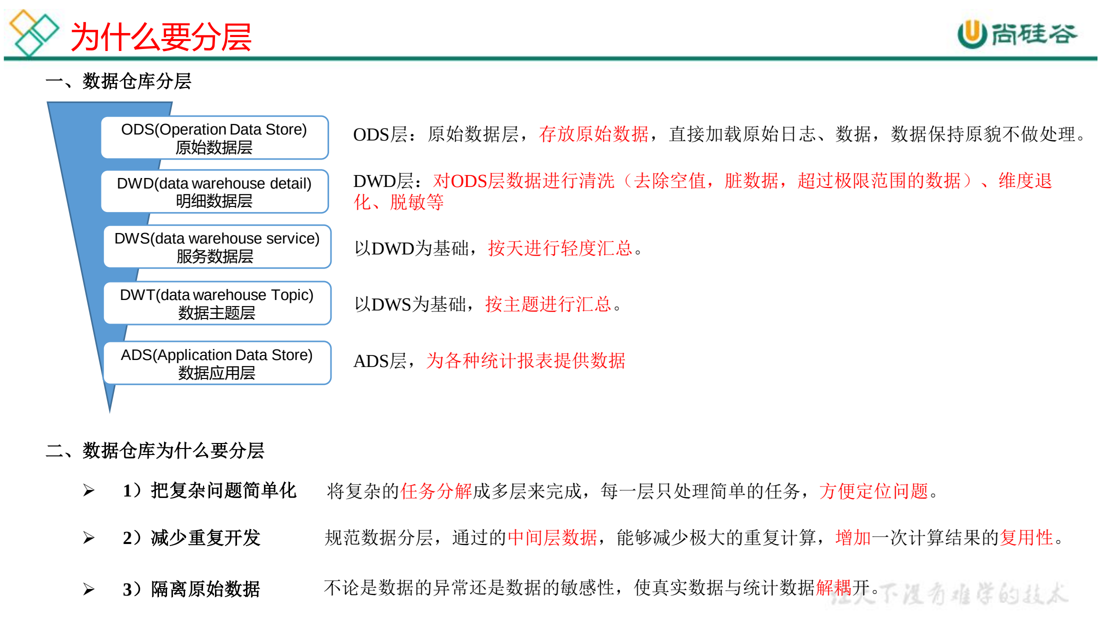
尚硅谷大数据项目之电商数据仓库系统

(作者：尚硅谷大数据研发部)

版本：V6.5

第 1 章 数仓分层

1.1 为什么要分层



为什么要分层

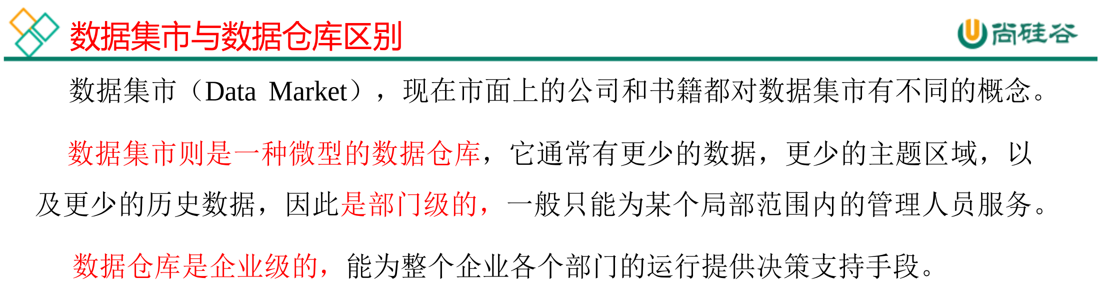
一、数据仓库分层

ODS(Operation Data Store) 原始数据层	ODS层：原始数据层，存放原始数据，直接加载原始日志、数据，数据保持原貌不做处理。
DWD(data warehouse detail) 明细数据层	DWD层：对ODS层数据进行清洗（去除空值，脏数据，超过极限范围的数据）、维度退化、脱敏等
DWS(data warehouse service) 服务数据层	以DWD为基础，按天进行轻度汇总。
DWT(data warehouse Topic) 数据主题层	以DWS为基础，按主题进行汇总。
ADS(Application Data Store) 数据应用层	ADS层，为各种统计报表提供数据

二、数据仓库为什么要分层

- **1）把复杂问题简单化**　将复杂的任务分解成多层来完成，每一层只处理简单的任务，方便定位问题。
- **2）减少重复开发**　规范数据分层，通过的中间层数据，能够减少极大的重复计算，增加一次计算结果的复用性。
- **3）隔离原始数据**　不论是数据的异常还是数据的敏感性，使真实数据与统计数据解耦开。

1.2 数据集市与数据仓库概念

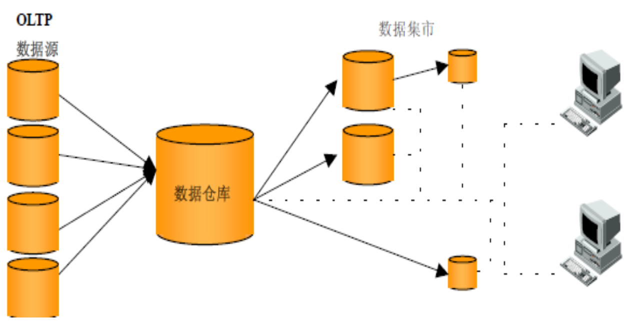


数据集市与数据仓库区别

数据集市（Data Market），现在市面上的公司和书籍都对数据集市有不同的概念。

数据集市则是一种微型的数据仓库，它通常有更少的数据，更少的主题区域，以及更少的历史数据，因此是部门级的，一般只能为某个局部范围内的管理人员服务。

数据仓库是企业级的，能为整个企业各个部门的运行提供决策支持手段。



1.3 数仓命名规范

1.3.1 表命名

- ODS层命名为ods_表名
- DWD层命名为dwd_dim/fact_表名
- DWS层命名为dws_表名
- DWT层命名为dwt_购物车
- ADS层命名为ads_表名
- 临时表命名为xxx_tmp
- 用户行为表，以log为后缀。

1.3.2 脚本命名

- 数据源_to_目标_db/log.sh
- 用户行为脚本以log为后缀；业务数据脚本以db为后缀。

第 2 章 数仓理论

2.1 范式理论

2.1.1 范式概念

1）定义

范式可以理解为设计一张数据表的表结构，符合的标准级别。 规范和要求

2）优点

关系型数据库设计时，遵照一定的规范要求，目的在于降低数据的冗余性。

为什么要降低数据冗余性？

（1）十几年前，磁盘很贵，为了减少磁盘存储。

（2）以前没有分布式系统，都是单机，只能增加磁盘，磁盘个数也是有限的

（3）一次修改，需要修改多个表，很难保证数据一致性

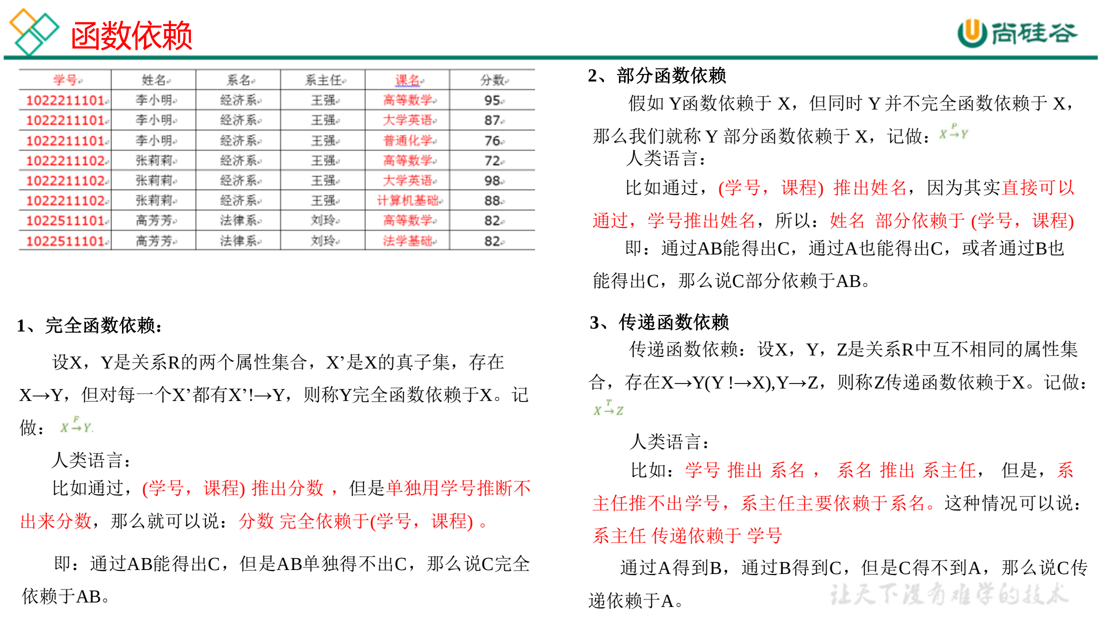
3）缺点

范式的缺点是获取数据时，需要通过 Join 拼接出最后的数据。

4）分类

目前业界范式有：第一范式(1NF)、第二范式(2NF)、第三范式(3NF)、巴斯-科德范式(BCNF)、第四范式(4NF)、第五范式(5NF)。

2.1.2 函数依赖



函数依赖　尚硅谷

学号	姓名	系名	系主任	课名	分数
1022211101	李小明	经济系	王强	高等数学	95
1022211101	李小明	经济系	王强	大学英语	87
1022211101	李小明	经济系	王强	普通化学	76
1022211102	张莉莉	经济系	王强	高等数学	72
1022211102	张莉莉	经济系	王强	大学英语	98
1022211102	张莉莉	经济系	王强	计算机基础	88
1022511101	高芳芳	法律系	刘玲	高等数学	82
1022511101	高芳芳	法律系	刘玲	法学基础	82

1、完全函数依赖：

设X，Y是关系R的两个属性集合，X’是X的真子集，存在X→Y，但对每一个X’都有X’!→Y，则称Y完全函数依赖于X。记做：$X\xrightarrow{F}Y$

人类语言：

比如通过，(学号，课程) 推出分数 ，但是单独用学号推断不出来分数，那么就可以说：分数 完全依赖于(学号，课程) 。

即：通过AB能得出C，但是AB单独得不出C，那么说C完全依赖于AB。

2、部分函数依赖

假如 Y函数依赖于 X，但同时 Y 并不完全函数依赖于 X，那么我们就称 Y 部分函数依赖于 X，记做：$X\xrightarrow{P}Y$

人类语言：

比如通过，(学号，课程) 推出姓名，因为其实直接可以通过，学号推出姓名，所以：姓名 部分依赖于 (学号，课程)

即：通过AB能得出C，通过A也能得出C，或者通过B也能得出C，那么说C部分依赖于AB。

3、传递函数依赖

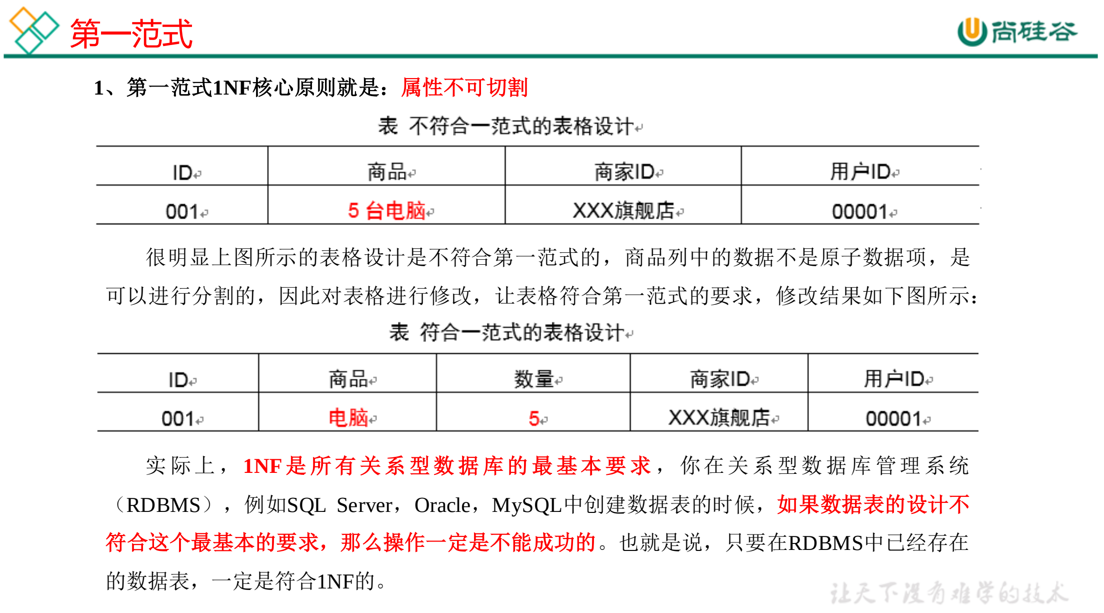
传递函数依赖：设X，Y，Z是关系R中互不相同的属性集合，存在X→Y(Y !→X),Y→Z，则称Z传递函数依赖于X。记做：$X\xrightarrow{T}Z$

人类语言：

比如：学号 推出 系名 ， 系名 推出 系主任， 但是，系主任推不出学号，系主任主要依赖于系名。这种情况可以说：系主任 传递依赖于 学号

通过A得到B，通过B得到C，但是C得不到A，那么说C传递依赖于A。

2.1.3 三范式区分



第一范式　尚硅谷

1、第一范式1NF核心原则就是：属性不可切割

表 不符合一范式的表格设计

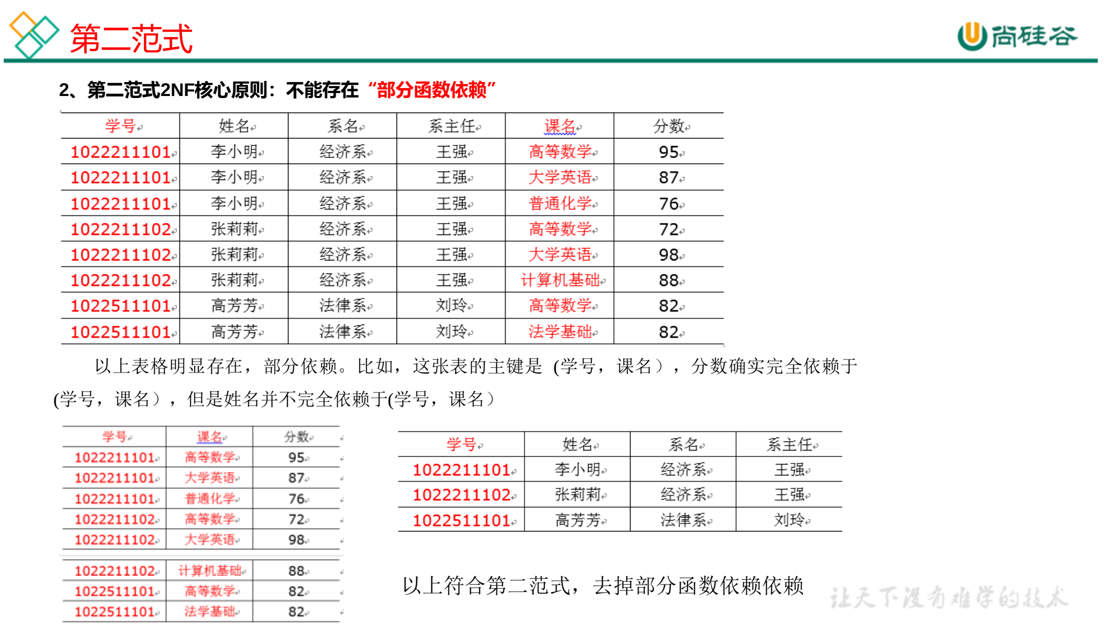
ID	商品	商家ID	用户ID
001	5 台电脑	XXX旗舰店	00001

很明显上图所示的表格设计是不符合第一范式的，商品列中的数据不是原子数据项，是可以进行分割的，因此对表格进行修改，让表格符合第一范式的要求，修改结果如下图所示：

表 符合一范式的表格设计

ID	商品	数量	商家ID	用户ID
001	电脑	5	XXX旗舰店	00001

实际上，**1NF是所有关系型数据库的最基本要求**，你在关系型数据库管理系统（RDBMS），例如SQL Server，Oracle，MySQL中创建数据表的时候，**如果数据表的设计不符合这个最基本的要求，那么操作一定是不能成功的**。也就是说，只要在RDBMS中已经存在的数据表，一定是符合1NF的。



第二范式

尚硅谷

2、第二范式2NF核心原则：不能存在“部分函数依赖”

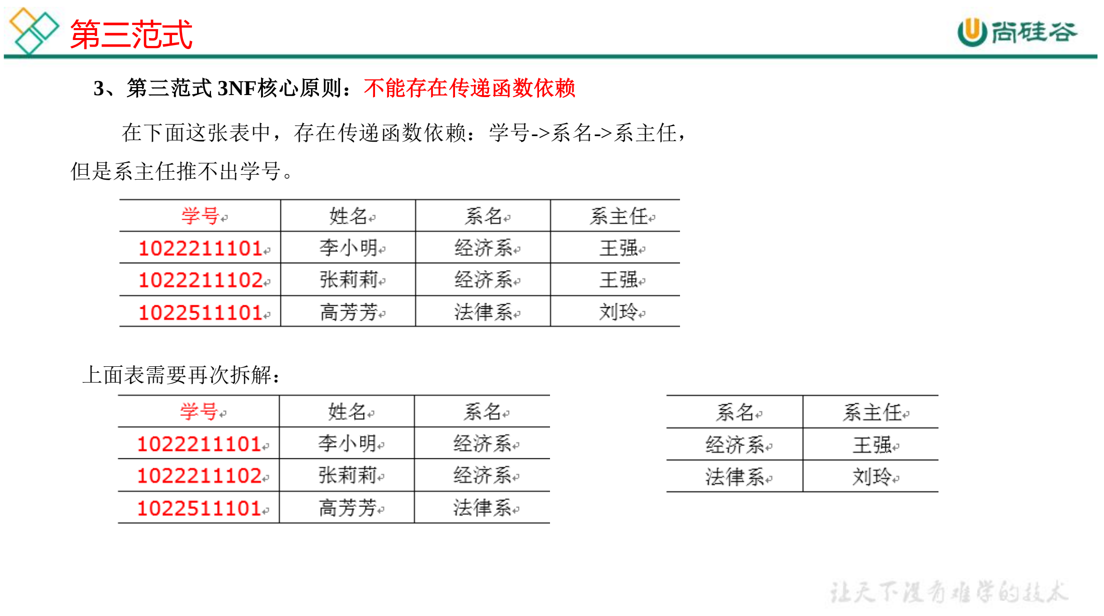
学号	姓名	系名	系主任	课名	分数
1022211101	李小明	经济系	王强	高等数学	95
1022211101	李小明	经济系	王强	大学英语	87
1022211101	李小明	经济系	王强	普通化学	76
1022211102	张莉莉	经济系	王强	高等数学	72
1022211102	张莉莉	经济系	王强	大学英语	98
1022211102	张莉莉	经济系	王强	计算机基础	88
1022511101	高芳芳	法律系	刘玲	高等数学	82
1022511101	高芳芳	法律系	刘玲	法学基础	82

以上表格明显存在，部分依赖。比如，这张表的主键是（学号，课名），分数确实完全依赖于(学号，课名），但是姓名并不完全依赖于(学号，课名）

学号	课名	分数
1022211101	高等数学	95
1022211101	大学英语	87
1022211101	普通化学	76
1022211102	高等数学	72
1022211102	大学英语	98
1022211102	计算机基础	88
1022511101	高等数学	82
1022511101	法学基础	82

学号	姓名	系名	系主任
1022211101	李小明	经济系	王强
1022211102	张莉莉	经济系	王强
1022511101	高芳芳	法律系	刘玲

以上符合第二范式，去掉部分函数依赖依赖



第三范式

尚硅谷

3、第三范式 3NF核心原则：不能存在传递函数依赖

在下面这张表中，存在传递函数依赖：学号->系名->系主任，但是系主任推不出学号。

学号	姓名	系名	系主任
1022211101	李小明	经济系	王强
1022211102	张莉莉	经济系	王强
1022511101	高芳芳	法律系	刘玲

上面表需要再次拆解：

学号	姓名	系名
1022211101	李小明	经济系
1022211102	张莉莉	经济系
1022511101	高芳芳	法律系

系名	系主任
经济系	王强
法律系	刘玲

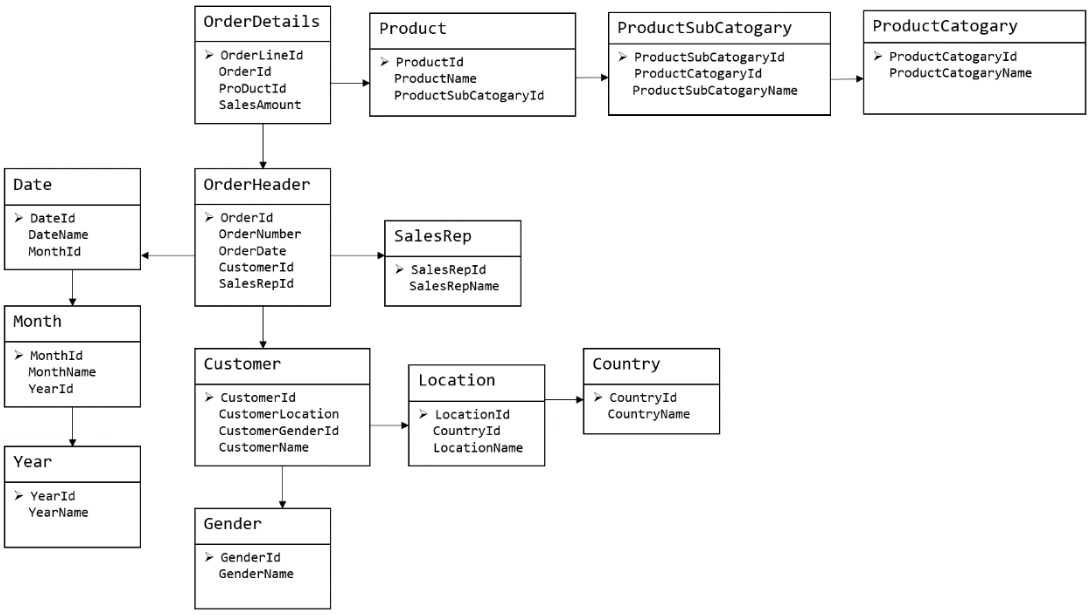
2.2 关系建模与维度建模

当今的数据处理大致可以分成两大类：联机事务处理 OLTP（on-line transaction processing）、联机分析处理 OLAP（On-Line Analytical Processing）。OLTP 是传统的关系型数据库的主要应用，主要是基本的、日常的事务处理，例如银行交易。OLAP 是数据仓库系统的主要应用，支持复杂的分析操作，侧重决策支持，并且提供直观易懂的查询结果。二者的主要区别对比如下表所示。

对比属性	OLTP	OLAP
读特性	每次查询只返回少量记录	对大量记录进行汇总
写特性	随机、低延时写入用户的输入	批量导入

使用场景	用户，Java EE 项目	内部分析师，为决策提供支持
数据表征	最新数据状态	随时间变化的历史状态
数据规模	GB	TB 到 PB

2.2.1 关系建模



关系模型如图所示，严格遵循第三范式（3NF），从图中可以看出，较为松散、零碎，物理表数量多，而数据冗余程度低。由于数据分布于众多的表中，这些数据可以更为灵活地被应用，功能性较强。关系模型主要应用与 OLTP 系统中，为了保证数据的一致性以及避免冗余，所以大部分业务系统的表都是遵循第三范式的。

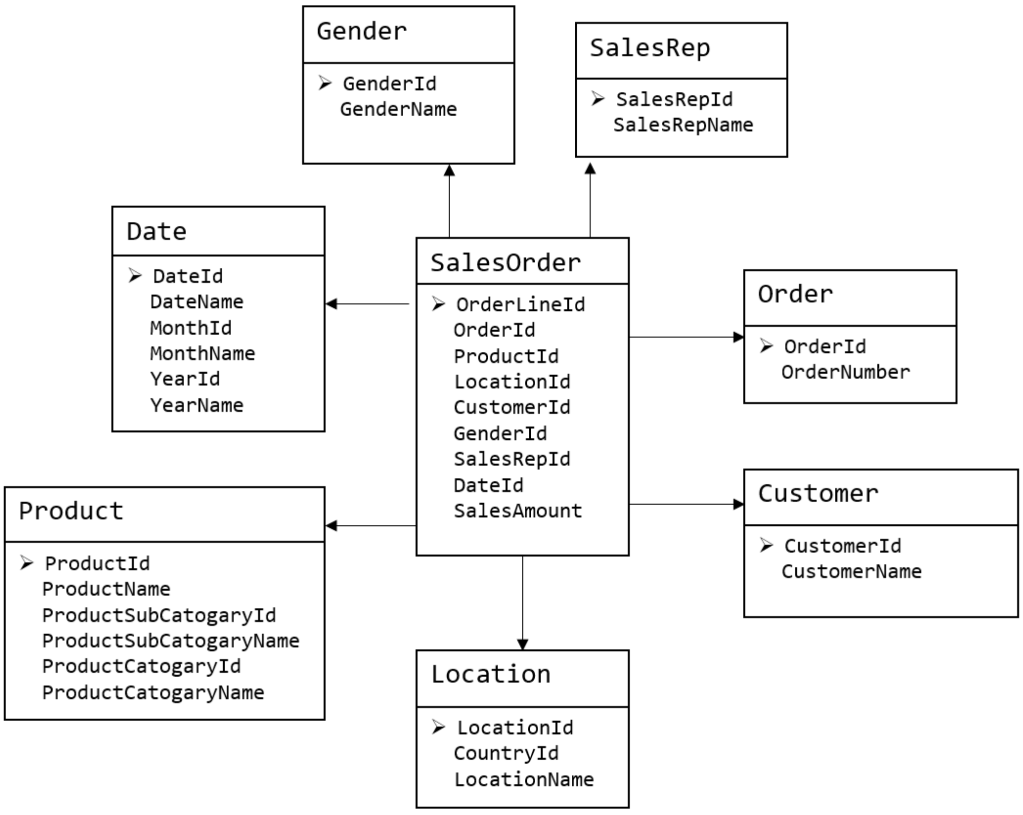


图 维度模型示意图

维度模型如图所示，主要应用于 OLAP 系统中，通常以某一个事实表为中心进行表的组织，主要面向业务，特征是可能存在数据的冗余，但是能方便的得到数据。

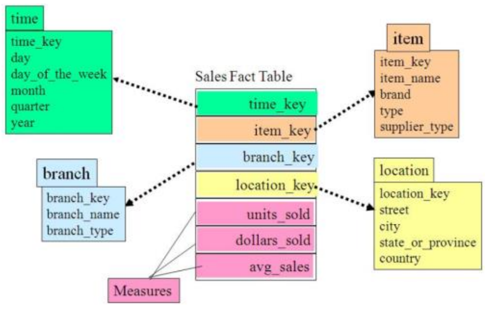
关系模型虽然冗余少，但是在大规模数据，跨表分析统计查询过程中，会造成多表关联，这会大大降低执行效率。所以通常我们采用维度模型建模，把相关各种表整理成两种：事实表和维度表两种。

2.2.2 维度建模

在维度建模的基础上又分为三种模型：星型模型、雪花模型、星座模型。

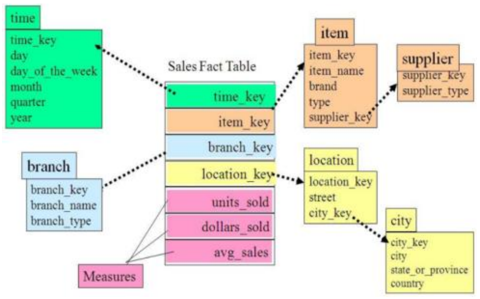
星型模型、雪花模型

1、星型模型



雪花模型与星型模型的区别主要在于维度的层级，标准的星型模型维度只有一层，而雪花模型可能会涉及多级。

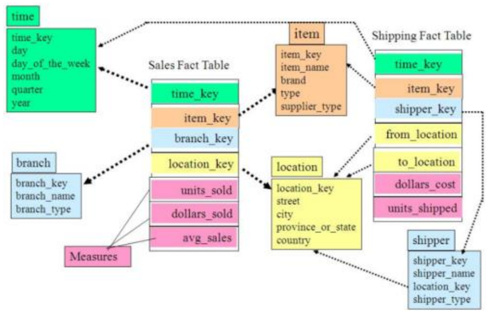
2、雪花模型



雪花模型，比较靠近3NF，但是无法完全遵守，因为遵循3NF的性能成本太高。

星座模型

3、星座模型



星座模型与前两种情况的区别是事实表的数量，星座模型是基于多个事实表。

基本上是很多数据仓库的常态，因为很多数据仓库都是多个事实表的。所以星座不星座只反映是否有多个事实表，他们之间是否共享一些维度表。

所以星座模型并不和前两个模型冲突。

4、模型的选择

首先就是星座不星座这个只跟数据和需求有关系，跟设计没关系，不用选择。

星型还是雪花，取决于性能优先，还是灵活更优先。

目前实际企业开发中，不会绝对选择一种，根据情况灵活组合，甚至并存（一层维度和多层维度都保存）。但是整体来看，更倾向于维度更少的星型模型。尤其是Hadoop体系，减少Join就是减少Shuffle，性能差距很大。（关系型数据可以依靠强大的主键索引）

2.3 维度表和事实表（重点）

2.3.1 维度表

维度表：一般是对事实的**描述信息**。每一张维表对应现实世界中的一个对象或者概念。例如：用户、商品、日期、地区等。

维表的特征：

- 维表的范围很宽（具有多个属性、列比较多）
- 跟事实表相比，行数相对较小：通常< 10 万条
- 内容相对固定：编码表

时间维度表：

日期 ID	day of week	day of year	季度	节假日
2020-01-01	2	1	1	元旦
2020-01-02	3	2	1	无
2020-01-03	4	3	1	无
2020-01-04	5	4	1	无
2020-01-05	6	5	1	无

2.3.2 事实表

事实表中的每行数据代表一个业务事件（下单、支付、退款、评价等）。“事实”这个术语表示的是业务事件的**度量值（可统计次数、个数、金额等）**，例如，订单事件中的下单金额。

每一个事实表的行包括：具有可加性的数值型的度量值、与维表相连接的外键、通常具有两个和两个以上的外键、外键之间表示维表之间多对多的关系。

事实表的特征：

- 非常的大
- 内容相对的窄：列数较少
- 经常发生变化，每天会新增加很多。

1）事务型事实表

以**每个事务或事件为单位**，例如一个销售订单记录，一笔支付记录等，作为事实表里的一行数据。一旦事务被提交，事实表数据被插入，数据就不再进行更改，其更新方式为增量更新。

2）周期型快照事实表

周期型快照事实表中**不会保留所有数据**，**只保留固定时间间隔的数据**，例如每天或者每月的销售额，或每月的账户余额等。

3）累积型快照事实表

累计快照事实表用于跟踪业务事实的变化。例如，数据仓库中可能需要累积或者存储订单从下订单开始，到订单商品被打包、运输、和签收的各个业务阶段的时间点数据来跟踪订单声明周期的进展情况。当这个业务过程进行时，事实表的记录也要不断更新。

订单 id	用户 id	下单时间	打包时间	发货时间	签收时间	订单金额
		3-8	3-8	3-9	3-10	

2.4 数据仓库建模（绝对重点）

2.4.1 ODS 层

（1）保持数据原貌不做任何修改，起到备份数据的作用。

（2）数据采用压缩，减少磁盘存储空间（例如：原始数据 100G，可以压缩到 10G 左右）

（3）创建分区表，防止后续的全表扫描

2.4.2 DWD 层

DWD 层需构建维度模型，一般采用星型模型，呈现的状态一般为星座模型。

维度建模一般按照以下四个步骤：

选择业务过程→声明粒度→确认维度→确认事实

（1）选择业务过程

在业务系统中，挑选我们感兴趣的业务线，比如下单业务，支付业务，退款业务，物流业务，一条业务线对应一张事实表。

（2）声明粒度

数据粒度指数据仓库的数据中保存数据的细化程度或综合程度的级别。

声明粒度意味着精确定义事实表中的一行数据表示什么，应该尽可能选择**最小粒度**，以此来应各种各样的需求。

典型的粒度声明如下：

订单中，每个商品项作为下单事实表中的一行，粒度为每次下单

每周的订单次数作为一行，粒度就是每周下单。

每月的订单次数作为一行，粒度就是每月下单

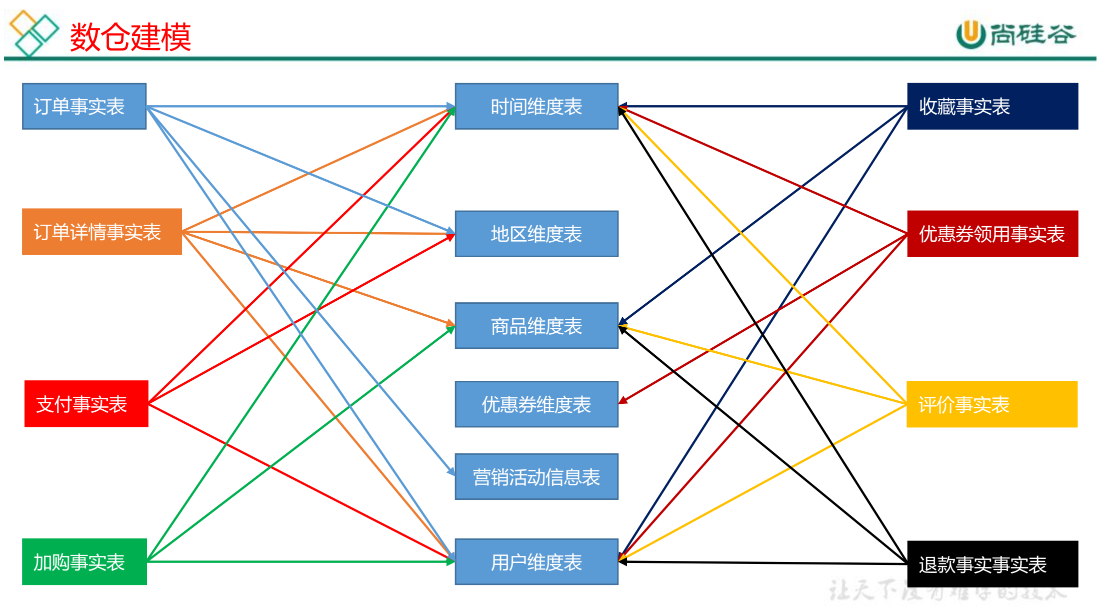
（3）确定维度

维度的主要作用是描述业务是事实，主要表示的是“谁，何处，何时”等信息。

（4）确定事实

此处的“事实”一词，指的是业务中的度量值，例如订单金额、下单次数等。

在 DWD 层，以**业务过程**为建模驱动，基于每个具体业务过程的特点，构建**最细粒度**的明细层事实表。事实表可做适当的宽表化处理。



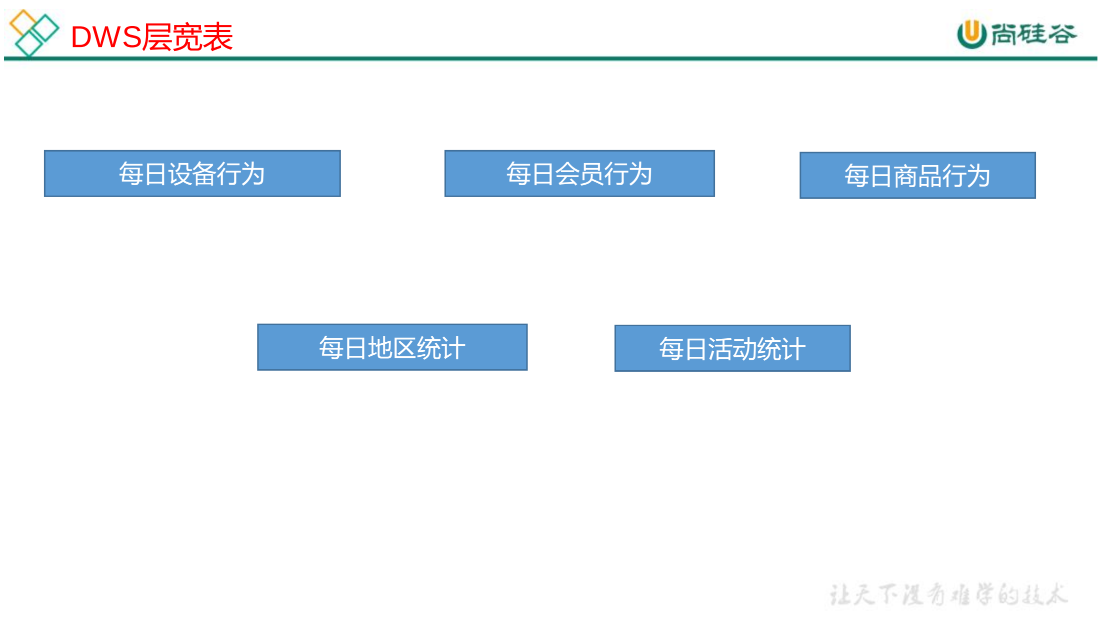
	时间	用户	地区	商品	优惠券	活动	编码	度量值
订单	√	√	√			√		件数/金额
订单详情	√		√	√				件数/金额
支付	√		√					金额
加购	√	√		√				件数/金额
收藏	√	√		√				个数
评价	√	√		√				个数
退款	√	√		√				件数/金额
优惠券领用	√	√			√			个数

