除未關閉服務
```

Step 4. 啟動 Zookeeper 與 Journalnode

```
/opt/zookeeper/bin/zkServer.sh start
hadoop-daemon.sh start journalnode
```

Step 5. 再從建立 /tmp 目錄那段開始從做

# 啟動 Hadoop 服務 (Master ，確定三台的 ZK、JN 服務都啟動)

```
start-all.sh
```

☆ Other Settings (Slaver1)

# 在 Slaver1 上，將此主機進行 NameNode 目錄服務格式化，並把 Master 上的 NameNode 目錄資 料複製過來

```
hdfs namenode -bootstrapStandby
```

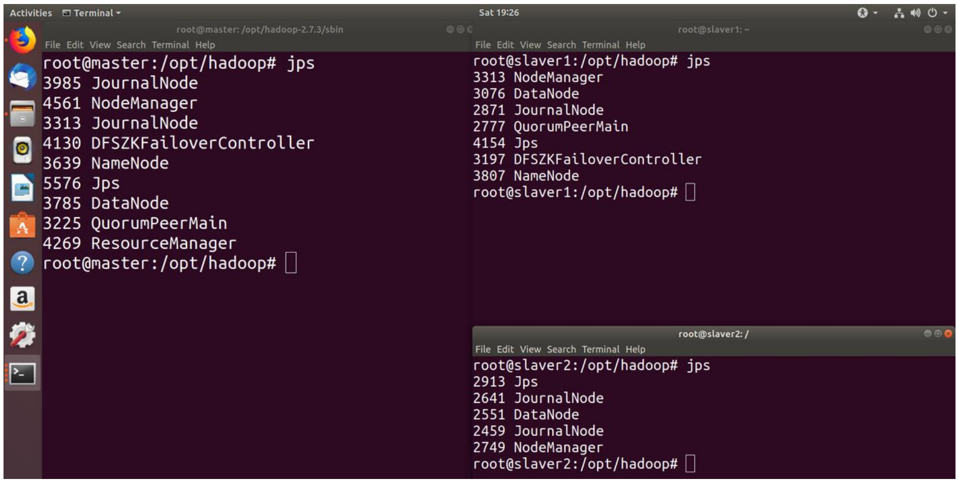
# 做完上述後，啟動 Slaver1 上的 NN 服務

```
hadoop-daemon.sh start namenode
```

☆ Success

瀏覽二台 (Master 與 Slaver1) 的 NameNode
http://ip:50070　會有 3 個 Datanode ，二台狀態分別為 Active 與 Standby
http://Ip:8088 (Slaver1 看不到 8088)

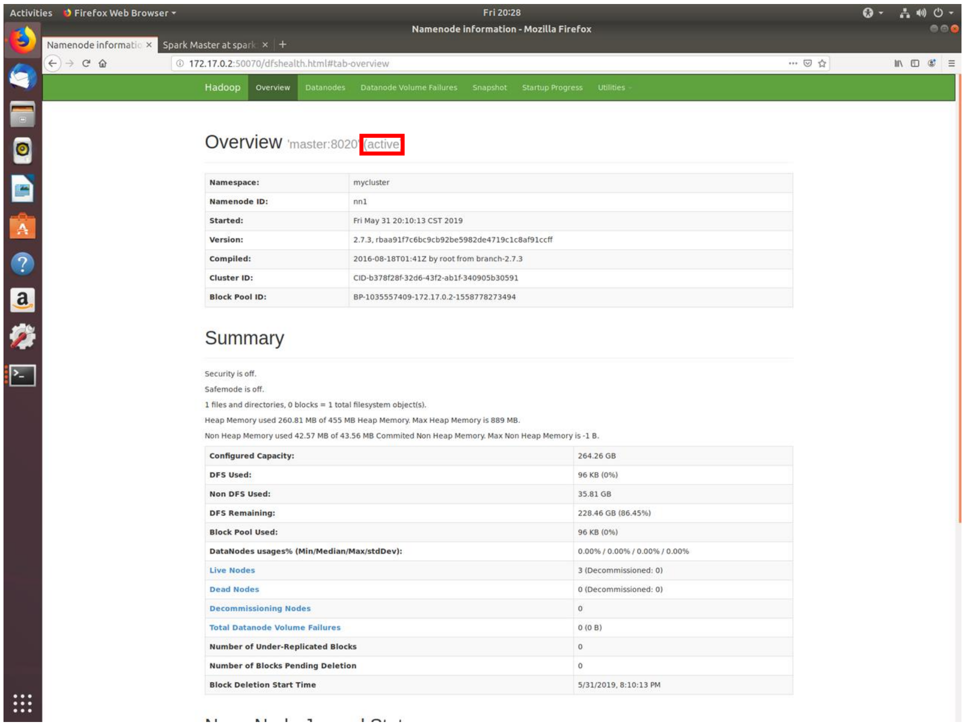
# 查看服務狀態
jps


Activities
Terminal
Sat 19:26
root@master: /opt/hadoop-2.7.3/sbin
File Edit View Search Terminal Help
root@slaver1: ~
root@slaver2: /

