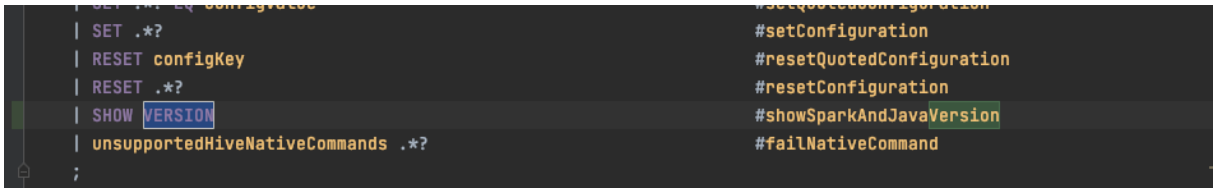
Spark SQL 作业实践

1.为Spark SQL添加一条自定义命令

- SHOW VERSION;
- 显示当前Spark版本和Java版本

在sqlbase.g4文件中增加新Keyword：SHOW VERSION，并编译antlr4。

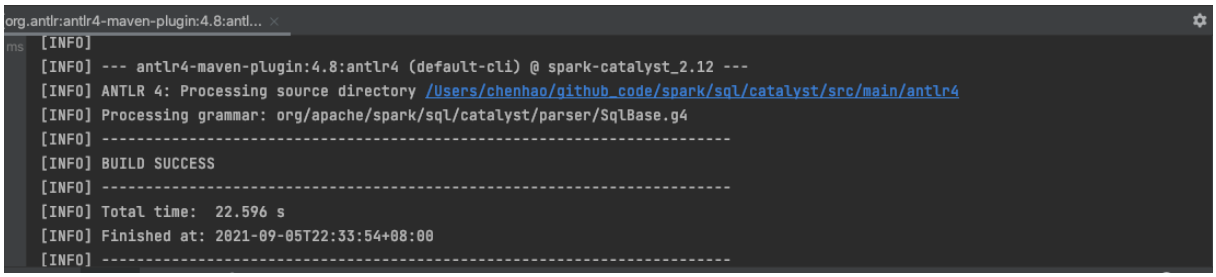
增加show version命令



增加version命令

在nonkeyword和ansinonkeyword中增加保留字

编译antlr4



在sparkSqlParse.scala文件中增加visitShowVersion方法

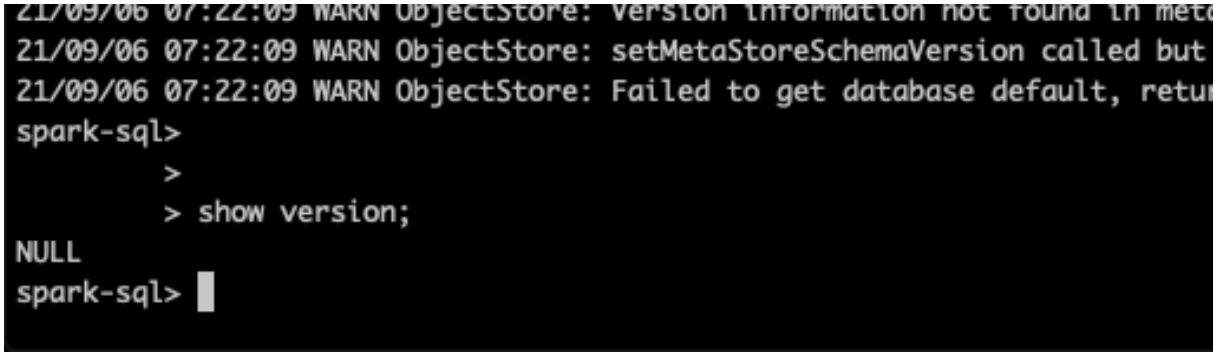
```
  //noinspection ScalaStyle
  override def visitShowVersion(ctx:
ShowSparkAndJavaVersionContext): LogicalPlan = withOrigin(ctx) {
      showVersionCommand()
  }
```

新增文件sql/core/src/main/scala/org/apache/spark/sql/execution/command/showVersionCommand.scala，实现showVersionCommand方法