至此，数仓的维度建模已经完毕，DWS、DWT 和 ADS 和维度建模已经没有关系了。

DWS 和 DWT 都是建宽表，宽表都是按照主题去建。主题相当于观察问题的角度。对应着维度表。

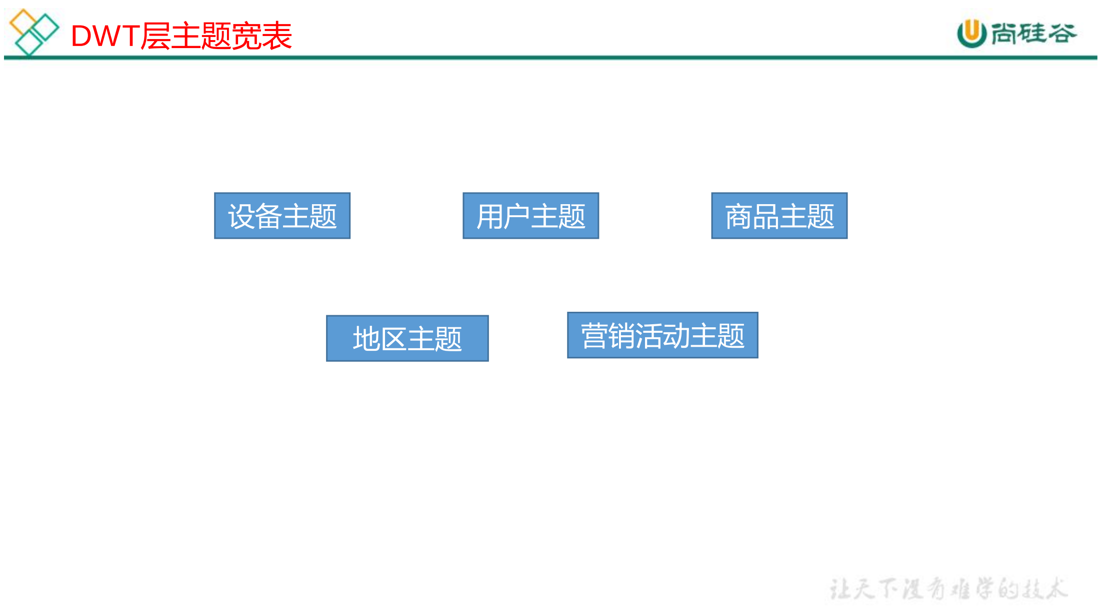
2.4.3 DWS 层

统计各个主题对象的当天行为，服务于 DWT 层的主题宽表。



2.4.4 DWT 层

以分析的主题对象为建模驱动，基于上层的应用和产品的指标需求，构建主题对象的全量宽表。



2.4.5 ADS 层

对电商系统各大主题指标分别进行分析。

第 3 章 Hive 环境准备

3.1 Hive on Spark 编译

1）从官网下载 Spark 源码并解压

下载地址: https://www.apache.org/dyn/closer.lua/spark/spark-2.4.5/spark-2.4.5.tgz

2）上传并解压 spark

3）进入 spark 解压后的目录

4）执行编译命令

```
[atguigu@hadoop102   spark-2.4.5]$   ./dev/make-distribution.sh   --name
without-hive --tgz -Pyarn -Phadoop-3.1 -Dhadoop.version=3.1.3 -Pparquet-
provided -Porc-provided -Phadoop-provided
```

5）等待编译完成，spark-2.4.5-bin-without-hive.tgz 为最终文件

3.2 Hive on Spark 配置

1）解压 spark-2.4.5-bin-without-hive.tgz

```
[atguigu@hadoop102  software]$  tar  -zxf  /opt/software/spark-2.4.5-bin-
without-hive.tgz -C /opt/module
[atguigu@hadoop102 software]$ mv /opt/module/spark-2.4.5-bin-without-hive
/opt/module/spark
```

2）配置 SPARK_HOME 环境变量

```
[atguigu@hadoop102 software]$ sudo vim /etc/profile.d/my_env.sh
```

添加如下内容

```
export SPARK_HOME=/opt/module/spark
export PATH=$PATH:$SPARK_HOME/bin
```

source 使其生效

```
[atguigu@hadoop102 software]$ source /etc/profile.d/my_env.sh
```

3）配置 spark 运行环境

```
[atguigu@hadoop102    software]$    mv    /opt/module/spark/conf/spark-
env.sh.template /opt/module/spark/conf/spark-env.sh
[atguigu@hadoop102 software]$ vim /opt/module/spark/conf/spark-env.sh
```

添加如下内容

```
export SPARK_DIST_CLASSPATH=$(hadoop classpath)
```

4）连接 sparkjar 包到 hive，如何 hive 中已存在则跳过

```
[atguigu@hadoop102 software]$ ln -s /opt/module/spark/jars/scala-library-
2.11.12.jar /opt/module/hive/lib/scala-library-2.11.12.jar
[atguigu@hadoop102   software]$   ln   -s   /opt/module/spark/jars/spark-
core_2.11-2.4.5.jar /opt/module/hive/lib/spark-core_2.11-2.4.5.jar
[atguigu@hadoop102 software]$ ln -s /opt/module/spark/jars/spark-network-
common_2.11-2.4.5.jar     /opt/module/hive/lib/spark-network-common_2.11-
2.4.5.jar
```

5）新建 spark 配置文件

```
[atguigu@hadoop102    software]$    vim    /opt/module/hive/conf/spark-
defaults.conf
```

添加如下内容

```
spark.master                              yarn
spark.master                              yarn
spark.eventLog.enabled                     true
spark.eventLog.dir                          hdfs://hadoop102:8020/spark-
history
spark.driver.memory                        2g
spark.executor.memory                       2g
```

6）在 HDFS 创建如下路径

```
hadoop fs -mkdir /spark-history
```

7）上传 Spark 依赖到 HDFS

```
[atguigu@hadoop102 software]$ hadoop fs -mkdir /spark-jars

[atguigu@hadoop102  software]$  hadoop  fs  -put  /opt/module/spark/jars/*
/spark-jars
```

8）修改 hive-site.xml

```
  <!--Spark 依赖位置-->
  <property>
    <name>spark.yarn.jars</name>
    <value>hdfs://hadoop102:8020/spark-jars/*</value>
  </property>

  <!--Hive 执行引擎-->
  <property>
    <name>hive.execution.engine</name>
    <value>spark</value>
  </property>
```

3.3 Hive on Spark 测试

1）启动 hive 客户端

2）创建一张测试表

```
hive (default)> create external table student(id int, name string) location
'/student';
```

3）通过 insert 测试效果

```
hive (default)> insert into table student values(1,'abc');
```

3.4 Yarn 容量调度器队列配置

1）增加 hive 队列

默认 Yarn 的配置下，容量调度器只有一条 Default 队列。在 capacity-scheduler.xml 中可以配置多条队列，修改以下属性，增加 hive 队列。

```
<property>
    <name>yarn.scheduler.capacity.root.queues</name>
    <value>default,hive</value>
    <description>
      The queues at the this level (root is the root queue).
    </description>
</property>
<property>
    <name>yarn.scheduler.capacity.root.default.capacity</name>
    <value>50</value>
    <description>
      default 队列的容量为 50%
    </description>
</property>
```

同时为新加队列添加必要属性：

```
<property>
    <name>yarn.scheduler.capacity.root.hive.capacity</name>
    <value>50</value>
    <description>
      hive 队列的容量为 50%
    </description>
</property>

<property>
    <name>yarn.scheduler.capacity.root.hive.user-limit-factor</name>
    <value>1</value>
    <description>
      一个用户最多能够获取该队列资源容量的比例
    </description>
</property>

<property>
    <name>yarn.scheduler.capacity.root.hive.maximum-capacity</name>
    <value>80</value>
    <description>
      hive 队列的最大容量
    </description>
</property>

<property>
    <name>yarn.scheduler.capacity.root.hive.state</name>
    <value>RUNNING</value>
</property>

<property>
    <name>yarn.scheduler.capacity.root.hive.acl_submit_applications</name>
    <value>*</value>
    <description>
      访问控制，控制谁可以将任务提交到该队列
    </description>
</property>

<property>
    <name>yarn.scheduler.capacity.root.hive.acl_administer_queue</name>
    <value>*</value>
    <description>
      访问控制，控制谁可以管理(包括提交和取消)该队列的任务
    </description>
</property>

<property>

<name>yarn.scheduler.capacity.root.hive.acl_application_max_priority</nam
e>
    <value>*</value>
<description>
      访问控制，控制用户可以提交到该队列的任务的最大优先级
    </description>
</property>

<property>
    <name>yarn.scheduler.capacity.root.hive.maximum-application-
lifetime</name>
    <value>-1</value>
    <description>
      hive 队列中任务的最大生命时长
    </description>
</property>
<property>
    <name>yarn.scheduler.capacity.root.hive.default-application-
```

```
lifetime</name>
    <value>-1</value>
    <description>
      default 队列中任务的最大生命时长
    </description>
</property>
```

2）配置 hive 客户端任务提交到 hive 队列

为方便后续 hive 客户端的测试和 shell 脚本中的任务能同时执行，我们将 hive 客户端的测试任务提交到 hive 队列，让 shell 脚本中的任务使用默认值，提交到 default 队列。

每次进入 hive 客户端时，执行以下命令

```
hive (default)> set mapreduce.job.queuename=hive;
```

第 4 章 数仓搭建-ODS 层

1）保持数据原貌不做任何修改，起到备份数据的作用。

2）数据采用 LZO 压缩，减少磁盘存储空间。100G 数据可以压缩到 10G 以内。

3）创建分区表，防止后续的全表扫描，在企业开发中大量使用分区表。

4）创建外部表。在企业开发中，除了自己用的临时表，创建内部表外，绝大多数场景都是创建外部表。

4.1 创建数据库

1）启动 hive

```
[atguigu@hadoop102 hive]$ nohup bin/hive --service metastore &
[atguigu@hadoop102 hive]$ nohup bin/hive --service hiveserver2 &
[atguigu@hadoop102 hive]$ bin/hive
```

2）显示数据库

```
hive (default)> show databases;
```

3）创建数据库

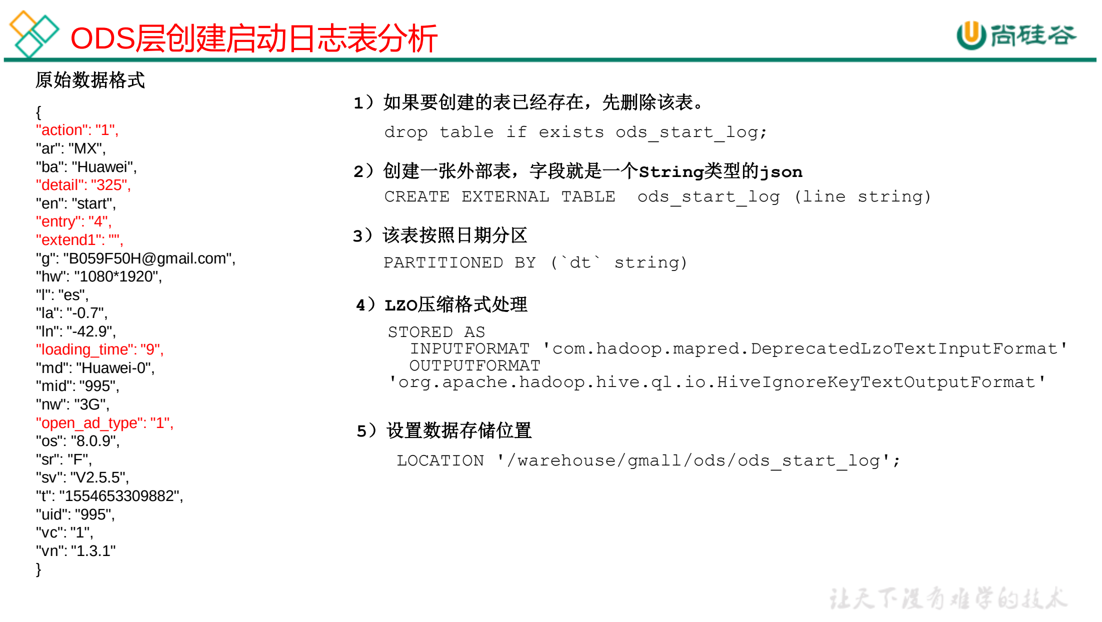
```
hive (default)> create database gmall;
```

4）使用数据库

```
hive (default)> use gmall;
```

4.2 ODS 层（用户行为数据）

4.2.1 创建启动日志表 ods_start_log



ODS层创建启动日志表分析

原始数据格式

```
{
"action": "1",
"ar": "MX",
"ba": "Huawei",
"detail": "325",
"en": "start",
"entry": "4",
"extend1": "",
"g": "B059F50H@gmail.com",
"hw": "1080*1920",
"l": "es",
"la": "-0.7",
"ln": "-42.9",
"loading_time": "9",
"md": "Huawei-0",
"mid": "995",
"nw": "3G",
"open_ad_type": "1",
"os": "8.0.9",
"sr": "F",
"sv": "V2.5.5",
"t": "1554653309882",
"uid": "995",
"vc": "1",
"vn": "1.3.1"
}
```

1）如果要创建的表已经存在，先删除该表。

```
drop table if exists ods_start_log;
```

2）创建一张外部表，字段就是一个String类型的json

```
CREATE EXTERNAL TABLE  ods_start_log (line string)
```

3）该表按照日期分区

```
PARTITIONED BY (`dt` string)
```

4）LZO压缩格式处理

```
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT
'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
```

5）设置数据存储位置

```
LOCATION '/warehouse/gmall/ods/ods_start_log';
```

让天下没有难学的技术

1）创建输入数据是 lzo 输出是 text，支持 json 解析的分区表

```
hive (gmall)>
drop table if exists ods_start_log;
CREATE EXTERNAL TABLE ods_start_log (`line` string)
PARTITIONED BY (`dt` string)
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT
'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
LOCATION '/warehouse/gmall/ods/ods_start_log';
```

说明 Hive 的 LZO 压缩：https://cwiki.apache.org/confluence/display/Hive/LanguageManual+LZO

2）加载数据

```
hive (gmall)>
load  data  inpath  '/origin_data/gmall/log/topic_start/2020-03-10' into table gmall.ods_start_log partition(dt='2020-03-10');
```

注意：时间格式都配置成 YYYY-MM-DD 格式，这是 Hive 默认支持的时间格式

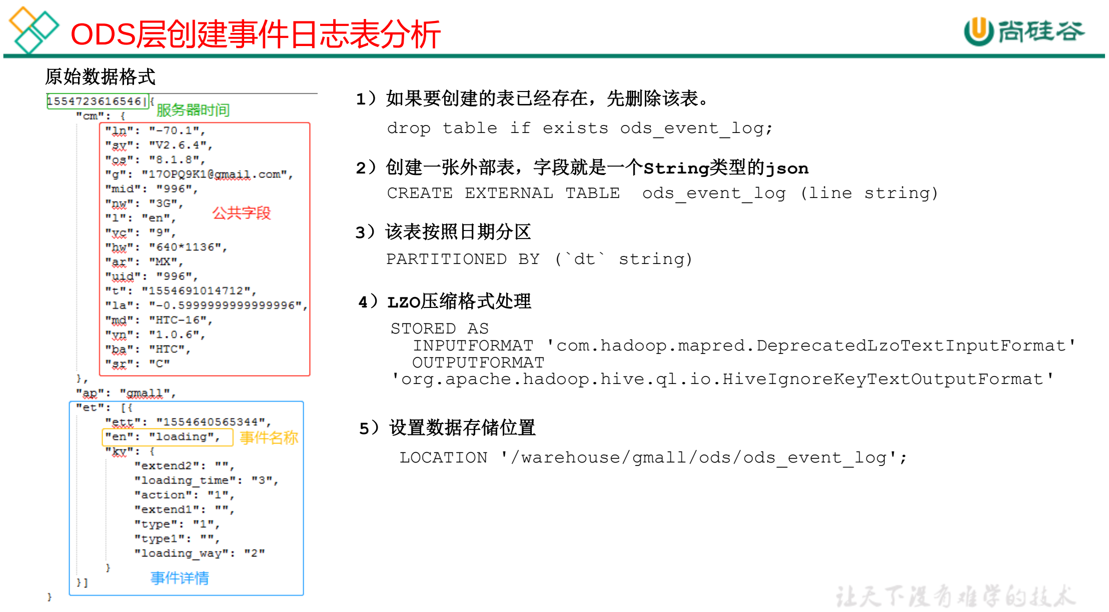
3）查看是否加载成功

```
hive (gmall)> select * from ods_start_log limit 2;
```

4）为 lzo 压缩文件创建索引

```
hadoop jar /opt/module/hadoop-2.7.2/share/hadoop/common/hadoop-lzo-0.4.20.jar
com.hadoop.compression.lzo.DistributedLzoIndexer
/warehouse/gmall/ods/ods_start_log/dt=2020-03-10
```

4.2.2 创建事件日志表 ods_event_log



ODS层创建事件日志表分析

原始数据格式

```
1554723616546|{
    "cm": {
        "ln": "-70.1",
        "sv": "V2.6.4",
        "os": "8.1.8",
        "g": "17OPQ9K1@gmail.com",
        "mid": "996",
        "nw": "3G",
        "l": "en",
        "vc": "9",
        "hw": "640*1136",
        "ar": "MX",
        "uid": "996",
        "t": "1554691014712",
        "la": "-0.5999999999999996",
        "md": "HTC-16",
        "vn": "1.0.6",
        "ba": "HTC",
        "sr": "C"
    },
    "ap": "gmall",
    "et": [{
        "ett": "1554640565344",
        "en": "loading",
        "kv": {
            "extend2": "",
            "loading_time": "3",
            "action": "1",
            "extend1": "",
            "type": "1",
            "type1": "",
            "loading_way": "2"
        }
    }]
}
```

1）如果要创建的表已经存在，先删除该表。

```
drop table if exists ods_event_log;
```

2）创建一张外部表，字段就是一个String类型的json

```
CREATE EXTERNAL TABLE  ods_event_log (line string)
```

3）该表按照日期分区

```
PARTITIONED BY (`dt` string)
```

4）LZO压缩格式处理

```
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT
'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
```

5）设置数据存储位置

```
LOCATION '/warehouse/gmall/ods/ods_event_log';
```

1）创建输入数据是 lzo 输出是 text，支持 json 解析的分区表

```
hive (gmall)>
drop table if exists ods_event_log;
CREATE EXTERNAL TABLE ods_event_log(`line` string)
PARTITIONED BY (`dt` string)
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT
'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
LOCATION '/warehouse/gmall/ods/ods_event_log';
```

2）加载数据

```
hive (gmall)>
load  data  inpath  '/origin_data/gmall/log/topic_event/2020-03-10' into table gmall.ods_event_log partition(dt='2020-03-10');
```

注意：时间格式都配置成 YYYY-MM-DD 格式，这是 Hive 默认支持的时间格式

3）查看是否加载成功

```
hive (gmall)> select * from ods_event_log limit 2;
```

4）为 lzo 压缩文件创建索引

```
hadoop jar /opt/module/hadoop-2.7.2/share/hadoop/common/hadoop-lzo-0.4.20.jar
com.hadoop.compression.lzo.DistributedLzoIndexer
/warehouse/gmall/ods/ods_event_log/dt=2020-03-10
```

4.2.3 Shell 中单引号和双引号区别

1）在/home/atguigu/bin 创建一个 test.sh 文件

```
[atguigu@hadoop102 bin]$ vim test.sh
```

在文件中添加如下内容

```
#!/bin/bash
do_date=$1
```

```
echo '$do_date'
echo "$do_date"
echo "'$do_date'"
echo '"$do_date"'
echo `date`
```

2）查看执行结果

```
[atguigu@hadoop102 bin]$ test.sh 2020-03-10
$do_date
2020-03-10
'2020-03-10'
"$do_date"
2020 年 05 月 02 日 星期四 21:02:08 CST
```

3）总结：

（1）单引号不取变量值
（2）双引号取变量值
（3）反引号`，执行引号中命令
（4）双引号内部嵌套单引号，取出变量值
（5）单引号内部嵌套双引号，不取出变量值

4.2.4 ODS 层加载数据脚本

1）在 hadoop102 的/home/atguigu/bin 目录下创建脚本

```
[atguigu@hadoop102 bin]$ vim hdfs_to_ods_log.sh
```

在脚本中编写如下内容

```
#!/bin/bash

db=gmall
hive=/opt/module/hive/bin/hive
do_date=`date -d '-1 day' +%F`

if [[ -n "$1" ]]; then
   do_date=$1
fi

sql="
load data inpath '/origin_data/gmall/log/topic_start/$do_date'
into table ${db}.ods_start_log partition(dt='$do_date');
load data inpath '/origin_data/gmall/log/topic_event/$do_date'
into table ${db}.ods_event_log partition(dt='$do_date');
"

$hive -e "$sql"
hadoop jar /opt/module/hadoop-2.7.2/share/hadoop/common/hadoop-
lzo-0.4.20.jar
com.hadoop.compression.lzo.DistributedLzoIndexer
/warehouse/gmall/ods/ods_start_log/dt=$do_date
hadoop jar /opt/module/hadoop-2.7.2/share/hadoop/common/hadoop-
lzo-0.4.20.jar
com.hadoop.compression.lzo.DistributedLzoIndexer
/warehouse/gmall/ods/ods_event_log/dt=$do_date
```

说明 1：

[-n 变量值] 判断变量的值，是否为空

-- 变量的值，非空，返回 true

-- 变量的值，为空，返回 false

说明 2：

查看 date 命令的使用，[atguigu@hadoop102 ~]$ date --help

2）增加脚本执行权限

```
[atguigu@hadoop102 bin]$ chmod 777 gmall_hdfs_to_ods_log.sh
```

3）脚本使用

```
[atguigu@hadoop102 module]$ gmall_hdfs_to_ods_log.sh 2020-03-11
```

4）查看导入数据

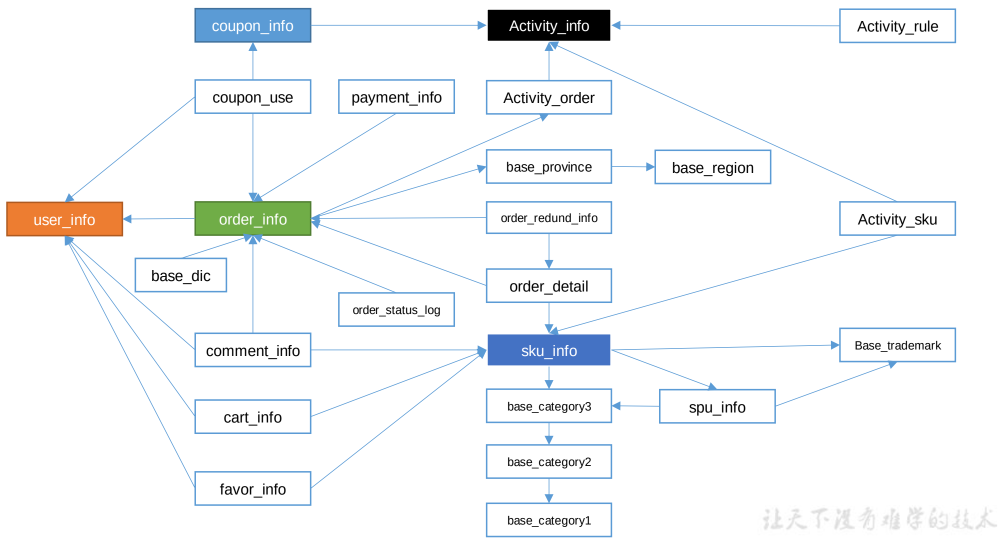
```
hive (gmall)>
select * from ods_start_log where dt='2020-03-11' limit 2;
select * from ods_event_log where dt='2020-03-11' limit 2;
```

5）脚本执行时间

企业开发中一般在每日凌晨 30 分~1 点

4.3 ODS 层（业务数据）

电商表结构



4.3.1 订单表（增量及更新）

```
hive (gmall)>
drop table if exists ods_order_info;
create external table ods_order_info (
    `id` string COMMENT '订单号',
    `final_total_amount` decimal(10,2) COMMENT '订单金额',
    `order_status` string COMMENT '订单状态',
    `user_id` string COMMENT '用户 id',
    `out_trade_no` string COMMENT '支付流水号',
    `create_time` string COMMENT '创建时间',
    `operate_time` string COMMENT '操作时间',
    `province_id` string COMMENT '省份 ID',
    `benefit_reduce_amount` decimal(10,2) COMMENT '优惠金额',
    `original_total_amount` decimal(10,2)  COMMENT '原价金额',
    `feight_fee` decimal(10,2)  COMMENT '运费'
) COMMENT '订单表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_order_info/';
```

4.3.2 订单详情表（增量）

```
hive (gmall)>
drop table if exists ods_order_detail;
create external table ods_order_detail(
    `id` string COMMENT '订单编号',
    `order_id` string  COMMENT '订单号',
    `user_id` string COMMENT '用户 id',
    `sku_id` string COMMENT '商品 id',
    `sku_name` string COMMENT '商品名称',
    `order_price` decimal(10,2) COMMENT '商品价格',
    `sku_num` bigint COMMENT '商品数量',
    `create_time` string COMMENT '创建时间'
) COMMENT '订单详情表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_order_detail/';
```

4.3.3 SKU 商品表（全量）

```
hive (gmall)>
drop table if exists ods_sku_info;
create external table ods_sku_info(
    `id` string COMMENT 'skuId',
    `spu_id` string   COMMENT 'spuid',
    `price` decimal(10,2) COMMENT '价格',
    `sku_name` string COMMENT '商品名称',
    `sku_desc` string COMMENT '商品描述',
    `weight` string COMMENT '重量',
    `tm_id` string COMMENT '品牌 id',
    `category3_id` string COMMENT '品类 id',
    `create_time` string COMMENT '创建时间'
) COMMENT 'SKU 商品表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_sku_info/';
```

4.3.4 用户表（增量及更新）

```
hive (gmall)>
drop table if exists ods_user_info;
create external table ods_user_info(
    `id` string COMMENT '用户 id',
    `name`  string COMMENT '姓名',
    `birthday` string COMMENT '生日',
    `gender` string COMMENT '性别',
    `email` string COMMENT '邮箱',
    `user_level` string COMMENT '用户等级',
    `create_time` string COMMENT '创建时间',
    `operate_time` string COMMENT '操作时间'
) COMMENT '用户表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_user_info/';
```

4.3.5 商品一级分类表（全量）

```
hive (gmall)>
drop table if exists ods_base_category1;
create external table ods_base_category1(
    `id` string COMMENT 'id',
    `name`  string COMMENT '名称'
) COMMENT '商品一级分类表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_base_category1/';
```

4.3.6 商品二级分类表（全量）

```
hive (gmall)>
drop table if exists ods_base_category2;
create external table ods_base_category2(
    `id` string COMMENT ' id',
    `name` string COMMENT '名称',
    category1_id string COMMENT '一级品类 id'
) COMMENT '商品二级分类表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_base_category2/';
```

4.3.7 商品三级分类表（全量）

```
hive (gmall)>
drop table if exists ods_base_category3;
create external table ods_base_category3(
    `id` string COMMENT ' id',
    `name`  string COMMENT '名称',
    category2_id string COMMENT '二级品类 id'
) COMMENT '商品三级分类表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_base_category3/';
```

4.3.8 支付流水表（增量）

```
hive (gmall)>
drop table if exists ods_payment_info;
create external table ods_payment_info(
    `id`   bigint COMMENT '编号',
    `out_trade_no`    string COMMENT '对外业务编号',
    `order_id`       string COMMENT '订单编号',
    `user_id`        string COMMENT '用户编号',
    `alipay_trade_no` string COMMENT '支付宝交易流水编号',
    `total_amount`    decimal(16,2) COMMENT '支付金额',
    `subject`        string COMMENT '交易内容',
    `payment_type`    string COMMENT '支付类型',
    `payment_time`    string COMMENT '支付时间'
)  COMMENT '支付流水表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_payment_info/';
```

4.3.9 省份表（特殊）

```
hive (gmall)>
drop table if exists ods_base_province;
create external table ods_base_province (
    `id`   bigint COMMENT '编号',
    `name`        string COMMENT '省份名称',
    `region_id`    string COMMENT '地区 ID',
    `area_code`    string COMMENT '地区编码',
    `iso_code` string COMMENT 'iso 编码'
   )  COMMENT '省份表'
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_base_province/';
```

4.3.10 地区表（特殊）

```
hive (gmall)>
drop table if exists ods_base_region;
create external table ods_base_region (
    `id`   bigint COMMENT '编号',
    `region_name`       string COMMENT '地区名称'
   )  COMMENT '地区表'
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_base_region/';
```

4.3.11 品牌表（全量）

```
hive (gmall)>
drop table if exists ods_base_trademark;
create external table ods_base_trademark (
    `tm_id`   bigint COMMENT '编号',
    `tm_name` string COMMENT '品牌名称'
)  COMMENT '品牌表'
```

```
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_base_trademark/';
```

4.3.12 订单状态表（增量）

```
hive (gmall)>
drop table if exists ods_order_status_log;
create external table ods_order_status_log (
    `id`  bigint COMMENT '编号',
    `order_id` string COMMENT '订单 ID',
    `order_status` string COMMENT '订单状态',
    `operate_time` string COMMENT '修改时间'
)  COMMENT '订单状态表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_order_status_log/';
```

4.3.13 SPU 商品表（全量）

```
hive (gmall)>
drop table if exists ods_spu_info;
create external table ods_spu_info(
    `id` string COMMENT 'spuid',
    `spu_name` string COMMENT 'spu 名称',
    `category3_id` string COMMENT '品类 id',
    `tm_id` string COMMENT '品牌 id'
) COMMENT 'SPU 商品表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_spu_info/';
```

4.3.14 商品评论表（增量）

```
hive (gmall)>
drop table if exists ods_comment_info;
create external table ods_comment_info(
    `id` string COMMENT '编号',
    `user_id` string COMMENT '用户 ID',
    `sku_id` string COMMENT '商品 sku',
    `spu_id` string COMMENT '商品 spu',
    `order_id` string COMMENT '订单 ID',
    `appraise` string COMMENT '评价',
    `create_time` string COMMENT '评价时间'
) COMMENT '商品评论表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_comment_info/';
```

4.3.15 退单表（增量）

```
hive (gmall)>
drop table if exists ods_order_refund_info;
create external table ods_order_refund_info(
    `id` string COMMENT '编号',
    `user_id` string COMMENT '用户 ID',
    `order_id` string COMMENT '订单 ID',
    `sku_id` string COMMENT '商品 ID',
    `refund_type` string COMMENT '退款类型',
    `refund_num` bigint COMMENT '退款件数',
    `refund_amount` decimal(16,2) COMMENT '退款金额',
    `refund_reason_type` string COMMENT '退款原因类型',
    `create_time` string COMMENT '退款时间'
) COMMENT '退单表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_order_refund_info/';
```

4.3.16 加购表（全量）

```
hive (gmall)>
drop table if exists ods_cart_info;
create external table ods_cart_info(
    `id` string COMMENT '编号',
    `user_id` string  COMMENT '用户 id',
    `sku_id` string  COMMENT 'skuid',
    `cart_price` string  COMMENT '放入购物车时价格',
    `sku_num` string  COMMENT '数量',
    `sku_name` string  COMMENT 'sku 名称 (冗余)',
    `create_time` string  COMMENT '创建时间',
    `operate_time` string COMMENT '修改时间',
    `is_ordered` string COMMENT '是否已经下单',
    `order_time` string  COMMENT '下单时间'
) COMMENT '加购表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_cart_info/';
```

4.3.17 商品收藏表（全量）

```
hive (gmall)>
drop table if exists ods_favor_info;
create external table ods_favor_info(
    `id` string COMMENT '编号',
    `user_id` string  COMMENT '用户 id',
    `sku_id` string  COMMENT 'skuid',
    `spu_id` string  COMMENT 'spuid',
    `is_cancel` string  COMMENT '是否取消',
    `create_time` string  COMMENT '收藏时间',
    `cancel_time` string  COMMENT '取消时间'
) COMMENT '商品收藏表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
```

```
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_favor_info/';
```

4.3.18 优惠券领用表（新增及变化）

```
hive (gmall)>
drop table if exists ods_coupon_use;
create external table ods_coupon_use(
    `id` string COMMENT '编号',
    `coupon_id` string  COMMENT '优惠券 ID',
    `user_id` string  COMMENT 'skuid',
    `order_id` string  COMMENT 'spuid',
    `coupon_status` string  COMMENT '优惠券状态',
    `get_time` string  COMMENT '领取时间',
    `using_time` string  COMMENT '使用时间(下单)',
    `used_time` string  COMMENT '使用时间(支付)'
) COMMENT '优惠券领用表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_coupon_use/';
```

