爱奇艺实时项目统计实战

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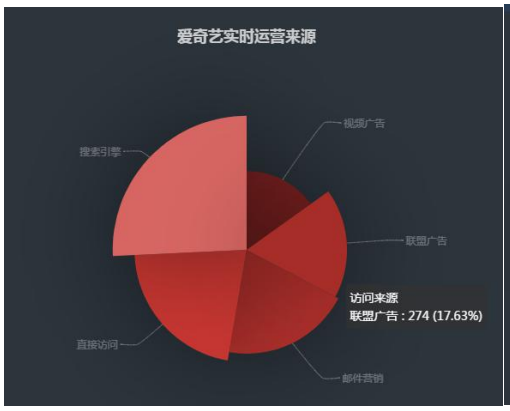
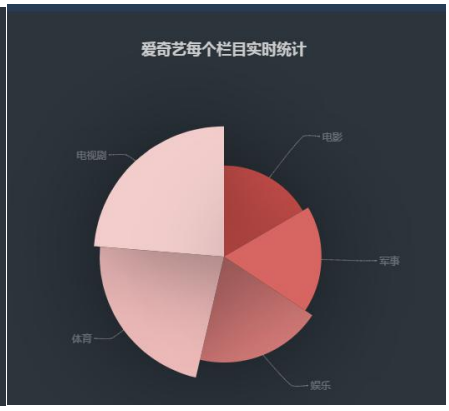
项目实战：

- 需求说明
- 互联网访问日志概述
- 功能开发以及本地运行
- 生产环境运行

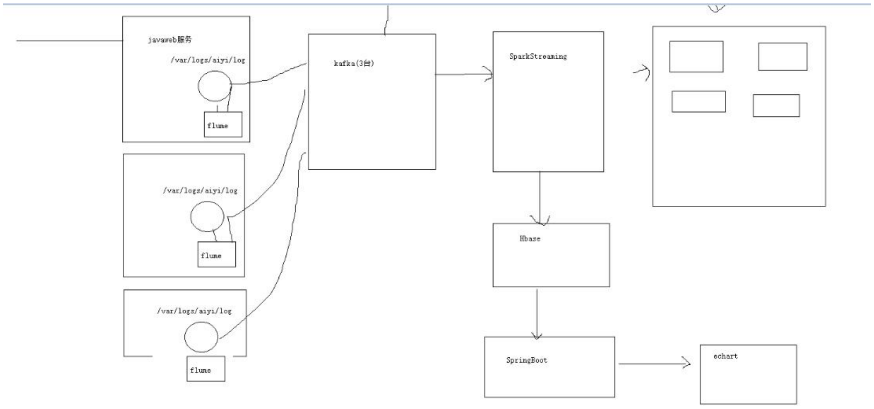
需求说明

- 今天到现在为止的每个类别的访问量
- 今天到现在为止从搜索引擎引流过来的类别的访问量
- 今天到现在为止每个栏目下面的销售额
- 今天到现在为止每个省份的购买量
- ....





项目使用的技术点：



互联网访问日志概述

为什么要记录访问日志的行为呢？
通过日志我们可以得到网站页面的访问量，网站的黏性，推荐
用户行为分析，是指在获得网站访问量基本数据的情况下，对有关数据进行统计、分析，从中发现用户访问网站的规律，并将这些规律与网络营销策略等相结合，从而发现目前网络营销活动中可能存在的问题，并为进一步修正或重新制定网络营销策略提供依据。这是狭义的只指网络上的用户行为分析。

重点分析的数据

用户行为分析应该包含以下数据重点分析：

* 用户的来源地区、来路域名和页面；

* 用户在网站的停留时间、跳出率、回访者、新访问者、回访次数、回访相隔天数；

* 注册用户和非注册用户，分析两者之间的浏览习惯；

* 用户所使用的搜索引擎、关键词、关联关键词和站内关键字；

* 用户选择什么样的入口形式（广告或者网站入口链接）更为有效；

* 用户访问网站流程，用来分析页面结构设计是否合理；

* 用户在页面上的网页热点图分布数据和网页覆盖图数据；

* 用户在不同时段的访问量情况等：

* 用户对于网站的字体颜色的喜好程度。

日志格式字段：
ip 地址 用户名 访问时间 访问的模块地址 使用的方式 .....
意义:
通过对用户行为监测获得的数据进行分析，可以让企业更加详细、清楚地了解用户的行为习惯，从而找出网站、推广渠道等企业营销环境存在的问题，有助于企业发掘高转化率页面，让企业的营销更加精准、有效，提高业务转化率，从而提升企业的广告收益。

日志分析

www/2 --代表电视剧
www/1 --代表电影
www/6 --综艺
www/4 -- 动漫
www/3 -- 记录篇

使用 Python 脚本实时产生数据

因为我们要使用实时数据，不可能从主站拿到，只能模仿，我们一般使用是脚本 python 或者 java
generate.py

```
import random
import time
url_paths = [
    "www/2",
```

```
    "www/1",
    "www/6",
    "www/4",
    "www/3",
    "pianhua/130",
    "toukouxu/821"
]
ip_slices=[132,156,124,10,29,167,143,187,30,100]
status_code =[404,302,200]
def sample_urls():
    return random.sample(url_paths,1)[0]
#ip
def sample_ip():
    slice = random.sample(ip_slices,4)
    return ".".join([str(item) for item in slice])

#k 开发状态码
def sample_status():
    return random.sample(status_code,1)[0]

def geneate_log(count = 10):
    while count >= 1:
        query_log =
"{ip}\t{url}\t{stats1}".format(ip=sample_ip(),url=sample_urls(),stats1=sample_status())
        print query_log
        count = count -1

if __name__ == '__main__':
    geneate_log(100)
```


```
http_referers = [
"https://www.baidu.com/s?wd={query}",
"https://www.sogou.com/web?qu={query}",
"http://cn.bing.com/search?q={query}",
"https://search.yahoo.com/search?p={query}"
]

search_keyword = [
   "猎场",
   "快乐人生",
   "极限挑战",
   "我的体育老师",
   "幸福满院"
]

def sample_referer():
        if random.uniform(0,1) > 0.2:
                return "-"
        refer_str = random.sample(http_referers,1)
        #print refer_str[0]
        query_str = random.sample(search_keyword,1)
        #print query_str[0]
        return refer_str[0].format(query=query_str[0])
```

添加时间

```
import time
time_str = time.strftime("%Y-%m-%d %H:%M:%S",time.localtime())
{localtime}
```

把日志写入到文件

```
def generate_log(count = 10):
        time_str = time.strftime("%Y-%m-%d %H:%M:%S",time.localtime())
        f = open("C:\\code\\logs","w+")
        while count >= 1:
            query_log = "{ip}\t{localtime}\t\"GET /{url} HTTP/1.1\"\t{refer}\t{status_code}".format(url = sample_url(),ip = sample_ip(),refer = sample_referer(),status_code = sample_status_code(),localtime = time_str)
              print query_log
              f.write(query_log+"\n")
              count = count -1
```