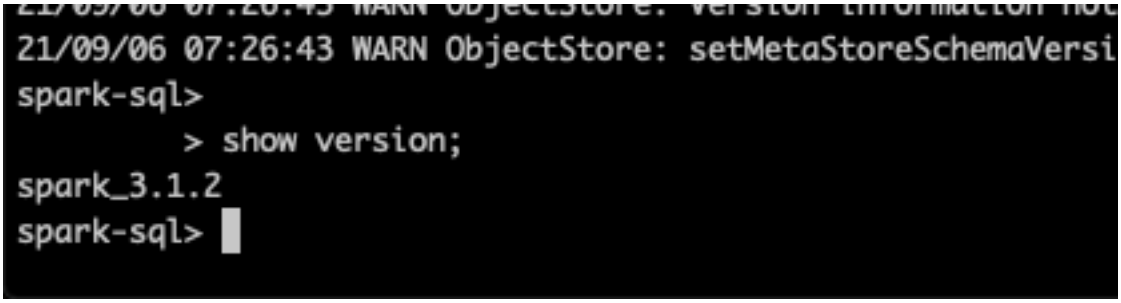
```
package org.apache.spark.sql.execution.command

import org.apache.spark.sql.{Row, SparkSession}
import org.apache.spark.sql.catalyst.expressions.{Attribute,
AttributeReference}
import org.apache.spark.sql.types.StringType


case class showVersionCommand() extends LeafRunnableCommand {

    override val output: Seq[Attribute] =
        Seq(AttributeReference("user", StringType, nullable =
true)())

    //noinspection ScalaStyle
    override def run(sparkSession: SparkSession) : Seq[Row] ={
        val outputString = System.getenv("SPARK_VERSION")
        Seq(Row(outputString))
    }

}
```

待sbt编译成功后，测试show version命令是否可在spark-sql交互界面里成功运行。

首先直接运行成功，但会返回空值。



其次先设置好SPARK_VERSION环境变量，再在spark-sql交互界面运行，成功返回获取的版本号。



2.构建SQL满足如下要求

通过set spark.sql.planChangeLog.level=WARN;查看

1. 构建一条SQL，同时apply下面三条优化规则：

- CombineFilters
- CollapseProject
- BooleanSimplification

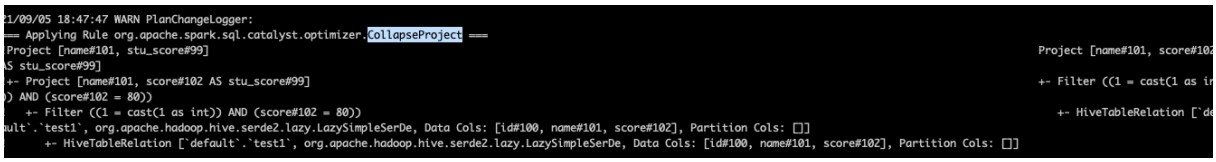
```
-- 建表
drop table if exists test1;
```

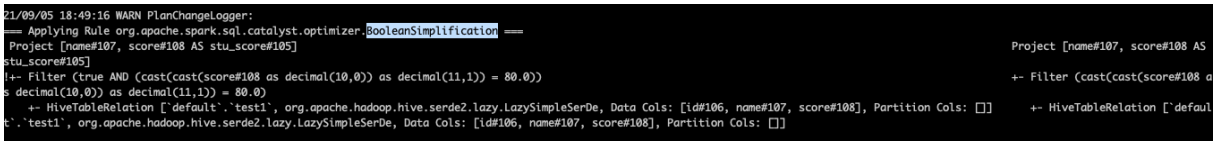
```sql
create table test1(
    id int,
    name string,
    score int
);
-- 记录初始化
insert overwrite table test1
select 1 as id, '张三' as name, 60 as score
union all
select 2 as id, '李四' as name, 70 as score
union all
select 3 as id, '王五' as name, 80 as score;
```

执行以下SQL语句，观察优化规则。

```sql
select a.name,a.stu_score
from ( select name, score as stu_score from test1
        where 1='1') a
where a.stu_score=80.0;
```

apply结果如图





2. 构建一条SQL，同时apply下面五条优化规则：

- ConstantFolding
- PushDownPredicates
- ReplaceDistinctWithAggregate
- ReplaceExceptWithAntiJoin

- FoldablePropagation

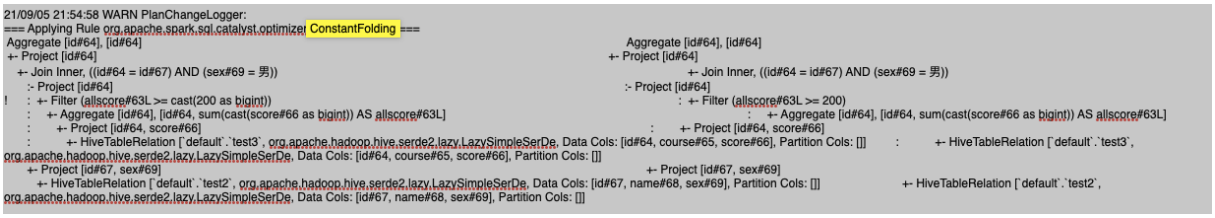
```
-- 建表
drop table if exists test2;
create table test2(
    id int,
    name string,
    sex string
);
drop table if exists test3;
create table test3(
    id int,
    course string,
    score int
);
-- 记录初始化
insert overwrite table test2
select 1 as id, '张三' as name, '男' as sex
union all
select 2 as id, '李四' as name, '男' as sex
union all
select 3 as id, '王五' as name, '男' as sex
union all
select 4 as id, '思思' as name, '女' as sex
union all
select 5 as id, '兰兰' as name, '女' as sex
union all
select 6 as id, null as name, null as sex;

insert overwrite table test3
select 1 as id, '语文' as course, 65 as score
union all
select 1 as id, '数学' as course, 70 as score
union all
select 1 as id, '英文' as course, 85 as score
union all
select 2 as id, '语文' as course, 65 as score
union all
select 2 as id, '数学' as course, 75 as score
union all
select 2 as id, '英文' as course, 90 as score
```