4.3.19 优惠券表（全量）

```
hive (gmall)>
drop table if exists ods_coupon_info;
create external table ods_coupon_info(
  `id` string COMMENT '购物券编号',
  `coupon_name` string COMMENT '购物券名称',
  `coupon_type` string COMMENT '购物券类型 1 现金券 2 折扣券 3 满减券 4 满件打折券',
  `condition_amount` string COMMENT '满额数',
  `condition_num` string COMMENT '满件数',
  `activity_id` string COMMENT '活动编号',
  `benefit_amount` string COMMENT '减金额',
  `benefit_discount` string COMMENT '折扣',
  `create_time` string COMMENT '创建时间',
  `range_type` string COMMENT '范围类型 1、商品 2、品类 3、品牌',
  `spu_id` string COMMENT '商品 id',
  `tm_id` string COMMENT '品牌 id',
  `category3_id` string COMMENT '品类 id',
  `limit_num` string COMMENT '最多领用次数',
  `operate_time`  string COMMENT '修改时间',
  `expire_time`  string COMMENT '过期时间'
) COMMENT '优惠券表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_coupon_info/';
```

4.3.20 活动表（全量）

```
hive (gmall)>
drop table if exists ods_activity_info;
create external table ods_activity_info(
    `id` string COMMENT '编号',
    `activity_name` string  COMMENT '活动名称',
    `activity_type` string  COMMENT '活动类型',
    `start_time` string  COMMENT '开始时间',
    `end_time` string  COMMENT '结束时间',
    `create_time` string  COMMENT '创建时间'
) COMMENT '活动表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_activity_info/';
```

4.3.21 活动订单关联表（增量）

```
hive (gmall)>
drop table if exists ods_activity_order;
create external table ods_activity_order(
    `id` string COMMENT '编号',
    `activity_id` string  COMMENT '优惠券 ID',
    `order_id` string  COMMENT 'skuid',
    `create_time` string  COMMENT '领取时间'
) COMMENT '活动订单关联表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_activity_order/';
```

4.3.22 活动规则表（全量）

```
hive (gmall)>
drop table if exists ods_activity_rule;
create external table ods_activity_rule(
    `id` string COMMENT '编号',
    `activity_id` string  COMMENT '活动 ID',
    `condition_amount` string  COMMENT '满减金额',
    `condition_num` string  COMMENT '满减件数',
    `benefit_amount` string  COMMENT '优惠金额',
    `benefit_discount` string  COMMENT '优惠折扣',
    `benefit_level` string  COMMENT '优惠级别'
) COMMENT '优惠规则表'
PARTITIONED BY (`dt` string)
row format fields terminated by '\t'
STORED AS
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_activity_rule/';
```

4.3.23 编码字典表（全量）

```
hive (gmall)>
drop table if exists ods_base_dic;
create external table ods_base_dic(
    `dic_code` string COMMENT '编号',
    `dic_name` string  COMMENT '编码名称',
    `parent_code` string  COMMENT '父编码',
    `create_time` string  COMMENT '创建日期',
    `operate_time` string  COMMENT '操作日期'
) COMMENT '编码字典表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
STORED AS
```

```
  INPUTFORMAT 'com.hadoop.mapred.DeprecatedLzoTextInputFormat'
  OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
location '/warehouse/gmall/ods/ods_base_dic/';
```

4.3.24 ODS 层加载数据脚本

1）在/home/atguigu/bin 目录下创建脚本 hdfs_to_ods_db.sh

```
[atguigu@hadoop102 bin]$ vim hdfs_to_ods_db.sh
```

在脚本中填写如下内容

```
#!/bin/bash

APP=gmall
hive=/opt/module/hive/bin/hive

# 如果是输入的日期按照取输入日期；如果没输入日期取当前时间的前一天
if [ -n "$2" ] ;then
   do_date=$2
else
   do_date=`date -d "-1 day" +%F`
fi

sql1="
load data inpath '/origin_data/$APP/db/order_info/$do_date' OVERWRITE into table ${APP}.ods_order_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/order_detail/$do_date' OVERWRITE into table ${APP}.ods_order_detail partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/sku_info/$do_date' OVERWRITE into table ${APP}.ods_sku_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/user_info/$do_date' OVERWRITE into table ${APP}.ods_user_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/payment_info/$do_date' OVERWRITE into table ${APP}.ods_payment_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/base_category1/$do_date' OVERWRITE into table ${APP}.ods_base_category1 partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/base_category2/$do_date' OVERWRITE into table ${APP}.ods_base_category2 partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/base_category3/$do_date' OVERWRITE into table ${APP}.ods_base_category3 partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/base_trademark/$do_date' OVERWRITE into table ${APP}.ods_base_trademark partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/activity_info/$do_date' OVERWRITE into table ${APP}.ods_activity_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/activity_order/$do_date' OVERWRITE into table ${APP}.ods_activity_order partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/cart_info/$do_date' OVERWRITE into table ${APP}.ods_cart_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/comment_info/$do_date' OVERWRITE into table ${APP}.ods_comment_info partition(dt='$do_date');
load data inpath '/origin_data/$APP/db/coupon_info/$do_date' OVERWRITE into table ${APP}.ods_coupon_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/coupon_use/$do_date' OVERWRITE into table ${APP}.ods_coupon_use partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/favor_info/$do_date' OVERWRITE into table ${APP}.ods_favor_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/order_refund_info/$do_date' OVERWRITE into table ${APP}.ods_order_refund_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/order_status_log/$do_date' OVERWRITE into table ${APP}.ods_order_status_log partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/spu_info/$do_date' OVERWRITE into table ${APP}.ods_spu_info partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/activity_rule/$do_date' OVERWRITE into table ${APP}.ods_activity_rule partition(dt='$do_date');

load data inpath '/origin_data/$APP/db/base_dic/$do_date' OVERWRITE into table ${APP}.ods_base_dic partition(dt='$do_date');
"

sql2="
load data inpath '/origin_data/$APP/db/base_province/$do_date' OVERWRITE into table ${APP}.ods_base_province;

load data inpath '/origin_data/$APP/db/base_region/$do_date' OVERWRITE into table ${APP}.ods_base_region;
"
case $1 in
"first"){
   $hive -e "$sql1$sql2"
};;
"all"){
   $hive -e "$sql1"
};;
esac
```

2）修改权限

```
[atguigu@hadoop102 bin]$ chmod 777 hdfs_to_ods_db.sh
```

3）初次导入

```
[atguigu@hadoop102 bin]$ hdfs_to_ods_db.sh first 2020-03-10
```

4）每日导入

```
[atguigu@hadoop102 bin]$ hdfs_to_ods_db.sh all 2020-03-11
```

5）测试数据是否导入成功

```
hive (gmall)> select * from ods_order_detail where dt='2020-03-11';
```

第 5 章 数仓搭建-DWD 层

1）对用户行为数据解析

2）对核心数据进行判空过滤。

3）对业务数据采用**维度模型**重新建模，即**维度退化**。

5.1 DWD 层（启动日志解析）

5.1.1 get_json_object 函数使用

1）数据 xjson

```
[{"name":" 大 郎 ","sex":" 男 ","age":"25"},{"name":" 西 门 庆 ","sex":" 男
","age":"47"}]
```

2）取出第一个 json 对象

```
select get_json_object('[{"name":"大郎","sex":"男","age":"25"},{"name":"西
门庆","sex":"男","age":"47"}]','$[0]');
```

结果是：{"name":"大郎","sex":"男","age":"25"}

3）取出第一个 json 的 age 字段的值

```
SELECT     get_json_object('[{"name":"    大    郎    ","sex":"    男
","age":"25"},{"name":"西门庆","sex":"男","age":"47"}]',"$[0].age");
```

结果是：25

5.1.2 创建启动表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_start_log;
CREATE EXTERNAL TABLE dwd_start_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `entry` string,
    `open_ad_type` string,
    `action` string,
    `loading_time` string,
    `detail` string,
    `extend1` string
)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_start_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

5.1.3 向启动表导入数据

```
hive (gmall)>
insert overwrite table dwd_start_log
PARTITION (dt='2020-03-10')
select
    get_json_object(line,'$.mid') mid_id,
    get_json_object(line,'$.uid') user_id,
    get_json_object(line,'$.vc') version_code,
    get_json_object(line,'$.vn') version_name,
    get_json_object(line,'$.l') lang,
    get_json_object(line,'$.sr') source,
    get_json_object(line,'$.os') os,
    get_json_object(line,'$.ar') area,
    get_json_object(line,'$.md') model,
    get_json_object(line,'$.ba') brand,
    get_json_object(line,'$.sv') sdk_version,
    get_json_object(line,'$.g') gmail,
    get_json_object(line,'$.hw') height_width,
    get_json_object(line,'$.t') app_time,
    get_json_object(line,'$.nw') network,
    get_json_object(line,'$.ln') lng,
    get_json_object(line,'$.la') lat,
    get_json_object(line,'$.entry') entry,
    get_json_object(line,'$.open_ad_type') open_ad_type,
    get_json_object(line,'$.action') action,
    get_json_object(line,'$.loading_time') loading_time,
    get_json_object(line,'$.detail') detail,
    get_json_object(line,'$.extend1') extend1
from ods_start_log
where dt='2020-03-10';
```

3）测试

```
hive (gmall)> select * from dwd_start_log limit 2;
```

5.1.4 DWD 层启动表加载数据脚本

1）在 hadoop102 的/home/atguigu/bin 目录下创建脚本

```
[atguigu@hadoop102 bin]$ vim ods_to_dwd_start_log.sh
```

在脚本中编写如下内容

```
#!/bin/bash

# 定义变量方便修改
APP=gmall
hive=/opt/module/hive/bin/hive

# 如果是输入的日期按照取输入日期；如果没输入日期取当前时间的前一天
if [ -n "$1" ] ;then
    do_date=$1
else
    do_date=`date -d "-1 day" +%F`
fi

sql="
insert overwrite table "$APP".dwd_start_log
PARTITION (dt='$do_date')
```

```
select
   get_json_object(line,'$.mid') mid_id,
   get_json_object(line,'$.uid') user_id,
   get_json_object(line,'$.vc') version_code,
   get_json_object(line,'$.vn') version_name,
   get_json_object(line,'$.l') lang,
   get_json_object(line,'$.sr') source,
   get_json_object(line,'$.os') os,
   get_json_object(line,'$.ar') area,
   get_json_object(line,'$.md') model,
   get_json_object(line,'$.ba') brand,
   get_json_object(line,'$.sv') sdk_version,
   get_json_object(line,'$.g') gmail,
   get_json_object(line,'$.hw') height_width,
   get_json_object(line,'$.t') app_time,
   get_json_object(line,'$.nw') network,
   get_json_object(line,'$.ln') lng,
   get_json_object(line,'$.la') lat,
   get_json_object(line,'$.entry') entry,
   get_json_object(line,'$.open_ad_type') open_ad_type,
   get_json_object(line,'$.action') action,
   get_json_object(line,'$.loading_time') loading_time,
   get_json_object(line,'$.detail') detail,
   get_json_object(line,'$.extend1') extend1
from "$APP".ods_start_log
where dt='$do_date';
"

$hive -e "$sql"
```

2）增加脚本执行权限

```
[atguigu@hadoop102 bin]$ chmod 777 ods_to_dwd_start_log.sh
```

3）脚本使用

```
[atguigu@hadoop102 module]$ ods_to_dwd_start_log.sh 2020-03-11
```

4）查询导入结果

```
hive (gmall)>
select * from dwd_start_log where dt='2020-03-11' limit 2;
```

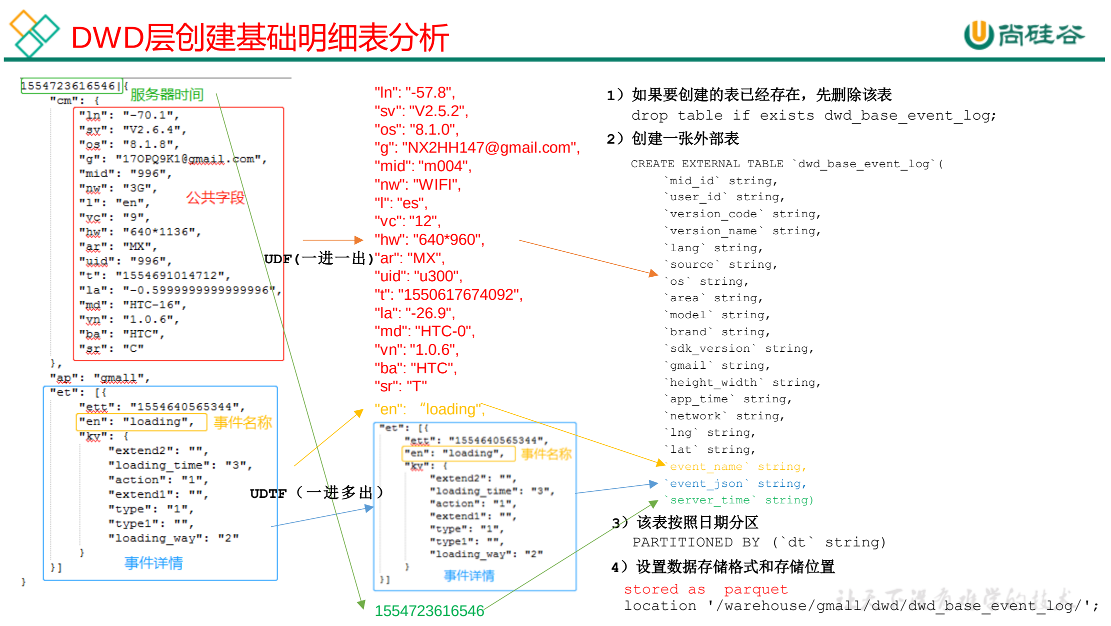
5）脚本执行时间

企业开发中一般在每日凌晨 30 分~1 点

5.2 DWD 层（事件日志解析之基础表）

5.2.1 创建基础明细表

明细表用于存储 ODS 层原始表转换过来的明细数据。



DWD层创建基础明细表分析

```
1554723616546|{
    "cm": {
        "ln": "-70.1",
        "sv": "V2.6.4",
        "os": "8.1.8",
        "g": "17OPQ9K1@gmail.com",
        "mid": "996",
        "nw": "3G",
        "l": "en",
        "vc": "9",
        "hw": "640*1136",
        "ar": "MX",
        "uid": "996",
        "t": "1554691014712",
        "la": "-0.5999999999999996",
        "md": "HTC-16",
        "vn": "1.0.6",
        "ba": "HTC",
        "sr": "C"
    },
    "ap": "gmall",
    "et": [{
        "ett": "1554640565344",
        "en": "loading",
        "kv": {
            "extend2": "",
            "loading_time": "3",
            "action": "1",
            "extend1": "",
            "type": "1",
            "type1": "",
            "loading_way": "2"
        }
    }]
}
```

```
"ln": "-57.8",
"sv": "V2.5.2",
"os": "8.1.0",
"g": "NX2HH147@gmail.com",
"mid": "m004",
"nw": "WIFI",
"l": "es",
"vc": "12",
"hw": "640*960",
"ar": "MX",
"uid": "u300",
"t": "1550617674092",
"la": "-26.9",
"md": "HTC-0",
"vn": "1.0.6",
"ba": "HTC",
"sr": "T"
"en":  "loading",
"et": [{
    "ett": "1554640565344",
    "en": "loading",
    "kv": {
        "extend2": "",
        "loading_time": "3",
        "action": "1",
        "extend1": "",
        "type": "1",
        "type1": "",
        "loading_way": "2"
    }
}]
1554723616546
```

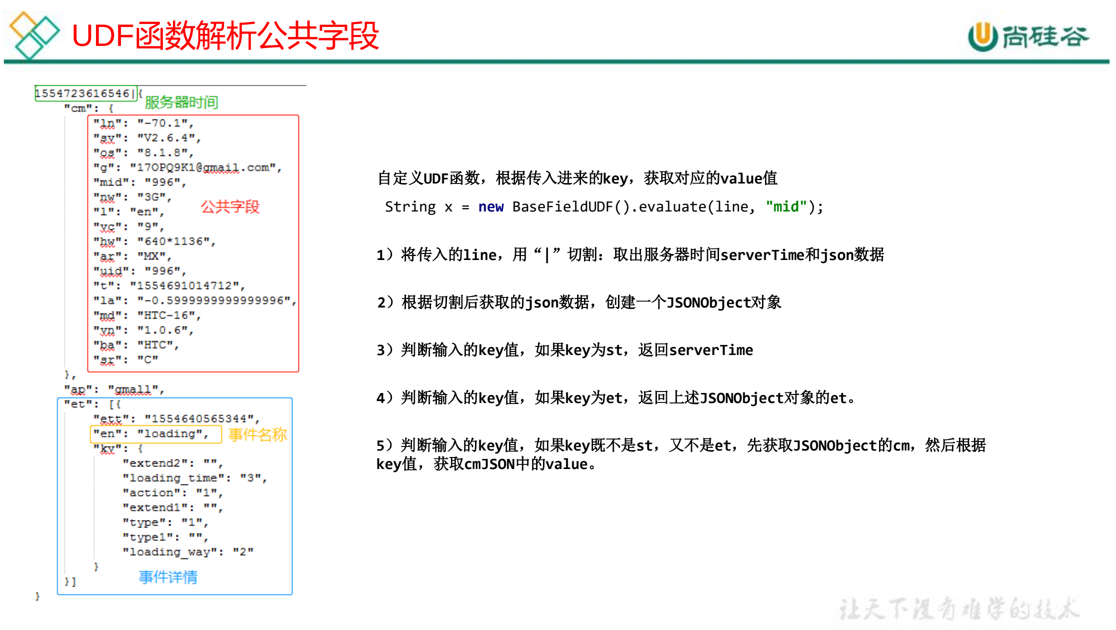
1）如果要创建的表已经存在，先删除该表
```
drop table if exists dwd_base_event_log;
```
2）创建一张外部表
```
CREATE EXTERNAL TABLE `dwd_base_event_log`(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `event_name` string,
    `event_json` string,
    `server_time` string)
```
3）该表按照日期分区
```
PARTITIONED BY (`dt` string)
```
4）设置数据存储格式和存储位置
```
stored as  parquet
location '/warehouse/gmall/dwd/dwd_base_event_log/';
```

1）创建事件日志基础明细表

```
hive (gmall)>
drop table if exists dwd_base_event_log;
CREATE EXTERNAL TABLE dwd_base_event_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `event_name` string,
    `event_json` string,
    `server_time` string)
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_base_event_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）说明：其中 event_name 和 event_json 用来对应事件名和整个事件。这个地方将原始日志1 对多的形式拆分出来了。操作的时候我们需要将原始日志展平，需要用到 UDF 和 UDTF。

5.2.2 自定义 UDF 函数（解析公共字段）



UDF函数解析公共字段

```
1554723616546|{
    "cm": {
        "ln": "-70.1",
        "sv": "V2.6.4",
        "os": "8.1.8",
        "g": "17OPQ9K1@gmail.com",
        "mid": "996",
        "nw": "3G",
        "l": "en",
        "vc": "9",
        "hw": "640*1136",
        "ar": "MX",
        "uid": "996",
        "t": "1554691014712",
        "la": "-0.5999999999999996",
        "md": "HTC-16",
        "vn": "1.0.6",
        "ba": "HTC",
        "sr": "C"
    },
    "ap": "gmall",
    "et": [{
        "ett": "1554640565344",
        "en": "loading",
        "kv": {
            "extend2": "",
            "loading_time": "3",
            "action": "1",
            "extend1": "",
            "type": "1",
            "type1": "",
            "loading_way": "2"
        }
    }]
}
```

自定义UDF函数，根据传入进来的key，获取对应的value值

```
String x = new BaseFieldUDF().evaluate(line, "mid");
```

1）将传入的line，用“|”切割：取出服务器时间serverTime和json数据

2）根据切割后获取的json数据，创建一个JSONObject对象

3）判断输入的key值，如果key为st，返回serverTime

4）判断输入的key值，如果key为et，返回上述JSONObject对象的et。

5）判断输入的key值，如果key既不是st，又不是et，先获取JSONObject的cm，然后根据key值，获取cmJSON中的value。

1）创建一个 maven 工程：hivefunction

2）创建包名：com.atguigu.udf

3）在 pom.xml 文件中添加如下内容

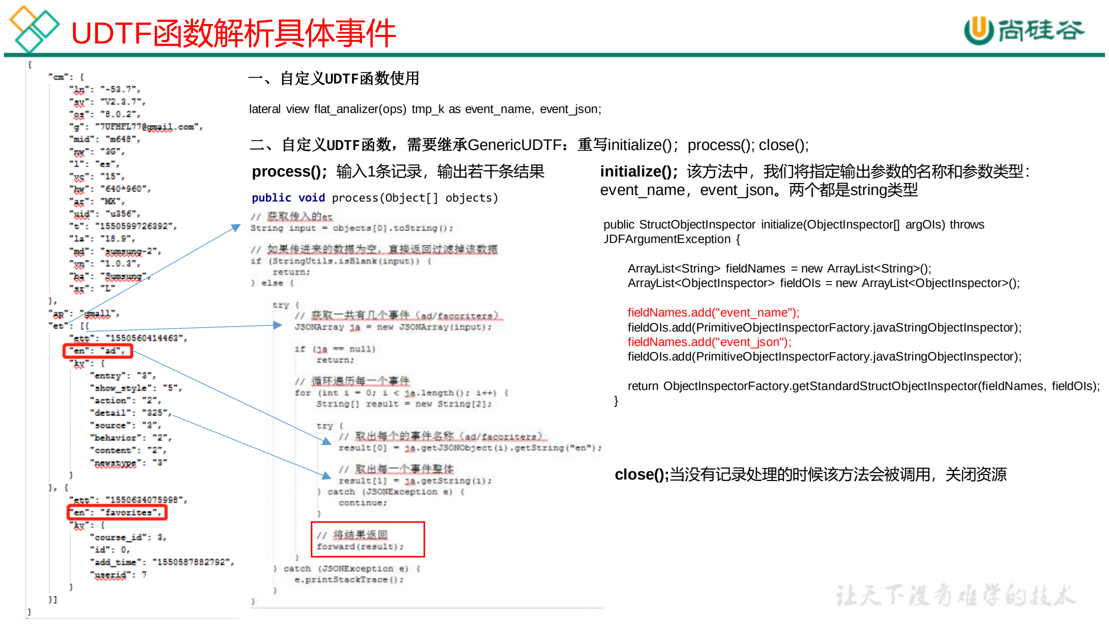
```xml
<properties>
    <project.build.sourceEncoding>UTF8</project.build.sourceEncoding>
    <hive.version>1.2.1</hive.version>
</properties>

<dependencies>
    <!--添加hive 依赖-->
    <dependency>
        <groupId>org.apache.hive</groupId>
        <artifactId>hive-exec</artifactId>
        <version>${hive.version}</version>
    </dependency>
</dependencies>

<build>
    <plugins>
        <plugin>
            <artifactId>maven-compiler-plugin</artifactId>
            <version>2.3.2</version>
            <configuration>
                <source>1.8</source>
                <target>1.8</target>
            </configuration>
        </plugin>
        <plugin>
            <artifactId>maven-assembly-plugin</artifactId>
            <configuration>
                <descriptorRefs>
                    <descriptorRef>jar-with-dependencies</descriptorRef>
                </descriptorRefs>
            </configuration>
            <executions>
                <execution>
                    <id>make-assembly</id>
                    <phase>package</phase>
                    <goals>
                        <goal>single</goal>
                    </goals>
                </execution>
            </executions>
        </plugin>
    </plugins>
</build>
```

4）UDF 用于解析公共字段

```
package com.atguigu.udf;

import org.apache.commons.lang.StringUtils;
import org.apache.hadoop.hive.ql.exec.UDF;
import org.json.JSONException;
import org.json.JSONObject;

public class BaseFieldUDF extends UDF {

    public String evaluate(String line, String key) throws JSONException {

        // 1 处理 line   服务器时间 | json
        String[] log = line.split("\\|");

        //2 合法性校验
        if (log.length != 2 || StringUtils.isBlank(log[1])) {
            return "";
        }

        // 3 开始处理 json
        JSONObject baseJson = new JSONObject(log[1].trim());

        String result = "";

        // 4 根据传进来的key 查找相应的value
        if ("et".equals(key)) {
            if (baseJson.has("et")) {
                result = baseJson.getString("et");
            }
        } else if ("st".equals(key)) {
            result = log[0].trim();
        } else {
            JSONObject cm = baseJson.getJSONObject("cm");
            if (cm.has(key)) {
                result = cm.getString(key);
            }
        }
        return result;
    }

    public static void main(String[] args) throws JSONException {

        String line =
"1541217850324|{\"cm\":{\"mid\":\"m7856\",\"uid\":\"u8739\",\"ln\":\"-
74.8\",\"sv\":\"V2.2.2\",\"os\":\"8.1.3\",\"g\":\"P7XC9126@gmail.com\",\"nw\":\"3G\
",\"l\":\"es\",\"vc\":\"6\",\"hw\":\"640*960\",\"ar\":\"MX\",\"t\":\"1541204134250\
",\"la\":\"-31.7\",\"md\":\"huawei-
17\",\"vn\":\"1.1.2\",\"sr\":\"O\",\"ba\":\"Huawei\"},\"ap\":\"weather\",\"et\":[{\
"ett\":\"1541146624055\",\"en\":\"display\",\"kv\":{\"goodsid\":\"n4195\",\"copyrig
ht\":\"ESPN\",\"content_provider\":\"CNN\",\"extend2\":\"5\",\"action\":\"2\",\"ext
end1\":\"2\",\"place\":\"3\",\"showtype\":\"2\",\"category\":\"72\",\"newstype\":\"
5\"}},{\"ett\":\"1541213331817\",\"en\":\"loading\",\"kv\":{\"extend2\":\"\",\"load
ing_time\":\"15\",\"action\":\"3\",\"extend1\":\"\",\"type1\":\"\",\"type\":\"3\",\
"loading_way\":\"1\"}},{\"ett\":\"1541126195645\",\"en\":\"ad\",\"kv\":{\"entry\":\
"3\",\"show_style\":\"0\",\"action\":\"2\",\"detail\":\"325\",\"source\":\"4\",\"be
havior\":\"2\",\"content\":\"1\",\"newstype\":\"5\"}},{\"ett\":\"1541202678812\",\"
en\":\"notification\",\"kv\":{\"ap_time\":\"1541184614380\",\"action\":\"3\",\"type
\":\"4\",\"content\":\"\"}},{\"ett\":\"1541194686688\",\"en\":\"active_background\"
,\"kv\":{\"active_source\":\"3\"}}]}";
        String x = new BaseFieldUDF().evaluate(line, "mid");
        System.out.println(x);
    }
}
```

注意：使用 main 函数主要用于模拟数据测试。

5.2.3 自定义 UDTF 函数（解析事件字段）



UDTF函数解析具体事件

```
{
    "cm": {
        "ln": "-53.7",
        "sv": "V2.3.7",
        "os": "8.0.2",
        "g": "7UFHFL77@gmail.com",
        "mid": "m648",
        "nw": "3G",
        "l": "es",
        "vc": "15",
        "hw": "640*960",
        "ar": "MX",
        "uid": "u356",
        "t": "1550599726392",
        "la": "18.9",
        "md": "sumsung-2",
        "vn": "1.0.3",
        "ba": "Sumsung",
        "sr": "L"
    },
    "ap": "gmall",
    "et": [{
        "ett": "1550560414463",
        "en": "ad",
        "kv": {
            "entry": "3",
            "show_style": "5",
            "action": "2",
            "detail": "325",
            "source": "3",
            "behavior": "2",
            "content": "2",
            "newstype": "3"
        }
    }, {
        "ett": "1550634075998",
        "en": "favorites",
        "kv": {
            "course_id": 3,
            "id": 0,
            "add_time": "1550587882792",
            "userid": 7
        }
    }]
}
```

一、自定义UDTF函数使用

lateral view flat_analizer(ops) tmp_k as event_name, event_json;

二、自定义UDTF函数，需要继承GenericUDTF：重写initialize()；process(); close();

process(); 输入1条记录，输出若干条结果

```
public void process(Object[] objects)
// 获取传入的et
String input = objects[0].toString();

// 如果传进来的数据为空，直接返回过滤掉该数据
if (StringUtils.isBlank(input)) {
    return;
} else {

    try {
        // 获取一共有几个事件（ad/facoriters）
        JSONArray ja = new JSONArray(input);

        if (ja == null)
            return;

        // 循环遍历每一个事件
        for (int i = 0; i < ja.length(); i++) {
            String[] result = new String[2];

            try {
                // 取出每个的事件名称（ad/facoriters）
                result[0] = ja.getJSONObject(i).getString("en");

                // 取出每一个事件整体
                result[1] = ja.getString(i);
            } catch (JSONException e) {
                continue;
            }

            // 将结果返回
            forward(result);
        }
    } catch (JSONException e) {
        e.printStackTrace();
    }
}
```

initialize(); 该方法中，我们将指定输出参数的名称和参数类型：event_name，event_json。两个都是string类型

```
public StructObjectInspector initialize(ObjectInspector[] argOIs) throws
UDFArgumentException {

    ArrayList<String> fieldNames = new ArrayList<String>();
    ArrayList<ObjectInspector> fieldOIs = new ArrayList<ObjectInspector>();

    fieldNames.add("event_name");
    fieldOIs.add(PrimitiveObjectInspectorFactory.javaStringObjectInspector);
    fieldNames.add("event_json");
    fieldOIs.add(PrimitiveObjectInspectorFactory.javaStringObjectInspector);

    return ObjectInspectorFactory.getStandardStructObjectInspector(fieldNames, fieldOIs);
}
```

close();当没有记录处理的时候该方法会被调用，关闭资源

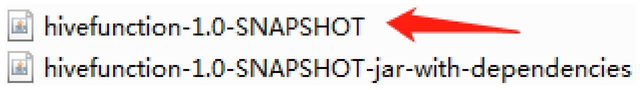
1）创建包名：com.atguigu.udtf

2）在 com.atguigu.udtf 包下创建类名：EventJsonUDTF

3）用于展开业务字段

```
package com.atguigu.udtf;

import org.apache.commons.lang.StringUtils;
import org.apache.hadoop.hive.ql.exec.UDFArgumentException;
import org.apache.hadoop.hive.ql.metadata.HiveException;
import org.apache.hadoop.hive.ql.udf.generic.GenericUDTF;
import org.apache.hadoop.hive.serde2.objectinspector.ObjectInspector;
import org.apache.hadoop.hive.serde2.objectinspector.ObjectInspectorFactory;
import org.apache.hadoop.hive.serde2.objectinspector.StructObjectInspector;
import
org.apache.hadoop.hive.serde2.objectinspector.primitive.PrimitiveObjectInspectorFac
tory;
import org.json.JSONArray;
import org.json.JSONException;

import java.util.ArrayList;

public class EventJsonUDTF extends GenericUDTF {

    //该方法中，我们将指定输出参数的名称和参数类型：
    @Override
    public StructObjectInspector initialize(ObjectInspector[] argOIs) throws
UDFArgumentException {

        ArrayList<String> fieldNames = new ArrayList<String>();
        ArrayList<ObjectInspector> fieldOIs = new ArrayList<ObjectInspector>();

        fieldNames.add("event_name");
        fieldOIs.add(PrimitiveObjectInspectorFactory.javaStringObjectInspector);
        fieldNames.add("event_json");
        fieldOIs.add(PrimitiveObjectInspectorFactory.javaStringObjectInspector);

        return ObjectInspectorFactory.getStandardStructObjectInspector(fieldNames,
fieldOIs);
    }

    //输入 1 条记录，输出若干条结果
    @Override
    public void process(Object[] objects) throws HiveException {

        // 获取传入的 et
        String input = objects[0].toString();

        // 如果传进来的数据为空，直接返回过滤掉该数据
        if (StringUtils.isBlank(input)) {
            return;
        } else {

            try {
                // 获取一共有几个事件（ad/facoriters）
                JSONArray ja = new JSONArray(input);

                if (ja == null)
                    return;

                // 循环遍历每一个事件
                for (int i = 0; i < ja.length(); i++) {
                    String[] result = new String[2];

                    try {
                        // 取出每个的事件名称（ad/facoriters）
                        result[0] = ja.getJSONObject(i).getString("en");

                        // 取出每一个事件整体
                        result[1] = ja.getString(i);
                    } catch (JSONException e) {
                        continue;
                    }

                    // 将结果返回
                    forward(result);
                }
            } catch (JSONException e) {
                e.printStackTrace();
            }
        }
    }

    //当没有记录处理的时候该方法会被调用，用来清理代码或者产生额外的输出
    @Override
    public void close() throws HiveException {

    }
}
```

2）打包



hivefunction-1.0-SNAPSHOT
hivefunction-1.0-SNAPSHOT-jar-with-dependencies

3）将 hivefunction-1.0-SNAPSHOT.jar 上传到 HDFS 上的/user/hive/jars 路径下

4）创建永久函数与开发好的 java class 关联

```
hive (gmall)>
create function base_analizer as 'com.atguigu.udf.BaseFieldUDF'
using  jar  'hdfs://hadoop102:9000/user/hive/jars/hivefunction-
1.0-SNAPSHOT.jar';

create            function           flat_analizer            as
'com.atguigu.udtf.EventJsonUDTF'             using            jar
'hdfs://hadoop102:9000/user/hive/jars/hivefunction-1.0-
SNAPSHOT.jar';
```

5.2.4 解析事件日志基础明细表

1）解析事件日志基础明细表

```
hive (gmall)>
insert overwrite table dwd_base_event_log partition(dt='2020-03-10')
select
    base_analizer(line,'mid') as mid_id,
    base_analizer(line,'uid') as user_id,
    base_analizer(line,'vc') as version_code,
    base_analizer(line,'vn') as version_name,
    base_analizer(line,'l') as lang,
    base_analizer(line,'sr') as source,
    base_analizer(line,'os') as os,
    base_analizer(line,'ar') as area,
    base_analizer(line,'md') as model,
    base_analizer(line,'ba') as brand,
    base_analizer(line,'sv') as sdk_version,
    base_analizer(line,'g') as gmail,
    base_analizer(line,'hw') as height_width,
    base_analizer(line,'t') as app_time,
    base_analizer(line,'nw') as network,
    base_analizer(line,'ln') as lng,
    base_analizer(line,'la') as lat,
    event_name,
    event_json,
    base_analizer(line,'st') as server_time
from  ods_event_log  lateral  view  flat_analizer(base_analizer(line,'et'))  tmp_flat  as
event_name,event_json
where dt='2020-03-10' and base_analizer(line,'et')<>'';
```

2）测试

```
hive (gmall)> select * from dwd_base_event_log limit 2;
```

5.2.5 DWD 层数据解析脚本

1）在 hadoop102 的/home/atguigu/bin 目录下创建脚本