通过调度器工具每一分钟产生一批数据

linux crontab

实例 1：每 1 分钟执行一次 command

命令：

*/1 * * * * command

实例 2：每小时的第 3 和第 15 分钟执行

命令：

3,15 * * * * command

实例 3：在上午 8 点到 11 点的第 3 和第 15 分钟执行

命令：

3,15 8-11 * * * command

实例 4：每隔两天的上午 8 点到 11 点的第 3 和第 15 分钟执行

命令：

3,15 8-11 */2 * * command

实例 5：每个星期一的上午 8 点到 11 点的第 3 和第 15 分钟执行

命令：

3,15 8-11 * * 1 command

实例 6：每晚的 21:30 重启 smb

命令：

30 21 * * * /etc/init.d/smb restart

实例 7：每月 1、10、22 日的 4：45 重启 smb

命令：

45 4 1,10,22 * * /etc/init.d/smb restart

实例 8：每周六、周日的 1：10 重启 smb

命令：

10 1 * * 6,0 /etc/init.d/smb restart

实例 9：每天 18：00 至 23：00 之间每隔 30 分钟重启 smb

命令：

0,30 18-23 * * * /etc/init.d/smb restart

实例 10：每星期六的晚上 11：00 pm 重启 smb

命令：

0 23 * * 6 /etc/init.d/smb restart

实例 11：每一小时重启 smb

命令：

* */1 * * * /etc/init.d/smb restart

实例 12：晚上 11 点到早上 7 点之间，每隔一小时重启 smb

命令：

* 23-7/1 * * * /etc/init.d/smb restart

实例 13：每月的 4 号与每周一到周三的 11 点重启 smb

命令：

0 11 4 * mon-wed /etc/init.d/smb restart

实例 14：一月一号的 4 点重启 smb

命令：

0 4 1 jan * /etc/init.d/smb restart

每一分钟执行一次的 crontab 表达式: */1 * * * *
vi log_generator.sh
chmod u+x log_generator.sh
./log_generator.sh

crontab -e
*/1 * * * * /home/centos/logs/log_generator.sh

tail -200f log 以追加的方式查询日志

启动和配置 flum kafka

运行 kafka 需要使用 Zookeeper，所以你需要先启动 Zookeeper

```
for host in s201 s202 s203;
do
   ssh $host "source /etc/profile;/soft/zk/bin/zkServer.sh start";
done

for host in s201 s202 s203;
do
  ssh $host "source /etc/profile;/soft/zk/bin/zkServer.sh status"
```

```
done
```

启动 kafka

bin/kafka-server-start.sh config/server.properties &

bin/kafka-server-stop.sh config/server.properties &

通过 list 命令查看创建的 topic:

创建一个叫做“flume”的 topic，它只有一个分区，一个副本。

bin/kafka-topics.sh --list --zookeeper s201:2181

创建一个消费者:

bin/kafka-topics.sh --create --zookeeper s201:2181 --replication-factor 1

--partitions 1 --topic **flumeTopic**

启动 Kafka consumer:

bin/kafka-console-consumer.sh --zookeeper s201:2181 --topic flumeTopic

--from-beginning

启动 Flume

bin/flume-ng agent --conf conf --conf-file conf/a1.conf --name a1

-Dflume.root.logger=INFO,console

```
vi conf/a1.conf

# 定义 agent

a1.sources = src1

a1.channels = ch1

a1.sinks = k1



# 定义 sources

a1.sources.src1.type = exec

a1.sources.src1.command=tail -F /home/centos/log/log

a1.sources.src1.channels=ch1



# 定义 sinks

a1.sinks.k1.type = org.apache.flume.sink.kafka.KafkaSink

a1.sinks.k1.topic  = flumeTopic

a1.sinks.k1.brokerList = s201:9092

a1.sinks.k1.batchSize = 20
a1.sinks.k1.requiredAcks = 1

a1.sinks.k1.channel = ch1

# 定义 channels

a1.channels.ch1.type = memory

a1.channels.ch1.capacity = 1000
```

上面 配置文件中提到的默认连接到一个名为 ‘default-flume-topic’ 的 topic" ，

实际上是在 flume-ng-kafka-sink 项目中定义的，

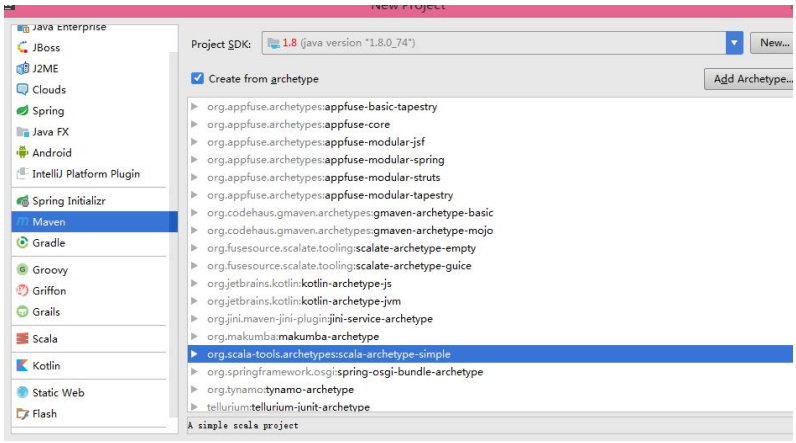
如果需要修改默认名称等属性，可以修改 Constants 类。

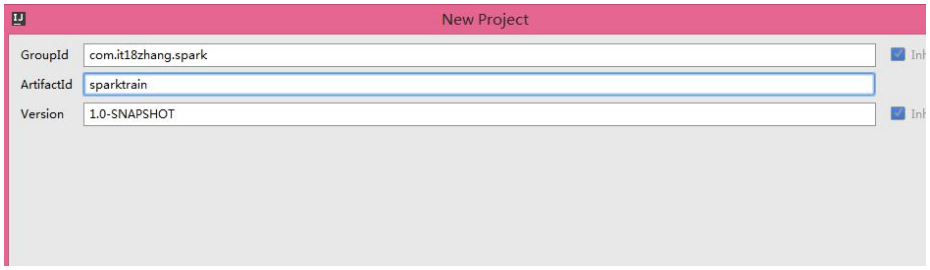
flume-ng-kafka-sink/impl/src/main/java/com/polaris/flume/sink/下面的

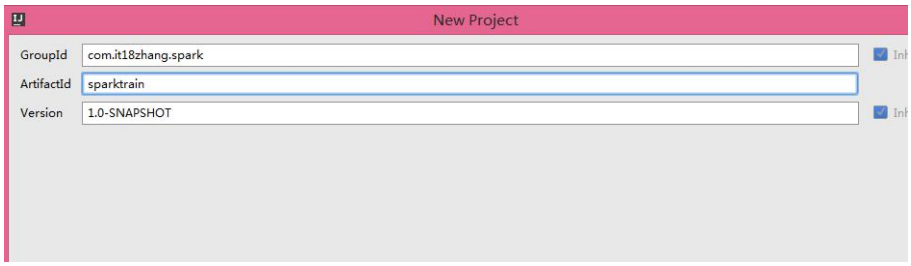
Constants.java

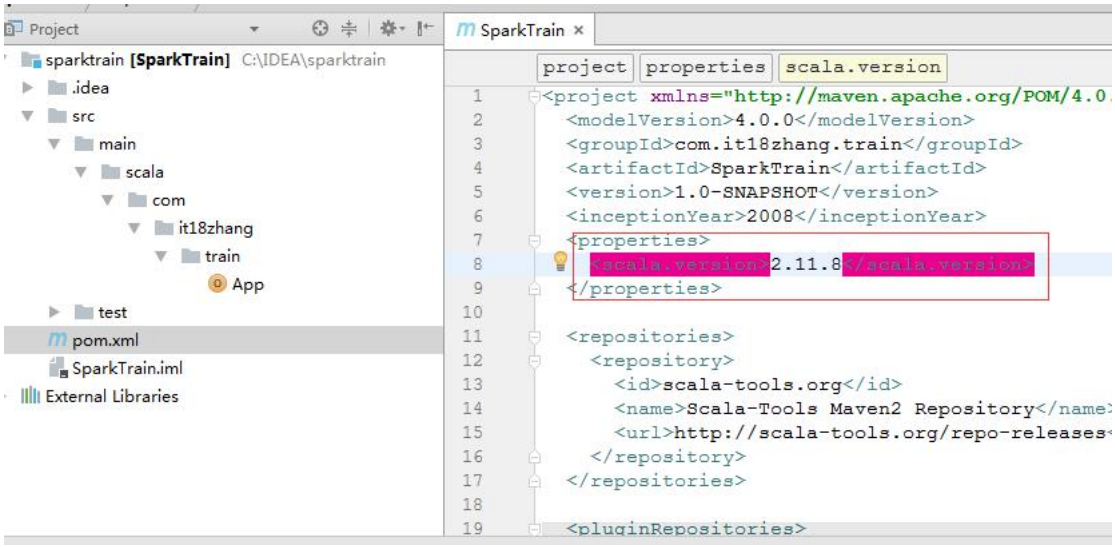
public static final String DEFAULT_TOPIC = "default-flume-topic";

