NSD ARCHITECTURE DAY06

1 案例1：安装与部署

1.1 问题

本案例要求：

- 对mapred和yarn文件进行配置
- 验证访问Hadoop

1.2 方案

在day05准备好的环境下给master（nn01）主机添加ResourceManager的角色，在node1，node2，node3上面添加NodeManager的角色，如表-1所示：

表-1

主机	角色	软件
192.168.1.21 master	NameNode SecondaryNameNode ResourceManager	HDFS YARN
192.168.1.22 node1	DataNode NodeManager	HDFS YARN
192.168.1.23 node2	DataNode NodeManager	HDFS YARN
192.168.1.24 node3	DataNode NodeManager	HDFS YARN

1.3 步骤

实现此案例需要按照如下步骤进行。

步骤一：安装与部署hadoop

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1）配置mapred-site（nn01上面操作）

```
[root@nn01 ~]# cd /usr/local/hadoop/etc/hadoop/
[root@nn01 hadoop]# mv mapred-site.xml.template mapred-site.xml
[root@nn01 hadoop]# vim mapred-site.xml
<configuration>
<property>
        <name>mapreduce.framework.name</name>
        <value>yarn</value>
    </property>
</configuration>
```

2）配置yarn-site（nn01上面操作）

```
[root@nn01 hadoop]# vim yarn-site.xml
<configuration>

<!-- Site specific YARN configuration properties -->
<property>
        <name>yarn.resourcemanager.hostname</name>
        <value>nn01</value>
    </property>
    <property>
        <name>yarn.nodemanager.aux-services</name>
        <value>mapreduce_shuffle</value>
    </property>
</configuration>
```

3）同步配置（nn01上面操作）

```
[root@nn01 hadoop]# for i in {22..24};do rsync -aSH --delete /usr/local/hadoop/ 192.
[1] 712
[2] 713
[3] 714
```

4）验证配置（nn01上面操作）

Top

```
[root@nn01 hadoop]# cd /usr/local/hadoop
```

```
[root@nn01 hadoop]# ./sbin/start-dfs.sh
Starting namenodes on [nn01]
nn01: namenode running as process 23408. Stop it first.
node1: datanode running as process 22409. Stop it first.
node2: datanode running as process 22367. Stop it first.
node3: datanode running as process 22356. Stop it first.
Starting secondary namenodes [nn01]
nn01: secondary namenode running as process 23591. Stop it first.
[root@nn01 hadoop]# ./sbin/start-yarn.sh
starting yarn daemons
starting resourcemanager, logging to /usr/local/hadoop/logs/yarn-root-resourcemanage
node2: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-root-nodemanage
node3: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-root-nodemanage
node1: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-root-nodemanage
[root@nn01 hadoop]# jps    //nn01查看有ResourceManager
23408 NameNode
1043 ResourceManager
1302 Jps
23591 SecondaryNameNode
[root@nn01 hadoop]# ssh node1 jps       //node1查看有NodeManager
25777 Jps
22409 DataNode
25673 NodeManager
[root@nn01 hadoop]# ssh node2 jps       //node1查看有NodeManager
25729 Jps
25625 NodeManager
22367 DataNode
[root@nn01 hadoop]# ssh node3 jps       //node1查看有NodeManager
22356 DataNode
25620 NodeManager
25724 Jps
```

5）web访问hadoop

```
http://192.168.1.21:50070/          //--namenode web页面（nn01）
http://192.168.1.21:50090/       //--secondory namenode web页面（nn01）
http://192.168.1.22:50075/       //--datanode web页面（node1,node2,node3）
http://192.168.1.21:8088/       //--resourcemanager web页面（nn01）
http://192.168.1.22:8042/       //--nodemanager web页面（node1,node2,node3）
```