```
[atguigu@hadoop102 bin]$ vim ods_to_dwd_base_log.sh
```

在脚本中编写如下内容

```
#!/bin/bash

# 定义变量方便修改
APP=gmall
hive=/opt/module/hive/bin/hive

# 如果是输入的日期按照取输入日期；如果没输入日期取当前时间的前一天
if [ -n "$1" ] ;then
    do_date=$1
else
    do_date=`date -d "-1 day" +%F`
fi

sql="
use gmall;
insert      overwrite      table      ${APP}.dwd_base_event_log
partition(dt='$do_date')
select
    ${APP}.base_analizer(line,'mid') as mid_id,
    ${APP}.base_analizer(line,'uid') as user_id,
    ${APP}.base_analizer(line,'vc') as version_code,
    ${APP}.base_analizer(line,'vn') as version_name,
    ${APP}.base_analizer(line,'l') as lang,
    ${APP}.base_analizer(line,'sr') as source,
    ${APP}.base_analizer(line,'os') as os,
    ${APP}.base_analizer(line,'ar') as area,
    ${APP}.base_analizer(line,'md') as model,
    ${APP}.base_analizer(line,'ba') as brand,
    ${APP}.base_analizer(line,'sv') as sdk_version,
    ${APP}.base_analizer(line,'g') as gmail,
    ${APP}.base_analizer(line,'hw') as height_width,
    ${APP}.base_analizer(line,'t') as app_time,
    ${APP}.base_analizer(line,'nw') as network,
    ${APP}.base_analizer(line,'ln') as lng,
    ${APP}.base_analizer(line,'la') as lat,
    event_name,
    event_json,
    ${APP}.base_analizer(line,'st') as server_time
from         ${APP}.ods_event_log         lateral         view
${APP}.flat_analizer(${APP}.base_analizer(line,'et'))  tem_flat
as event_name,event_json
where dt='$do_date'  and ${APP}.base_analizer(line,'et')<>'';
"

$hive -e "$sql";
```

2）增加脚本执行权限

```
[atguigu@hadoop102 bin]$ chmod 777 dwd_base_log.sh
```

3）脚本使用

```
[atguigu@hadoop102 module]$ dwd_base_log.sh 2020-03-11
```

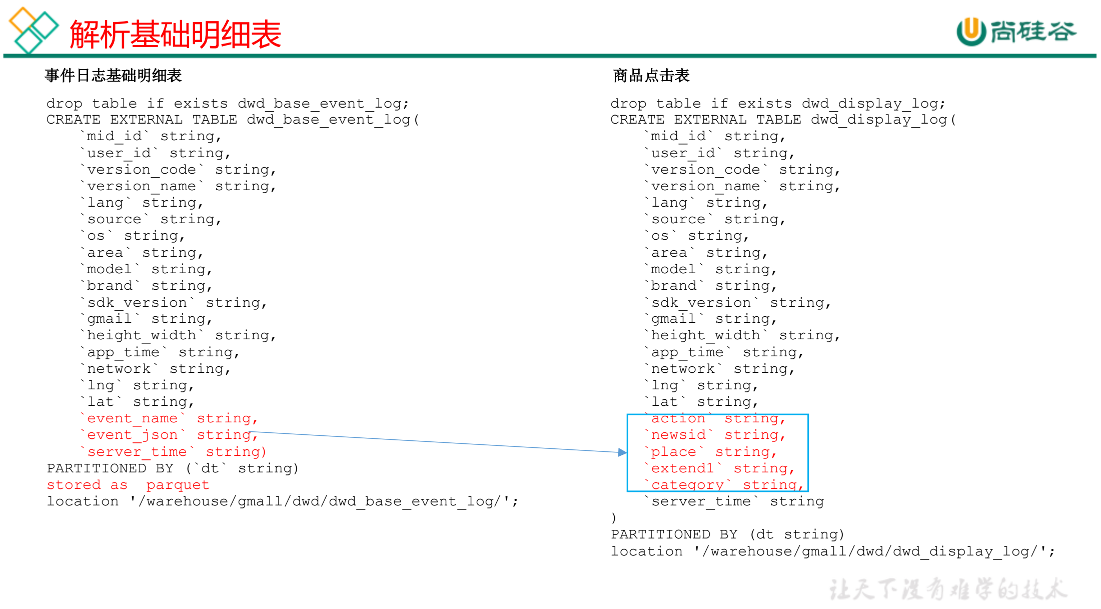
4）查询导入结果

```
hive (gmall)>
select * from dwd_base_event_log where dt='2020-03-11' limit 2;
```

5）脚本执行时间

企业开发中一般在每日凌晨 30 分~1 点

5.3 DWD 层（事件日志解析之具体事件表）



事件日志基础明细表

```
drop table if exists dwd_base_event_log;
CREATE EXTERNAL TABLE dwd_base_event_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `event_name` string,
    `event_json` string,
    `server_time` string)
PARTITIONED BY (`dt` string)
stored as  parquet
location '/warehouse/gmall/dwd/dwd_base_event_log/';
```

商品点击表

```
drop table if exists dwd_display_log;
CREATE EXTERNAL TABLE dwd_display_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `action` string,
    `newsid` string,
    `place` string,
    `extend1` string,
    `category` string,
    `server_time` string
)
PARTITIONED BY (dt string)
location '/warehouse/gmall/dwd/dwd_display_log/';
```

5.3.1 商品曝光表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_display_log;
CREATE EXTERNAL TABLE dwd_display_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `action` string,
    `goodsid` string,
    `place` string,
    `extend1` string,
    `category` string,
    `server_time` string
)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_display_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_display_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.goodsid') goodsid,
    get_json_object(event_json,'$.kv.place') place,
    get_json_object(event_json,'$.kv.extend1') extend1,
    get_json_object(event_json,'$.kv.category') category,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='display';
```

3）测试

```
hive (gmall)> select * from dwd_display_log limit 2;
```

5.3.2 商品详情页表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_newsdetail_log;
CREATE EXTERNAL TABLE dwd_newsdetail_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `entry` string,
    `action` string,
    `goodsid` string,
    `showtype` string,
    `news_staytime` string,
    `loading_time` string,
    `type1` string,
    `category` string,
    `server_time` string)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_newsdetail_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_newsdetail_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.entry') entry,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.goodsid') goodsid,
    get_json_object(event_json,'$.kv.showtype') showtype,
    get_json_object(event_json,'$.kv.news_staytime')
news_staytime,
    get_json_object(event_json,'$.kv.loading_time')
loading_time,
    get_json_object(event_json,'$.kv.type1') type1,
    get_json_object(event_json,'$.kv.category') category,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='newsdetail';
```

3）测试

```
hive (gmall)> select * from dwd_newsdetail_log limit 2;
```

5.3.3 商品列表页表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_loading_log;
CREATE EXTERNAL TABLE dwd_loading_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `action` string,
    `loading_time` string,
    `loading_way` string,
    `extend1` string,
    `extend2` string,
    `type` string,
    `type1` string,
    `server_time` string)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_loading_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_loading_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.loading_time')
loading_time,
    get_json_object(event_json,'$.kv.loading_way') loading_way,
    get_json_object(event_json,'$.kv.extend1') extend1,
    get_json_object(event_json,'$.kv.extend2') extend2,
    get_json_object(event_json,'$.kv.type') type,
    get_json_object(event_json,'$.kv.type1') type1,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='loading';
```

3）测试

```
hive (gmall)> select * from dwd_loading_log limit 2;
```

5.3.4 广告表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_ad_log;
CREATE EXTERNAL TABLE dwd_ad_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `entry` string,
    `action` string,
    `contentType` string,
    `displayMills` string,
    `itemId` string,
    `activityId` string,
    `server_time` string)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_ad_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_ad_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.entry') entry,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.contentType') contentType,
    get_json_object(event_json,'$.kv.displayMills') displayMills,
    get_json_object(event_json,'$.kv.itemId') itemId,
    get_json_object(event_json,'$.kv.activityId') activityId,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='ad';
```

3）测试

```
hive (gmall)> select * from dwd_ad_log limit 2;
```

5.3.5 消息通知表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_notification_log;
CREATE EXTERNAL TABLE dwd_notification_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `action` string,
    `noti_type` string,
    `ap_time` string,
    `content` string,
    `server_time` string
    )
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_notification_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_notification_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.noti_type') noti_type,
    get_json_object(event_json,'$.kv.ap_time') ap_time,
    get_json_object(event_json,'$.kv.content') content,
    server_time
from dwd_base_event_log
```

```
where dt='2020-03-10' and event_name='notification';
```

3）测试

```
hive (gmall)> select * from dwd_notification_log limit 2;
```

5.3.6 用户后台活跃表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_active_background_log;
CREATE EXTERNAL TABLE dwd_active_background_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `active_source` string,
    `server_time` string
    )
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_background_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_active_background_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.active_source')
active_source,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='active_background';
```

3）测试

```
hive (gmall)> select * from dwd_active_background_log limit 2;
```

5.3.7 评论表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_comment_log;
CREATE EXTERNAL TABLE dwd_comment_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `comment_id` int,
    `userid` int,
    `p_comment_id` int,
    `content` string,
    `addtime` string,
    `other_id` int,
    `praise_count` int,
    `reply_count` int,
    `server_time` string
)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_comment_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_comment_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.comment_id') comment_id,
    get_json_object(event_json,'$.kv.userid') userid,
    get_json_object(event_json,'$.kv.p_comment_id')
p_comment_id,
    get_json_object(event_json,'$.kv.content') content,
    get_json_object(event_json,'$.kv.addtime') addtime,
    get_json_object(event_json,'$.kv.other_id') other_id,
    get_json_object(event_json,'$.kv.praise_count')
praise_count,
    get_json_object(event_json,'$.kv.reply_count') reply_count,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='comment';
```

3）测试

```
hive (gmall)> select * from dwd_comment_log limit 2;
```

5.3.8 收藏表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_favorites_log;
CREATE EXTERNAL TABLE dwd_favorites_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `id` int,
    `course_id` int,
    `userid` int,
    `add_time` string,
    `server_time` string
)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_favorites_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_favorites_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.id') id,
    get_json_object(event_json,'$.kv.course_id') course_id,
    get_json_object(event_json,'$.kv.userid') userid,
    get_json_object(event_json,'$.kv.add_time') add_time,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='favorites';
```

3）测试

```
hive (gmall)> select * from dwd_favorites_log limit 2;
```

5.3.9 点赞表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_praise_log;
CREATE EXTERNAL TABLE dwd_praise_log(
    `mid_id` string,
    `user_id` string,
    `version_code` string,
    `version_name` string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `id` string,
    `userid` string,
    `target_id` string,
    `type` string,
    `add_time` string,
    `server_time` string
)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_praise_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_praise_log
PARTITION (dt='2020-03-10')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.id') id,
    get_json_object(event_json,'$.kv.userid') userid,
    get_json_object(event_json,'$.kv.target_id') target_id,
    get_json_object(event_json,'$.kv.type') type,
    get_json_object(event_json,'$.kv.add_time') add_time,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='praise';
```

3）测试

```
hive (gmall)> select * from dwd_praise_log limit 2;
```

5.3.10 错误日志表

1）建表语句

```
hive (gmall)>
drop table if exists dwd_error_log;
CREATE EXTERNAL TABLE dwd_error_log(
    `mid_id` string,
    `user_id` string,
    `version_code`string,
    `version_name`string,
    `lang` string,
    `source` string,
    `os` string,
    `area` string,
    `model` string,
    `brand` string,
    `sdk_version` string,
    `gmail` string,
    `height_width` string,
    `app_time` string,
    `network` string,
    `lng` string,
    `lat` string,
    `errorBrief` string,
    `errorDetail` string,
    `server_time` string)
PARTITIONED BY (dt string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_error_log/'
TBLPROPERTIES('parquet.compression'='lzo');
```

2）导入数据

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table dwd_error_log
PARTITION (dt='2020-03-10')
select
   mid_id,
   user_id,
   version_code,
   version_name,
   lang,
   source,
   os,
   area,
   model,
   brand,
   sdk_version,
   gmail,
   height_width,
   app_time,
   network,
   lng,
   lat,
   get_json_object(event_json,'$.kv.errorBrief') errorBrief,
   get_json_object(event_json,'$.kv.errorDetail') errorDetail,
    server_time
from dwd_base_event_log
where dt='2020-03-10' and event_name='error';
```

3）测试

```
hive (gmall)> select * from dwd_error_log limit 2;
```

5.3.11 DWD 层事件表加载数据脚本

1）在 hadoop102 的/home/atguigu/bin 目录下创建脚本

```
[atguigu@hadoop102 bin]$ vim dwd_events_log.sh
```

在脚本中编写如下内容

```
#!/bin/bash

# 定义变量方便修改
APP=gmall
hive=/opt/module/hive/bin/hive

# 如果是输入的日期按照取输入日期；如果没输入日期取当前时间的前一天
if [ -n "$1" ] ;then
    do_date=$1
else
    do_date=`date -d "-1 day" +%F`
fi

sql="
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table "$APP".dwd_display_log
PARTITION (dt='$do_date')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.goodsid') goodsid,
    get_json_object(event_json,'$.kv.place') place,
    get_json_object(event_json,'$.kv.extend1') extend1,
    get_json_object(event_json,'$.kv.category') category,
    server_time
from "$APP".dwd_base_event_log
where dt='$do_date' and event_name='display';
```

```
insert overwrite table "$APP".dwd_newsdetail_log
PARTITION (dt='$do_date')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.entry') entry,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.goodsid') goodsid,
    get_json_object(event_json,'$.kv.showtype') showtype,
    get_json_object(event_json,'$.kv.news_staytime')
news_staytime,
    get_json_object(event_json,'$.kv.loading_time')
loading_time,
    get_json_object(event_json,'$.kv.type1') type1,
    get_json_object(event_json,'$.kv.category') category,
    server_time
from "$APP".dwd_base_event_log
where dt='$do_date' and event_name='newsdetail';


insert overwrite table "$APP".dwd_loading_log
PARTITION (dt='$do_date')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.loading_time') 
loading_time,
    get_json_object(event_json,'$.kv.loading_way') loading_way,
    get_json_object(event_json,'$.kv.extend1') extend1,
    get_json_object(event_json,'$.kv.extend2') extend2,
    get_json_object(event_json,'$.kv.type') type,
    get_json_object(event_json,'$.kv.type1') type1,
    server_time
from "$APP".dwd_base_event_log 
where dt='$do_date' and event_name='loading';


insert overwrite table "$APP".dwd_ad_log
PARTITION (dt='$do_date')
select 
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.entry') entry,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.contentType') contentType,
    get_json_object(event_json,'$.kv.displayMills') 
displayMills,
    get_json_object(event_json,'$.kv.itemId') itemId,
    get_json_object(event_json,'$.kv.activityId') activityId,
    server_time
from "$APP".dwd_base_event_log 
where dt='$do_date' and event_name='ad';


insert overwrite table "$APP".dwd_notification_log
PARTITION (dt='$do_date')
select 
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.action') action,
    get_json_object(event_json,'$.kv.noti_type') noti_type,
    get_json_object(event_json,'$.kv.ap_time') ap_time,
    get_json_object(event_json,'$.kv.content') content,
    server_time
from "$APP".dwd_base_event_log
where dt='$do_date' and event_name='notification';


insert overwrite table "$APP".dwd_active_background_log
PARTITION (dt='$do_date')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.active_source')
active_source,
    server_time
from "$APP".dwd_base_event_log
where dt='$do_date' and event_name='active_background';


insert overwrite table "$APP".dwd_comment_log
PARTITION (dt='$do_date')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.comment_id') comment_id,
    get_json_object(event_json,'$.kv.userid') userid,
    get_json_object(event_json,'$.kv.p_comment_id')
p_comment_id,
    get_json_object(event_json,'$.kv.content') content,
    get_json_object(event_json,'$.kv.addtime') addtime,
    get_json_object(event_json,'$.kv.other_id') other_id,
    get_json_object(event_json,'$.kv.praise_count')
praise_count,
    get_json_object(event_json,'$.kv.reply_count') reply_count,
    server_time
from "$APP".dwd_base_event_log
where dt='$do_date' and event_name='comment';


insert overwrite table "$APP".dwd_favorites_log
PARTITION (dt='$do_date')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.id') id,
    get_json_object(event_json,'$.kv.course_id') course_id,
    get_json_object(event_json,'$.kv.userid') userid,
    get_json_object(event_json,'$.kv.add_time') add_time,
    server_time
from "$APP".dwd_base_event_log
where dt='$do_date' and event_name='favorites';


insert overwrite table "$APP".dwd_praise_log
PARTITION (dt='$do_date')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.id') id,
    get_json_object(event_json,'$.kv.userid') userid,
    get_json_object(event_json,'$.kv.target_id') target_id,
    get_json_object(event_json,'$.kv.type') type,
    get_json_object(event_json,'$.kv.add_time') add_time,
    server_time
from "$APP".dwd_base_event_log
where dt='$do_date' and event_name='praise';


insert overwrite table "$APP".dwd_error_log
PARTITION (dt='$do_date')
select
    mid_id,
    user_id,
    version_code,
    version_name,
    lang,
    source,
    os,
    area,
    model,
    brand,
    sdk_version,
    gmail,
    height_width,
    app_time,
    network,
    lng,
    lat,
    get_json_object(event_json,'$.kv.errorBrief') errorBrief,
    get_json_object(event_json,'$.kv.errorDetail') errorDetail,
    server_time
from "$APP".dwd_base_event_log
where dt='$do_date' and event_name='error';
"

$hive -e "$sql"
```

2）增加脚本执行权限

```
[atguigu@hadoop102 bin]$ chmod 777 dwd_event_log.sh
```

3）脚本使用

```
[atguigu@hadoop102 module]$ dwd_event_log.sh 2020-03-11
```

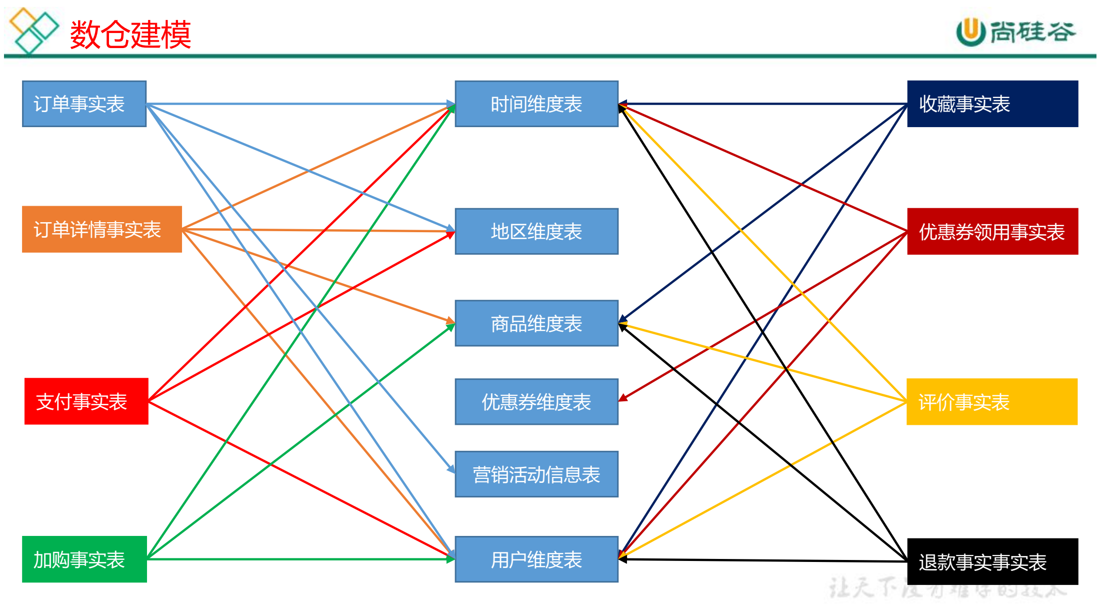
4）查询导入结果

```
hive (gmall)>
select * from dwd_comment_log where dt='2020-03-11' limit 2;
```

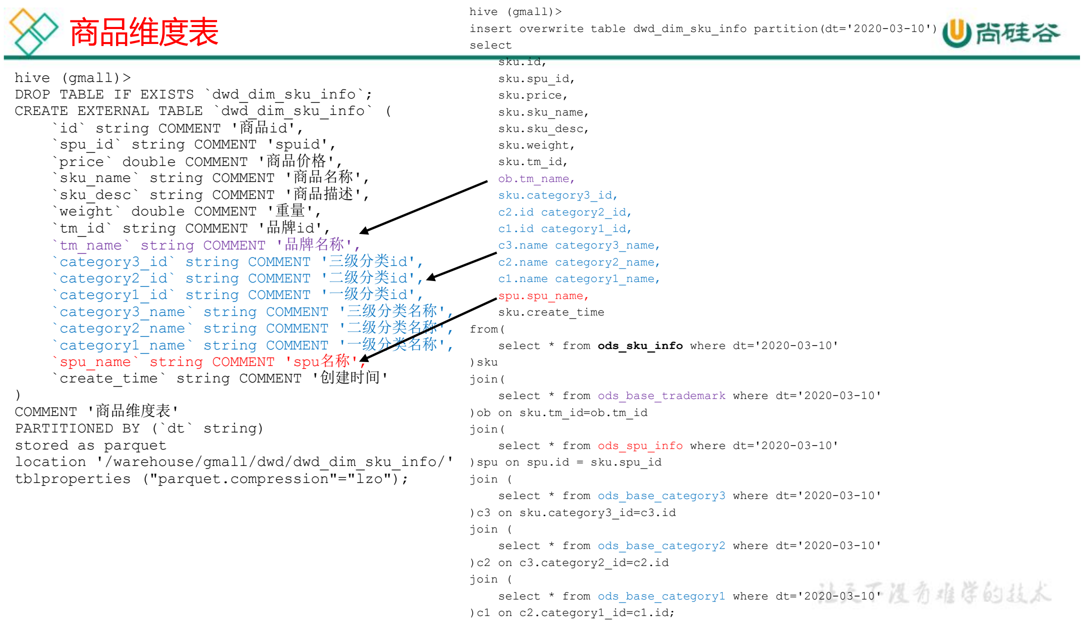
5）脚本执行时间

企业开发中一般在每日凌晨 30 分~1 点

5.2 DWD 层（业务数据）



5.4.1 商品维度表（全量表）



```
hive (gmall)>
DROP TABLE IF EXISTS `dwd_dim_sku_info`;
CREATE EXTERNAL TABLE `dwd_dim_sku_info` (
    `id` string COMMENT '商品id',
    `spu_id` string COMMENT 'spuid',
    `price` double COMMENT '商品价格',
    `sku_name` string COMMENT '商品名称',
    `sku_desc` string COMMENT '商品描述',
    `weight` double COMMENT '重量',
    `tm_id` string COMMENT '品牌id',
    `tm_name` string COMMENT '品牌名称',
    `category3_id` string COMMENT '三级分类id',
    `category2_id` string COMMENT '二级分类id',
    `category1_id` string COMMENT '一级分类id',
    `category3_name` string COMMENT '三级分类名称',
    `category2_name` string COMMENT '二级分类名称',
    `category1_name` string COMMENT '一级分类名称',
    `spu_name` string COMMENT 'spu名称',
    `create_time` string COMMENT '创建时间'
)
COMMENT '商品维度表'
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_dim_sku_info/'
tblproperties ("parquet.compression"="lzo");
```

```
hive (gmall)>
insert overwrite table dwd_dim_sku_info partition(dt='2020-03-10')
select
    sku.id,
    sku.spu_id,
    sku.price,
    sku.sku_name,
    sku.sku_desc,
    sku.weight,
    sku.tm_id,
    ob.tm_name,
    sku.category3_id,
    c2.id category2_id,
    c1.id category1_id,
    c3.name category3_name,
    c2.name category2_name,
    c1.name category1_name,
    spu.spu_name,
    sku.create_time
from(
    select * from ods_sku_info where dt='2020-03-10'
)sku
join(
    select * from ods_base_trademark where dt='2020-03-10'
)ob on sku.tm_id=ob.tm_id
join(
    select * from ods_spu_info where dt='2020-03-10'
)spu on spu.id = sku.spu_id
join (
    select * from ods_base_category3 where dt='2020-03-10'
)c3 on sku.category3_id=c3.id
join (
    select * from ods_base_category2 where dt='2020-03-10'
)c2 on c3.category2_id=c2.id
join (
    select * from ods_base_category1 where dt='2020-03-10'
)c1 on c2.category1_id=c1.id;
```

1）建表语句

```
hive (gmall)>
DROP TABLE IF EXISTS `dwd_dim_sku_info`;
CREATE EXTERNAL TABLE `dwd_dim_sku_info` (
    `id` string COMMENT '商品 id',
    `spu_id` string COMMENT 'spuid',
    `price` double COMMENT '商品价格',
    `sku_name` string COMMENT '商品名称',
    `sku_desc` string COMMENT '商品描述',
    `weight` double COMMENT '重量',
    `tm_id` string COMMENT '品牌 id',
    `tm_name` string COMMENT '品牌名称',
    `category3_id` string COMMENT '三级分类 id',
    `category2_id` string COMMENT '二级分类 id',
    `category1_id` string COMMENT '一级分类 id',
    `category3_name` string COMMENT '三级分类名称',
    `category2_name` string COMMENT '二级分类名称',
    `category1_name` string COMMENT '一级分类名称',
    `spu_name` string COMMENT 'spu 名称',
    `create_time` string COMMENT '创建时间'
)
COMMENT '商品维度表'
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_dim_sku_info/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwd_dim_sku_info partition(dt='2020-03-10')
select
    sku.id,
    sku.spu_id,
    sku.price,
    sku.sku_name,
    sku.sku_desc,
    sku.weight,
    sku.tm_id,
    ob.tm_name,
    sku.category3_id,
    c2.id category2_id,
    c1.id category1_id,
    c3.name category3_name,
    c2.name category2_name,
    c1.name category1_name,
    spu.spu_name,
    sku.create_time
from
(
    select * from ods_sku_info where dt='2020-03-10'
)sku
join
(
    select * from ods_base_trademark where dt='2020-03-10'
)ob on sku.tm_id=ob.tm_id
join
(
    select * from ods_spu_info where dt='2020-03-10'
)spu on spu.id = sku.spu_id
join
(
    select * from ods_base_category3 where dt='2020-03-10'
)c3 on sku.category3_id=c3.id
join
(
    select * from ods_base_category2 where dt='2020-03-10'
)c2 on c3.category2_id=c2.id
join
(
    select * from ods_base_category1 where dt='2020-03-10'
)c1 on c2.category1_id=c1.id;
```

3）查询加载结果

```
hive (gmall)> select * from dwd_dim_sku_info where dt='2020-03-10';
```

5.4.2 优惠券信息表（全量）

把 ODS 层 ods_coupon_info 表数据导入到 DWD 层优惠卷信息表，在导入过程中可以做适当的清洗。

1）建表语句

```
hive (gmall)>
drop table if exists dwd_dim_coupon_info;
create external table dwd_dim_coupon_info(
    `id` string COMMENT '购物券编号',
    `coupon_name` string COMMENT '购物券名称',
    `coupon_type` string COMMENT '购物券类型 1 现金券 2 折扣券 3 满减券 4 满件打折券',
    `condition_amount` string COMMENT '满额数',
    `condition_num` string COMMENT '满件数',
    `activity_id` string COMMENT '活动编号',
    `benefit_amount` string COMMENT '减金额',
    `benefit_discount` string COMMENT '折扣',
    `create_time` string COMMENT '创建时间',
    `range_type` string COMMENT '范围类型 1、商品 2、品类 3、品牌',
    `spu_id` string COMMENT '商品 id',
    `tm_id` string COMMENT '品牌 id',
    `category3_id` string COMMENT '品类 id',
    `limit_num` string COMMENT '最多领用次数',
    `operate_time`  string COMMENT '修改时间',
    `expire_time`  string COMMENT '过期时间'
) COMMENT '优惠券信息表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
stored as parquet
location '/warehouse/gmall/dwd/dwd_dim_coupon_info/'
tblproperties ("parquet.compression"="lzo");
```

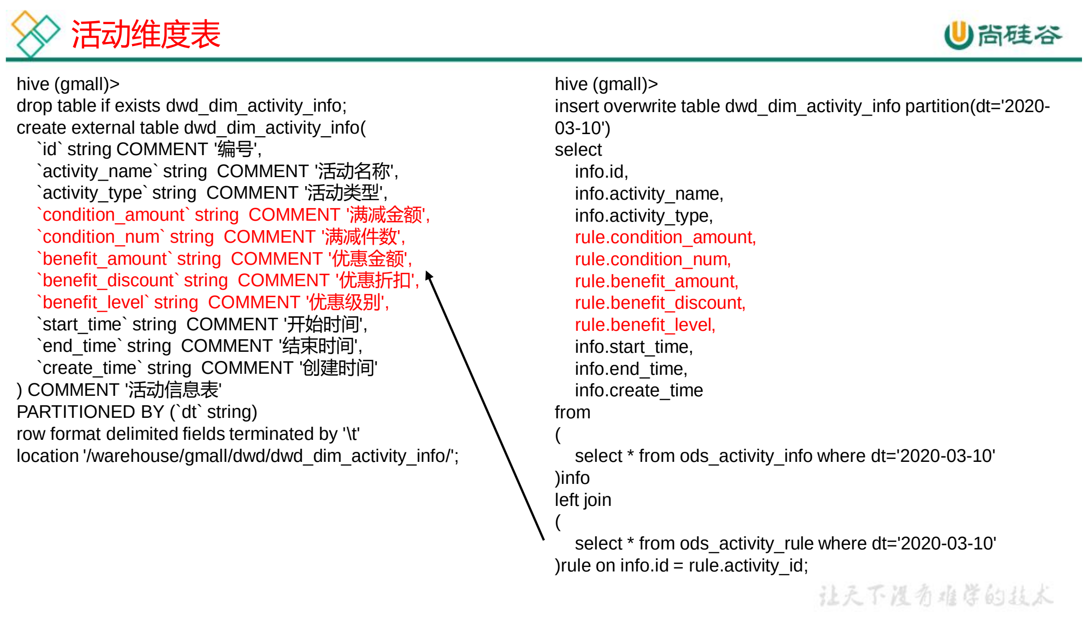
2）数据装载

```
hive (gmall)>
insert overwrite table dwd_dim_coupon_info partition(dt='2020-03-10')
select
    id,
    coupon_name,
    coupon_type,
    condition_amount,
    condition_num,
    activity_id,
    benefit_amount,
    benefit_discount,
    create_time,
    range_type,
    spu_id,
    tm_id,
    category3_id,
    limit_num,
    operate_time,
    expire_time
from ods_coupon_info
where dt='2020-03-10';
```

3）查询加载结果

```
hive (gmall)> select * from dwd_dim_coupon_info where dt='2020-03-10';
```

5.4.3 活动维度表（全量）



活动维度表

尚硅谷

```
hive (gmall)>
drop table if exists dwd_dim_activity_info;
create external table dwd_dim_activity_info(
    `id` string COMMENT '编号',
    `activity_name` string  COMMENT '活动名称',
    `activity_type` string  COMMENT '活动类型',
    `condition_amount` string  COMMENT '满减金额',
    `condition_num` string  COMMENT '满减件数',
    `benefit_amount` string  COMMENT '优惠金额',
    `benefit_discount` string  COMMENT '优惠折扣',
    `benefit_level` string  COMMENT '优惠级别',
    `start_time` string  COMMENT '开始时间',
    `end_time` string  COMMENT '结束时间',
    `create_time` string  COMMENT '创建时间'
) COMMENT '活动信息表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwd/dwd_dim_activity_info/';
```

```
hive (gmall)>
insert overwrite table dwd_dim_activity_info partition(dt='2020-
03-10')
select
    info.id,
    info.activity_name,
    info.activity_type,
    rule.condition_amount,
    rule.condition_num,
    rule.benefit_amount,
    rule.benefit_discount,
    rule.benefit_level,
    info.start_time,
    info.end_time,
    info.create_time
from
(
    select * from ods_activity_info where dt='2020-03-10'
)info
left join
(
    select * from ods_activity_rule where dt='2020-03-10'
)rule on info.id = rule.activity_id;
```

让天下没有难学的技术

1）建表语句

```
hive (gmall)>
drop table if exists dwd_dim_activity_info;
create external table dwd_dim_activity_info(
    `id` string COMMENT '编号',
    `activity_name`  string  COMMENT '活动名称',
    `activity_type`  string  COMMENT '活动类型',
    `condition_amount`  string  COMMENT '满减金额',
    `condition_num`  string  COMMENT '满减件数',
    `benefit_amount`  string  COMMENT '优惠金额',
    `benefit_discount`  string  COMMENT '优惠折扣',
    `benefit_level`  string  COMMENT '优惠级别',
    `start_time`  string  COMMENT '开始时间',
    `end_time`  string  COMMENT '结束时间',
    `create_time`  string  COMMENT '创建时间'
) COMMENT '活动信息表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
stored as parquet
location '/warehouse/gmall/dwd/dwd_dim_activity_info/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

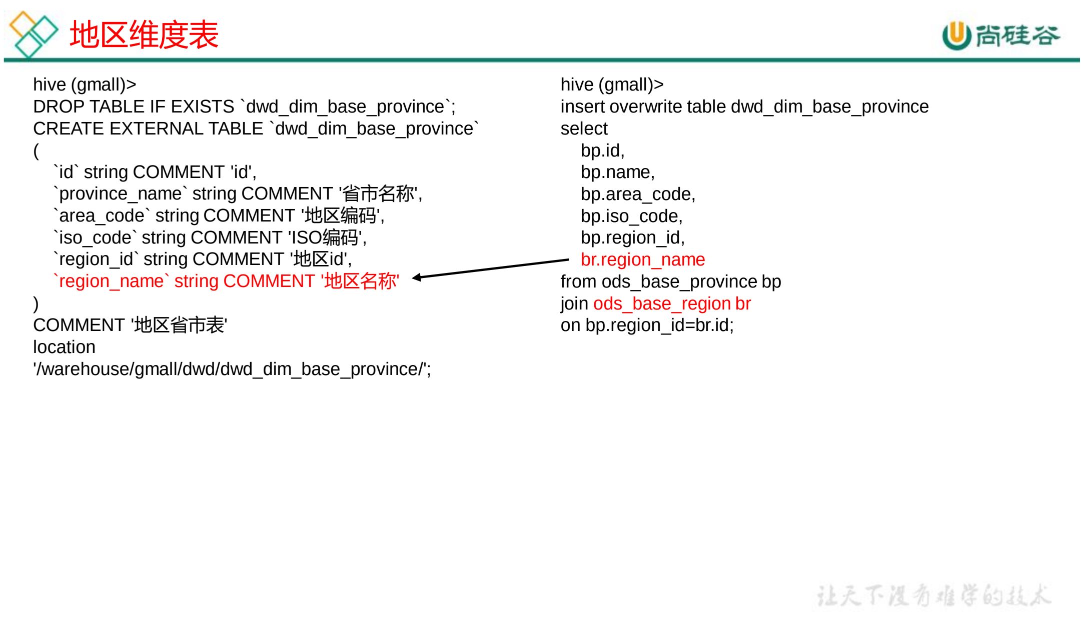
```
hive (gmall)>
insert overwrite table dwd_dim_activity_info partition(dt='2020-03-10')
select
    info.id,
    info.activity_name,
    info.activity_type,
    rule.condition_amount,
    rule.condition_num,
    rule.benefit_amount,
    rule.benefit_discount,
    rule.benefit_level,
    info.start_time,
    info.end_time,
    info.create_time
```

```
from
(
   select * from ods_activity_info where dt='2020-03-10'
)info
left join
(
   select * from ods_activity_rule where dt='2020-03-10'
)rule on info.id = rule.activity_id;
```

3）查询加载结果

```
hive (gmall)> select * from dwd_dim_activity_info where dt='2020-03-10';
```