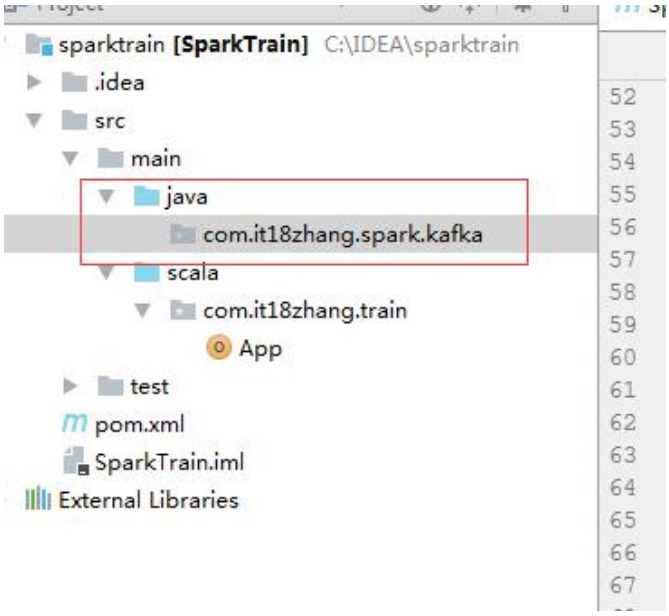
开发环境搭建






New Project
GroupId
com.it18zhang.spark
ArtifactId
sparktrain
Version
1.0-SNAPSHOT


Project
sparktrain [SparkTrain] C:\IDEA\sparktrain
.idea
src
main
scala
com
it18zhang
train
App
test
pom.xml
SparkTrain.iml
External Libraries
SparkTrain
project
properties
scala.version
<project xmlns="http://maven.apache.org/POM/4.0
<modelVersion>4.0.0</modelVersion>
<groupId>com.it18zhang.train</groupId>
<artifactId>SparkTrain</artifactId>
<version>1.0-SNAPSHOT</version>
<inceptionYear>2008</inceptionYear>
<properties>
<scala.version>2.11.8</scala.version>
</properties>
<repositories>
<repository>
<id>scala-tools.org</id>
<name>Scala-Tools Maven2 Repository</name>
<url>http://scala-tools.org/repo-releases
</repository>
</repositories>
<pluginRepositories>


sparktrain [SparkTrain] C:\IDEA\sparktrain
.idea
src
main
java
com.it18zhang.spark.kafka
scala
com.it18zhang.train
App
test
pom.xml
SparkTrain.iml
External Libraries

添加 kafka 的依赖

```
<inceptionYear>2008</inceptionYear>
<properties>
  <scala.version>2.11.8</scala.version>
  <kafka.version>0.9.0.0</kafka.version>
</properties>


<dependencies>
  <dependency>
    <groupId>org.scala-lang</groupId>
    <artifactId>scala-library</artifactId>
    <version>${scala.version}</version>
  </dependency>
  <!--kafka依赖-->
  <dependency>
    <groupId>org.apache.kafka</groupId>
    <artifactId>kafka_2.11</artifactId>
    <version>${kafka.version}</version>
  </dependency>
```

添加依赖包：

```
<dependencies>

  <dependency>
    <groupId>org.scala-lang</groupId>
    <artifactId>scala-library</artifactId>
    <version>${scala.version}</version>
  </dependency>
  <!--kafka 依赖-->
  <dependency>
    <groupId>org.apache.kafka</groupId>
    <artifactId>kafka_2.11</artifactId>
    <version>0.10.0.0</version>
  </dependency>

  <dependency>
    <groupId>org.apache.hadoop</groupId>
    <artifactId>hadoop-client</artifactId>
    <version>${hadoop.version}</version>
  </dependency>
  <dependency>
    <groupId>org.apache.hbase</groupId>
    <artifactId>hbase-client</artifactId>
    <version>1.2.0</version>
  </dependency>

  <dependency>
    <groupId>org.apache.hbase</groupId>
    <artifactId>hbase-server</artifactId>
    <version>1.2.0</version>
```

```
  </dependency>

  <dependency>
  <groupId>org.apache.spark</groupId>
  <artifactId>spark-streaming_2.11</artifactId>
  <version>2.1.0</version>
  </dependency>

  <dependency>
    <groupId>org.apache.spark</groupId>
    <artifactId>spark-streaming-kafka-0-10_2.11</artifactId>
    <version>2.1.0</version>
  </dependency>

</dependencies>
```

打通 Flume&Kafka&Spark Streaming

Advanced Sources

Python API As of Spark 2.2.0, out of these sources, Kafka, Kinesis and Flume are available in the Python API.

This category of sources require interfacing with external non-Spark libraries, some of them with complex dependencies (e.g., Kafka and Flume). Hence, to minimize issues related to version conflicts of dependencies, the functionality to create DStreams from these sources has been moved to separate libraries that can be linked to explicitly when necessary.

Note that these advanced sources are not available in the Spark shell, hence applications based on these advanced sources cannot be tested in the shell. If you really want to use them in the Spark shell you will have to download the corresponding Maven artifact's JAR along with its dependencies and add it to the classpath.

Some of these advanced sources are as follows.

- **Kafka:** Spark Streaming 2.2.0 is compatible with Kafka broker versions 0.8.2.1 or higher. See the Kafka Integration Guide for more details.
- **Flume:** Spark Streaming 2.2.0 is compatible with Flume 1.6.0. See the Flume Integration Guide for more details.
- **Kinesis:** Spark Streaming 2.2.0 is compatible with Kinesis Client Library 1.2.1. See the Kinesis Integration Guide for more details.

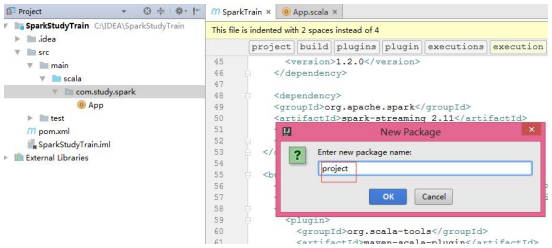
Spark Streaming + Kafka Integration Guide

Apache Kafka is publish-subscribe messaging rethought as a distributed, partitioned, replicated commit log service. Please read the Kafka documentation thoroughly before starting an integration using Spark.

The Kafka project introduced a new consumer api between versions 0.8 and 0.10, so there are 2 separate corresponding Spark Streaming packages available. Please choose the correct package for your brokers and desired features; note that the 0.8 integration is compatible with later 0.9 and 0.10 brokers, but the 0.10 integration is not compatible with earlier brokers.

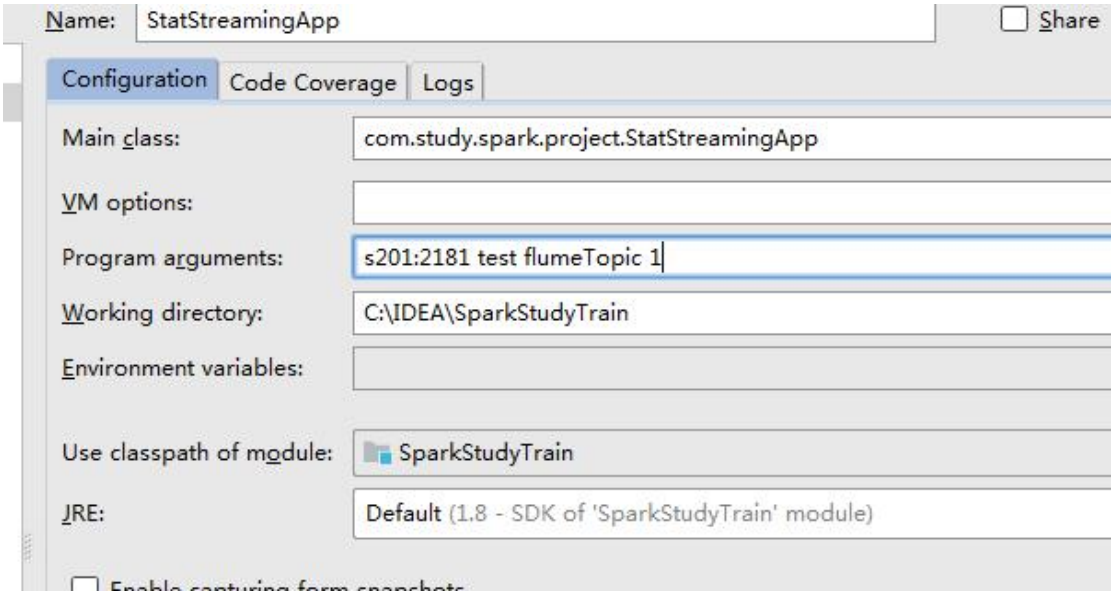
	spark-streaming-kafka-0-8	spark-streaming-kafka-0-10
Broker Version	0.8.2.1 or higher	0.10.0 or higher
Api Stability	Stable	Experimental
Language Support	Scala, Java, Python	Scala, Java
Receiver DStream	Yes	No
Direct DStream	Yes	Yes
SSL / TLS Support	No	Yes
Offset Commit Api	No	Yes
Dynamic Topic Subscription	No	Yes