Top

2 案例2：Hadoop词频统计

2.1 问题

本案例要求：

- 在集群文件系统里创建文件夹
- 上传要分析的文件到目录中
- 分析上传文件
- 展示结果

2.2 步骤

实现此案例需要按照如下步骤进行。

步骤一：词频统计

```
[root@nn01 hadoop]# ./bin/hadoop fs -ls /       //查看集群文件系统的根，没有内容
[root@nn01 hadoop]# ./bin/hadoop fs -mkdir  /aaa
//在集群文件系统下创建aaa目录
[root@nn01 hadoop]# ./bin/hadoop fs -ls /       //再次查看，有刚创建的aaa目录
Found 1 items
drwxr-xr-x   - root supergroup          0 2018-09-10 09:56 /aaa
[root@nn01 hadoop]#  ./bin/hadoop fs -touchz  /fa    //在集群文件系统下创建fa文件
[root@nn01 hadoop]# ./bin/hadoop fs -put *.txt /aaa
//上传*.txt到集群文件系统下的aaa目录
[root@nn01 hadoop]#  ./bin/hadoop fs -ls /aaa    //查看
Found 3 items
-rw-r--r--   2 root supergroup      86424 2018-09-10 09:58 /aaa/LICENSE.txt
-rw-r--r--   2 root supergroup      14978 2018-09-10 09:58 /aaa/NOTICE.txt
-rw-r--r--   2 root supergroup       1366 2018-09-10 09:58 /aaa/README.txt
[root@nn01 hadoop]# ./bin/hadoop fs -get  /aaa  //下载集群文件系统的aaa目录
[root@nn01 hadoop]# ./bin/hadoop jar  \
 share/hadoop/mapreduce/hadoop-mapreduce-examples-2.7.6.jar  wordcount /aaa /bbb
[root@nn01 hadoop]# ./bin/hadoop fs -cat /bbb/*       //查看集群里的数据
```

3 案例3：节点管理

3.1 问题

本案例要求：

Top

- 增加一个新的节点
- 查看状态
- 删除节点

3.2 方案：

另外准备两台主机，node4和nfsgw，作为新添加的节点和网关，具体要求如表-2所示：

表-2

主机名	IP	作用
node4	192.168.1.25	新增节点
nfsgw	192.168.1.26	浏览访问 HDFS 文件系统

3.3 步骤

实现此案例需要按照如下步骤进行。

步骤一：增加节点

1）增加一个新的节点node4

```
[root@hadoop5 ~]# echo node4 > /etc/hostname     //更改主机名为node4
[root@hadoop5 ~]# hostname node4
[root@node4 ~]# yum -y install rsync
[root@node4 ~]# yum -y install java-1.8.0-openjdk-devel
[root@node4 ~]# mkdir /var/hadoop
[root@nn01 .ssh]# ssh-copy-id 192.168.1.25
[root@nn01 .ssh]# vim /etc/hosts
192.168.1.21  nn01
192.168.1.22  node1
192.168.1.23  node2
192.168.1.24  node3
192.168.1.25  node4
[root@nn01 .ssh]# scp /etc/hosts 192.168.1.25:/etc/
[root@nn01 ~]# cd /usr/local/hadoop/
[root@nn01 hadoop]# vim ./etc/hadoop/slaves
node1
node2
node3
node4
[root@nn01 hadoop]# for i in {22..25};do rsync -aSH --delete /usr/local/hadoop/
\192.168.1.$i:/usr/local/hadoop/ -e 'ssh' &done        //同步配置
[1] 1841
[2] 1842
[3] 1843
[4] 1844
[root@node4 hadoop]# ./sbin/hadoop-daemon.sh start datanode  //启动
```

Top

2）查看状态

```
[root@node4 hadoop]#jps
24439 Jps
24351 DataNode
```

3）设置同步带宽

```
[root@node4 hadoop]#./bin/hdfs dfsadmin -setBalancerBandwidth 60000000
Balancer bandwidth is set to 60000000
[root@node4 hadoop]#./sbin/start-balancer.sh
```

4）删除节点

```
[root@nn01 hadoop]#vim /usr/local/hadoop/etc/hadoop/slaves
//去掉之前添加的node4
node1
node2
node3
[root@nn01 hadoop]#vim /usr/local/hadoop/etc/hadoop/hdfs-site.xml
//在此配置文件里面加入下面四行
<property>
    <name>dfs.hosts.exclude</name>
    <value>/usr/local/hadoop/etc/hadoop/exclude</value>
</property>

[root@nn01 hadoop]#vim /usr/local/hadoop/etc/hadoop/exclude
node4
```

5）导出数据

```
[root@nn01 hadoop]#./bin/hdfs dfsadmin -refreshNodes
Refresh nodes successful
[root@nn01 hadoop]#./bin/hdfs dfsadmin -report  //查看node4显示Decommissioned
Dead datanodes (1):
```