5.5.4 地区维度表（特殊）



地区维度表

```
hive (gmall)>
DROP TABLE IF EXISTS `dwd_dim_base_province`;
CREATE EXTERNAL TABLE `dwd_dim_base_province`
(
   `id` string COMMENT 'id',
   `province_name` string COMMENT '省市名称',
   `area_code` string COMMENT '地区编码',
   `iso_code` string COMMENT 'ISO编码',
   `region_id` string COMMENT '地区id',
   `region_name` string COMMENT '地区名称'
)
COMMENT '地区省市表'
location
'/warehouse/gmall/dwd/dwd_dim_base_province/';
```

```
hive (gmall)>
insert overwrite table dwd_dim_base_province
select
   bp.id,
   bp.name,
   bp.area_code,
   bp.iso_code,
   bp.region_id,
   br.region_name
from ods_base_province bp
join ods_base_region br
on bp.region_id=br.id;
```

1）建表语句

```
hive (gmall)>
DROP TABLE IF EXISTS `dwd_dim_base_province`;
CREATE EXTERNAL TABLE `dwd_dim_base_province` (
    `id` string COMMENT 'id',
    `province_name` string COMMENT '省市名称',
    `area_code` string COMMENT '地区编码',
    `iso_code` string COMMENT 'ISO 编码',
    `region_id` string COMMENT '地区 id',
    `region_name` string COMMENT '地区名称'
)
COMMENT '地区省市表'
stored as parquet
location '/warehouse/gmall/dwd/dwd_dim_base_province/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwd_dim_base_province
select
   bp.id,
   bp.name,
   bp.area_code,
   bp.iso_code,
   bp.region_id,
   br.region_name
```

```
from ods_base_province bp
join ods_base_region br
on bp.region_id=br.id;
```

3）查询加载结果

```
hive (gmall)> select * from dwd_dim_base_province;
```

5.4.5 时间维度表（特殊）

1）建表语句

```
hive (gmall)>
DROP TABLE IF EXISTS `dwd_dim_date_info`;
CREATE EXTERNAL TABLE `dwd_dim_date_info`(
    `date_id` string COMMENT '日',
    `week_id` int COMMENT '周',
    `week_day` int COMMENT '周的第几天',
    `day` int COMMENT '每月的第几天',
    `month` int COMMENT '第几月',
    `quarter` int COMMENT '第几季度',
    `year` int COMMENT '年',
    `is_workday` int COMMENT '是否是周末',
    `holiday_id` int COMMENT '是否是节假日'
)
row format delimited fields terminated by '\t'
stored as parquet
location '/warehouse/gmall/dwd/dwd_dim_date_info/'
tblproperties ("parquet.compression"="lzo");
```

2）把 date_info.txt 文件上传到 hadoop102 的/opt/module/db_log/路径

3）数据装载

（1）创建临时表，非列式存储

```
hive (gmall)>
DROP TABLE IF EXISTS `dwd_dim_date_info_tmp`;
CREATE EXTERNAL TABLE `dwd_dim_date_info_tmp`(
    `date_id` string COMMENT '日',
    `week_id` int COMMENT '周',
    `week_day` int COMMENT '周的第几天',
    `day` int COMMENT '每月的第几天',
    `month` int COMMENT '第几月',
    `quarter` int COMMENT '第几季度',
    `year` int COMMENT '年',
    `is_workday` int COMMENT '是否是周末',
    `holiday_id` int COMMENT '是否是节假日'
)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwd/dwd_dim_date_info_tmp/';
```

（2）将数据导入临时表

```
hive (gmall)>
load    data    local    inpath    '/opt/module/db_log/date_info.txt'    into    table
dwd_dim_date_info_tmp;
```

（3）将数据导入正式表

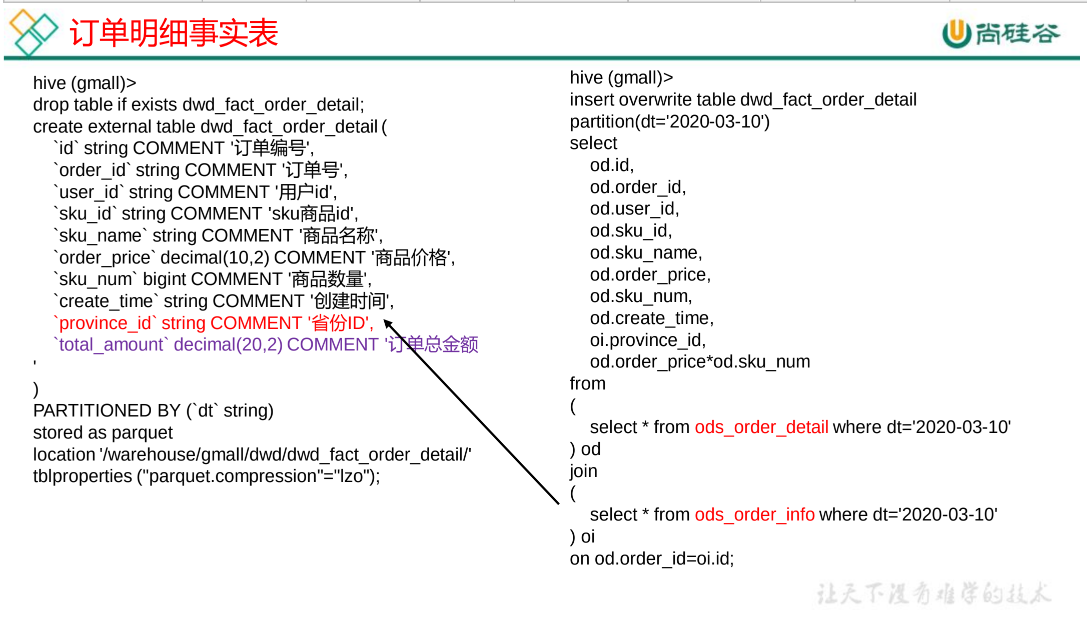
```
hive (gmall)>
insert overwrite table dwd_dim_date_info select * from dwd_dim_date_info_tmp;
```

4）查询加载结果

```
hive (gmall)> select * from dwd_dim_date_info;
```

5.4.6 订单明细事实表（事务型事实表）

	时间	用户	地区	商品	优惠券	活动	编码	度量值
订单详情	√		√	√				件数/金额


订单明细事实表

```
hive (gmall)>
drop table if exists dwd_fact_order_detail;
create external table dwd_fact_order_detail (
    `id` string COMMENT '订单编号',
    `order_id` string COMMENT '订单号',
    `user_id` string COMMENT '用户id',
    `sku_id` string COMMENT 'sku商品id',
    `sku_name` string COMMENT '商品名称',
    `order_price` decimal(10,2) COMMENT '商品价格',
    `sku_num` bigint COMMENT '商品数量',
    `create_time` string COMMENT '创建时间',
    `province_id` string COMMENT '省份ID',
    `total_amount` decimal(20,2) COMMENT '订单总金额
'
)
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_fact_order_detail/'
tblproperties ("parquet.compression"="lzo");
```

```
hive (gmall)>
insert overwrite table dwd_fact_order_detail
partition(dt='2020-03-10')
select
    od.id,
    od.order_id,
    od.user_id,
    od.sku_id,
    od.sku_name,
    od.order_price,
    od.sku_num,
    od.create_time,
    oi.province_id,
    od.order_price*od.sku_num
from
(
    select * from ods_order_detail where dt='2020-03-10'
) od
join
(
    select * from ods_order_info where dt='2020-03-10'
) oi
on od.order_id=oi.id;
```

1）建表语句

```
hive (gmall)>
drop table if exists dwd_fact_order_detail;
create external table dwd_fact_order_detail (
    `id` string COMMENT '',
    `order_id` string COMMENT '',
    `province_id` string COMMENT '',
    `user_id` string COMMENT '',
    `sku_id` string COMMENT '',
    `create_time` string COMMENT '',
    `total_amount` decimal(20,2) COMMENT '',
    `sku_num` bigint COMMENT ''
)
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_fact_order_detail/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwd_fact_order_detail partition(dt='2020-03-10')
select
    od.id,
    od.order_id,
    oi.province_id,
    od.user_id,
    od.sku_id,
    od.create_time,
    od.order_price*od.sku_num,
    od.sku_num
from
(
    select * from ods_order_detail where dt='2020-03-10'
) od
join
```

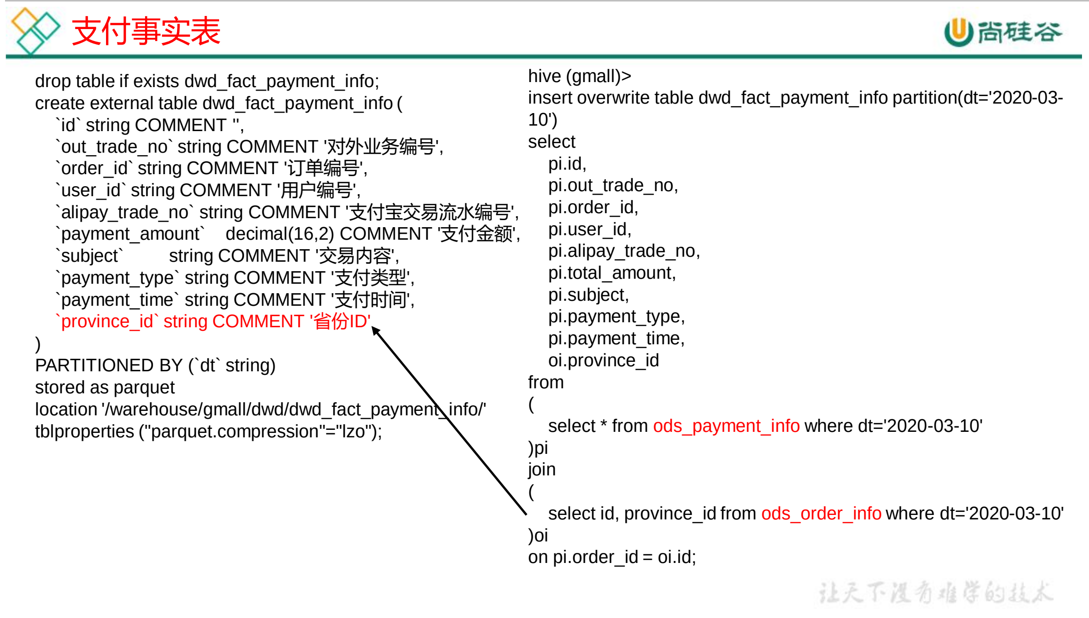
```
(
    select * from ods_order_info where dt='2020-03-10'
) oi
on od.order_id=oi.id;
```

3）查询加载结果

```
hive (gmall)> select * from dwd_fact_order_detail;
```

5.4.7 支付事实表（事务型事实表）

	时间	用户	地区	商品	优惠券	活动	编码	度量值
支付	√		√					金额



支付事实表

尚硅谷

```
drop table if exists dwd_fact_payment_info;
create external table dwd_fact_payment_info (
    `id` string COMMENT '',
    `out_trade_no` string COMMENT '对外业务编号',
    `order_id` string COMMENT '订单编号',
    `user_id` string COMMENT '用户编号',
    `alipay_trade_no` string COMMENT '支付宝交易流水编号',
    `payment_amount`    decimal(16,2) COMMENT '支付金额',
    `subject`         string COMMENT '交易内容',
    `payment_type` string COMMENT '支付类型',
    `payment_time` string COMMENT '支付时间',
    `province_id` string COMMENT '省份ID'
)
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_fact_payment_info/'
tblproperties ("parquet.compression"="lzo");
```

```
hive (gmall)>
insert overwrite table dwd_fact_payment_info partition(dt='2020-03-
10')
select
    pi.id,
    pi.out_trade_no,
    pi.order_id,
    pi.user_id,
    pi.alipay_trade_no,
    pi.total_amount,
    pi.subject,
    pi.payment_type,
    pi.payment_time,
    oi.province_id
from
(
    select * from ods_payment_info where dt='2020-03-10'
)pi
join
(
    select id, province_id from ods_order_info where dt='2020-03-10'
)oi
on pi.order_id = oi.id;
```

让天下没有难学的技术

1）建表语句

```
hive (gmall)>
drop table if exists dwd_fact_payment_info;
create external table dwd_fact_payment_info (
    `id` string COMMENT '',
    `out_trade_no` string COMMENT '对外业务编号',
    `order_id` string COMMENT '订单编号',
    `user_id` string COMMENT '用户编号',
    `alipay_trade_no` string COMMENT '支付宝交易流水编号',
    `payment_amount`    decimal(16,2) COMMENT '支付金额',
    `subject`         string COMMENT '交易内容',
    `payment_type` string COMMENT '支付类型',
    `payment_time` string COMMENT '支付时间',
    `province_id` string COMMENT '省份 ID'
)
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_fact_payment_info/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwd_fact_payment_info partition(dt='2020-03-10')
select
    pi.id,
    pi.out_trade_no,
    pi.order_id,
    pi.user_id,
    pi.alipay_trade_no,
    pi.total_amount,
    pi.subject,
    pi.payment_type,
    pi.payment_time,
    oi.province_id
from
(
    select * from ods_payment_info where dt='2020-03-10'
)pi
join
(
    select id, province_id from ods_order_info where dt='2020-03-10'
)oi
on pi.order_id = oi.id;
```

3）查询加载结果

```
hive (gmall)> select * from dwd_fact_payment_info where dt='2020-03-10';
```

5.4.8 退款事实表（事务型事实表）

把 ODS 层 ods_order_refund_info 表数据导入到 DWD 层退款事实表，在导入过程中可以做适当的清洗。

	时间	用户	地区	商品	优惠券	活动	编码	度量值
退款	√	√		√				件数/金额

1）建表语句

```
hive (gmall)>
drop table if exists dwd_fact_order_refund_info;
create external table dwd_fact_order_refund_info(
    `id` string COMMENT '编号',
    `user_id` string COMMENT '用户 ID',
    `order_id` string COMMENT '订单 ID',
    `sku_id` string COMMENT '商品 ID',
    `refund_type` string COMMENT '退款类型',
    `refund_num` bigint COMMENT '退款件数',
    `refund_amount` decimal(16,2) COMMENT '退款金额',
    `refund_reason_type` string COMMENT '退款原因类型',
    `create_time` string COMMENT '退款时间'
) COMMENT '退款事实表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwd/dwd_fact_order_refund_info/';
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwd_fact_order_refund_info partition(dt='2020-03-10')
select
    id,
    user_id,
    order_id,
    sku_id,
    refund_type,
    refund_num,
    refund_amount,
    refund_reason_type,
    create_time
from ods_order_refund_info
where dt='2020-03-10';
```

3）查询加载结果

```
hive (gmall)> select * from dwd_fact_order_refund_info where dt='2020-03-10';
```

5.4.9 评价事实表（事务型事实表）

把 ODS 层 ods_comment_info 表数据导入到 DWD 层评价事实表，在导入过程中可以做适当的清洗。

	时间	用户	地区	商品	优惠券	活动	编码	度量值
评价	√	√		√				个数

1）建表语句

```
hive (gmall)>
drop table if exists dwd_fact_comment_info;
create external table dwd_fact_comment_info(
    `id` string COMMENT '编号',
    `user_id` string COMMENT '用户 ID',
    `sku_id` string COMMENT '商品 sku',
    `spu_id` string COMMENT '商品 spu',
    `order_id` string COMMENT '订单 ID',
    `appraise` string COMMENT '评价',
    `create_time` string COMMENT '评价时间'
) COMMENT '评价事实表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwd/dwd_fact_comment_info/';
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwd_fact_comment_info partition(dt='2020-03-10')
select
    id,
    user_id,
    sku_id,
    spu_id,
    order_id,
    appraise,
    create_time
from ods_comment_info
where dt='2020-03-10';
```

3）查询加载结果

```
hive (gmall)> select * from dwd_fact_comment_info where dt='2020-03-10';
```

5.4.10 加购事实表（周期型快照事实表，每日快照）

由于购物车的数量是会发生变化，所以导增量不合适。

每天做一次快照，导入的数据是全量，区别于事务型事实表是每天导入新增。

周期型快照事实表劣势：存储的数据量会比较大。

解决方案：周期型快照事实表存储的数据比较讲究时效性，时间太久了的意义不大，可以删除以前的数据。

	时间	用户	地区	商品	优惠券	活动	编码	度量值
加购	√	√		√				件数/金额

1）建表语句

```
hive (gmall)>
drop table if exists dwd_fact_cart_info;
create external table dwd_fact_cart_info(
    `id` string COMMENT '编号',
    `user_id` string  COMMENT '用户 id',
    `sku_id` string  COMMENT 'skuid',
    `cart_price` string  COMMENT '放入购物车时价格',
    `sku_num` string  COMMENT '数量',
    `sku_name` string  COMMENT 'sku 名称 (冗余)',
    `create_time` string  COMMENT '创建时间',
    `operate_time` string COMMENT '修改时间',
    `is_ordered` string COMMENT '是否已经下单。1 为已下单;0 为未下单',
    `order_time` string  COMMENT '下单时间'
) COMMENT '加购事实表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwd/dwd_fact_cart_info/';
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwd_fact_cart_info partition(dt='2020-03-10')
select
    id,
    user_id,
    sku_id,
    cart_price,
    sku_num,
    sku_name,
    create_time,
    operate_time,
    is_ordered,
    order_time
from ods_cart_info
where dt='2020-03-10';
```

3）查询加载结果

```
hive (gmall)> select * from dwd_fact_cart_info where dt='2020-03-10';
```

5.4.11 收藏事实表（周期型快照事实表，每日快照）

收藏的标记，是否取消，会发生变化，做增量不合适。

每天做一次快照，导入的数据是全量，区别于事务型事实表是每天导入新增。

	时间	用户	地区	商品	优惠券	活动	编码	度量值
收藏	√	√		√				个数

1）建表语句

```
hive (gmall)>
drop table if exists dwd_fact_favor_info;
create external table dwd_fact_favor_info(
    `id` string COMMENT '编号',
    `user_id` string  COMMENT '用户 id',
    `sku_id` string  COMMENT 'skuid',
    `spu_id` string  COMMENT 'spuid',
    `is_cancel` string  COMMENT '是否取消',
    `create_time` string  COMMENT '收藏时间',
    `cancel_time` string  COMMENT '取消时间'
) COMMENT '收藏事实表'
```

```
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwd/dwd_fact_favor_info/';
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwd_fact_favor_info partition(dt='2020-03-10')
select
    id,
    user_id,
    sku_id,
    spu_id,
    is_cancel,
    create_time,
    cancel_time
from ods_favor_info
where dt='2020-03-10';
```

3）查询加载结果

```
hive (gmall)> select * from dwd_fact_favor_info where dt='2020-03-10';
```

5.4.12 优惠券领用事实表（累积型快照事实表）

	时间	用户	地区	商品	优惠券	活动	编码	度量值
优惠券领用	√	√			√			个数

优惠卷的生命周期：领取优惠卷-》用优惠卷下单-》优惠卷参与支付

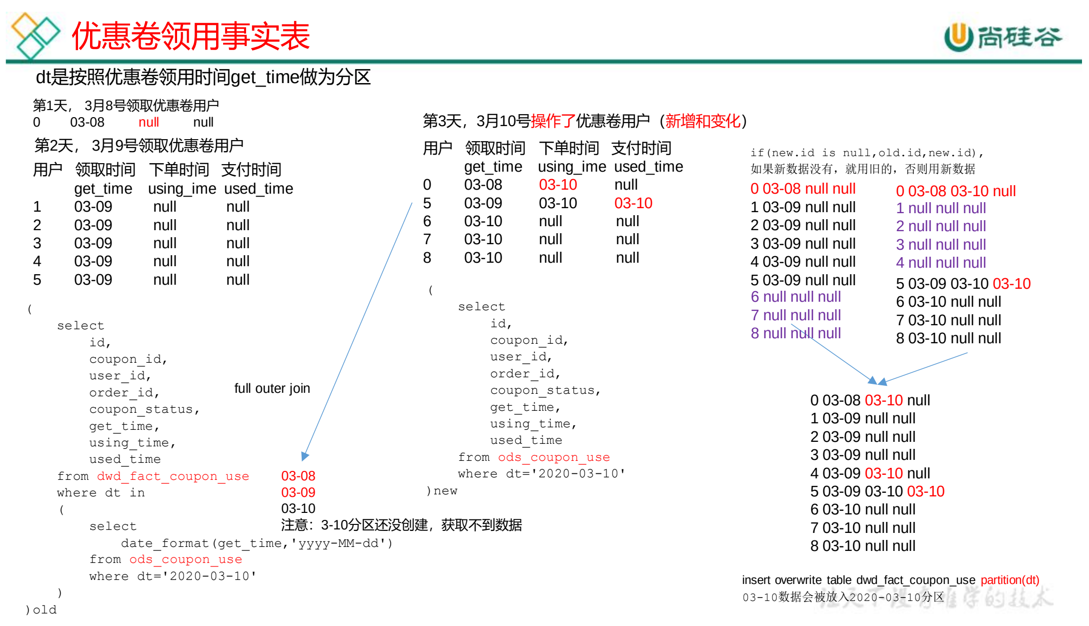
累积型快照事实表使用：统计优惠卷领取次数、优惠卷下单次数、优惠卷参与支付次数

1）建表语句

```
hive (gmall)>
drop table if exists dwd_fact_coupon_use;
create external table dwd_fact_coupon_use(
    `id` string COMMENT '编号',
    `coupon_id` string  COMMENT '优惠券 ID',
    `user_id` string  COMMENT 'userid',
    `order_id` string  COMMENT '订单 id',
    `coupon_status` string  COMMENT '优惠券状态',
    `get_time` string  COMMENT '领取时间',
    `using_time` string  COMMENT '使用时间(下单)',
    `used_time` string  COMMENT '使用时间(支付)'
) COMMENT '优惠券领用事实表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwd/dwd_fact_coupon_use/';
```

注意：dt 是按照优惠卷领用时间 get_time 做为分区。

2）数据装载



优惠卷领用事实表

dt是按照优惠卷领用时间get_time做为分区

第1天， 3月8号领取优惠卷用户

0	03-08	null	null

第2天， 3月9号领取优惠卷用户

用户	领取时间 get_time	下单时间 using_ime	支付时间 used_time
1	03-09	null	null
2	03-09	null	null
3	03-09	null	null
4	03-09	null	null
5	03-09	null	null

```
(
    select
        id,
        coupon_id,
        user_id,
        order_id,
        coupon_status,
        get_time,
        using_time,
        used_time
    from dwd_fact_coupon_use
    where dt in
    (
        select
            date_format(get_time,'yyyy-MM-dd')
        from ods_coupon_use
        where dt='2020-03-10'
    )
)old
```

full outer join

03-08
03-09
03-10
注意：3-10分区还没创建，获取不到数据

第3天，3月10号操作了优惠卷用户（新增和变化）

用户	领取时间 get_time	下单时间 using_ime	支付时间 used_time
0	03-08	03-10	null
5	03-09	03-10	03-10
6	03-10	null	null
7	03-10	null	null
8	03-10	null	null

```
(
    select
        id,
        coupon_id,
        user_id,
        order_id,
        coupon_status,
        get_time,
        using_time,
        used_time
    from ods_coupon_use
    where dt='2020-03-10'
)new
```

```
if(new.id is null,old.id,new.id),
```

如果新数据没有，就用旧的，否则用新数据

```
0 03-08 null null        0 03-08 03-10 null
1 03-09 null null        1 null null null
2 03-09 null null        2 null null null
3 03-09 null null        3 null null null
4 03-09 null null        4 null null null
5 03-09 null null        5 03-09 03-10 03-10
6 null null null         6 03-10 null null
7 null null null         7 03-10 null null
8 null null null         8 03-10 null null
```

```
0 03-08 03-10 null
1 03-09 null null
2 03-09 null null
3 03-09 null null
4 03-09 03-10 null
5 03-09 03-10 03-10
6 03-10 null null
7 03-10 null null
8 03-10 null null
```

insert overwrite table dwd_fact_coupon_use partition(dt)
03-10数据会被放入2020-03-10分区

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;
insert overwrite table dwd_fact_coupon_use partition(dt)
select
    if(new.id is null,old.id,new.id),
    if(new.coupon_id is null,old.coupon_id,new.coupon_id),
    if(new.user_id is null,old.user_id,new.user_id),
    if(new.order_id is null,old.order_id,new.order_id),
    if(new.coupon_status is null,old.coupon_status,new.coupon_status),
    if(new.get_time is null,old.get_time,new.get_time),
    if(new.using_time is null,old.using_time,new.using_time),
    if(new.used_time is null,old.used_time,new.used_time),
    date_format(if(new.get_time is null,old.get_time,new.get_time),'yyyy-MM-dd')
from
(
    select
        id,
        coupon_id,
        user_id,
        order_id,
        coupon_status,
        get_time,
        using_time,
        used_time
    from dwd_fact_coupon_use
    where dt in
    (
        select
            date_format(get_time,'yyyy-MM-dd')
        from ods_coupon_use
        where dt='2020-03-10'
    )
)old
full outer join
(
    select
        id,
        coupon_id,
        user_id,
        order_id,
        coupon_status,
        get_time,
        using_time,
        used_time
    from ods_coupon_use
    where dt='2020-03-10'
)new
on old.id=new.id;
```

3）查询加载结果

```
hive (gmall)> select * from dwd_fact_coupon_use where dt='2020-03-10';
```

5.4.13 订单事实表（累积型快照事实表）

1）concat 函数

concat 函数在连接字符串的时候，只要其中一个是 NULL，那么将返回 NULL

```
hive> select concat('a','b');
ab

hive> select concat('a','b',null);
NULL
```

2）concat_ws 函数

concat_ws 函数在连接字符串的时候，只要有一个字符串不是 NULL，就不会返回 NULL。concat_ws 函数需要指定分隔符。

```
hive> select concat_ws('-','a','b');
a-b

hive> select concat_ws('-','a','b',null);
a-b

hive> select concat_ws('','a','b',null);
ab
```

3）STR_TO_MAP 函数

（1）语法描述

STR_TO_MAP(VARCHAR text, VARCHAR listDelimiter, VARCHAR keyValueDelimiter)

（2）功能描述

使用 listDelimiter 将 text 分隔成 K-V 对，然后使用 keyValueDelimiter 分隔每个 K-V 对，组装成 MAP 返回。默认 listDelimiter 为（ ，），keyValueDelimiter 为（=）。

（3）案例

```
str_to_map('1001=2020-03-10,1002=2020-03-10',  ','  ,  '=')
输出
{"1001":"2020-03-10","1002":"2020-03-10"}
```

4）建表语句

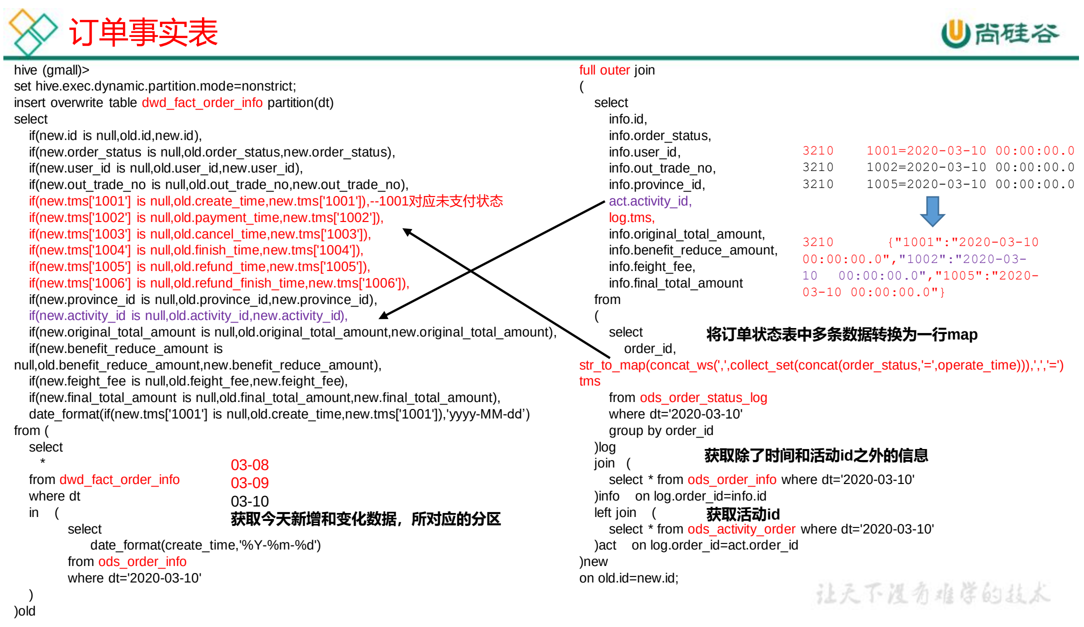
	时间	用户	地区	商品	优惠券	活动	编码	度量值
订单	√	√	√			√		件数/金额

订单生命周期：创建时间=》支付时间=》取消时间=》完成时间=》退款时间=》退款完成时间。

由于 ODS 层订单表只有创建时间和操作时间两个状态，不能表达所有时间含义，所以需要关联订单状态表。订单事实表里面增加了活动 id，所以需要关联活动订单表。

```
hive (gmall)>
drop table if exists dwd_fact_order_info;
create external table dwd_fact_order_info (
    `id` string COMMENT '订单编号',
    `order_status` string COMMENT '订单状态',
    `user_id` string COMMENT '用户 id',
    `out_trade_no` string COMMENT '支付流水号',
    `create_time` string COMMENT '创建时间(未支付状态)',
    `payment_time` string COMMENT '支付时间(已支付状态)',
    `cancel_time` string COMMENT '取消时间(已取消状态)',
    `finish_time` string COMMENT '完成时间(已完成状态)',
    `refund_time` string COMMENT '退款时间(退款中状态)',
    `refund_finish_time` string COMMENT '退款完成时间(退款完成状态)',
    `province_id` string COMMENT '省份 ID',
    `activity_id` string COMMENT '活动 ID',
    `original_total_amount` string COMMENT '原价金额',
    `benefit_reduce_amount` string COMMENT '优惠金额',
    `feight_fee` string COMMENT '运费',
    `final_total_amount` decimal(10,2) COMMENT '订单金额'
)
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dwd/dwd_fact_order_info/'
tblproperties ("parquet.compression"="lzo");
```

5）数据装载



订单事实表

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;
insert overwrite table dwd_fact_order_info partition(dt)
select
    if(new.id is null,old.id,new.id),
    if(new.order_status is null,old.order_status,new.order_status),
    if(new.user_id is null,old.user_id,new.user_id),
    if(new.out_trade_no is null,old.out_trade_no,new.out_trade_no),
    if(new.tms['1001'] is null,old.create_time,new.tms['1001']),--1001对应未支付状态
    if(new.tms['1002'] is null,old.payment_time,new.tms['1002']),
    if(new.tms['1003'] is null,old.cancel_time,new.tms['1003']),
    if(new.tms['1004'] is null,old.finish_time,new.tms['1004']),
    if(new.tms['1005'] is null,old.refund_time,new.tms['1005']),
    if(new.tms['1006'] is null,old.refund_finish_time,new.tms['1006']),
    if(new.province_id is null,old.province_id,new.province_id),
    if(new.activity_id is null,old.activity_id,new.activity_id),
    if(new.original_total_amount is null,old.original_total_amount,new.original_total_amount),
    if(new.benefit_reduce_amount is
null,old.benefit_reduce_amount,new.benefit_reduce_amount),
    if(new.feight_fee is null,old.feight_fee,new.feight_fee),
    if(new.final_total_amount is null,old.final_total_amount,new.final_total_amount),
    date_format(if(new.tms['1001'] is null,old.create_time,new.tms['1001']),'yyyy-MM-dd’)
from (
    select
      *
    from dwd_fact_order_info
    where dt
    in   (
            select
                date_format(create_time,'%Y-%m-%d')
            from ods_order_info
            where dt='2020-03-10'
    )
)old
```

03-08
03-09
03-10
获取今天新增和变化数据，所对应的分区

```
full outer join
(
    select
        info.id,
        info.order_status,
        info.user_id,
        info.out_trade_no,
        info.province_id,
        act.activity_id,
        log.tms,
        info.original_total_amount,
        info.benefit_reduce_amount,
        info.feight_fee,
        info.final_total_amount
    from
    (
        select
            order_id,
str_to_map(concat_ws(',',collect_set(concat(order_status,'=',operate_time))),',','=')
tms
        from ods_order_status_log
        where dt='2020-03-10'
        group by order_id
    )log
    join   (
        select * from ods_order_info where dt='2020-03-10'
    )info   on log.order_id=info.id
    left join   (
        select * from ods_activity_order where dt='2020-03-10'
    )act   on log.order_id=act.order_id
)new
on old.id=new.id;
```

```
3210    1001=2020-03-10 00:00:00.0
3210    1002=2020-03-10 00:00:00.0
3210    1005=2020-03-10 00:00:00.0

3210      {"1001":"2020-03-10
00:00:00.0","1002":"2020-03-
10  00:00:00.0","1005":"2020-
03-10 00:00:00.0"}
```

将订单状态表中多条数据转换为一行map

获取除了时间和活动id之外的信息

获取活动id

5）常用函数

```
hive   (gmall)>   select   order_id,   concat(order_status,'=',   operate_time)   from
ods_order_status_log where dt='2020-03-10';

3210   1001=2020-03-10 00:00:00.0
3211   1001=2020-03-10 00:00:00.0
3212   1001=2020-03-10 00:00:00.0
3210   1002=2020-03-10 00:00:00.0
3211   1002=2020-03-10 00:00:00.0
3212   1002=2020-03-10 00:00:00.0
```

```
3210    1005=2020-03-10 00:00:00.0
3211    1004=2020-03-10 00:00:00.0
3212    1004=2020-03-10 00:00:00.0
```

```
hive (gmall)> select order_id, collect_set(concat(order_status,'=',operate_time)) from
ods_order_status_log where dt='2020-03-10' group by order_id;

3210    ["1001=2020-03-10 00:00:00.0","1002=2020-03-10 00:00:00.0","1005=2020-03-10 00:00:00.0"]
3211    ["1001=2020-03-10 00:00:00.0","1002=2020-03-10 00:00:00.0","1004=2020-03-10 00:00:00.0"]
3212    ["1001=2020-03-10 00:00:00.0","1002=2020-03-10 00:00:00.0","1004=2020-03-10 00:00:00.0"]
```

```
hive (gmall)>
select  order_id,  concat_ws(',',  collect_set(concat(order_status,'=',operate_time)))
 from ods_order_status_log where dt='2020-03-10' group by order_id;

3210    1001=2020-03-10 00:00:00.0,1002=2020-03-10 00:00:00.0,1005=2020-03-10 00:00:00.0
3211    1001=2020-03-10 00:00:00.0,1002=2020-03-10 00:00:00.0,1004=2020-03-10 00:00:00.0
3212    1001=2020-03-10 00:00:00.0,1002=2020-03-10 00:00:00.0,1004=2020-03-10 00:00:00.0
```

```
hive (gmall)>
select                                                                          order_id,
str_to_map(concat_ws(',',collect_set(concat(order_status,'=',operate_time))),  ','    ,
'=') from ods_order_status_log where dt='2020-03-10' group by order_id;

3210    {"1001":"2020-03-10 00:00:00.0","1002":"2020-03-10 00:00:00.0","1005":"2020-03-10 00:00:00.0"}
3211    {"1001":"2020-03-10 00:00:00.0","1002":"2020-03-10 00:00:00.0","1004":"2020-03-10 00:00:00.0"}
3212    {"1001":"2020-03-10 00:00:00.0","1002":"2020-03-10 00:00:00.0","1004":"2020-03-10 00:00:00.0"}
```