在 spark 应用程序接收到数据并完成记录数统计



次代码为 0.8 版本的

```
/**
   * Created by zhang on 2017/11/21.
   *  使用 sparkStreaming 处理 Kafka 过来数据
   */
object StatStreamingApp {

      def main(args: Array[String]): Unit = {
            if(args.length != 4){
                  println("Usage:StatStreamingApp<zkQuorum><group><topic>
<numberThread>")
                  System.exit(1)
            }

            val Array(zkQuorum,groupId,topis,numberThread) = args
            val sparkConf = new
SparkConf().setMaster("local[4]").setAppName("StatStreamingApp")
            val ssc = new StreamingContext(sparkConf,Seconds(60))

            val topicMap = topis.split(",").map((_,numberThread.toInt)).toMap
            val messages = KafkaUtils.createStream(ssc, zkQuorum, groupId, topicMap)

             //测试接收数据
             messages.map(_._2).count().print()

      }

}
```



kafka0.10 之后的代码，目前项目中用到此版本

```
import org.apache.kafka.common.serialization.StringDeserializer
import org.apache.spark.streaming.{Seconds, StreamingContext,
kafka010}
import
org.apache.spark.streaming.kafka010.ConsumerStrategies.Subscri
be
import org.apache.spark.streaming.kafka010.KafkaUtils
import
org.apache.spark.streaming.kafka010.LocationStrategies.PreferC
onsistent

/**
  * Created by zhang on 2017/11/21.
  * 使用 sparkStreaming 处理 Kafka 过来数据
  */
object StatStreamingApp {

    def main(args: Array[String]): Unit = {
```

```
        val ssc = new StreamingContext("local[*]",
"StatStreamingApp", Seconds(5))

        val kafkaParams = Map[String, Object](
            "bootstrap.servers" -> "s201:9092,s202:9092",
            "key.deserializer" -> classOf[StringDeserializer],
            "value.deserializer" -> classOf[StringDeserializer],
            "group.id" -> "example",
            "auto.offset.reset" -> "latest",
            "enable.auto.commit" -> (false: java.lang.Boolean)
        )
        val topics = List("flumeTopic").toSet
        val lines = KafkaUtils.createDirectStream[String, String](
            ssc,
            PreferConsistent,
            Subscribe[String, String](topics, kafkaParams)
        ).map(_.value())
        lines.print()

        ssc.start();
        ssc.awaitTermination();
    }
}
```

功能开发

目标：今天到现在为止，每个栏目的访问量

分析：yyyyMMdd　categoryId

使用数据库进行存储我们的统计结果
Spark Streaming 把统计的结构吸入到数据库里面
可视化前端根据：yyyyMMdd categoryId 把数据库里面的统计结构展示出来

选择什么数据库作为统计结构存储呢？
关系型数据库 RDBMS：MySQL Oracle

day	categoryId	click_count
20171117	1	10

20171117　2　　19

下一个批次数据进来以后
我们需要取出 20171117　1 对应的值 10 + 对应的数据

非关系型数据库：Hbase，Redis
Hbase 一个 API 就能搞定，非常方便

使用 HBase 必须要做环境的开启：

Hdfs start-all.sh
zk
Hbase start-hbase.sh

使用 Hbase

./hbase shell
list 查看对应的数据库
创建表：
create 'category_clickcount','info'
Rowkey 设计：
day_categoryid
desc 'category_clickcount'
scan 'category_clickcount' 查看表
操作 Hbase 数据库的工具类：

```
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.hbase.client.HBaseAdmin;
import org.apache.hadoop.hbase.client.HTable;
import org.apache.hadoop.hbase.client.Put;
import org.apache.hadoop.hbase.util.Bytes;

import java.io.IOException;

/**
 * Created by zhang on 2017/11/18.
 */
public class HBaseUtils {

    HBaseAdmin admin = null;
    Configuration configration = null;
```

```
/**
 * 私有构造方法
 */
private HBaseUtils(){
	configration = new Configuration();
	configration.set("hbase.zookeeper.quorum","s201:2181");
	configration.set("hbase.rootdir","hdfs://s201/hbase");
	try {
		admin = new HBaseAdmin(configration);
	} catch (IOException e) {
		e.printStackTrace();
	}

}

private static HBaseUtils instance = null;
public static synchronized HBaseUtils getInstance(){
	if(null == instance){
		instance = new HBaseUtils();
	}
	return	instance;
}

/**
 * 根据表名获取到 Htable 实例
 */
 public HTable getTable(String tableName){
	HTable table = null;
	try {
		table = new HTable(configration,tableName);
	} catch (IOException e) {
		e.printStackTrace();
	}
	return table;
 }

/**
 * 添加一条记录到 Hbase 表  70 30 128 32 核  200T 8000
 * @param tableName Hbase 表名
 * @param rowkey Hbase 表的 rowkey
 * @param cf Hbase 表的 columnfamily
 * @param column Hbase 表的列
 * @param value  写入 Hbase 表的值
```

```
     */
     public void    put(String tableName,String rowkey,String cf,String column,String value){
       HTable table = getTable(tableName);
       Put put = new Put(Bytes.toBytes(rowkey));
       put.add(Bytes.toBytes(cf),Bytes.toBytes(column),Bytes.toBytes(value));
            try {
                  table.put(put);
            } catch (IOException e) {
                  e.printStackTrace();
            }
     }
    public static void main(String[] args) {
          //HTable table = HBaseUtils.getInstance().getTable("category_clickcount");
          //System.out.println(table.getName().getNameAsString());
          String tableName = "category_click";
          String rowkey = "20271111_88";
          String cf="info";
          String column ="click_count";
          String value = "2";

          HBaseUtils.getInstance().put(tableName,rowkey,cf,column,value);
    }
}
```

使用 spark-streaming 完成数据清洗操作

1）时间工具类

```
156.187.29.132      2017-11-20 00:39:26      "GET www/2 HTTP/1.0"  -      200
30.187.124.132      2017-11-20 00:39:26      "GET www/2 HTTP/1.0"  -      302
```

DataUtil.java

```
object DataUtils {

    val YYYYMMDDHHMMSS_FORMAT = FastDateFormat.getInstance("yyyy-MM-dd
HH:mm:ss");
    val TARGE_FORMAT = FastDateFormat.getInstance("yyyyMMdd");

    def getTime(time: String)={
          YYYYMMDDHHMMSS_FORMAT.parse(time).getTime
```

```
    }

    def parseToMinute(time:String)={
      TARGE_FORMAT.format(new Date(getTime(time)))
    }

    def main(args: Array[String]): Unit = {
        println(parseToMinute("2017-11-22 01:20:20"))
    }

}
```

针对数据进行分析

清洗数据，过滤出无用数据

```
    val cleanData = logs.map(line =>{
        val infos = line.split("\t")
        val url = infos(2).split(" ")(1)
        var categaryId = 0
        //把爱奇艺的类目编号拿到了
        if(url.startsWith("/www")){
            categaryId = url.split("/")(2).toInt
        }
        ClickLog(infos(0),DataUtils.parseToMin(infos(1)),categaryId,infos(4).toInt,infos(3))

      }).filter(clickLog=>clickLog.categaryId!=0)

      cleanData.print()
```

点击 ClickLog 类

```
/**
  * Created by zhang on 2017/11/22.
  */
case class
ClickLog(ip:String,time:String,categaryId:Int,statusCode:Int,r
eferer:String);
```

