# GIS Tools for Hadoop对接FusionInsight

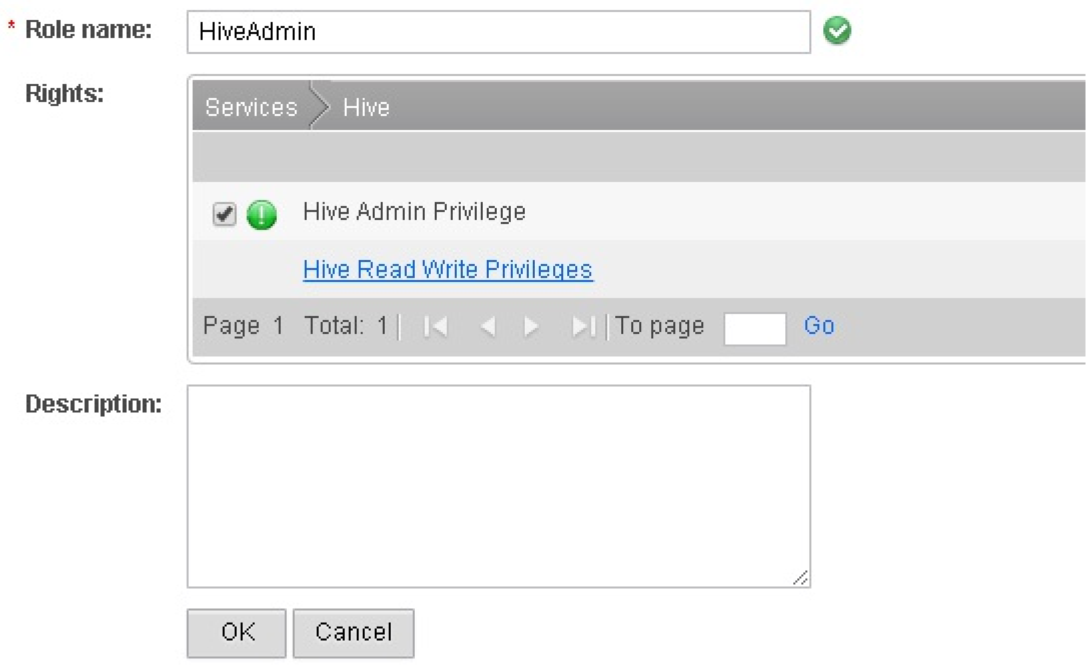
## 适用场景

> GIS Tools for Hadoop <-> FusionInsight HD V100R002C60U20

## aggregation-hive

参考GIS说明https://github.com/Esri/gis-tools-for-hadoop/tree/master/samples/point-in-polygon-aggregation-hive中关于集成Hive的示例，在华为FusionInsight HD中执行该示例。

- 获取gis源代码https://github.com/Esri/gis-tools-for-hadoop/
- 完成FusionInsight HD V100R002C60U20的安装，包含Hive组件。
- 在FusionInsight Manager创建一个HiveAdmin角色，具体请参加《FusionInsight HD 管理员指南》的 **创建Hive角色** 章节。



* Role name: HiveAdmin

Rights:

Services > Hive

☑ Hive Admin Privilege

Hive Read Write Privileges

Description:

- 在FusionInsight Manager创建一个“机机”用户，具体请参见《FusionInsight HD 管理员指南》的创建用户章节。将用户加入上面创建的角色HiveAdmin。例如，创建用户 testuser 并下载对应的keytab文件user.keytab以及krb5.conf文件
- 安装FusionInsight HD的客户端，具体请参见《FusionInsight HD 管理员指南》的安装和使用客户端章节。
- 将下载的gis tools源码通过WinSCP工具上传到安装有FusionInsight HD客户端所在节点的 `/opt` 目录下，上传源码目录为gis-tools-for-hadoop-master
- 将下载的gis tools源码通过FusionInsight HD的客户端上传到HDFS文件系统中，将目录gis-tools-for-hadoop-master直接放到HDFS的根目录下，命令参考

```
source /opt/hadoopclient/bigdata_env
kinit -k -t /opt/user.keytab testuser
hadoop fs -put -f /opt/gis-tools-for-hadoop-master /gis-tools-for-hadoop-master
```