6）数据装载

```
hive (gmall)>
set hive.exec.dynamic.partition.mode=nonstrict;
insert overwrite table dwd_fact_order_info partition(dt)
select
   if(new.id is null,old.id,new.id),
   if(new.order_status is null,old.order_status,new.order_status),
   if(new.user_id is null,old.user_id,new.user_id),
   if(new.out_trade_no is null,old.out_trade_no,new.out_trade_no),
   if(new.tms['1001'] is null,old.create_time,new.tms['1001']),--1001 对应未支付状态
   if(new.tms['1002'] is null,old.payment_time,new.tms['1002']),
   if(new.tms['1003'] is null,old.cancel_time,new.tms['1003']),
   if(new.tms['1004'] is null,old.finish_time,new.tms['1004']),
   if(new.tms['1005'] is null,old.refund_time,new.tms['1005']),
   if(new.tms['1006'] is null,old.refund_finish_time,new.tms['1006']),
   if(new.province_id is null,old.province_id,new.province_id),
   if(new.activity_id is null,old.activity_id,new.activity_id),
   if(new.original_total_amount                                                     is
null,old.original_total_amount,new.original_total_amount),
   if(new.benefit_reduce_amount                                                     is
null,old.benefit_reduce_amount,new.benefit_reduce_amount),
   if(new.feight_fee is null,old.feight_fee,new.feight_fee),
   if(new.final_total_amount is null,old.final_total_amount,new.final_total_amount),
   date_format(if(new.tms['1001']  is  null,old.create_time,new.tms['1001']),'yyyy-MM-
dd')
from
(
   select
      id,
      order_status,
      user_id,
      out_trade_no,
      create_time,
      payment_time,
      cancel_time,
      finish_time,
      refund_time,
      refund_finish_time,
      province_id,
      activity_id,
      original_total_amount,
      benefit_reduce_amount,
      feight_fee,
      final_total_amount
   from dwd_fact_order_info
   where dt
   in
   (
      select
        date_format(create_time,'yyyy-MM-dd')
      from ods_order_info
      where dt='2020-03-10'
   )
)old
full outer join
(
   select
      info.id,
      info.order_status,
      info.user_id,
      info.out_trade_no,
      info.province_id,
      act.activity_id,
      log.tms,
      info.original_total_amount,
      info.benefit_reduce_amount,
      info.feight_fee,
      info.final_total_amount
   from
   (
      select
          order_id,

str_to_map(concat_ws(',',collect_set(concat(order_status,'=',operate_time))),',','=')
tms
      from ods_order_status_log
      where dt='2020-03-10'
      group by order_id
   )log
   join
   (
      select * from ods_order_info where dt='2020-03-10'
   )info
   on log.order_id=info.id
   left join
   (
      select * from ods_activity_order where dt='2020-03-10'
   )act
   on log.order_id=act.order_id
)new
on old.id=new.id;
```

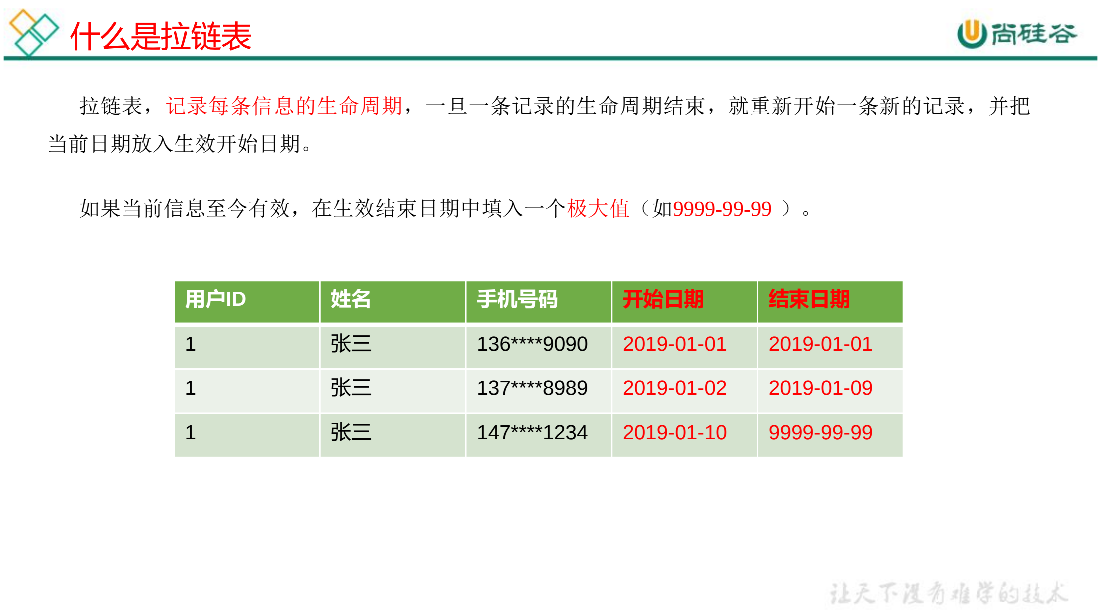
6）查询加载结果

```
hive (gmall)> select * from dwd_fact_order_info where dt='2020-03-10';
```

5.4.14 用户维度表（拉链表）

用户表中的数据每日既有可能新增，也有可能修改，但修改频率并不高，属于缓慢变化维度，此处采用拉链表存储用户维度数据。

1）什么是拉链表



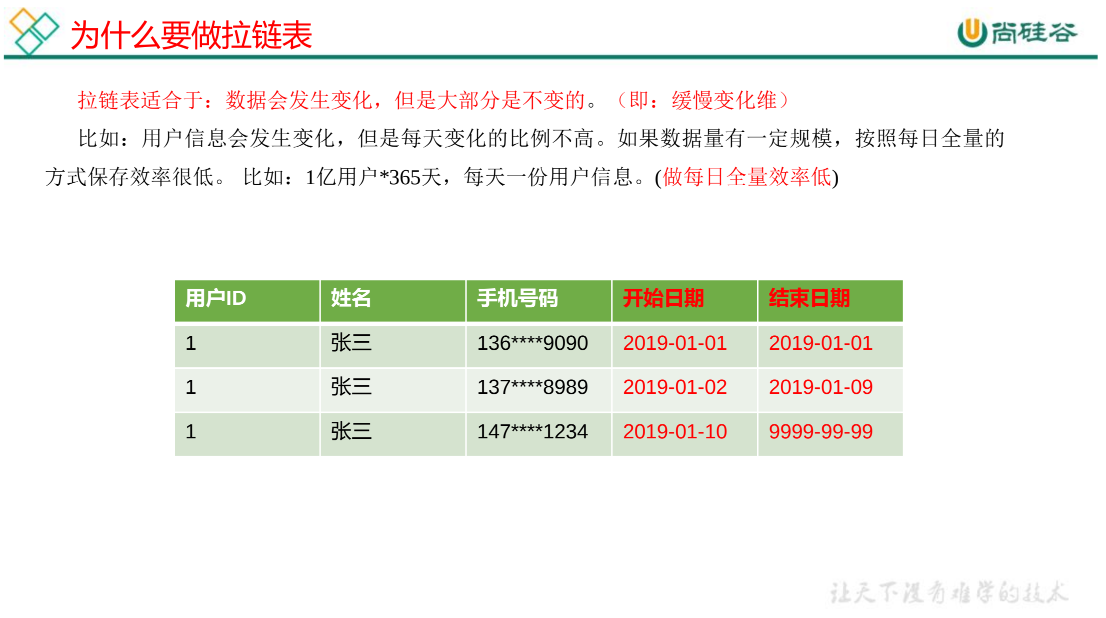
什么是拉链表

拉链表，记录每条信息的生命周期，一旦一条记录的生命周期结束，就重新开始一条新的记录，并把当前日期放入生效开始日期。

如果当前信息至今有效，在生效结束日期中填入一个极大值（如9999-99-99 ）。

用户ID	姓名	手机号码	开始日期	结束日期
1	张三	136****9090	2019-01-01	2019-01-01
1	张三	137****8989	2019-01-02	2019-01-09
1	张三	147****1234	2019-01-10	9999-99-99

2）为什么要做拉链表

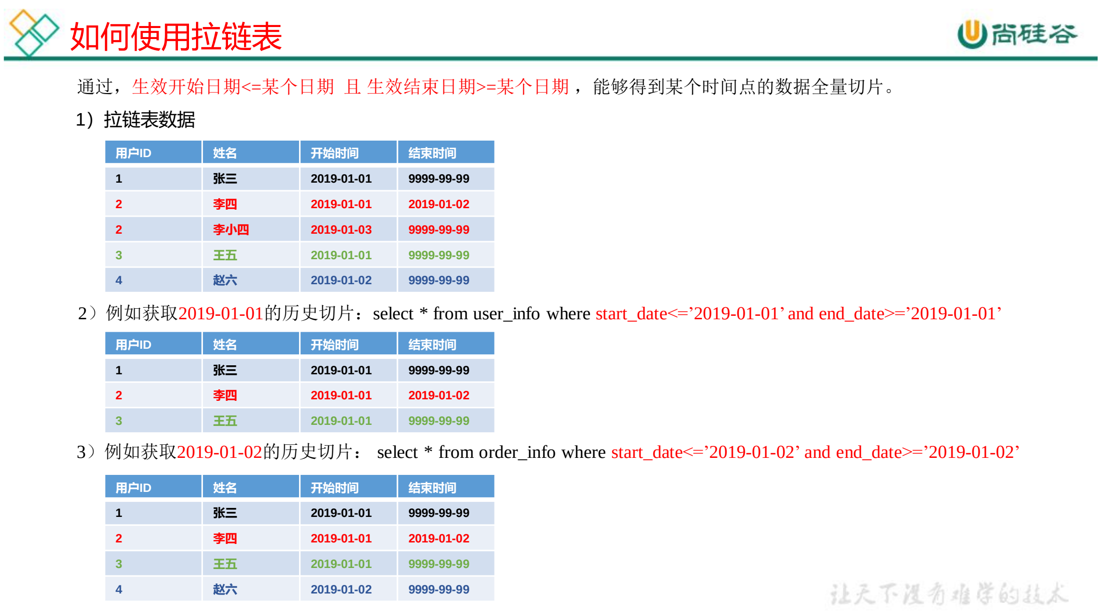


为什么要做拉链表

拉链表适合于：数据会发生变化，但是大部分是不变的。（即：缓慢变化维）

比如：用户信息会发生变化，但是每天变化的比例不高。如果数据量有一定规模，按照每日全量的方式保存效率很低。 比如：1亿用户*365天，每天一份用户信息。(做每日全量效率低)

用户ID	姓名	手机号码	开始日期	结束日期
1	张三	136****9090	2019-01-01	2019-01-01
1	张三	137****8989	2019-01-02	2019-01-09
1	张三	147****1234	2019-01-10	9999-99-99



如何使用拉链表

通过，生效开始日期<=某个日期 且 生效结束日期>=某个日期，能够得到某个时间点的数据全量切片。

1）拉链表数据

用户ID	姓名	开始时间	结束时间
1	张三	2019-01-01	9999-99-99
2	李四	2019-01-01	2019-01-02
2	李小四	2019-01-03	9999-99-99
3	王五	2019-01-01	9999-99-99
4	赵六	2019-01-02	9999-99-99

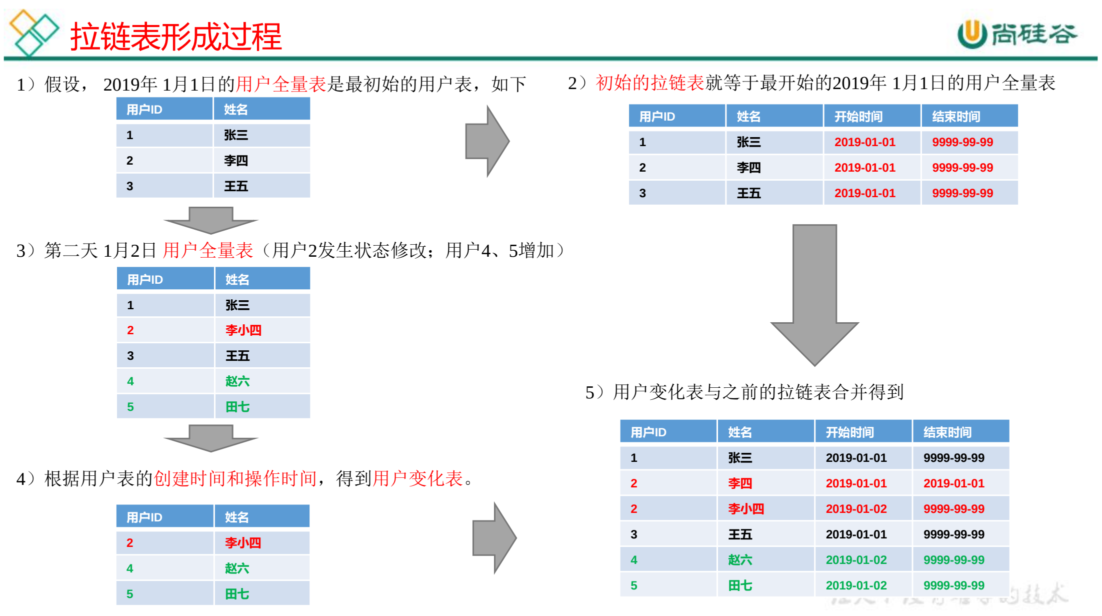
2）例如获取2019-01-01的历史切片：select * from user_info where start_date<=’2019-01-01’ and end_date>=’2019-01-01’

用户ID	姓名	开始时间	结束时间
1	张三	2019-01-01	9999-99-99
2	李四	2019-01-01	2019-01-02
3	王五	2019-01-01	9999-99-99

3）例如获取2019-01-02的历史切片： select * from order_info where start_date<=’2019-01-02’ and end_date>=’2019-01-02’

用户ID	姓名	开始时间	结束时间
1	张三	2019-01-01	9999-99-99
2	李四	2019-01-01	2019-01-02
3	王五	2019-01-01	9999-99-99
4	赵六	2019-01-02	9999-99-99

3）拉链表形成过程



拉链表形成过程

1）假设， 2019年 1月1日的用户全量表是最初始的用户表，如下

用户ID	姓名
1	张三
2	李四
3	王五

2）初始的拉链表就等于最开始的2019年 1月1日的用户全量表

用户ID	姓名	开始时间	结束时间
1	张三	2019-01-01	9999-99-99
2	李四	2019-01-01	9999-99-99
3	王五	2019-01-01	9999-99-99

3）第二天 1月2日 用户全量表（用户2发生状态修改；用户4、5增加）

用户ID	姓名
1	张三
2	李小四
3	王五
4	赵六
5	田七

4）根据用户表的创建时间和操作时间，得到用户变化表。

用户ID	姓名
2	李小四
4	赵六
5	田七

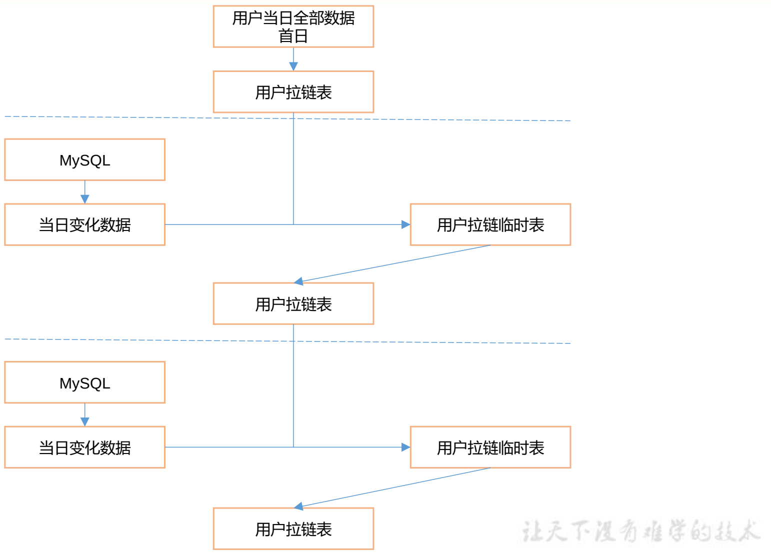
5）用户变化表与之前的拉链表合并得到

用户ID	姓名	开始时间	结束时间
1	张三	2019-01-01	9999-99-99
2	李四	2019-01-01	2019-01-01
2	李小四	2019-01-02	9999-99-99
3	王五	2019-01-01	9999-99-99
4	赵六	2019-01-02	9999-99-99
5	田七	2019-01-02	9999-99-99

4）拉链表制作过程图

拉链表制作流程图

用户当日全部数据和MySQL中每天变化的数据拼接在一起，形成一个新的临时拉链表数据。用临时的拉链表覆盖旧的拉链表数据。（这就解决了hive表中数据不能更新的问题）



5）拉链表制作过程

步骤 0：初始化拉链表（首次独立执行）

（1）建立拉链表

```
hive (gmall)>
drop table if exists dwd_dim_user_info_his;
create external table dwd_dim_user_info_his(
    `id` string COMMENT '用户 id',
    `name` string COMMENT '姓名',
    `birthday` string COMMENT '生日',
    `gender` string COMMENT '性别',
    `email` string COMMENT '邮箱',
    `user_level` string COMMENT '用户等级',
    `create_time` string COMMENT '创建时间',
    `operate_time` string COMMENT '操作时间',
    `start_date`  string COMMENT '有效开始日期',
    `end_date`  string COMMENT '有效结束日期'
) COMMENT '订单拉链表'
stored as parquet
location '/warehouse/gmall/dwd/dwd_dim_user_info_his/'
tblproperties ("parquet.compression"="lzo");
```

（2）初始化拉链表

```
hive (gmall)>
insert overwrite table dwd_dim_user_info_his
select
    id,
    name,
    birthday,
    gender,
    email,
    user_level,
    create_time,
    operate_time,
    '2020-03-10',
    '9999-99-99'
from ods_user_info oi
where oi.dt='2020-03-10';
```

步骤 1：制作当日变动数据（包括新增，修改）每日执行

（1）如何获得每日变动表

a.最好表内有创建时间和变动时间（Lucky!）

b.如果没有，可以利用第三方工具监控比如 canal，监控 MySQL 的实时变化进行记录（麻烦）。

c.逐行对比前后两天的数据，检查 md5(concat(全部有可能变化的字段))是否相同(low)

d.要求业务数据库提供变动流水（人品，颜值）

（2）因为 ods_order_info 本身导入过来就是新增变动明细的表，所以不用处理

a）数据库中新增 2020-03-11 一天的数据

b）通过 Sqoop 把 2020-03-11 日所有数据导入

```
mysqlTohdfs.sh all 2020-03-11
```

c）ods 层数据导入

```
hdfs_to_ods_db.sh all 2020-03-11
```

步骤 2：先合并变动信息，再追加新增信息，插入到临时表中

1）建立临时表

```
hive (gmall)>
drop table if exists dwd_dim_user_info_his_tmp;
create external table dwd_dim_user_info_his_tmp(
    `id` string COMMENT '用户 id',
    `name` string COMMENT '姓名',
    `birthday` string COMMENT '生日',
    `gender` string COMMENT '性别',
    `email` string COMMENT '邮箱',
    `user_level` string COMMENT '用户等级',
    `create_time` string COMMENT '创建时间',
    `operate_time` string COMMENT '操作时间',
    `start_date`  string COMMENT '有效开始日期',
    `end_date`  string COMMENT '有效结束日期'
) COMMENT '订单拉链临时表'
stored as parquet
location '/warehouse/gmall/dwd/dwd_dim_user_info_his_tmp/'
tblproperties ("parquet.compression"="lzo");
```

2）导入脚本

```
hive (gmall)>
insert overwrite table dwd_dim_user_info_his_tmp
select * from
(
    select
        id,
        name,
        birthday,
        gender,
        email,
        user_level,
        create_time,
        operate_time,
        '2020-03-11' start_date,
        '9999-99-99' end_date
    from ods_user_info where dt='2020-03-11'

    union all
    select
        uh.id,
        uh.name,
        uh.birthday,
        uh.gender,
        uh.email,
        uh.user_level,
        uh.create_time,
        uh.operate_time,
        uh.start_date,
        if(ui.id is not null  and uh.end_date='9999-99-99', date_add(ui.dt,-1), 
uh.end_date) end_date
    from dwd_dim_user_info_his uh left join
    (
        select
            *
        from ods_user_info
        where dt='2020-03-11'
    ) ui on uh.id=ui.id
)his
order by his.id, start_date;
```

步骤 3：把临时表覆盖给拉链表

1）导入数据

```
hive (gmall)>
insert overwrite table dwd_dim_user_info_his 
select * from dwd_dim_user_info_his_tmp;
```

2）查询导入数据

```
hive (gmall)> select id, start_date, end_date from dwd_dim_user_info_his;
```

5.4.15 DWD 层业务数据导入脚本

1）在/home/atguigu/bin 目录下创建脚本 ods_to_dwd_db.sh

```
[atguigu@hadoop102 bin]$ vim ods_to_dwd_db.sh
```

注意：该脚本中不包含时间维度表的数据导入以及用户维度表的初始化导入，上述工作应手动执行。

在脚本中填写如下内容

```
#!/bin/bash

APP=gmall
hive=/opt/module/hive/bin/hive

# 如果是输入的日期按照取输入日期；如果没输入日期取当前时间的前一天
if [ -n "$2" ] ;then
    do_date=$2
else 
    do_date=`date -d "-1 day" +%F`
fi
```

```
sql1="
set hive.exec.dynamic.partition.mode=nonstrict;

insert overwrite table ${APP}.dwd_dim_sku_info partition(dt='$do_date')
select
    sku.id,
    sku.spu_id,
    sku.price,
    sku.sku_name,
    sku.sku_desc,
    sku.weight,
    sku.tm_id,
    ob.tm_name,
    sku.category3_id,
    c2.id category2_id,
    c1.id category1_id,
    c3.name category3_name,
    c2.name category2_name,
    c1.name category1_name,
    spu.spu_name,
    sku.create_time
from
(
    select * from ${APP}.ods_sku_info where dt='$do_date'
)sku
join
(
    select * from ${APP}.ods_base_trademark where dt='$do_date'
)ob on sku.tm_id=ob.tm_id
join
(
    select * from ${APP}.ods_spu_info where dt='$do_date'
)spu on spu.id = sku.spu_id
join
(
    select * from ${APP}.ods_base_category3 where dt='$do_date'
)c3 on sku.category3_id=c3.id
join
(
    select * from ${APP}.ods_base_category2 where dt='$do_date'
)c2 on c3.category2_id=c2.id
join
(
    select * from ${APP}.ods_base_category1 where dt='$do_date'
)c1 on c2.category1_id=c1.id;


insert overwrite table ${APP}.dwd_dim_coupon_info partition(dt='$do_date')
select
    id,
    coupon_name,
    coupon_type,
    condition_amount,
    condition_num,
    activity_id,
    benefit_amount,
    benefit_discount,
    create_time,
    range_type,
    spu_id,
    tm_id,
    category3_id,
    limit_num,
    operate_time,
    expire_time
from ${APP}.ods_coupon_info
where dt='$do_date';


insert overwrite table ${APP}.dwd_dim_activity_info partition(dt='$do_date')
select
    info.id,
    info.activity_name,
    info.activity_type,
    rule.condition_amount,
    rule.condition_num,
    rule.benefit_amount,
    rule.benefit_discount,
    rule.benefit_level,
    info.start_time,
    info.end_time,
    info.create_time
from
(
    select * from ${APP}.ods_activity_info where dt='$do_date'
)info
left join
(
    select * from ${APP}.ods_activity_rule where dt='$do_date'
)rule on info.id = rule.activity_id;


insert overwrite table ${APP}.dwd_fact_order_detail partition(dt='$do_date')
select
    od.id,
    od.order_id,
    oi.province_id,
    od.user_id,
    od.sku_id,
    od.create_time,
    od.order_price*od.sku_num,
    od.sku_num
from
(
    select * from ${APP}.ods_order_detail where dt='$do_date'
) od
join
(
    select * from ${APP}.ods_order_info where dt='$do_date'
) oi
on od.order_id=oi.id;


insert overwrite table ${APP}.dwd_fact_payment_info partition(dt='$do_date')
select
    pi.id,
    pi.out_trade_no,
    pi.order_id,
    pi.user_id,
    pi.alipay_trade_no,
    pi.total_amount,
    pi.subject,
    pi.payment_type,
    pi.payment_time,
    oi.province_id
```

```
from
(
    select * from ${APP}.ods_payment_info where dt='$do_date'
)pi
join
(
    select id, province_id from ${APP}.ods_order_info where dt='$do_date'
)oi
on pi.order_id = oi.id;


insert overwrite table ${APP}.dwd_fact_order_refund_info partition(dt='$do_date')
select
    id,
    user_id,
    order_id,
    sku_id,
    refund_type,
    refund_num,
    refund_amount,
    refund_reason_type,
    create_time
from ${APP}.ods_order_refund_info
where dt='$do_date';


insert overwrite table ${APP}.dwd_fact_comment_info partition(dt='$do_date')
select
    id,
    user_id,
    sku_id,
    spu_id,
    order_id,
    appraise,
    create_time
from ${APP}.ods_comment_info
where dt='$do_date';


insert overwrite table ${APP}.dwd_fact_cart_info partition(dt='$do_date')
select
    id,
    user_id,
    sku_id,
    cart_price,
    sku_num,
    sku_name,
    create_time,
    operate_time,
    is_ordered,
    order_time
from ${APP}.ods_cart_info
where dt='$do_date';


insert overwrite table ${APP}.dwd_fact_favor_info partition(dt='$do_date')
select
    id,
    user_id,
    sku_id,
    spu_id,
    is_cancel,
    create_time,
    cancel_time
from ${APP}.ods_favor_info
where dt='$do_date';

insert overwrite table ${APP}.dwd_fact_coupon_use partition(dt)
select
    if(new.id is null,old.id,new.id),
    if(new.coupon_id is null,old.coupon_id,new.coupon_id),
    if(new.user_id is null,old.user_id,new.user_id),
    if(new.order_id is null,old.order_id,new.order_id),
    if(new.coupon_status is null,old.coupon_status,new.coupon_status),
    if(new.get_time is null,old.get_time,new.get_time),
    if(new.using_time is null,old.using_time,new.using_time),
    if(new.used_time is null,old.used_time,new.used_time),
    date_format(if(new.get_time is null,old.get_time,new.get_time),'yyyy-MM-dd')
from
(
    select
        id,
        coupon_id,
        user_id,
        order_id,
        coupon_status,
        get_time,
        using_time,
        used_time
    from ${APP}.dwd_fact_coupon_use
    where dt in
    (
        select
            date_format(get_time,'yyyy-MM-dd')
        from ${APP}.ods_coupon_use
        where dt='$do_date'
    )
)old
full outer join
(
    select
        id,
        coupon_id,
        user_id,
        order_id,
        coupon_status,
        get_time,
        using_time,
        used_time
    from ${APP}.ods_coupon_use
    where dt='$do_date'
)new
on old.id=new.id;


insert overwrite table ${APP}.dwd_fact_order_info partition(dt)
select
    if(new.id is null,old.id,new.id),
    if(new.order_status is null,old.order_status,new.order_status),
    if(new.user_id is null,old.user_id,new.user_id),
    if(new.out_trade_no is null,old.out_trade_no,new.out_trade_no),
    if(new.tms['1001'] is null,old.create_time,new.tms['1001']),--1001 对应未支付状态
    if(new.tms['1002'] is null,old.payment_time,new.tms['1002']),
    if(new.tms['1003'] is null,old.cancel_time,new.tms['1003']),
    if(new.tms['1004'] is null,old.finish_time,new.tms['1004']),
    if(new.tms['1005'] is null,old.refund_time,new.tms['1005']),
    if(new.tms['1006'] is null,old.refund_finish_time,new.tms['1006']),
    if(new.province_id is null,old.province_id,new.province_id),
    if(new.activity_id is null,old.activity_id,new.activity_id),
    if(new.original_total_amount                                              is
null,old.original_total_amount,new.original_total_amount),
    if(new.benefit_reduce_amount                                              is
null,old.benefit_reduce_amount,new.benefit_reduce_amount),
    if(new.feight_fee is null,old.feight_fee,new.feight_fee),
    if(new.final_total_amount                                                 is
null,old.final_total_amount,new.final_total_amount),
    date_format(if(new.tms['1001']  is  null,old.create_time,new.tms['1001']),'yyyy-
MM-dd')
from
(
    select
        id,
        order_status,
        user_id,
        out_trade_no,
        create_time,
        payment_time,
        cancel_time,
        finish_time,
        refund_time,
        refund_finish_time,
        province_id,
        activity_id,
        original_total_amount,
        benefit_reduce_amount,
        feight_fee,
        final_total_amount
    from ${APP}.dwd_fact_order_info
    where dt
    in
    (
        select
          date_format(create_time,'yyyy-MM-dd')
        from ${APP}.ods_order_info
        where dt='$do_date'
    )
)old
full outer join
(
    select
        info.id,
        info.order_status,
        info.user_id,
        info.out_trade_no,
        info.province_id,
        act.activity_id,
        log.tms,
        info.original_total_amount,
        info.benefit_reduce_amount,
        info.feight_fee,
        info.final_total_amount
    from
    (
        select
            order_id,

str_to_map(concat_ws(',',collect_set(concat(order_status,'=',operate_time))),',','
=') tms
        from ${APP}.ods_order_status_log
        where dt='$do_date'
        group by order_id
    )log
    join
    (
        select * from ${APP}.ods_order_info where dt='$do_date'
    )info
    on log.order_id=info.id
    left join
    (
        select * from ${APP}.ods_activity_order where dt='$do_date'
    )act
    on log.order_id=act.order_id
)new
on old.id=new.id;
"

sql2="
insert overwrite table ${APP}.dwd_dim_base_province
select
    bp.id,
    bp.name,
    bp.area_code,
    bp.iso_code,
    bp.region_id,
    br.region_name
from ${APP}.ods_base_province bp
join ${APP}.ods_base_region br
on bp.region_id=br.id;
"

sql3="
insert overwrite table ${APP}.dwd_dim_user_info_his_tmp
select * from
(
    select
        id,
        name,
        birthday,
        gender,
        email,
        user_level,
        create_time,
        operate_time,
        '$do_date' start_date,
        '9999-99-99' end_date
    from ${APP}.ods_user_info where dt='$do_date'

    union all
    select
        uh.id,
        uh.name,
        uh.birthday,
        uh.gender,
        uh.email,
        uh.user_level,
        uh.create_time,
        uh.operate_time,
        uh.start_date,
        if(ui.id is not null  and uh.end_date='9999-99-99', date_add(ui.dt,-1), 
uh.end_date) end_date
    from ${APP}.dwd_dim_user_info_his uh left join
    (
       select
           *
       from ${APP}.ods_user_info
       where dt='$do_date'
    ) ui on uh.id=ui.id
)his
order by his.id, start_date;

insert overwrite table ${APP}.dwd_dim_user_info_his
select * from ${APP}.dwd_dim_user_info_his_tmp;
"

case $1 in
"first"){
    $hive -e "$sql1$sql2"
};;
"all"){
    $hive -e "$sql1$sql3"
};;
esac
```

2）增加脚本执行权限

```
[atguigu@hadoop102 bin]$ chmod 777 ods_to_dwd_db.sh
```

3）初次导入

（1）时间维度表

参照 5.4.5 节数据装载

（2）用户维度表

参照 5.4.14 节拉链表初始化

（3）其余表

```
[atguigu@hadoop102 bin]$ ods_to_dwd_db.sh first 2020-03-10
```

4）每日定时导入

```
[atguigu@hadoop102 bin]$ ods_to_dwd_db.sh all 2020-03-11
```

第 6 章 数仓搭建-DWS 层

6.1 业务术语

1）用户

用户以设备为判断标准，在移动统计中，每个独立设备认为是一个独立用户。Android 系统根据 IMEI 号，IOS 系统根据 OpenUDID 来标识一个独立用户，每部手机一个用户。

2）新增用户

首次联网使用应用的用户。如果一个用户首次打开某 APP，那这个用户定义为新增用户；卸载再安装的设备，不会被算作一次新增。新增用户包括日新增用户、周新增用户、月新增用户。

3）活跃用户

打开应用的用户即为活跃用户，不考虑用户的使用情况。每天一台设备打开多次会被计

为一个活跃用户。

4）周（月）活跃用户

某个自然周（月）内启动过应用的用户，该周（月）内的多次启动只记一个活跃用户。

5）月活跃率

月活跃用户与截止到该月累计的用户总和之间的比例。

6）沉默用户

用户仅在安装当天（次日）启动一次，后续时间无再启动行为。该指标可以反映新增用户质量和用户与 APP 的匹配程度。

7）版本分布

不同版本的周内各天新增用户数，活跃用户数和启动次数。利于判断 APP 各个版本之间的优劣和用户行为习惯。

8）本周回流用户

上周未启动过应用，本周启动了应用的用户。

9）连续 n 周活跃用户

连续 n 周，每周至少启动一次。

10）忠诚用户

连续活跃 5 周以上的用户

11）连续活跃用户

连续 2 周及以上活跃的用户

12）近期流失用户

连续 n（2<= n <= 4）周没有启动应用的用户。（第 n+1 周没有启动过）

13）留存用户

某段时间内的新增用户，经过一段时间后，仍然使用应用的被认作是留存用户；这部分用户占当时新增用户的比例即是留存率。

例如，5 月份新增用户 200，这 200 人在 6 月份启动过应用的有 100 人，7 月份启动过应用的有 80 人，8 月份启动过应用的有 50 人；则 5 月份新增用户一个月后的留存率是 50%，二个月后的留存率是 40%，三个月后的留存率是 25%。

14）用户新鲜度

每天启动应用的新老用户比例，即新增用户数占活跃用户数的比例。

15）单次使用时长

每次启动使用的时间长度。

16）日使用时长

累计一天内的使用时间长度。

17）启动次数计算标准

IOS 平台应用退到后台就算一次独立的启动；Android 平台我们规定，两次启动之间的间隔小于 30 秒，被计算一次启动。用户在使用过程中，若因收发短信或接电话等退出应用 30 秒又再次返回应用中，那这两次行为应该是延续而非独立的，所以可以被算作一次使用行为，即一次启动。业内大多使用 30 秒这个标准，但用户还是可以自定义此时间间隔。

6.2 系统函数

6.2.1 collect_set 函数

1）创建原数据表

```
hive (gmall)>
drop table if exists stud;
create table stud (name string, area string, course string,
score int);
```

2）向原数据表中插入数据

```
hive (gmall)>
insert into table stud values('zhang3','bj','math',88);
insert into table stud values('li4','bj','math',99);
insert into table stud values('wang5','sh','chinese',92);
insert into table stud values('zhao6','sh','chinese',54);
insert into table stud values('tian7','bj','chinese',91);
```

3）查询表中数据

```
hive (gmall)> select * from stud;
stud.name       stud.area       stud.course     stud.score
zhang3 bj      math    88
li4     bj      math    99
wang5   sh      chinese 92
zhao6   sh      chinese 54
tian7   bj      chinese 91
```