产生的日志：

```
ClickLog(187.124.156.143,20171122,6,-,404)
ClickLog(29.132.10.100,20171122,1,-,302)
ClickLog(100.167.30.124,20171122,3,-,404)
ClickLog(30.10.167.132,20171122,4,-,200)
ClickLog(132.124.100.143,20171122,4,-,200)
ClickLog(167.132.10.156,20171122,4,http://cn.bing.com/search?q=幸福满院,302)
ClickLog(29.143.10.187,20171122,3,-,302)
```

API 操作 Hbase

```
/**
  * 视频类别点击数
  *
  * @param day_category 对应的就是 Hbase 中的 rowkey 20171118
  * @param click_count 对应的 20171118 的点击数
  */

case class
CategaryClickCount(day_categaryId:String,click_count:Int)
```

```
package com.study.spark.domain

import com.study.spark.project.util.HBaseUtils
import org.apache.hadoop.hbase.client.{Get, HTable}
import org.apache.hadoop.hbase.util.Bytes

import scala.collection.mutable.ListBuffer

/**
  * Created by zhang on 2017/11/22.
  */
object CategaryClickCountDAO {

    val tableName= "category_clickcount"
    val cf = "info"
    val qualifer = "click_count"

    /**
      * 保存数据到 HBase
      */
```

```
    def save(list:ListBuffer[CategaryClickCount]): Unit ={
        val table =    HBaseUtils.getInstance().getHtable(tableName)
        for(els <- list){

table.incrementColumnValue(Bytes.toBytes(els.day_categaryId),Bytes.toBytes(cf),Bytes.toBytes(qualifer),els.click_count)
        }
    }

    /**
      * 根据 rowkey 查询值

      */
  def count(day_categary:String):Long ={
    val talbe = HBaseUtils.getInstance().getHtable(tableName)
    val get = new Get(Bytes.toBytes(day_categary))
    val value =talbe.get(get).getValue(cf.getBytes(),qualifer.getBytes())
      if(value == null){
          0L
      }else{
          Bytes.toLong(value)
      }
  }

    def main(args: Array[String]): Unit = {
        val list = new    ListBuffer[CategaryClickCount]
        list.append(CategaryClickCount("20171122_1",100))
        list.append(CategaryClickCount("20171122_2", 200))
        list.append(CategaryClickCount("20171122_3", 300))
        save(list)
        print(count("20171122_1"))
    }
}
```

保存收集数据到 HBase 里面

```
cleanLog.map(log=>{
    (log.time.substring(0,8)+"_"+log.categaryId,1)
}).reduceByKey(_+_).foreachRDD(rdd=>{
    rdd.foreachPartition(partriosRdds=>{
        val list = new ListBuffer[CategaryClickCount]
```

```
        partriosRdds.foreach(pair=>{
            list.append(CategaryClickCount(pair._1,pair._2))
        })

        CategaryClickCountDAO.save(list)
    })
})
```

功能二：功能一+从搜索引擎引流过来的

Hbase 表设计

create 'category_search_clickcount','info'

rowkey 设计：也是根据我们的业务需求来的

封装类

```
case class CategarSearchClickCount
(day_search_categary:String,clickCount:Int)
```

DAO 操作类

```
object CategarySearchClickCountDAO {

    val tableName = "category_serch_clickcount"
    val cf = "info"
    val qualifer = "click_count"

  /**
    * 保存数据
    * @param list
    */
  def save(list:ListBuffer[CategarySearchClickCount]): Unit ={
    val table =    HBaseUtils.getInstance().getHtable(tableName)
      for(els <- list){

table.incrementColumnValue(Bytes.toBytes(els.day_search_categary),Bytes.toBytes(cf),Bytes.toB
ytes(qualifer),els.clickCout);
      }

  }
```

```
    def count(day_categary:String) : Long={
        val table    =HBaseUtils.getInstance().getHtable(tableName)
        val get = new Get(Bytes.toBytes(day_categary))
        val    value =    table.get(get).getValue(Bytes.toBytes(cf), Bytes.toBytes(qualifer))
         if(value == null){
            0L
         }else{
              Bytes.toLong(value)
         }
    }

    def main(args: Array[String]): Unit = {
      val list = new ListBuffer[CategarySearchClickCount]
        list.append(CategarySearchClickCount("20171122_1_8",300))
        list.append(CategarySearchClickCount("20171122_2_9", 600))
        list.append(CategarySearchClickCount("20171122_2_10", 1600))
        save(list)

        print(count("20171122_2_2")+"---")
    }

}
```

业务功能实现

```
    cleanLog.map(log=>{
            val referer = log.refer.replace("//","/")
            val splits = referer.split("/")
            var host = ""
            if(splits.length > 2){
               host = splits(1)
            }
            (host,log.categaryId,log.time)
        }).filter(_._1!="").map(x =>{
            (x._3.substring(0,8)+"_"+x._1+"_"+x._2,1)
        }).reduceByKey(_+_).foreachRDD(rdd=>{
             rdd.foreachPartition(partitionRecods=>{
                val list = new ListBuffer[CategarySearchClickCount]
                  partitionRecods.foreach(pair=>{
                        list.append(CategarySearchClickCount(pair._1,pair._2))
```

```
                    })
                    CategarySearchClickCountDAO.save(list)
                })
            })
```

生成环境上运行代码

1）打包

```
<plugins>
  <plugin>
    <artifactId>maven-assembly-plugin</artifactId>
    <configuration>
      <archive>
        <manifest>
          <!--这里要替换成 jar 包 main 方法所在类 -->

<mainClass>com.study.spark.project.StatStreamingApp</mainClass
>
        </manifest>
      </archive>
      <descriptorRefs>
        <descriptorRef>jar-with-dependencies</descriptorRef>
      </descriptorRefs>
    </configuration>
    <executions>
      <execution>
        <id>make-assembly</id> <!-- this is used for inheritance
merges -->
        <phase>package</phase> <!-- 指定在打包节点执行 jar 包合并操作
-->
        <goals>
          <goal>single</goal>
        </goals>
      </execution>
    </executions>
  </plugin>
</plugins>
```

2）上传 jar 包到对应的服务器上面

3）运行

```
spark-submit --master spark://s201:7077 --class com.study.spark.project.StatStreamingApp /home/centos/dowload/SparkTrain.jar
```

3）开启 kafka ，flume，hbase，hadoop，spark
4）清空 hbase 里面的数据
truncate ‘表名’
5）执行日志生成器

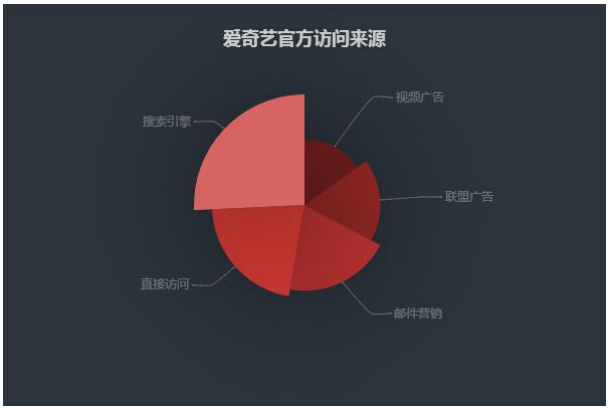
脚本生成器

```
/soft/spark/bin/spark-submit \
--class com.study.spark.project.StatStreamingApp \
/home/centos/SparkTrain-1.0-jar-with-dependencies.jar \
```

可视化

- 为什么需要可视化
- Spring Boot 构建 web 项目
- 使用 Echarts 构建静态数据可视化
- 使用 Echarts 构建动态数据可视化

为什么需要可视化



提供更好的数据分析服务,让公司做出更好的决策(Business Intelligence). 在

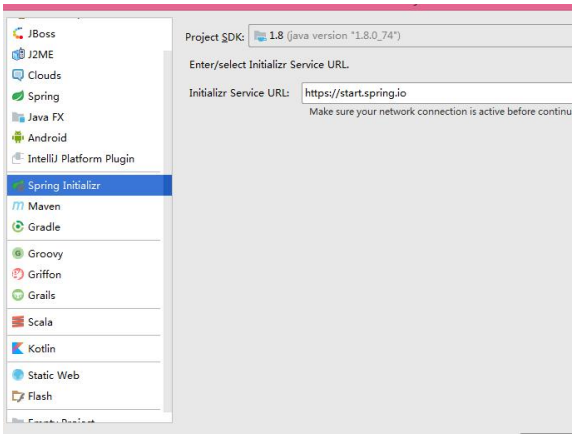
国内也不少公司正在向这一方向的服务发展。一句话回答：可视化能够提高效率，如果没有可视化，我们的决策就会低，就会导致金钱，时间的损失，甚至危及健康和生命