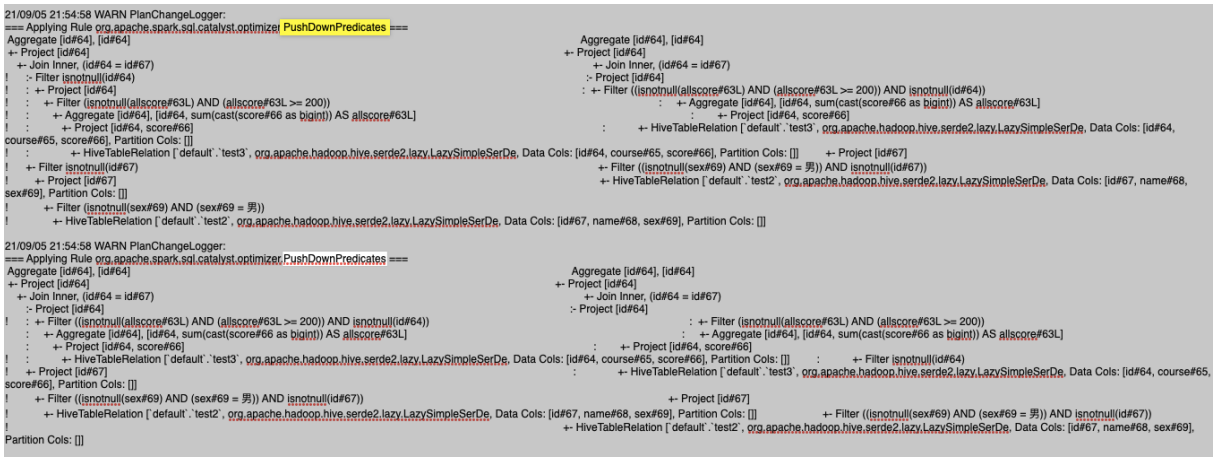
```
union all
select 3 as id, '语文' as course, 90 as score
union all
select 3 as id, '数学' as course, 80 as score
union all
select 3 as id, '英文' as course, 85 as score
union all
select 4 as id, '语文' as course, 80 as score
union all
select 4 as id, '数学' as course, 70 as score
union all
select 4 as id, '英文' as course, 85 as score;
```

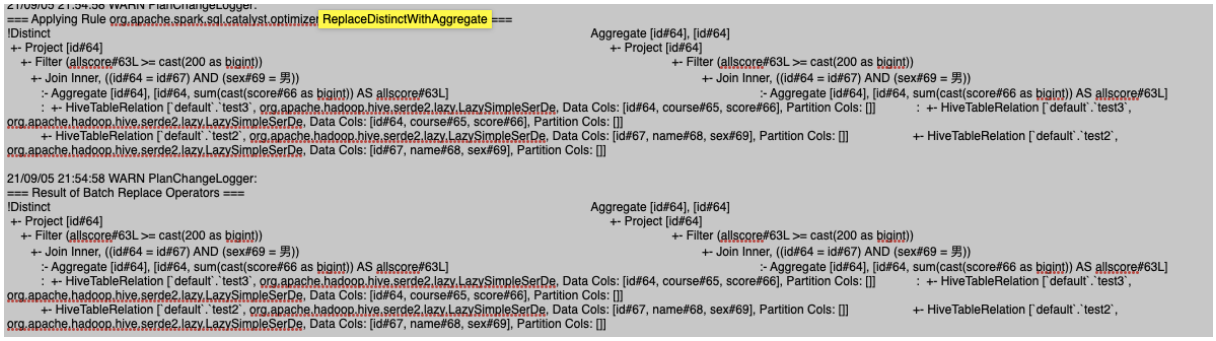
执行以下SQL语句，观察优化规则。

```
select distinct t3.id
from (select id, sum(score) as allscore
        from test3
    group by id) as t3
join test2 as t2
  on t3.id = t2.id and t2.sex='男'
where t3.allscore >= 200
```

apply结果如图







3.实现自定义优化规则（静默规则）

待实现