4）把同一分组的不同行的数据聚合成一个集合

```
hive (gmall)> select course, collect_set(area), avg(score) from
stud group by course;
chinese ["sh","bj"]     79.0
math    ["bj"]  93.5
```

5） 用下标可以取某一个

```
hive (gmall)> select course, collect_set(area)[0], avg(score)
from stud group by course;
chinese sh      79.0
math    bj      93.5
```

6.2.2 nvl 函数

1）基本语法

NVL（表达式 1，表达式 2）

如果表达式 1 为空值，NVL 返回值为表达式 2 的值，否则返回表达式 1 的值。 该函数的目的是把一个空值（null）转换成一个实际的值。其表达式的值可以是数字型、字符型和日期型。但是表达式 1 和表达式 2 的数据类型必须为同一个类型。

6.2.3 日期处理函数

1）date_format 函数（根据格式整理日期）

```
hive (gmall)> select date_format('2020-03-10','yyyy-MM');
2020-03
```

2）date_add 函数（加减日期）

```
hive (gmall)> select date_add('2020-03-10',-1);
2020-03-09
hive (gmall)> select date_add('2020-03-10',1);
2020-03-11
```

3）next_day 函数

（1）取当前天的下一个周一

```
hive (gmall)> select next_day('2020-03-12','MO');
2020-03-16
```

说明：星期一到星期日的英文（Monday，Tuesday、Wednesday、Thursday、Friday、Saturday、Sunday）

（2）取当前周的周一

```
hive (gmall)> select date_add(next_day('2020-03-12','MO'),-7);
2020-03-11
```

4）last_day 函数（求当月最后一天日期）

```
hive (gmall)> select last_day('2020-03-10');
2020-03-31
```

6.3 DWS 层（用户行为）

6.3.1 每日设备行为

每日设备行为，主要按照设备 id 统计。

每日设备行为

1）建表语句

```
drop table if exists dws_uv_detail_daycount;
create external table dws_uv_detail_daycount
(
    `mid_id` string COMMENT '设备唯一标识',
    `user_id` string COMMENT '用户标识',
    `version_code` string COMMENT '程序版本号',
    `version_name` string COMMENT '程序版本名',
    `lang` string COMMENT '系统语言',
    `source` string COMMENT '渠道号',
    `os` string COMMENT '安卓系统版本',
    `area` string COMMENT '区域',
    `model` string COMMENT '手机型号',
    `brand` string COMMENT '手机品牌',
    `sdk_version` string COMMENT 'sdkVersion',
    `gmail` string COMMENT 'gmail',
    `height_width` string COMMENT '屏幕宽高',
    `app_time` string COMMENT '客户端日志产生时的时间',
    `network` string COMMENT '网络模式',
    `lng` string COMMENT '经度',
    `lat` string COMMENT '纬度',
    `login_count` bigint COMMENT '活跃次数'
)
partitioned by(dt string)
stored as parquet
location '/warehouse/gmall/dws/dws_uv_detail_daycount';
```

2）数据装载

```
insert        overwrite        table        dws_uv_detail_daycount
partition(dt='2020-03-10')
select
    mid_id,
    concat_ws('|', collect_set(user_id)) user_id,
    concat_ws('|', collect_set(version_code)) version_code,
    concat_ws('|', collect_set(version_name)) version_name,
    concat_ws('|', collect_set(lang))lang,
    concat_ws('|', collect_set(source)) source,
    concat_ws('|', collect_set(os)) os,
    concat_ws('|', collect_set(area)) area,
    concat_ws('|', collect_set(model)) model,
    concat_ws('|', collect_set(brand)) brand,
    concat_ws('|', collect_set(sdk_version)) sdk_version,
    concat_ws('|', collect_set(gmail)) gmail,
    concat_ws('|', collect_set(height_width)) height_width,
    concat_ws('|', collect_set(app_time)) app_time,
    concat_ws('|', collect_set(network)) network,
    concat_ws('|', collect_set(lng)) lng,
    concat_ws('|', collect_set(lat)) lat,
    count(*) login_count
from dwd_start_log
where dt='2020-03-10'
group by mid_id;
```

1）建表语句

```
drop table if exists dws_uv_detail_daycount;
create external table dws_uv_detail_daycount
(
    `mid_id` string COMMENT '设备唯一标识',
    `user_id` string COMMENT '用户标识',
    `version_code` string COMMENT '程序版本号',
    `version_name` string COMMENT '程序版本名',
    `lang` string COMMENT '系统语言',
    `source` string COMMENT '渠道号',
    `os` string COMMENT '安卓系统版本',
    `area` string COMMENT '区域',
    `model` string COMMENT '手机型号',
    `brand` string COMMENT '手机品牌',
    `sdk_version` string COMMENT 'sdkVersion',
    `gmail` string COMMENT 'gmail',
    `height_width` string COMMENT '屏幕宽高',
    `app_time` string COMMENT '客户端日志产生时的时间',
    `network` string COMMENT '网络模式',
    `lng` string COMMENT '经度',
    `lat` string COMMENT '纬度'
)
partitioned by(dt string)
stored as parquet
location '/warehouse/gmall/dws/dws_uv_detail_daycount';
```

2）数据装载

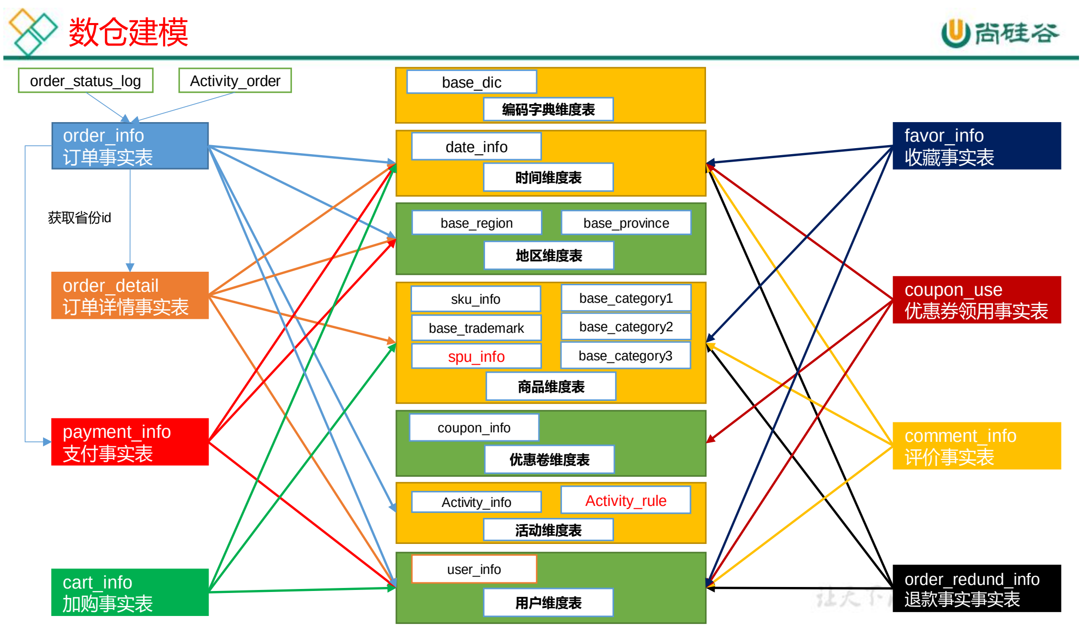
```
insert overwrite table dws_uv_detail_daycount partition(dt='2020-03-10')
select
    mid_id,
    concat_ws('|', collect_set(user_id)) user_id,
    concat_ws('|', collect_set(version_code)) version_code,
    concat_ws('|', collect_set(version_name)) version_name,
    concat_ws('|', collect_set(lang))lang,
    concat_ws('|', collect_set(source)) source,
    concat_ws('|', collect_set(os)) os,
    concat_ws('|', collect_set(area)) area,
    concat_ws('|', collect_set(model)) model,
    concat_ws('|', collect_set(brand)) brand,
    concat_ws('|', collect_set(sdk_version)) sdk_version,
    concat_ws('|', collect_set(gmail)) gmail,
    concat_ws('|', collect_set(height_width)) height_width,
    concat_ws('|', collect_set(app_time)) app_time,
    concat_ws('|', collect_set(network)) network,
    concat_ws('|', collect_set(lng)) lng,
    concat_ws('|', collect_set(lat)) lat
from dwd_start_log
where dt='2020-03-10'
group by mid_id;
```

3）查询加载结果

```
hive (gmall)> select * from dws_uv_detail_daycount where dt='2020-03-10';
```

6.4 DWS 层（业务）

DWS 层的宽表字段，是站在不同维度的视角去看事实表。重点关注事实表的度量值。



6.4.1 每日会员行为

1）建表语句

```
hive (gmall)>
drop table if exists dws_user_action_daycount;
create external table dws_user_action_daycount
(
    user_id string comment '用户 id',
    login_count bigint comment '登录次数',
    cart_count bigint comment '加入购物车次数',
    order_count bigint comment '下单次数',
    order_amount    decimal(16,2)  comment '下单金额',
    payment_count   bigint      comment '支付次数',
    payment_amount  decimal(16,2) comment '支付金额',
    order_detail_stats 
array<struct<sku_id:string,sku_num:bigint,order_count:bigint,order_amount:de
cimal(20,2)>> comment '下单明细统计'
) COMMENT '每日用户行为'
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dws/dws_user_action_daycount/'
```

```
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
with
tmp_login as
(
    select
        user_id,
        count(*) login_count
    from dwd_start_log
    where dt='2020-03-10'
    and user_id is not null
    group by user_id
),
tmp_cart as
(
    select
        user_id,
        count(*) cart_count
    from dwd_fact_cart_info
    where dt='2020-03-10'
and date_format(create_time,'yyyy-MM-dd')='2020-03-10'
    group by user_id
),
tmp_order as
(
    select
        user_id,
        count(*) order_count,
        sum(final_total_amount) order_amount
    from dwd_fact_order_info
    where dt='2020-03-10'
    group by user_id
) ,
tmp_payment as
(
    select
        user_id,
        count(*) payment_count,
        sum(payment_amount) payment_amount
    from dwd_fact_payment_info
    where dt='2020-03-10'
    group by user_id
),
tmp_order_detail as
(
    select
        user_id,

collect_set(named_struct('sku_id',sku_id,'sku_num',sku_num,'order_count',ord
er_count,'order_amount',order_amount)) order_stats
    from
    (
        select
            user_id,
            sku_id,
            sum(sku_num) sku_num,
            count(*) order_count,
            cast(sum(total_amount) as decimal(20,2)) order_amount
        from dwd_fact_order_detail
        where dt='2020-03-10'
        group by user_id,sku_id
    )tmp
    group by user_id
)

insert overwrite table dws_user_action_daycount partition(dt='2020-03-10')
select

coalesce(tmp_login.user_id,tmp_cart.user_id,tmp_order.user_id,tmp_payment.us
er_id,tmp_order_detail.user_id),
    nvl(login_count,0),
    nvl(cart_count,0),
    nvl(order_count,0),
    nvl(order_amount,0.0),
    nvl(payment_count,0),
    nvl(payment_amount,0.0),
    order_stats
from tmp_login
full outer join tmp_cart on tmp_login.user_id=tmp_cart.user_id
full outer join tmp_order on tmp_login.user_id=tmp_order.user_id
full outer join tmp_payment on tmp_login.user_id=tmp_payment.user_id
full outer join tmp_order_detail on tmp_login.user_id=tmp_order_detail.user_id;
```

3）查询加载结果

```
hive (gmall)> select * from dws_user_action_daycount where dt='2020-03-10';
```

6.4.2 每日商品行为

1）建表语句

```
hive (gmall)>
drop table if exists dws_sku_action_daycount;
create external table dws_sku_action_daycount
(
    sku_id string comment 'sku_id',
    order_count bigint comment '被下单次数',
    order_num bigint comment '被下单件数',
    order_amount decimal(16,2) comment '被下单金额',
    payment_count bigint  comment '被支付次数',
    payment_num bigint comment '被支付件数',
    payment_amount decimal(16,2) comment '被支付金额',
    refund_count bigint  comment '被退款次数',
    refund_num bigint comment '被退款件数',
    refund_amount  decimal(16,2) comment '被退款金额',
    cart_count bigint comment '被加入购物车次数',
    favor_count bigint comment '被收藏次数',
    appraise_good_count bigint comment '好评数',
    appraise_mid_count bigint comment '中评数',
    appraise_bad_count bigint comment '差评数',
    appraise_default_count bigint comment '默认评价数'
) COMMENT '每日商品行为'
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dws/dws_sku_action_daycount/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

注意：如果是 23 点 59 下单，支付日期跨天。需要从订单详情里面取出支付时间是今天，订单时间是昨天或者今天的订单。

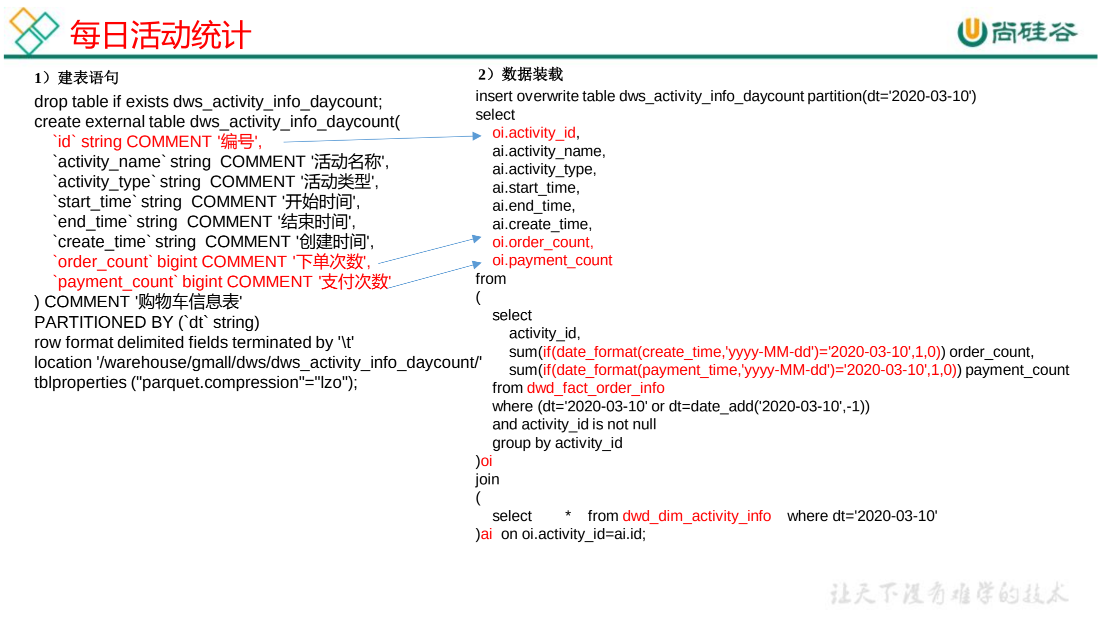
```
hive (gmall)>
```

```
with
tmp_order as
(
    select
        sku_id,
        count(*) order_count,
        sum(sku_num) order_num,
        sum(total_amount) order_amount
    from dwd_fact_order_detail
    where dt='2020-03-10'
    group by sku_id
),
tmp_payment as
(
    select
        sku_id,
        count(*) payment_count,
        sum(sku_num) payment_num,
        sum(total_amount) payment_amount
    from dwd_fact_order_detail
    where dt='2020-03-10'
    and order_id in
    (
        select
            id
        from dwd_fact_order_info
        where (dt='2020-03-10'
        or dt=date_add('2020-03-10',-1))
        and date_format(payment_time,'yyyy-MM-dd')='2020-03-10'
    )
    group by sku_id
),
tmp_refund as
(
    select
        sku_id,
        count(*) refund_count,
        sum(refund_num) refund_num,
        sum(refund_amount) refund_amount
    from dwd_fact_order_refund_info
    where dt='2020-03-10'
    group by sku_id
),
tmp_cart as
(
    select
        sku_id,
        count(*) cart_count
    from dwd_fact_cart_info
    where dt='2020-03-10'
    and date_format(create_time,'yyyy-MM-dd')='2020-03-10'
    group by sku_id
),
tmp_favor as
(
    select
        sku_id,
        count(*) favor_count
    from dwd_fact_favor_info
    where dt='2020-03-10'
    and date_format(create_time,'yyyy-MM-dd')='2020-03-10'
    group by sku_id
),
tmp_appraise as
(
select
    sku_id,
    sum(if(appraise='1201',1,0)) appraise_good_count,
    sum(if(appraise='1202',1,0)) appraise_mid_count,
    sum(if(appraise='1203',1,0)) appraise_bad_count,
    sum(if(appraise='1204',1,0)) appraise_default_count
from dwd_fact_comment_info
where dt='2020-03-10'
group by sku_id
)

insert overwrite table dws_sku_action_daycount partition(dt='2020-03-10')
select
    sku_id,
    sum(order_count),
    sum(order_num),
    sum(order_amount),
    sum(payment_count),
    sum(payment_num),
    sum(payment_amount),
    sum(refund_count),
    sum(refund_num),
    sum(refund_amount),
    sum(cart_count),
    sum(favor_count),
    sum(appraise_good_count),
    sum(appraise_mid_count),
    sum(appraise_bad_count),
    sum(appraise_default_count)
from
(
    select
        sku_id,
        order_count,
        order_num,
        order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        0 cart_count,
        0 favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_order
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        payment_count,
        payment_num,
        payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        0 cart_count,
        0 favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_payment
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        refund_count,
        refund_num,
        refund_amount,
        0 cart_count,
        0 favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_refund
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        cart_count,
        0 favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_cart
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        0 cart_count,
        favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_favor
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        0 cart_count,
        0 favor_count,
        appraise_good_count,
        appraise_mid_count,
        appraise_bad_count,
        appraise_default_count
    from tmp_appraise
)tmp
group by sku_id;
```

3）查询加载结果

```
hive (gmall)> select * from dws_sku_action_daycount where dt='2020-03-10';
```

6.4.3 每日活动统计


每日活动统计

1）建表语句

```
drop table if exists dws_activity_info_daycount;
create external table dws_activity_info_daycount(
    `id` string COMMENT '编号',
    `activity_name` string  COMMENT '活动名称',
    `activity_type` string  COMMENT '活动类型',
    `start_time` string  COMMENT '开始时间',
    `end_time` string  COMMENT '结束时间',
    `create_time` string  COMMENT '创建时间',
    `order_count` bigint COMMENT '下单次数',
    `payment_count` bigint COMMENT '支付次数'
) COMMENT '购物车信息表'
PARTITIONED BY (`dt` string)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dws/dws_activity_info_daycount/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
insert overwrite table dws_activity_info_daycount partition(dt='2020-03-10')
select
    oi.activity_id,
    ai.activity_name,
    ai.activity_type,
    ai.start_time,
    ai.end_time,
    ai.create_time,
    oi.order_count,
    oi.payment_count
from
(
    select
        activity_id,
        sum(if(date_format(create_time,'yyyy-MM-dd')='2020-03-10',1,0)) order_count,
        sum(if(date_format(payment_time,'yyyy-MM-dd')='2020-03-10',1,0)) payment_count
    from dwd_fact_order_info
    where (dt='2020-03-10' or dt=date_add('2020-03-10',-1))
    and activity_id is not null
    group by activity_id
)oi
join
(
    select     *    from dwd_dim_activity_info    where dt='2020-03-10'
)ai  on oi.activity_id=ai.id;
```

1）建表语句

```
hive (gmall)>
drop table if exists dws_activity_info_daycount;
create external table dws_activity_info_daycount(
    `id` string COMMENT '编号',
    `activity_name` string  COMMENT '活动名称',
    `activity_type` string  COMMENT '活动类型',
    `start_time` string  COMMENT '开始时间',
    `end_time` string  COMMENT '结束时间',
    `create_time` string  COMMENT '创建时间',
    `order_count` bigint COMMENT '下单次数',
    `payment_count` bigint COMMENT '支付次数'
) COMMENT '购物车信息表'
PARTITIONED BY (`dt` string)
stored as parquet
location '/warehouse/gmall/dws/dws_activity_info_daycount/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
insert overwrite table dws_activity_info_daycount partition(dt='2020-03-10')
select
    oi.activity_id,
    ai.activity_name,
    ai.activity_type,
    ai.start_time,
    ai.end_time,
    ai.create_time,
    oi.order_count,
    oi.payment_count
from
(
    select
        activity_id,
        sum(if(date_format(create_time,'yyyy-MM-dd')='2020-03-10',1,0))
order_count,
        sum(if(date_format(payment_time,'yyyy-MM-dd')='2020-03-10',1,0))
payment_count
    from dwd_fact_order_info
    where (dt='2020-03-10' or dt=date_add('2020-03-10',-1))
    and activity_id is not null
    group by activity_id
)oi
join
(
    select
        *
    from dwd_dim_activity_info
    where dt='2020-03-10'
)ai
on oi.activity_id=ai.id;
```

3）查询加载结果

```
hive (gmall)> select * from dws_activity_info_daycount where dt='2020-03-10';
```

6.4.4 每日地区统计

1）建表语句

```
hive (gmall)>
drop table if exists dws_area_stats_daycount;
create external table dws_area_stats_daycount(
    `id` bigint COMMENT '编号',
    `province_name` string COMMENT '省份名称',
    `area_code` string COMMENT '地区编码',
    `iso_code` string COMMENT 'iso 编码',
    `region_id` string COMMENT '地区 ID',
    `region_name` string COMMENT '地区名称',
    `order_count` bigint COMMENT '下单次数',
    `order_amount` decimal(20,2) COMMENT '下单金额',
    `payment_count` bigint COMMENT '支付次数',
    `payment_amount` decimal(20,2) COMMENT '支付金额'
) COMMENT '购物车信息表'
PARTITIONED BY (`dt` string)
```

```
stored as parquet
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dws/dws_area_stats_daycount/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
with
tmp_op as
(
    select
        province_id,
        sum(if(date_format(create_time,'yyyy-MM-dd')='2020-03-10',1,0))
order_count,
        sum(if(date_format(create_time,'yyyy-MM-dd')='2020-03-
10',final_total_amount,0)) order_amount,
        sum(if(date_format(payment_time,'yyyy-MM-dd')='2020-03-10',1,0))
payment_count,
        sum(if(date_format(payment_time,'yyyy-MM-dd')='2020-03-
10',final_total_amount,0)) payment_amount
    from dwd_fact_order_info
    where (dt='2020-03-10' or dt=date_add('2020-03-10',-1))
    group by province_id
)
insert overwrite table dws_area_stats_daycount partition(dt='2020-03-10')
select
    pro.id,
    pro.province_name,
    pro.area_code,
    pro.iso_code,
    pro.region_id,
    pro.region_name,
    nvl(tmp_op.order_count,0),
    nvl(tmp_op.order_amount,0.0),
    nvl(tmp_op.payment_count,0),
    nvl(tmp_op.payment_amount,0.0)
from dwd_dim_base_province pro
left join tmp_op on pro.id=tmp_op.province_id;
```

6.5 DWS 层数据导入脚本

1）在/home/atguigu/bin 目录下创建脚本 dwd_to_dws.sh

```
[atguigu@hadoop102 bin]$ vim dwd_to_dws.sh
```

在脚本中填写如下内容

```
#!/bin/bash

APP=gmall
hive=/opt/module/hive/bin/hive

# 如果是输入的日期按照取输入日期；如果没输入日期取当前时间的前一天
if [ -n "$1" ] ;then
    do_date=$1
else
    do_date=`date -d "-1 day" +%F`
fi

sql="
insert overwrite table ${APP}.dws_uv_detail_daycount partition(dt='$do_date')
select
    mid_id,
    concat_ws('|', collect_set(user_id)) user_id,
    concat_ws('|', collect_set(version_code)) version_code,
    concat_ws('|', collect_set(version_name)) version_name,
    concat_ws('|', collect_set(lang))lang,
    concat_ws('|', collect_set(source)) source,
    concat_ws('|', collect_set(os)) os,
    concat_ws('|', collect_set(area)) area,
    concat_ws('|', collect_set(model)) model,
    concat_ws('|', collect_set(brand)) brand,
    concat_ws('|', collect_set(sdk_version)) sdk_version,
    concat_ws('|', collect_set(gmail)) gmail,
    concat_ws('|', collect_set(height_width)) height_width,
    concat_ws('|', collect_set(app_time)) app_time,
    concat_ws('|', collect_set(network)) network,
    concat_ws('|', collect_set(lng)) lng,
    concat_ws('|', collect_set(lat)) lat
from ${APP}.dwd_start_log
where dt='$do_date'
group by mid_id;

with
tmp_login as
(
    select
        user_id,
        count(*) login_count
    from ${APP}.dwd_start_log
    where dt='$do_date'
    and user_id is not null
    group by user_id
),
tmp_cart as
(
    select
        user_id,
        count(*) cart_count
    from ${APP}.dwd_fact_cart_info
    where dt='$do_date'
and date_format(create_time,'yyyy-MM-dd')='$do_date'
    group by user_id
),
tmp_order as
(
    select
        user_id,
        count(*) order_count,
        sum(final_total_amount) order_amount
    from ${APP}.dwd_fact_order_info
    where dt='$do_date'
    group by user_id
) ,
tmp_payment as
(
    select
        user_id,
        count(*) payment_count,
        sum(payment_amount) payment_amount
    from ${APP}.dwd_fact_payment_info
    where dt='$do_date'
    group by user_id
),
tmp_order_detail as
(
    select
```

```
       user_id,

collect_set(named_struct('sku_id',sku_id,'sku_num',sku_num,'order_count',order_count,'
order_amount',order_amount)) order_stats
    from
    (
        select
            user_id,
            sku_id,
            sum(sku_num) sku_num,
            count(*) order_count,
            cast(sum(total_amount) as decimal(20,2)) order_amount
        from ${APP}.dwd_fact_order_detail
        where dt='$do_date'
        group by user_id,sku_id
    )tmp
    group by user_id
)

insert overwrite table ${APP}.dws_user_action_daycount partition(dt='$do_date')
select

coalesce(tmp_login.user_id,tmp_cart.user_id,tmp_order.user_id,tmp_payment.user_id,tmp_
order_detail.user_id),
    nvl(login_count,0),
    nvl(cart_count,0),
    nvl(order_count,0),
    nvl(order_amount,0.0),
    nvl(payment_count,0),
    nvl(payment_amount,0.0),
    order_stats
from tmp_login
full outer join tmp_cart on tmp_login.user_id=tmp_cart.user_id
full outer join tmp_order on tmp_login.user_id=tmp_order.user_id
full outer join tmp_payment on tmp_login.user_id=tmp_payment.user_id
full outer join tmp_order_detail on tmp_login.user_id=tmp_order_detail.user_id;

with
tmp_order as
(
    select
        sku_id,
        count(*) order_count,
        sum(sku_num) order_num,
        sum(total_amount) order_amount
    from ${APP}.dwd_fact_order_detail
    where dt='$do_date'
    group by sku_id
),
tmp_payment as
(
    select
        sku_id,
        count(*) payment_count,
        sum(sku_num) payment_num,
        sum(total_amount) payment_amount
    from ${APP}.dwd_fact_order_detail
    where dt='$do_date'
    and order_id in
    (
        select
            id
        from ${APP}.dwd_fact_order_info
        where (dt='$do_date'
        or dt=date_add('$do_date',-1))
        and date_format(payment_time,'yyyy-MM-dd')='$do_date'
    )
    group by sku_id
),
tmp_refund as
(
    select
        sku_id,
        count(*) refund_count,
        sum(refund_num) refund_num,
        sum(refund_amount) refund_amount
    from ${APP}.dwd_fact_order_refund_info
    where dt='$do_date'
    group by sku_id
),
tmp_cart as
(
    select
        sku_id,
        count(*) cart_count
    from ${APP}.dwd_fact_cart_info
    where dt='$do_date'
    and date_format(create_time,'yyyy-MM-dd')='$do_date'
    group by sku_id
),
tmp_favor as
(
    select
        sku_id,
        count(*) favor_count
    from ${APP}.dwd_fact_favor_info
    where dt='$do_date'
    and date_format(create_time,'yyyy-MM-dd')='$do_date'
    group by sku_id
),
tmp_appraise as
(
select
    sku_id,
    sum(if(appraise='1201',1,0)) appraise_good_count,
    sum(if(appraise='1202',1,0)) appraise_mid_count,
    sum(if(appraise='1203',1,0)) appraise_bad_count,
    sum(if(appraise='1204',1,0)) appraise_default_count
from ${APP}.dwd_fact_comment_info
where dt='$do_date'
group by sku_id
)

insert overwrite table ${APP}.dws_sku_action_daycount partition(dt='$do_date')
select
    sku_id,
    sum(order_count),
    sum(order_num),
    sum(order_amount),
    sum(payment_count),
    sum(payment_num),
    sum(payment_amount),
    sum(refund_count),
    sum(refund_num),
    sum(refund_amount),
    sum(cart_count),
    sum(favor_count),
    sum(appraise_good_count),
    sum(appraise_mid_count),
    sum(appraise_bad_count),
    sum(appraise_default_count)
from
(
    select
        sku_id,
        order_count,
        order_num,
        order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        0 cart_count,
        0 favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_order
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        payment_count,
        payment_num,
        payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        0 cart_count,
        0 favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_payment
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        refund_count,
        refund_num,
        refund_amount,
        0 cart_count,
        0 favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_refund
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        cart_count,
        0 favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_cart
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        0 cart_count,
        favor_count,
        0 appraise_good_count,
        0 appraise_mid_count,
        0 appraise_bad_count,
        0 appraise_default_count
    from tmp_favor
    union all
    select
        sku_id,
        0 order_count,
        0 order_num,
        0 order_amount,
        0 payment_count,
        0 payment_num,
        0 payment_amount,
        0 refund_count,
        0 refund_num,
        0 refund_amount,
        0 cart_count,
        0 favor_count,
        appraise_good_count,
        appraise_mid_count,
        appraise_bad_count,
        appraise_default_count
    from tmp_appraise
)tmp
group by sku_id;


insert overwrite table ${APP}.dws_activity_info_daycount partition(dt='$do_date')
select
```

```
    oi.activity_id,
    ai.activity_name,
    ai.activity_type,
    ai.start_time,
    ai.end_time,
    ai.create_time,
    oi.order_count,
    oi.payment_count
from
(
    select
        activity_id,
        sum(if(date_format(create_time,'yyyy-MM-dd')='$do_date',1,0)) order_count,
        sum(if(date_format(payment_time,'yyyy-MM-dd')='$do_date',1,0)) payment_count
    from ${APP}.dwd_fact_order_info
    where (dt='$do_date' or dt=date_add('$do_date',-1))
    and activity_id is not null
    group by activity_id
)oi
join
(
    select
        *
    from ${APP}.dwd_dim_activity_info
    where dt='$do_date'
)ai
on oi.activity_id=ai.id;

with
tmp_op as
(
    select
        province_id,
        sum(if(date_format(create_time,'yyyy-MM-dd')='$do_date',1,0)) order_count,
        sum(if(date_format(create_time,'yyyy-MM-dd')='$do_date',final_total_amount,0))
order_amount,
        sum(if(date_format(payment_time,'yyyy-MM-dd')='$do_date',1,0)) payment_count,
        sum(if(date_format(payment_time,'yyyy-MM-dd')='$do_date',final_total_amount,0))
payment_amount
    from ${APP}.dwd_fact_order_info
    where (dt='$do_date' or dt=date_add('$do_date',-1))
    group by province_id
)
insert overwrite table ${APP}.dws_area_stats_daycount partition(dt='$do_date')
select
    pro.id,
    pro.province_name,
    pro.area_code,
    pro.iso_code,
    pro.region_id,
    pro.region_name,
    nvl(tmp_op.order_count,0),
    nvl(tmp_op.order_amount,0.0),
    nvl(tmp_op.payment_count,0),
    nvl(tmp_op.payment_amount,0.0)
from ${APP}.dwd_dim_base_province pro
left join tmp_op on pro.id=tmp_op.province_id;
"

$hive -e "$sql"
```

2）增加脚本执行权限

```
[atguigu@hadoop102 bin]$ chmod 777 dwd_to_dws.sh
```

3）执行脚本导入数据

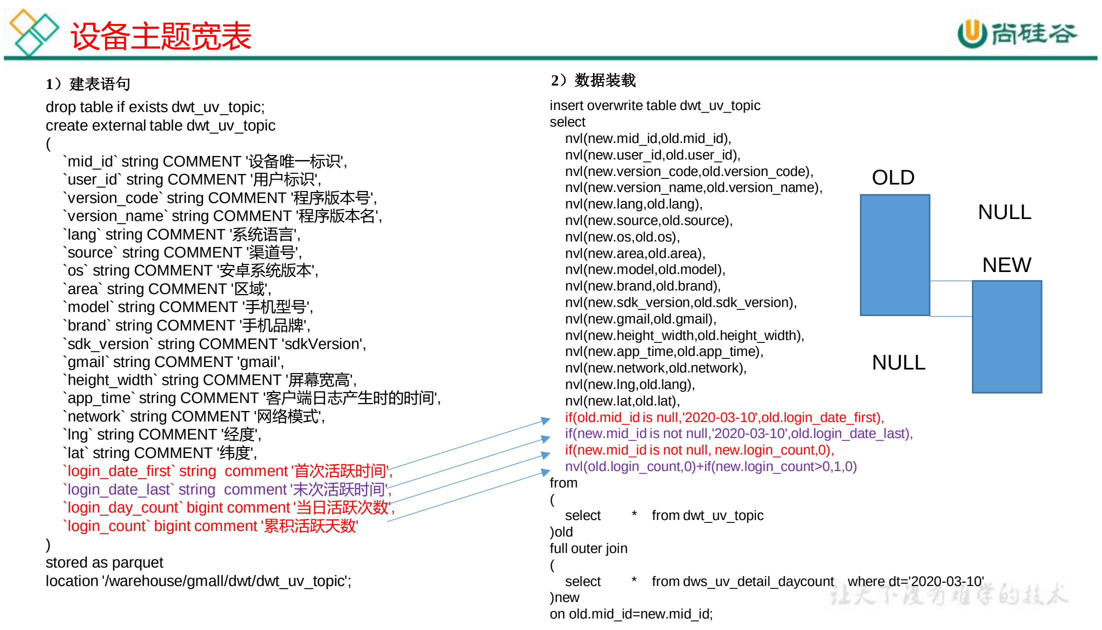
```
[atguigu@hadoop102 bin]$ dwd_to_dws.sh 2020-03-11
```

4）查看导入数据

```
hive (gmall)>
select * from dws_uv_detail_daycount where dt='2020-03-11';
select * from dws_user_action_daycount where dt='2020-03-11';
select * from dws_sku_action_daycount where dt='2020-03-11';
select * from dws_sale_detail_daycount where dt='2020-03-11';
select * from dws_coupon_use_daycount where dt='2020-03-11';
select * from dws_activity_info_daycount where dt='2020-03-11';
```

第 7 章 数仓搭建-DWT 层

7.1 设备主题宽表



设备主题宽表

1）建表语句