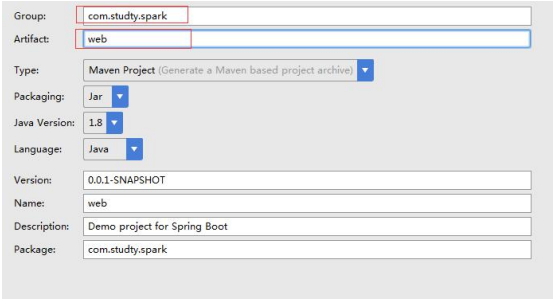
http://www.jianshu.com/p/2b2643ce941b

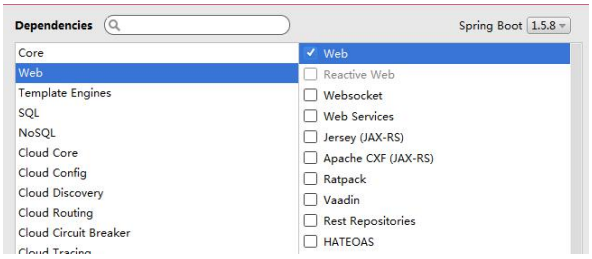
https://www.zhihu.com/question/26685414/answer/33654795

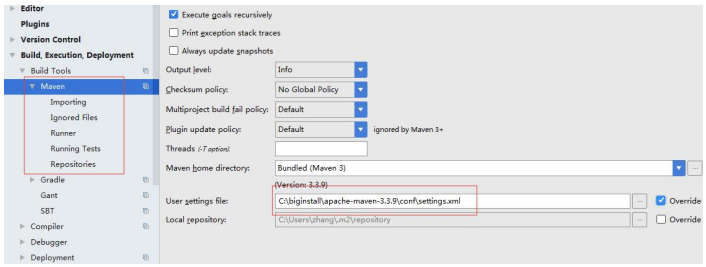
可视化

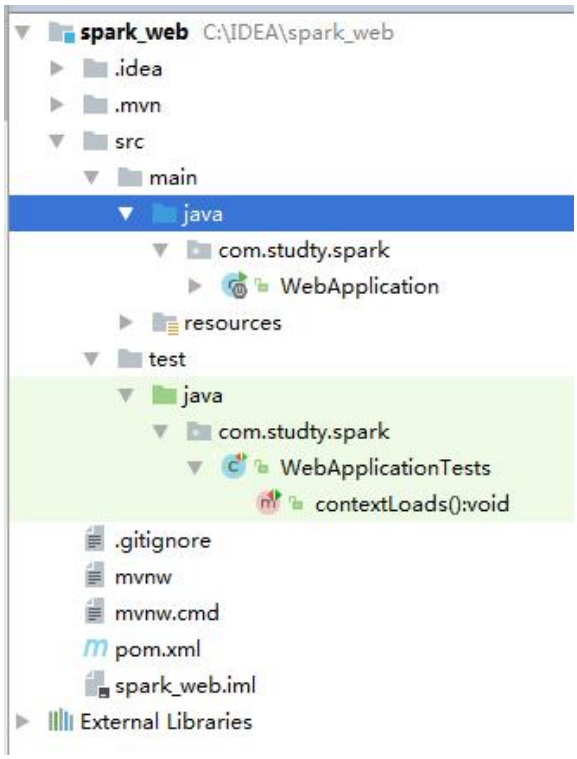
Spring Boot 构建 Web 项目

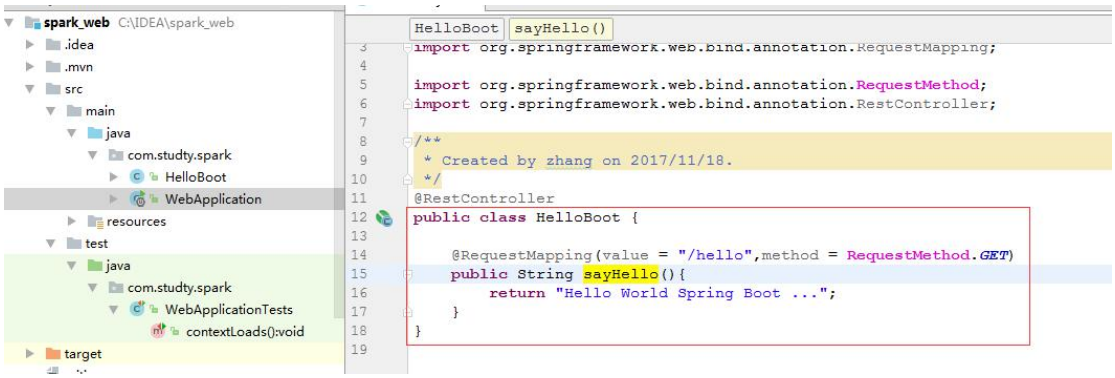




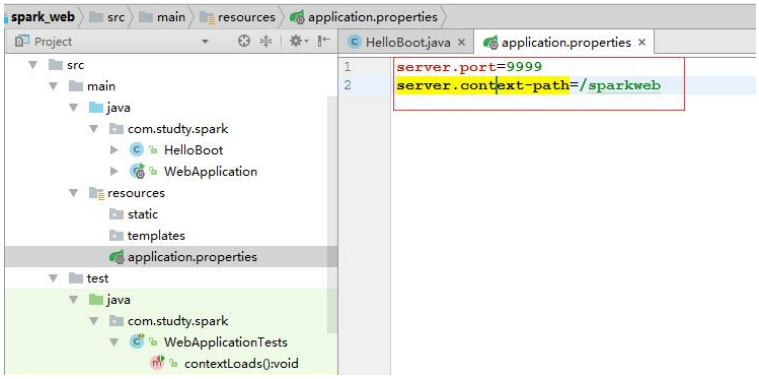



Editor
Plugins
Version Control
Build, Execution, Deployment
Build Tools
Maven
Importing
Ignored Files
Runner
Running Tests
Repositories
Gradle
Gant
SBT
Compiler
Debugger
Deployment
Execute goals recursively
Print exception stack traces
Always update snapshots
Output level:
Info
Checksum policy:
No Global Policy
Multiproject build fail policy:
Default
Plugin update policy:
Default
ignored by Maven 3+
Threads (-T option)
Maven home directory:
Bundled (Maven 3)
(Version: 3.3.9)
User settings file:
C:\biginstall\apache-maven-3.3.9\conf\settings.xml
Override
Local repository:
C:\Users\zhang\.m2\repository
Override


spark_web C:\IDEA\spark_web
.idea
.mvn
src
main
java
com.studty.spark
WebApplication
resources
test
java
com.studty.spark
WebApplicationTests
contextLoads():void
.gitignore
mvnw
mvnw.cmd
pom.xml
spark_web.iml
External Libraries

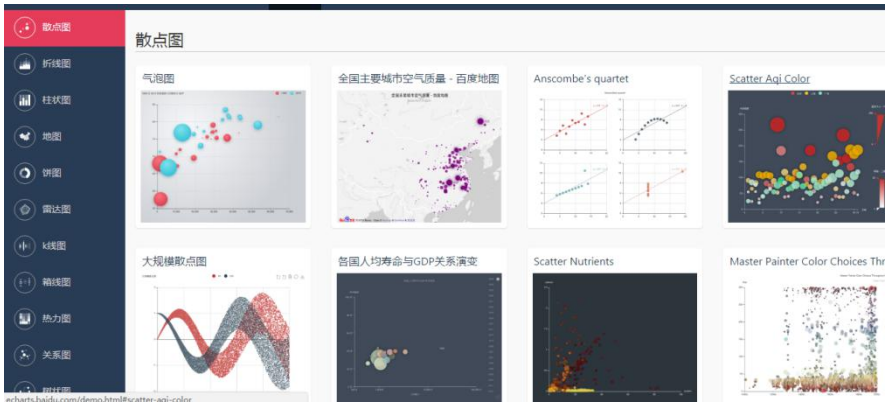

spark_web C:\IDEA\spark_web
.idea
.mvn
src
main
java
com.studty.spark
HelloBoot
WebApplication
resources
test
java
com.studty.spark
WebApplicationTests
contextLoads():void
target
HelloBoot
sayHello()
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestMethod;
import org.springframework.web.bind.annotation.RestController;
/**
* Created by zhang on 2017/11/18.
*/
@RestController
public class HelloBoot {
@RequestMapping(value = "/hello",method = RequestMethod.GET)
public String sayHello(){
return "Hello World Spring Boot ...";
}
}


localhost:8080/hello
应用
百度一下
招生组员待遇及提成
Hello World Spring Boot ...