Top

```
Name: 192.168.1.25:50010 (node4)
Hostname: node4
Decommission Status : Decommissioned
Configured Capacity: 17168314368 (15.99 GB)
DFS Used: 12288 (12 KB)
Non DFS Used: 1656664064 (1.54 GB)
DFS Remaining: 155111638016 (14.45 GB)
DFS Used%: 0.00%
DFS Remaining%: 90.35%
Configured Cache Capacity: 0 (0 B)
Cache Used: 0 (0 B)
Cache Remaining: 0 (0 B)
Cache Used%: 100.00%
Cache Remaining%: 0.00%
Xceivers: 1
Last contact: Mon Sep 10 10:59:58 CST 2018

[root@node4 hadoop]# ./sbin/hadoop-daemon.sh stop datanode    //停止datanode
stopping datanode
[root@node4 hadoop]# ./sbin/yarn-daemon.sh start nodemanager
//yarn 增加 nodemanager
[root@node4 hadoop]# ./sbin/yarn-daemon.sh stop  nodemanager  //停止nodemanager
stopping nodemanager
[root@node4 hadoop]# ./bin/yarn node -list
//yarn 查看节点状态，还是有node4节点，要过一段时间才会消失
18/09/10 11:04:50 INFO client.RMProxy: Connecting to ResourceManager at nn01/192.168.
Total Nodes:4
         Node-Id         Node-State    Node-Http-Address    Number-of-Running-Containers
    node3:34628            RUNNING         node3:8042                       0
    node2:36300            RUNNING         node2:8042                       0
    node4:42459            RUNNING         node4:8042                       0
    node1:39196            RUNNING         node1:8042                       0
```

4 案例4：NFS配置

4.1 问题

本案例要求：

Top

- 创建代理用户
- 启动一个新系统，禁用Selinux和firewalld
- 配置NFSWG

- 启动服务
- 挂载NFS并实现开机自启

4.2 步骤

实现此案例需要按照如下步骤进行。

步骤一：基础准备

1）更改主机名，配置/etc/hosts（/etc/hosts在nn01和nfsgw上面配置）

```
[root@localhost ~]# echo nfsgw > /etc/hostname
[root@localhost ~]# hostname nfsgw
[root@nn01 hadoop]# vim /etc/hosts
192.168.1.21  nn01
192.168.1.22  node1
192.168.1.23  node2
192.168.1.24  node3
192.168.1.25  node4
192.168.1.26  nfsgw
```

2）创建代理用户（nn01和nfsgw上面操作），以nn01为例子

```
[root@nn01 hadoop]# groupadd -g 200 nfs
[root@nn01 hadoop]# useradd -u 200 -g nfs nfs
```

3）配置core-site.xml

```
[root@nn01 hadoop]# ./sbin/stop-all.sh   //停止所有服务
This script is Deprecated. Instead use stop-dfs.sh and stop-yarn.sh
Stopping namenodes on [nn01]
nn01: stopping namenode
node2: stopping datanode
node4: no datanode to stop
node3: stopping datanode
node1: stopping datanode
Stopping secondary namenodes [nn01]
nn01: stopping secondary namenode
stopping yarn daemons
stopping resourcemanager
node2: stopping nodemanager
```

Top

```
node3: stopping nodemanager
node4: no nodemanager to stop
node1: stopping nodemanager
...

[root@nn01 hadoop]# cd etc/hadoop
[root@nn01 hadoop]# >exclude
[root@nn01 hadoop]# vim core-site.xml
    <property>
        <name>hadoop.proxyuser.nfs.groups</name>
        <value>*</value>
    </property>
    <property>
        <name>hadoop.proxyuser.nfs.hosts</name>
        <value>*</value>
    </property>
```

4）同步配置到node1，node2，node3

```
[root@nn01 hadoop]# for i in {22..24}; do rsync -aSH --delete /usr/local/hadoop/ 192.
[4] 2722
[5] 2723
[6] 2724
```

5）启动集群

```
[root@nn01 hadoop]# /usr/local/hadoop/sbin/start-dfs.sh
```

6）查看状态

```
[root@nn01 hadoop]# /usr/local/hadoop/bin/hdfs dfsadmin -report
```

步骤二：NFSGW配置

1）安装java-1.8.0-openjdk-devel和rsync

Top

```
[root@nfsgw ~]# yum -y install java-1.8.0-openjdk-devel
[root@nfsgw ~]# yum -y install rsync
[root@nn01 hadoop]# rsync -avSH --delete \
/usr/local/hadoop/ 192.168.1.26:/usr/local/hadoop/ -e 'ssh'
```