```
root@master:/opt/hadoop# jps
3985 JournalNode
4561 NodeManager
3313 JournalNode
4130 DFSZKFailoverController
3639 NameNode
5576 Jps
3785 DataNode
3225 QuorumPeerMain
4269 ResourceManager
root@master:/opt/hadoop# 
```

```
root@slaver1:/opt/hadoop# jps
3313 NodeManager
3076 DataNode
2871 JournalNode
2777 QuorumPeerMain
4154 Jps
3197 DFSZKFailoverController
3807 NameNode
root@slaver1:/opt/hadoop# 
```

```
root@slaver2:/opt/hadoop# jps
2913 Jps
2641 JournalNode
2551 DataNode
2459 JournalNode
2749 NodeManager
root@slaver2:/opt/hadoop# 
```



Overview 'master:8020' (active)

Namespace:	mycluster
Namenode ID:	nn1
Started:	Fri May 31 20:10:13 CST 2019
Version:	2.7.3, rbaa91f7c6bc9cb92be5982de4719c1c8af91ccff
Compiled:	2016-08-18T01:41Z by root from branch-2.7.3
Cluster ID:	CID-b378f28f-32d6-43f2-ab1f-340905b30591
Block Pool ID:	BP-1035557409-172.17.0.2-1558778273494

Summary

Security is off.

Safemode is off.

1 files and directories, 0 blocks = 1 total filesystem object(s).

Heap Memory used 260.81 MB of 455 MB Heap Memory. Max Heap Memory is 889 MB.

Non Heap Memory used 42.57 MB of 43.56 MB Commited Non Heap Memory. Max Non Heap Memory is -1 B.

Configured Capacity:	264.26 GB
DFS Used:	96 KB (0%)
Non DFS Used:	35.81 GB
DFS Remaining:	228.46 GB (86.45%)
Block Pool Used:	96 KB (0%)
DataNodes usages% (Min/Median/Max/stdDev):	0.00% / 0.00% / 0.00% / 0.00%
Live Nodes	3 (Decommissioned: 0)
Dead Nodes	0 (Decommissioned: 0)
Decommissioning Nodes	0
Total Datanode Volume Failures	0 (0 B)
Number of Under-Replicated Blocks	0
Number of Blocks Pending Deletion	0
Block Deletion Start Time	5/31/2019, 8:10:13 PM

☆ If Reboot

# 設定主機資訊 (!!!每次開機都要重新加入!!!)

```
  vi /etc/hosts
  已有 172.17.0.2      master
  加入 172.17.0.3      slaver1
  加入 172.17.0.4      slaver2
```

# 複製檔案到其他兩台

```
  scp -rp /etc/hosts root@slaver1:/etc/hosts
  scp -rp /etc/hosts root@slaver2:/etc/hosts
```

# 確認資訊是否存在

```
  vi /opt/zookeeper/myid
  vi /opt/hadoop-2.7.3/etc/hadoop/slaves
```

# 啟動 Zookeeper 與 Journalnode (!!!三台都要做!!!)

```
  /opt/zookeeper/bin/zkServer.sh start
  hadoop-daemon.sh start journalnode
```

有可能會顯示 bash: hadoop-daemon.sh: command not found

先 **source /etc/profile** 後應該就可啟動

# 啟動 Hadoop 服務 (Master ，確定三台的 ZK、JN 服務都啟動)

```
  start-all.sh
```

☆ Helper

# 查詢 Container IP

```
  sudo docker inspect --format '{{ .NetworkSettings.IPAddress }}'
containername
  sudo docker inspect --format '{{ .NetworkSettings.IPAddress }}'
master slaver1 slaver2
```

# 將 Zookeeper 壓縮檔，搬到 Container 的 /tmp 目錄下

```
  sudo docker cp ~/Templates/zookeeper-3.4.9.tar.gz e382608548b3:/tmp
```