使用 Echarts 构建可视化

http://echarts.baidu.com/examples.html



使用 Echart 构建静态的 HTML

添加依赖

```
<dependency>
   <groupId>org.springframework.boot</groupId>
   <artifactId>spring-boot-starter-thymeleaf</artifactId>
</dependency>
```

```java
/**
 * Created by zhang on 2017/11/18.
 */
@RestController
public class HelloBoot {

    @RequestMapping(value = "/hello",method = RequestMethod.GET)
    public String sayHello(){
        return "Hello World Spring Boot ...";
    }

    @RequestMapping(value = "/first", method = RequestMethod.GET)
    public ModelAndView firstDemo(){
        return new ModelAndView( viewName: "test");
    }
}
```

3. 创建 test.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8"/>//注意一定要关闭
    <!-- 引入 ECharts 文件 -->
    <script src="js/echarts.min.js"></script>
    <title>Title</title>
</head>
<body>
<!-- 为 ECharts 准备一个具备大小（宽高）的 DOM -->
    <div id="main" style="width: 600px;height:400px; position: absolute; top:50%;left:50%;margin-top:-200px;margin-left: -300px"></div>
<script type="text/javascript">
    // 基于准备好的 dom，初始化 echarts 实例
    var myChart = echarts.init(document.getElementById('main'));

    // 指定图表的配置项和数据
    var option = {
        title: {
            text: 'ECharts 入门示例'
        },
        tooltip: {},
        legend: {
            data: ['销量']
        },
        xAxis: {
            data: ["衬衫", "羊毛衫", "雪纺衫", "裤子", "高跟鞋", "袜子"]
        },
        yAxis: {},
        series: [{
```

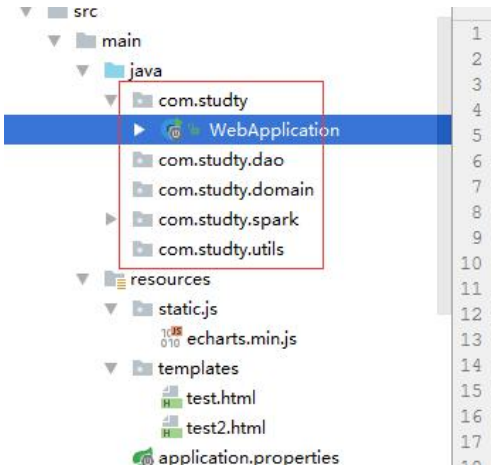
```
                name: '销量',
                type: 'bar',
                data: [5, 20, 36, 10, 10, 20]
            }]
        };

        // 使用刚指定的配置项和数据显示图表。
        myChart.setOption(option);
</script>
</body>
</html>
```

在页面上显示出来数据

```
 itemStyle:{
                normal:{
                        label:{
                           show: true,
                           formatter: '{b} : {c} ({d}%)'
                        },
                        labelLine :{show:true}
                    }
                }
```

使用 Echart 构建动态创建饼图之包名修改

添加 domain dao utils 对应的包名



添加 maven 包：

```
<dependency>
   <groupId>org.apache.hbase</groupId>
   <artifactId>hbase-client</artifactId>
   <version>1.3.1</version>
</dependency>
```

根据天来获取 HBase 表中的类目访问次数

```
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.hbase.client.*;
import org.apache.hadoop.hbase.filter.Filter;
import org.apache.hadoop.hbase.filter.PrefixFilter;
import org.apache.hadoop.hbase.util.Bytes;

import java.io.IOException;
import java.util.HashMap;
import java.util.Map;

/**
 * HBase 操作工具类
 */
public class HBaseUtils {
	HBaseAdmin admin = null;
	Configuration configration = null;

	/**
	 * 私有构造方法
	 */
	private HBaseUtils(){
		configration = new Configuration();
		configration.set("hbase.zookeeper.quorum", "s201:2181");
		configration.set("hbase.rootdir", "hdfs://s201/hbase");
		try {
			admin = new HBaseAdmin(configration);
		} catch (IOException e) {
			e.printStackTrace();
		}
	}


	private static HBaseUtils instance = null;
```

```
 /**
  * 获取单实例对象
  * @return
  */
 public static synchronized HBaseUtils getInstance(){
       if(null == instance){
             instance = new HBaseUtils();
       }
       return    instance;
 }

 /**
  * 根据表明获取到 Htable 实例
  * @param tableName
  * @return
  */
public HTable getTable(String tableName){
      HTable table = null;
      try {
            table = new HTable(configration,tableName);
      } catch (Exception e) {
            e.printStackTrace();
      }
      return    table;
}

 /**
  * 添加一条记录到 Hbase 表  70 30 128 32 核  200T 8000
  *
  * @param tableName Hbase 表名
  * @param rowkey       Hbase 表的 rowkey
  * @param cf              Hbase 表的 columnfamily
  * @param column       Hbase 表的列
  * @param value         写入 Hbase 表的值
  */
public void put(String tableName,String rowkey,String cf,String column,String value){
    HTable table = getTable(tableName);
    Put put = new Put(Bytes.toBytes(rowkey));
    put.add(Bytes.toBytes(cf),Bytes.toBytes(column),Bytes.toBytes(value));
     try {
            table.put(put);
     } catch (IOException e) {
            e.printStackTrace();
     }
```

```
    }

    /**
     * 根据表名输入条件获取 Hbase 的记录数
     */
    public Map<String, Long> query(String tableName, String condition) throws IOException {
        Map<String, Long> map = new HashMap<>();

        HTable table = getTable(tableName);
        String cf = "info";
        String qualifier = "click_count";

        Scan scan = new Scan();

        Filter filter = new PrefixFilter(Bytes.toBytes(condition));
        scan.setFilter(filter);

        ResultScanner rs = table.getScanner(scan);
        for (Result result : rs) {
            String row = Bytes.toString(result.getRow());
            String clickCount = Bytes.toString(result.getValue(cf.getBytes(),
qualifier.getBytes()));
            long clickCount1 = Long.valueOf(clickCount);
            map.put(row, clickCount1);
        }

        return map;
    }

    public static void main(String[] args) throws IOException {
        Map<String, Long> map = HBaseUtils.getInstance().query("category_clickcount",
"20171022");

        for (Map.Entry<String, Long> entry : map.entrySet()) {
            System.out.println(entry.getKey() + " : " + entry.getValue());
        }
    }

}
```

类目访问量 domain 和 dao 开发

```java
/**
 * 类别访问数量实体类
 */
public class CategoryClickCount {
    private String name;
    private long value;

    public void setName(String name) {
        this.name = name;
    }

    public void setValue(long value) {
        this.value = value;
    }

    public long getValue() {
        return value;
    }

    public String getName() {
        return name;
    }
}
```

Dao 的开发

```java
public class CategoryClickCountDAO {

    public List<CategoryClickCount> query(String day) throws IOException {
        List<CategoryClickCount> list = new ArrayList<>();