2）创建数据根目录 /var/hadoop（在NFSGW主机上面操作）

```
[root@nfsgw ~]# mkdir /var/hadoop
```

3）创建转储目录，并给用户nfs 赋权

```
[root@nfsgw ~]# mkdir /var/nfstmp
[root@nfsgw ~]# chown nfs:nfs /var/nfstmp
```

4）给/usr/local/hadoop/logs赋权（在NFSGW主机上面操作）

```
[root@nfsgw ~]# setfacl -m u:nfs:rwx /usr/local/hadoop/logs
[root@nfsgw ~]# vim /usr/local/hadoop/etc/hadoop/hdfs-site.xml
    <property>
        <name>nfs.exports.allowed.hosts</name>
        <value>* rw</value>
    </property>
    <property>
        <name>nfs.dump.dir</name>
        <value>/var/nfstmp</value>
    </property>
```

5）可以创建和删除即可

```
[root@nfsgw ~]# su - nfs
[nfs@nfsgw ~]$ cd /var/nfstmp/
[nfs@nfsgw nfstmp]$ touch 1
[nfs@nfsgw nfstmp]$ ls
1
[nfs@nfsgw nfstmp]$ rm -rf 1
```

Top

```
[nfs@nfsgw nfstmp]$ ls
[nfs@nfsgw nfstmp]$ cd /usr/local/hadoop/logs/
[nfs@nfsgw logs]$ touch 1
[nfs@nfsgw logs]$ ls
1  hadoop-root-secondarynamenode-nn01.log   yarn-root-resourcemanager-nn01.log
hadoop-root-namenode-nn01.log hadoop-root-secondarynamenode-nn01.out   yarn-ro
hadoop-root-namenode-nn01.out   hadoop-root-secondarynamenode-nn01.out.1
hadoop-root-namenode-nn01.out.1  SecurityAuth-root.audit
[nfs@nfsgw logs]$ rm -rf 1
[nfs@nfsgw logs]$ ls
```

6）启动服务

```
[root@nfsgw ~]# /usr/local/hadoop/sbin/hadoop-daemon.sh --script ./bin/hdfs start pc
starting portmap, logging to /usr/local/hadoop/logs/hadoop-root-portmap-nfsgw.out
[root@nfsgw ~]#jps
23714 Jps
23670 Portmap

[root@nfsgw ~]# su - nfs
Last login: Mon Sep 10 12:31:58 CST 2018 on pts/0
[nfs@nfsgw ~]$ cd /usr/local/hadoop/
[nfs@nfsgw hadoop]$ ./sbin/hadoop-daemon.sh --script ./bin/hdfs start nfs3
//nfs3只能用代理用户启动
starting nfs3, logging to /usr/local/hadoop/logs/hadoop-nfs-nfs3-nfsgw.out
[nfs@nfsgw hadoop]$ jps
1362 Jps
1309 Nfs3
[root@nfsgw hadoop]# jps          //root用户执行可以看到portmap和nfs3
1216 Portmap
1309 Nfs3
1374 Jps
```

7）实现客户端挂载（客户端可以用node4这台主机）

Top

```
[root@node4 ~]# rm -rf /usr/local/hadoop
[root@node4 ~]# yum -y install nfs-utils
[root@node4 ~]# mount -t nfs -o \
```

```
vers=3,proto=tcp,nolock,noatime,sync,noacl 192.168.1.26:/ /mnt/ //挂载
[root@node4 ~]# cd /mnt/
[root@node4 mnt]# ls
aaa bbb fa system tmp
[root@node4 mnt]# touch a
[root@node4 mnt]# ls
a aaa bbb fa system tmp
[root@node4 mnt]# rm -rf a
[root@node4 mnt]# ls
aaa bbb fa system tmp
```

8）实现开机自动挂载

```
[root@node4 ~]# vim /etc/fstab
192.168.1.26:/ /mnt/ nfs vers=3,proto=tcp,nolock,noatime,sync,noacl,_netdev 0 0
[root@node4 ~]# mount -a
[root@node4 ~]# df -h
192.168.1.26:/  64G  6.2G  58G  10% /mnt

[root@node4 ~]# rpcinfo -p 192.168.1.26
   program vers proto   port  service
    100005    3   udp   4242  mountd
    100005    1   tcp   4242  mountd
    100000    2   udp    111  portmapper
    100000    2   tcp    111  portmapper
    100005    3   tcp   4242  mountd
    100005    2   tcp   4242  mountd
    100003    3   tcp   2049  nfs
    100005    2   udp   4242  mountd
    100005    1   udp   4242  mountd
```

Top