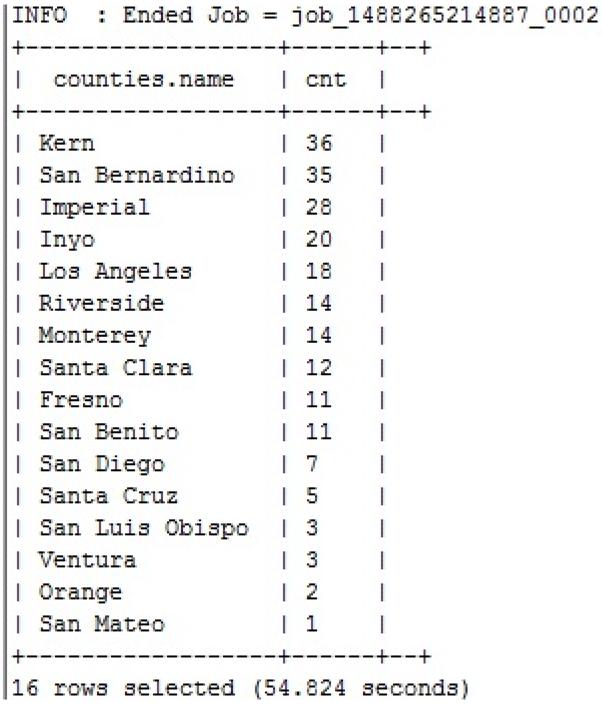
- 修改执行hive示例的sql文件，修改后的文件如下

```
set role admin;

add jar hdfs:///gis-tools-for-hadoop-master/samples/lib/esri-geometry-api.jar;
add jar hdfs:///gis-tools-for-hadoop-master/samples/lib/spatial-sdk-hadoop.jar;

reload function;
DROP TABLE earthquakes;
DROP TABLE counties;

create temporary function ST_Point as 'com.esri.hadoop.hive.ST_Point';
create temporary function ST_Contains as 'com.esri.hadoop.hive.ST_Contains';

CREATE EXTERNAL TABLE IF NOT EXISTS earthquakes (
  earthquake_date STRING,
  latitude DOUBLE,
  longitude DOUBLE,
  depth DOUBLE,
  magnitude DOUBLE,
  magtype string,
  mbstations string,
  gap string,
  distance string,
  rms string,
  source string,
  eventid string
)
ROW FORMAT DELIMITED FIELDS TERMINATED BY ','
STORED AS TEXTFILE
LOCATION 'hdfs:///gis-tools-for-hadoop-master/samples/data/earthquake-data';

CREATE EXTERNAL TABLE IF NOT EXISTS counties (
  Area string,
  Perimeter string,
  State string,
  County string,
  Name string,
  BoundaryShape binary
)
ROW FORMAT SERDE 'com.esri.hadoop.hive.serde.JsonSerde'
STORED AS INPUTFORMAT 'com.esri.json.hadoop.EnclosedJsonInputFormat'
OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
LOCATION 'hdfs:///gis-tools-for-hadoop-master/samples/data/counties-data';

SELECT counties.name, count(*) cnt FROM counties
JOIN earthquakes
WHERE ST_Contains(counties.boundaryshape, ST_Point(earthquakes.longitude, earthquakes.latitude))
GROUP BY counties.name
ORDER BY cnt desc;
```

- 使用FusionInsight HD客户端执行修改后的sql文件，命令参考

```
source /opt/hadoopclient/bigdata_env
kinit -k -t /opt/user.keytab testuser
cd /opt
beeline -f gis-tools-for-hadoop-master/samples/point-in-polygon-aggregation-hive/run-sample.sql
```

- 执行结果如下，与GIS开源网站描述一致



```
INFO  : Ended Job = job_1488265214887_0002
+-------------------+-------+--+
|  counties.name    | cnt   |
+-------------------+-------+--+
| Kern              | 36    |
| San Bernardino    | 35    |
| Imperial          | 28    |
| Inyo              | 20    |
| Los Angeles       | 18    |
| Riverside         | 14    |
| Monterey          | 14    |
| Santa Clara       | 12    |
| Fresno            | 11    |
| San Benito        | 11    |
| San Diego         | 7     |
| Santa Cruz        | 5     |
| San Luis Obispo   | 3     |
| Ventura           | 3     |
| Orange            | 2     |
| San Mateo         | 1     |
+-------------------+-------+--+
16 rows selected (54.824 seconds)
```