        Map<String,Long> map = HBaseUtils.getInstance().query("category_clickcount",day);

        for (Map.Entry<String, Long> entry : map.entrySet()) {
            CategoryClickCount categoryClickCount = new CategoryClickCount();
            categoryClickCount.setName(entry.getKey());;
            categoryClickCount.setValue(entry.getValue());
            list.add(categoryClickCount);
        }

         return list;
```

```
    }

    public static void main(String[] args) throws IOException {
        CategoryClickCountDAO dao = new CategoryClickCountDAO();
        List<CategoryClickCount> list = dao.query("2017");
        for (CategoryClickCount c : list) {
            System.out.println(c.getValue());
        }
    }
}
```

视频类目访问量实时查询展示功能实现以及扩展

```
package com.studty.spark;

import com.studty.dao.CourseClickCountDAO;
import com.studty.domain.CourseClickCount;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestMethod;
import org.springframework.web.bind.annotation.ResponseBody;
import org.springframework.web.bind.annotation.RestController;
import org.springframework.web.servlet.ModelAndView;

import java.util.HashMap;
import java.util.List;
import java.util.Map;

/**
 * Created by zhang on 2017/11/19.
 */
@RestController
public class SparkStatApp {
    private static Map<String,String> courses = new HashMap<>();
    static {
        courses.put("112","偶像爱情");
        courses.put("128","宫斗谋权");
        courses.put("145","玄幻史诗");
        courses.put("146", "都市生活");
        courses.put("131", "罪案谍战");
        courses.put("130", "历险科幻");
    }
```

```
    @Autowired
    CourseClickCountDAO courseClickCountDAO;

    @RequestMapping(value = "/course_clickcount_dynamic", method = RequestMethod.POST)
    @ResponseBody
    public List<CourseClickCount> courseClickCount() throws Exception {
        List<CourseClickCount> list = courseClickCountDAO.query("20771111");
        for(CourseClickCount model:list){
           model.setName(courses.get(model.getName().substring(9)));
        }
        return    list;
    }

    @RequestMapping(value = "/echarts", method = RequestMethod.GET)
    public ModelAndView echarts(){
         return    new ModelAndView("echarts");
    }
}
```

页面调用数据展示

```
data: (function () {//<![CDATA[
    var datas = [];
    $.ajax({
        type: "POST",
        url: "/sparkweb/CategoryClickCount",
        dataType: 'json',
        async: false,
        success: function (result) {
            for (var i = 0; i < result.length; i++) {//{value: 335,
name: '直接访问'}
                datas.push({"value": result[i].value, "name":
result[i].name})
            }
        }
    })
    return datas;
    //]]>
})()
```

全部源码

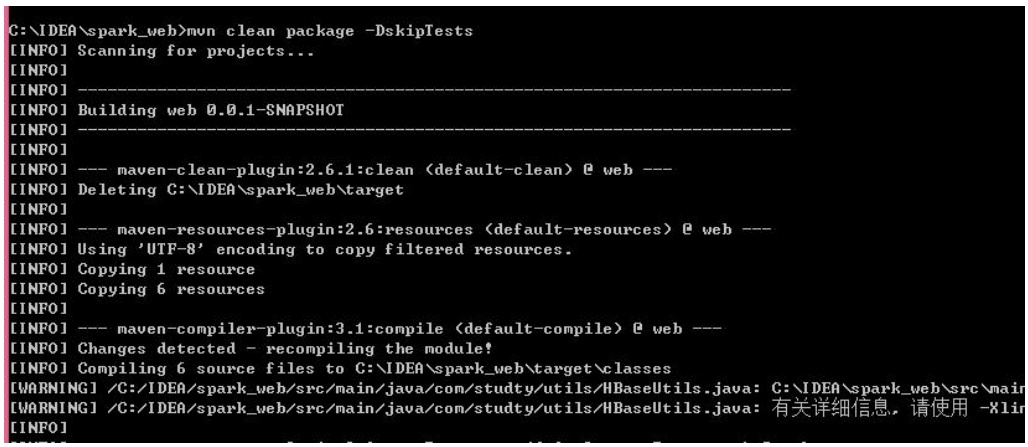
```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8"/>
    <!-- 引入 ECharts 文件 -->
    <script src="js/echarts.min.js"></script>
    <script src="js/jquery.min.js" type="text/javascript"></script>
    <title>Title</title>
</head>
<body>
<!-- 为 ECharts 准备一个具备大小（宽高）的 DOM -->
  <div id="main" style="width: 600px;height:400px; position: absolute; top:50%;left:50%;margin-top:-200px;margin-left: -300px"></div>
<script type="text/javascript">
    // 基于准备好的 dom，初始化 echarts 实例
    var myChart = echarts.init(document.getElementById('main'));

    // 指定图表的配置项和数据
    option = {
        backgroundColor: '#2c343c',

        title: {
            text: '爱奇艺官方访问来源',
            left: 'center',
            top: 20,
            textStyle: {
                color: '#ccc'
            }
        },

        tooltip: {
            trigger: 'item',
            formatter: "{a} <br/>{b} : {c} ({d}%)"
        },

        visualMap: {
            show: false,
            min: 80,
            max: 600,
            inRange: {
                colorLightness: [0, 1]
            }
```

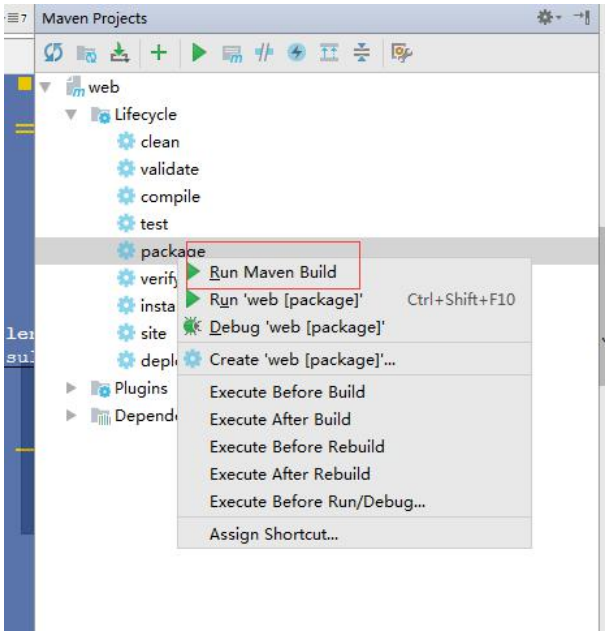
```
        },
        series: [
            {
                name: '访问来源',
                type: 'pie',
                radius: '55%',
                center: ['50%', '50%'],
                data: (function () {//<![CDATA[
                    var datas = [];
                    $.ajax({
                        type: "POST",
                        url: "/sparkweb/course_click",
                        dataType: 'json',
                        async: false,
                        success: function (result) {
                            for (var i = 0; i < result.length; i++) {//{value: 335, name: '直接访问'}
                                datas.push({"value": result[i].value, "name": result[i].name})
                            }
                        }
                    })
                    return datas;
                    //]]>
                })().sort(function (a, b) {
                    return a.value - b.value;
                }),
                roseType: 'radius',
                label: {
                    normal: {
                        textStyle: {
                            color: 'rgba(255, 255, 255, 0.3)'
                        }
                    }
                },
                labelLine: {
                    normal: {
                        lineStyle: {
                            color: 'rgba(255, 255, 255, 0.3)'
                        },
                        smooth: 0.2,
                        length: 10,
                        length2: 20
                    }
```

```
                    },
                    itemStyle: {
                        normal: {
                            label: {
                                show: true,
                                formatter: '{b} : {c} ({d}%)'
                            },
                            labelLine: {show: true}
                        }
                    },

                    animationType: 'scale',
                    animationEasing: 'elasticOut',
                    animationDelay: function (idx) {
                        return Math.random() * 200;
                    }
                }
            ]
        };

        // 使用刚指定的配置项和数据显示图表。
        myChart.setOption(option);
</script>
</body>
</html>
```

代码打包上传到服务器

mvn clean package -DskipTests




Maven Projects
web
Lifecycle
clean
validate
compile
test
package
Run Maven Build
Run 'web [package]' Ctrl+Shift+F10
Debug 'web [package]'
Create 'web [package]'...
Execute Before Build
Execute After Build
Execute Before Rebuild
Execute After Rebuild
Execute Before Run/Debug...
Assign Shortcut...
Plugins