# aggregation-mr

参考GIS说明https://github.com/Esri/gis-tools-for-hadoop/tree/master/samples/point-in-polygon-aggregation-mr中关于集成MR的示例，在华为FusionInsight HD中执行该示例。

- 获取gis源代码https://github.com/Esri/gis-tools-for-hadoop/
- 完成FusionInsight HD V100R002C60U20的安装，包含Hive组件。
- 在FusionInsight Manager创建一个“机机”用户，具体请参见《FusionInsight HD 管理员指南》的创建用户章节。将用户加入上面创建的角色HiveAdmin。例如，创建用户“testuser”并下载对应的keytab文件user.keytab以及krb5.conf文件
- 安装FusionInsight HD的客户端，具体请参见《FusionInsight HD 管理员指南》的安装和使用客户端章节。
- 将下载的gis tools源码通过WinSCP工具上传到安装有FusionInsight HD客户端所在节点的 `/opt` 目录下，上传源码目录为gis-tools-for-hadoop-master

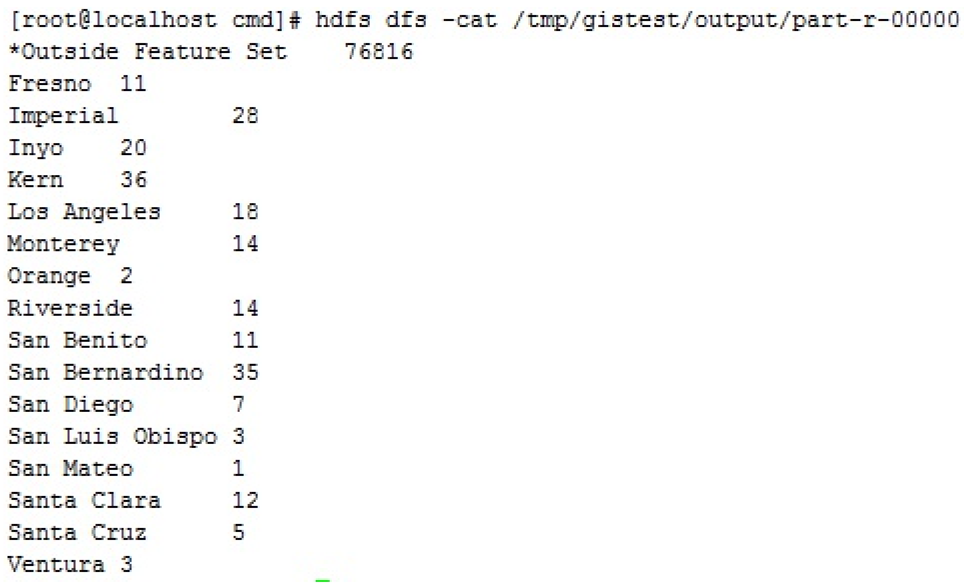
- 修改 `/opt/gis-tools-for-hadoop-master/samples/point-in-polygon-aggregation-mr/cmd/sample-config.sh` 如下，其中26004为yarn配置的yarn.resourcemanager.port端口

```
#!/bin/bash

NAME_NODE_URL=hdfs://hacluster
JOB_TRACKER_URL=162.1.93.103:26004
SAMPLE_DIR=/tmp/gistest

JOB_DIR=$SAMPLE_DIR/job
LIB_DIR=$SAMPLE_DIR/lib
DATA_DIR=$SAMPLE_DIR/data
OUTPUT_DIR=$SAMPLE_DIR/output
```

- 修改 `/opt/gis-tools-for-hadoop-master/samples/point-in-polygon-aggregation-mr/cmd/run-sample.sh` 的执行权限，并执行

```
source /opt/hadoopclient/bigdata_env
kinit -k -t /opt/user.keytab testuser
cd /opt/gis-tools-for-hadoop-master/samples/point-in-polygon-aggregation-mr/cmd/
chmod u+x run-sample.sh
sh run-sample.sh
```

- 执行完毕得到如下结果文件result.txt



```
[root@localhost cmd]# hdfs dfs -cat /tmp/gistest/output/part-r-00000
*Outside Feature Set    76816
Fresno  11
Imperial        28
Inyo    20
Kern    36
Los Angeles     18
Monterey        14
Orange  2
Riverside       14
San Benito      11
San Bernardino  35
San Diego       7
San Luis Obispo 3
San Mateo       1
Santa Clara     12
Santa Cruz      5
Ventura 3
```