```
drop table if exists dwt_uv_topic;
create external table dwt_uv_topic
(
    `mid_id` string COMMENT '设备唯一标识',
    `user_id` string COMMENT '用户标识',
    `version_code` string COMMENT '程序版本号',
    `version_name` string COMMENT '程序版本名',
    `lang` string COMMENT '系统语言',
    `source` string COMMENT '渠道号',
    `os` string COMMENT '安卓系统版本',
    `area` string COMMENT '区域',
    `model` string COMMENT '手机型号',
    `brand` string COMMENT '手机品牌',
    `sdk_version` string COMMENT 'sdkVersion',
    `gmail` string COMMENT 'gmail',
    `height_width` string COMMENT '屏幕宽高',
    `app_time` string COMMENT '客户端日志产生时的时间',
    `network` string COMMENT '网络模式',
    `lng` string COMMENT '经度',
    `lat` string COMMENT '纬度',
    `login_date_first` string  comment '首次活跃时间',
    `login_date_last` string  comment '末次活跃时间',
    `login_day_count` bigint comment '当日活跃次数',
    `login_count` bigint comment '累积活跃天数'
)
stored as parquet
location '/warehouse/gmall/dwt/dwt_uv_topic';
```

2）数据装载

```
insert overwrite table dwt_uv_topic
select
    nvl(new.mid_id,old.mid_id),
    nvl(new.user_id,old.user_id),
    nvl(new.version_code,old.version_code),
    nvl(new.version_name,old.version_name),
    nvl(new.lang,old.lang),
    nvl(new.source,old.source),
    nvl(new.os,old.os),
    nvl(new.area,old.area),
    nvl(new.model,old.model),
    nvl(new.brand,old.brand),
    nvl(new.sdk_version,old.sdk_version),
    nvl(new.gmail,old.gmail),
    nvl(new.height_width,old.height_width),
    nvl(new.app_time,old.app_time),
    nvl(new.network,old.network),
    nvl(new.lng,old.lang),
    nvl(new.lat,old.lat),
    if(old.mid_id is null,'2020-03-10',old.login_date_first),
    if(new.mid_id is not null,'2020-03-10',old.login_date_last),
    if(new.mid_id is not null, new.login_count,0),
    nvl(old.login_count,0)+if(new.login_count>0,1,0)
from
(
    select    *    from dwt_uv_topic
)old
full outer join
(
    select    *    from dws_uv_detail_daycount    where dt='2020-03-10'
)new
on old.mid_id=new.mid_id;
```

1）建表语句

```
hive (gmall)>
drop table if exists dwt_uv_topic;
create external table dwt_uv_topic
(
    `mid_id` string COMMENT '设备唯一标识',
    `model` string COMMENT '手机型号',
    `brand` string COMMENT '手机品牌',
    `login_date_first` string  comment '首次活跃时间',
    `login_date_last` string  comment '末次活跃时间',
    `login_count` bigint comment '累积活跃天数'
)
stored as parquet
location '/warehouse/gmall/dwt/dwt_uv_topic';
```

2）数据装载

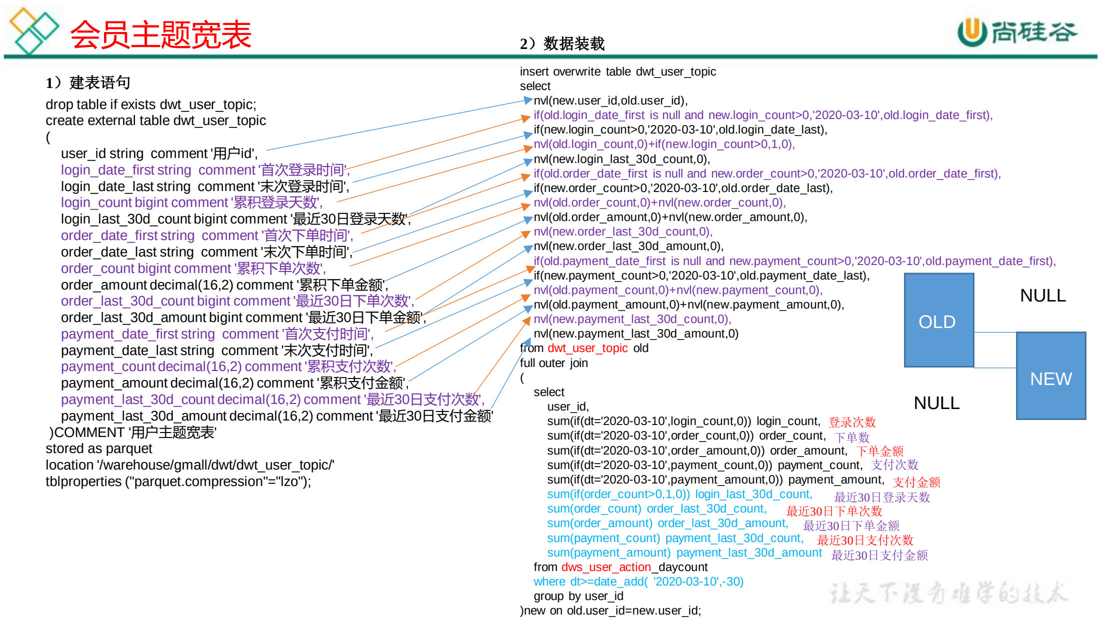
```
hive (gmall)>
insert overwrite table dwt_uv_topic
select
    nvl(new.mid_id,old.mid_id),
    nvl(new.model,old.model),
    nvl(new.brand,old.brand),
    nvl(old.login_date_first,'2020-03-10'),
    if(new.mid_id is not null,'2020-03-10',old.login_date_last),
    nvl(old.login_count,0)+if(new.mid_id is not null,1,0)
from
(
    select
        *
    from dwt_uv_topic
)old
full outer join
(
    select
        *
    from dws_uv_detail_daycount
    where dt='2020-03-10'
)new
on old.mid_id=new.mid_id;
```

3）查询加载结果

```
hive (gmall)> select * from dwt_uv_topic limit 5;
```

7.2 会员主题宽表

宽表字段怎么来？维度关联的事实表度量值+开头、结尾+累积+累积一个时间段。



1）建表语句

```
drop table if exists dwt_user_topic;
create external table dwt_user_topic
(
    user_id string  comment '用户id',
    login_date_first string  comment '首次登录时间',
    login_date_last string  comment '末次登录时间',
    login_count bigint comment '累积登录天数',
    login_last_30d_count bigint comment '最近30日登录天数',
    order_date_first string  comment '首次下单时间',
    order_date_last string  comment '末次下单时间',
    order_count bigint comment '累积下单次数',
    order_amount decimal(16,2) comment '累积下单金额',
    order_last_30d_count bigint comment '最近30日下单次数',
    order_last_30d_amount bigint comment '最近30日下单金额',
    payment_date_first string  comment '首次支付时间',
    payment_date_last string  comment '末次支付时间',
    payment_count decimal(16,2) comment '累积支付次数',
    payment_amount decimal(16,2) comment '累积支付金额',
    payment_last_30d_count decimal(16,2) comment '最近30日支付次数',
    payment_last_30d_amount decimal(16,2) comment '最近30日支付金额'
 )COMMENT '用户主题宽表'
stored as parquet
location '/warehouse/gmall/dwt/dwt_user_topic/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
insert overwrite table dwt_user_topic
select
    nvl(new.user_id,old.user_id),
    if(old.login_date_first is null and new.login_count>0,'2020-03-10',old.login_date_first),
    if(new.login_count>0,'2020-03-10',old.login_date_last),
    nvl(old.login_count,0)+if(new.login_count>0,1,0),
    nvl(new.login_last_30d_count,0),
    if(old.order_date_first is null and new.order_count>0,'2020-03-10',old.order_date_first),
    if(new.order_count>0,'2020-03-10',old.order_date_last),
    nvl(old.order_count,0)+nvl(new.order_count,0),
    nvl(old.order_amount,0)+nvl(new.order_amount,0),
    nvl(new.order_last_30d_count,0),
    nvl(new.order_last_30d_amount,0),
    if(old.payment_date_first is null and new.payment_count>0,'2020-03-10',old.payment_date_first),
    if(new.payment_count>0,'2020-03-10',old.payment_date_last),
    nvl(old.payment_count,0)+nvl(new.payment_count,0),
    nvl(old.payment_amount,0)+nvl(new.payment_amount,0),
    nvl(new.payment_last_30d_count,0),
    nvl(new.payment_last_30d_amount,0)
from dwt_user_topic old
full outer join
(
    select
        user_id,
        sum(if(dt='2020-03-10',login_count,0)) login_count,  登录次数
        sum(if(dt='2020-03-10',order_count,0)) order_count,  下单数
        sum(if(dt='2020-03-10',order_amount,0)) order_amount,  下单金额
        sum(if(dt='2020-03-10',payment_count,0)) payment_count,  支付次数
        sum(if(dt='2020-03-10',payment_amount,0)) payment_amount,  支付金额
        sum(if(order_count>0,1,0)) login_last_30d_count,  最近30日登录天数
        sum(order_count) order_last_30d_count,  最近30日下单次数
        sum(order_amount) order_last_30d_amount,  最近30日下单金额
        sum(payment_count) payment_last_30d_count,  最近30日支付次数
        sum(payment_amount) payment_last_30d_amount  最近30日支付金额
    from dws_user_action_daycount
    where dt>=date_add( '2020-03-10',-30)
    group by user_id
)new on old.user_id=new.user_id;
```

1）建表语句

```
hive (gmall)>
drop table if exists dwt_user_topic;
create external table dwt_user_topic
(
    user_id string  comment '用户 id',
    login_date_first string  comment '首次登录时间',
    login_date_last string  comment '末次登录时间',
    login_count bigint comment '累积登录天数',
    login_last_30d_count bigint comment '最近 30 日登录天数',
    order_date_first string  comment '首次下单时间',
    order_date_last string  comment '末次下单时间',
    order_count bigint comment '累积下单次数',
    order_amount decimal(16,2)  comment '累积下单金额',
    order_last_30d_count bigint comment '最近 30 日下单次数',
    order_last_30d_amount bigint comment '最近 30 日下单金额',
    payment_date_first string  comment '首次支付时间',
    payment_date_last string  comment '末次支付时间',
    payment_count decimal(16,2) comment '累积支付次数',
    payment_amount decimal(16,2) comment '累积支付金额',
    payment_last_30d_count decimal(16,2) comment '最近 30 日支付次数',
    payment_last_30d_amount decimal(16,2) comment '最近 30 日支付金额'
 )COMMENT '用户主题宽表'
stored as parquet
location '/warehouse/gmall/dwt/dwt_user_topic/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwt_user_topic
select
    nvl(new.user_id,old.user_id),
    if(old.login_date_first  is  null  and  new.user_id  is  not  null,'2020-03-10',old.login_date_first),
    if(new.user_id is not null,'2020-03-10',old.login_date_last),
    nvl(old.login_count,0)+if(new.user_id is not null,1,0),
    nvl(new.login_last_30d_count,0),
    if(old.order_date_first    is    null    and    new.order_count>0,'2020-03-10',old.order_date_first),
    if(new.order_count>0,'2020-03-10',old.order_date_last),
    nvl(old.order_count,0)+nvl(new.order_count,0),
    nvl(old.order_amount,0)+nvl(new.order_amount,0),
    nvl(new.order_last_30d_count,0),
    nvl(new.order_last_30d_amount,0),
    if(old.payment_date_first   is   null   and   new.payment_count>0,'2020-03-10',old.payment_date_first),
    if(new.payment_count>0,'2020-03-10',old.payment_date_last),
    nvl(old.payment_count,0)+nvl(new.payment_count,0),
    nvl(old.payment_amount,0)+nvl(new.payment_amount,0),
    nvl(new.payment_last_30d_count,0),
    nvl(new.payment_last_30d_amount,0)
from
dwt_user_topic old
full outer join
(
    select
        user_id,
        sum(if(dt='2020-03-10',order_count,0)) order_count,
        sum(if(dt='2020-03-10',order_amount,0)) order_amount,
        sum(if(dt='2020-03-10',payment_count,0)) payment_count,
        sum(if(dt='2020-03-10',payment_amount,0)) payment_amount,
        sum(if(login_count>0,1,0)) login_last_30d_count,
        sum(order_count) order_last_30d_count,
        sum(order_amount) order_last_30d_amount,
        sum(payment_count) payment_last_30d_count,
        sum(payment_amount) payment_last_30d_amount
    from dws_user_action_daycount
    where dt>=date_add( '2020-03-10',-30)
    group by user_id
)new
on old.user_id=new.user_id;
```

3）查询加载结果

```
hive (gmall)> select * from dwt_user_topic limit 5;
```

7.3 商品主题宽表

1）建表语句

```
hive (gmall)>
drop table if exists dwt_sku_topic;
create external table dwt_sku_topic
(
    sku_id string comment 'sku_id',
    spu_id string comment 'spu_id',
    order_last_30d_count bigint comment '最近 30 日被下单次数',
    order_last_30d_num bigint comment '最近 30 日被下单件数',
    order_last_30d_amount decimal(16,2)  comment '最近 30 日被下单金额',
    order_count bigint comment '累积被下单次数',
    order_num bigint comment '累积被下单件数',
    order_amount decimal(16,2) comment '累积被下单金额',
    payment_last_30d_count   bigint  comment '最近 30 日被支付次数',
    payment_last_30d_num bigint comment '最近 30 日被支付件数',
    payment_last_30d_amount  decimal(16,2) comment '最近 30 日被支付金额',
    payment_count   bigint  comment '累积被支付次数',
    payment_num bigint comment '累积被支付件数',
    payment_amount  decimal(16,2) comment '累积被支付金额',
    refund_last_30d_count bigint comment '最近三十日退款次数',
    refund_last_30d_num bigint comment '最近三十日退款件数',
    refund_last_30d_amount decimal(10,2) comment '最近三十日退款金额',
    refund_count bigint comment '累积退款次数',
    refund_num bigint comment '累积退款件数',
    refund_amount decimal(10,2) comment '累积退款金额',
    cart_last_30d_count bigint comment '最近 30 日被加入购物车次数',
    cart_count bigint comment '累积被加入购物车次数',
    favor_last_30d_count bigint comment '最近 30 日被收藏次数',
    favor_count bigint comment '累积被收藏次数',
    appraise_last_30d_good_count bigint comment '最近 30 日好评数',
    appraise_last_30d_mid_count bigint comment '最近 30 日中评数',
    appraise_last_30d_bad_count bigint comment '最近 30 日差评数',
    appraise_last_30d_default_count bigint comment '最近 30 日默认评价数',
    appraise_good_count bigint comment '累积好评数',
    appraise_mid_count bigint comment '累积中评数',
    appraise_bad_count bigint comment '累积差评数',
    appraise_default_count bigint comment '累积默认评价数'
 )COMMENT '商品主题宽表'
stored as parquet
location '/warehouse/gmall/dwt/dwt_sku_topic/'
tblproperties ("parquet.compression"="lzo");
```

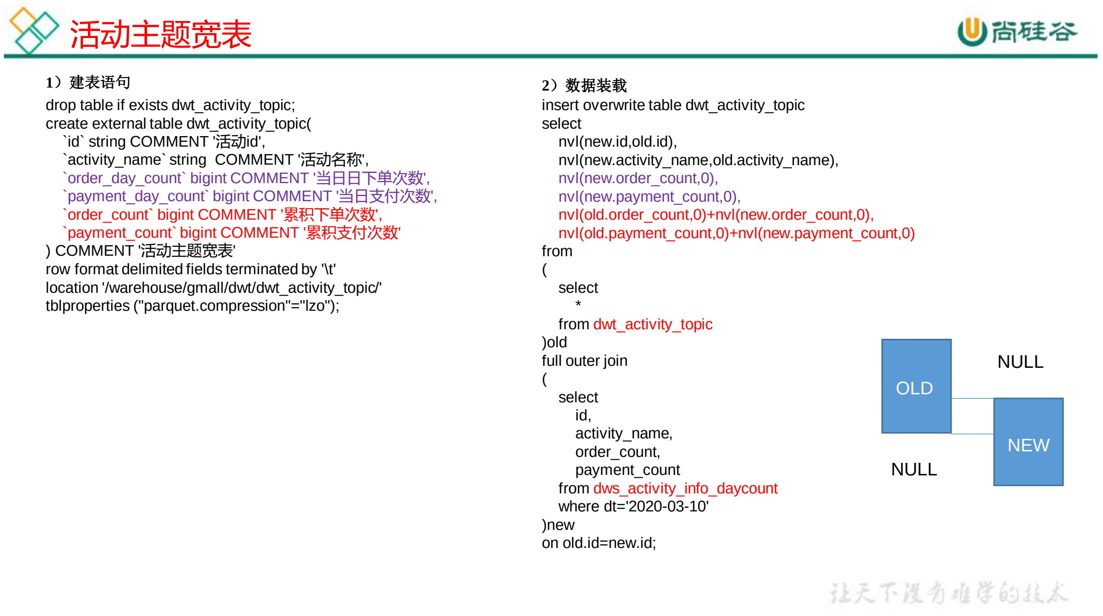
2）数据装载

```
hive (gmall)>
insert overwrite table dwt_sku_topic
select 
    nvl(new.sku_id,old.sku_id),
    sku_info.spu_id,
    nvl(new.order_count30,0),
    nvl(new.order_num30,0),
    nvl(new.order_amount30,0),
    nvl(old.order_count,0) + nvl(new.order_count,0),
    nvl(old.order_num,0) + nvl(new.order_num,0),
    nvl(old.order_amount,0) + nvl(new.order_amount,0),
    nvl(new.payment_count30,0),
    nvl(new.payment_num30,0),
    nvl(new.payment_amount30,0),
    nvl(old.payment_count,0) + nvl(new.payment_count,0),
    nvl(old.payment_num,0) + nvl(new.payment_count,0),
    nvl(old.payment_amount,0) + nvl(new.payment_count,0),
    nvl(new.refund_count30,0),
    nvl(new.refund_num30,0),
    nvl(new.refund_amount30,0),
    nvl(old.refund_count,0) + nvl(new.refund_count,0),
    nvl(old.refund_num,0) + nvl(new.refund_num,0),
    nvl(old.refund_amount,0) + nvl(new.refund_amount,0),
    nvl(new.cart_count30,0),
    nvl(old.cart_count,0) + nvl(new.cart_count,0),
    nvl(new.favor_count30,0),
    nvl(old.favor_count,0) + nvl(new.favor_count,0),
    nvl(new.appraise_good_count30,0),
    nvl(new.appraise_mid_count30,0),
    nvl(new.appraise_bad_count30,0),
    nvl(new.appraise_default_count30,0)  ,
    nvl(old.appraise_good_count,0) + nvl(new.appraise_good_count,0),
    nvl(old.appraise_mid_count,0) + nvl(new.appraise_mid_count,0),
    nvl(old.appraise_bad_count,0) + nvl(new.appraise_bad_count,0),
    nvl(old.appraise_default_count,0) + nvl(new.appraise_default_count,0)
from
(
    select
        sku_id,
        spu_id,
        order_last_30d_count,
        order_last_30d_num,
        order_last_30d_amount,
        order_count,
        order_num,
        order_amount  ,
        payment_last_30d_count,
        payment_last_30d_num,
        payment_last_30d_amount,
        payment_count,
        payment_num,
        payment_amount,
        refund_last_30d_count,
        refund_last_30d_num,
        refund_last_30d_amount,
        refund_count,
        refund_num,
        refund_amount,
        cart_last_30d_count,
        cart_count,
        favor_last_30d_count,
        favor_count,
        appraise_last_30d_good_count,
        appraise_last_30d_mid_count,
        appraise_last_30d_bad_count,
        appraise_last_30d_default_count,
        appraise_good_count,
        appraise_mid_count,
        appraise_bad_count,
        appraise_default_count
    from dwt_sku_topic
)old
full outer join
(
    select
        sku_id,
        sum(if(dt='2020-03-10', order_count,0 )) order_count,
        sum(if(dt='2020-03-10',order_num ,0 ))  order_num,
        sum(if(dt='2020-03-10',order_amount,0 )) order_amount ,
        sum(if(dt='2020-03-10',payment_count,0 )) payment_count,
        sum(if(dt='2020-03-10',payment_num,0 )) payment_num,
        sum(if(dt='2020-03-10',payment_amount,0 )) payment_amount,
        sum(if(dt='2020-03-10',refund_count,0 )) refund_count,
        sum(if(dt='2020-03-10',refund_num,0 )) refund_num,
        sum(if(dt='2020-03-10',refund_amount,0 )) refund_amount,
        sum(if(dt='2020-03-10',cart_count,0 )) cart_count,
        sum(if(dt='2020-03-10',favor_count,0 )) favor_count,
        sum(if(dt='2020-03-10',appraise_good_count,0 )) appraise_good_count,
        sum(if(dt='2020-03-10',appraise_mid_count,0 ) ) appraise_mid_count ,
        sum(if(dt='2020-03-10',appraise_bad_count,0 )) appraise_bad_count,
        sum(if(dt='2020-03-10',appraise_default_count,0 )) appraise_default_count,
        sum(order_count) order_count30 ,
        sum(order_num) order_num30,
        sum(order_amount) order_amount30,
        sum(payment_count) payment_count30,
        sum(payment_num) payment_num30,
        sum(payment_amount) payment_amount30,
        sum(refund_count) refund_count30,
        sum(refund_num) refund_num30,
        sum(refund_amount) refund_amount30,
        sum(cart_count) cart_count30,
        sum(favor_count) favor_count30,
        sum(appraise_good_count) appraise_good_count30,
        sum(appraise_mid_count) appraise_mid_count30,
        sum(appraise_bad_count) appraise_bad_count30,
        sum(appraise_default_count) appraise_default_count30
    from dws_sku_action_daycount
    where dt >= date_add ('2020-03-10', -30)
    group by sku_id
)new
on new.sku_id = old.sku_id
left join
(select * from dwd_dim_sku_info where dt='2020-03-10') sku_info
on nvl(new.sku_id,old.sku_id)= sku_info.id;
```

3）查询加载结果

```
hive (gmall)> select * from dwt_sku_topic limit 5;
```

7.4 活动主题宽表



活动主题宽表

1）建表语句

```
drop table if exists dwt_activity_topic;
create external table dwt_activity_topic(
    `id` string COMMENT '活动id',
    `activity_name` string  COMMENT '活动名称',
    `order_day_count` bigint COMMENT '当日日下单次数',
    `payment_day_count` bigint COMMENT '当日支付次数',
    `order_count` bigint COMMENT '累积下单次数',
    `payment_count` bigint COMMENT '累积支付次数'
) COMMENT '活动主题宽表'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwt/dwt_activity_topic/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
insert overwrite table dwt_activity_topic
select
    nvl(new.id,old.id),
    nvl(new.activity_name,old.activity_name),
    nvl(new.order_count,0),
    nvl(new.payment_count,0),
    nvl(old.order_count,0)+nvl(new.order_count,0),
    nvl(old.payment_count,0)+nvl(new.payment_count,0)
from
(
    select
        *
    from dwt_activity_topic
)old
full outer join
(
    select
        id,
        activity_name,
        order_count,
        payment_count
    from dws_activity_info_daycount
    where dt='2020-03-10'
)new
on old.id=new.id;
```

1）建表语句

```
hive (gmall)>
drop table if exists dwt_activity_topic;
create external table dwt_activity_topic(
    `id` string COMMENT '活动 id',
    `activity_name` string  COMMENT '活动名称',
    `order_day_count` bigint COMMENT '当日日下单次数',
    `payment_day_count` bigint COMMENT '当日支付次数',
    `order_count` bigint COMMENT '累积下单次数',
    `payment_count` bigint COMMENT '累积支付次数'
) COMMENT '活动主题宽表'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwt/dwt_activity_topic/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwt_activity_topic
select
    nvl(new.id,old.id),
    nvl(new.activity_name,old.activity_name),
    nvl(new.order_count,0),
    nvl(new.payment_count,0),
    nvl(old.order_count,0)+nvl(new.order_count,0),
    nvl(old.payment_count,0)+nvl(new.payment_count,0)
from
(
    select
        *
    from dwt_activity_topic
)old
full outer join
(
    select
        id,
        activity_name,
        order_count,
        payment_count
    from dws_activity_info_daycount
    where dt='2020-03-10'
)new
on old.id=new.id;
```

3）查询加载结果

```
hive (gmall)> select * from dwt_activity_topic limit 5;
```

7.5 地区主题宽表

1）建表语句

```
hive (gmall)>
drop table if exists dwt_area_topic;
create external table dwt_area_topic(
    `id` bigint COMMENT '编号',
    `province_name` string COMMENT '省份名称',
    `area_code` string COMMENT '地区编码',
    `iso_code` string COMMENT 'iso 编码',
    `region_id` string COMMENT '地区 ID',
    `region_name` string COMMENT '地区名称',
    `order_day_count` bigint COMMENT '当天下单次数',
    `order_day_amount` decimal(20,2) COMMENT '当天下单金额',
    `order_last_30d_count` bigint COMMENT '最近 30 天下单次数',
    `order_last_30d_amount` decimal(20,2) COMMENT '最近 30 天下单金额',
    `payment_day_count` bigint COMMENT '当天支付次数',
    `payment_day_amount` decimal(20,2) COMMENT '当天支付金额',
    `payment_last_30d_count` bigint COMMENT '最近 30 天支付次数',
    `payment_last_30d_amount` decimal(20,2) COMMENT '最近 30 天支付金额'
) COMMENT '地区主题宽表'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/dwt/dwt_area_topic/'
tblproperties ("parquet.compression"="lzo");
```

2）数据装载

```
hive (gmall)>
insert overwrite table dwt_area_topic
select
    nvl(old.id,new.id),
    nvl(old.province_name,new.province_name),
    nvl(old.area_code,new.area_code),
    nvl(old.iso_code,new.iso_code),
    nvl(old.region_id,new.region_id),
    nvl(old.region_name,new.region_name),
    nvl(new.order_day_count,0),
    nvl(new.order_day_amount,0.0),
    nvl(new.order_last_30d_count,0),
    nvl(new.order_last_30d_amount,0.0),
    nvl(new.payment_day_count,0),
    nvl(new.payment_day_amount,0.0),
    nvl(new.payment_last_30d_count,0),
    nvl(new.payment_last_30d_amount,0.0)
from
(
    select
        *
    from dwt_area_topic
)old
full outer join
(
    select
```

```
        id,
        province_name,
        area_code,
        iso_code,
        region_id,
        region_name,
        sum(if(dt='2020-03-10',order_count,0)) order_day_count,
        sum(if(dt='2020-03-10',order_amount,0.0)) order_day_amount,
        sum(if(dt='2020-03-10',payment_count,0)) payment_day_count,
        sum(if(dt='2020-03-10',payment_amount,0.0)) payment_day_amount,
        sum(order_count) order_last_30d_count,
        sum(order_amount) order_last_30d_amount,
        sum(payment_count) payment_last_30d_count,
        sum(payment_amount) payment_last_30d_amount
    from dws_area_stats_daycount
    where dt>=date_add('2020-03-10',-30)
    group by id,province_name,area_code,iso_code,region_id,region_name
)new
on old.id=new.id;
```

3）查询加载结果

```
hive (gmall)> select * from dwt_area_topic limit 5;
```

7.6 DWT 层数据导入脚本

1）在/home/atguigu/bin 目录下创建脚本 dws_to_dwt.sh

```
[atguigu@hadoop102 bin]$ vim dws_to_dwt.sh
```

在脚本中填写如下内容

```
#!/bin/bash
#!/bin/bash

APP=gmall
hive=/opt/module/hive/bin/hive

# 如果是输入的日期按照取输入日期；如果没输入日期取当前时间的前一天
if [ -n "$1" ] ;then
    do_date=$1
else
    do_date=`date -d "-1 day" +%F`
fi

sql="
insert overwrite table ${APP}.dwt_uv_topic
select
    nvl(new.mid_id,old.mid_id),
    nvl(new.model,old.model),
    nvl(new.brand,old.brand),
    nvl(old.login_date_first,'$do_date'),
    if(new.mid_id is not null,'$do_date',old.login_date_last),
    nvl(old.login_count,0)+if(new.mid_id is not null,1,0)
from
(
    select
        *
    from ${APP}.dwt_uv_topic
)old
full outer join
(
    select
        *
    from ${APP}.dws_uv_detail_daycount
    where dt='$do_date'
)new
on old.mid_id=new.mid_id;

insert overwrite table ${APP}.dwt_user_topic
select
    nvl(new.user_id,old.user_id),
    if(old.login_date_first    is    null    and    new.user_id    is    not
null,'$do_date',old.login_date_first),
    if(new.user_id is not null,'$do_date',old.login_date_last),
    nvl(old.login_count,0)+if(new.user_id is not null,1,0),
    nvl(new.login_last_30d_count,0),
    if(old.order_date_first              is               null               and
new.order_count>0,'$do_date',old.order_date_first),
    if(new.order_count>0,'$do_date',old.order_date_last),
    nvl(old.order_count,0)+nvl(new.order_count,0),
    nvl(old.order_amount,0)+nvl(new.order_amount,0),
    nvl(new.order_last_30d_count,0),
    nvl(new.order_last_30d_amount,0),
    if(old.payment_date_first              is              null              and
new.payment_count>0,'$do_date',old.payment_date_first),
    if(new.payment_count>0,'$do_date',old.payment_date_last),
    nvl(old.payment_count,0)+nvl(new.payment_count,0),
    nvl(old.payment_amount,0)+nvl(new.payment_amount,0),
    nvl(new.payment_last_30d_count,0),
    nvl(new.payment_last_30d_amount,0)
from
${APP}.dwt_user_topic old
full outer join
(
    select
        user_id,
        sum(if(dt='$do_date',order_count,0)) order_count,
        sum(if(dt='$do_date',order_amount,0)) order_amount,
        sum(if(dt='$do_date',payment_count,0)) payment_count,
        sum(if(dt='$do_date',payment_amount,0)) payment_amount,
        sum(if(login_count>0,1,0)) login_last_30d_count,
        sum(order_count) order_last_30d_count,
        sum(order_amount) order_last_30d_amount,
        sum(payment_count) payment_last_30d_count,
        sum(payment_amount) payment_last_30d_amount
    from ${APP}.dws_user_action_daycount
    where dt>=date_add( '$do_date',-30)
    group by user_id
)new
on old.user_id=new.user_id;

insert overwrite table ${APP}.dwt_sku_topic
select
    nvl(new.sku_id,old.sku_id),
    sku_info.spu_id,
    nvl(new.order_count30,0),
    nvl(new.order_num30,0),
    nvl(new.order_amount30,0),
    nvl(old.order_count,0) + nvl(new.order_count,0),
    nvl(old.order_num,0) + nvl(new.order_num,0),
    nvl(old.order_amount,0) + nvl(new.order_amount,0),
    nvl(new.payment_count30,0),
    nvl(new.payment_num30,0),
    nvl(new.payment_amount30,0),
    nvl(old.payment_count,0) + nvl(new.payment_count,0),
    nvl(old.payment_num,0) + nvl(new.payment_count,0),
    nvl(old.payment_amount,0) + nvl(new.payment_count,0),
    nvl(new.refund_count30,0),
    nvl(new.refund_num30,0),
    nvl(new.refund_amount30,0),
    nvl(old.refund_count,0) + nvl(new.refund_count,0),
    nvl(old.refund_num,0) + nvl(new.refund_num,0),
    nvl(old.refund_amount,0) + nvl(new.refund_amount,0),
    nvl(new.cart_count30,0),
    nvl(old.cart_count,0) + nvl(new.cart_count,0),
    nvl(new.favor_count30,0),
    nvl(old.favor_count,0) + nvl(new.favor_count,0),
    nvl(new.appraise_good_count30,0),
    nvl(new.appraise_mid_count30,0),
    nvl(new.appraise_bad_count30,0),
    nvl(new.appraise_default_count30,0)  ,
    nvl(old.appraise_good_count,0) + nvl(new.appraise_good_count,0),
    nvl(old.appraise_mid_count,0) + nvl(new.appraise_mid_count,0),
    nvl(old.appraise_bad_count,0) + nvl(new.appraise_bad_count,0),
    nvl(old.appraise_default_count,0) + nvl(new.appraise_default_count,0)
from
(
    select
        sku_id,
        spu_id,
        order_last_30d_count,
        order_last_30d_num,
        order_last_30d_amount,
        order_count,
        order_num,
        order_amount  ,
        payment_last_30d_count,
        payment_last_30d_num,
        payment_last_30d_amount,
        payment_count,
        payment_num,
        payment_amount,
        refund_last_30d_count,
        refund_last_30d_num,
        refund_last_30d_amount,
        refund_count,
        refund_num,
        refund_amount,
        cart_last_30d_count,
        cart_count,
        favor_last_30d_count,
        favor_count,
        appraise_last_30d_good_count,
        appraise_last_30d_mid_count,
        appraise_last_30d_bad_count,
        appraise_last_30d_default_count,
        appraise_good_count,
        appraise_mid_count,
        appraise_bad_count,
        appraise_default_count
    from ${APP}.dwt_sku_topic
)old
full outer join
(
    select
        sku_id,
        sum(if(dt='$do_date', order_count,0 )) order_count,
        sum(if(dt='$do_date',order_num ,0 ))  order_num,
        sum(if(dt='$do_date',order_amount,0 )) order_amount ,
        sum(if(dt='$do_date',payment_count,0 )) payment_count,
        sum(if(dt='$do_date',payment_num,0 )) payment_num,
        sum(if(dt='$do_date',payment_amount,0 )) payment_amount,
        sum(if(dt='$do_date',refund_count,0 )) refund_count,
        sum(if(dt='$do_date',refund_num,0 )) refund_num,
        sum(if(dt='$do_date',refund_amount,0 )) refund_amount,
        sum(if(dt='$do_date',cart_count,0 )) cart_count,
        sum(if(dt='$do_date',favor_count,0 )) favor_count,
        sum(if(dt='$do_date',appraise_good_count,0 )) appraise_good_count,
        sum(if(dt='$do_date',appraise_mid_count,0 ) ) appraise_mid_count ,
        sum(if(dt='$do_date',appraise_bad_count,0 )) appraise_bad_count,
        sum(if(dt='$do_date',appraise_default_count,0                       ))
appraise_default_count,
        sum(order_count) order_count30 ,
        sum(order_num) order_num30,
        sum(order_amount) order_amount30,
        sum(payment_count) payment_count30,
        sum(payment_num) payment_num30,
        sum(payment_amount) payment_amount30,
        sum(refund_count) refund_count30,
        sum(refund_num) refund_num30,
        sum(refund_amount) refund_amount30,
        sum(cart_count) cart_count30,
        sum(favor_count) favor_count30,
        sum(appraise_good_count) appraise_good_count30,
        sum(appraise_mid_count) appraise_mid_count30,
        sum(appraise_bad_count) appraise_bad_count30,
        sum(appraise_default_count) appraise_default_count30
    from ${APP}.dws_sku_action_daycount
    where dt >= date_add ('$do_date', -30)
    group by sku_id
)new
on new.sku_id = old.sku_id
left join
(select * from ${APP}.dwd_dim_sku_info where dt='$do_date') sku_info
on nvl(new.sku_id,old.sku_id)= sku_info.id;


insert overwrite table ${APP}.dwt_activity_topic
select
    nvl(new.id,old.id),
    nvl(new.activity_name,old.activity_name),
    nvl(new.order_count,0),
    nvl(new.payment_count,0),
    nvl(old.order_count,0)+nvl(new.order_count,0),
    nvl(old.payment_count,0)+nvl(new.payment_count,0)
from
(
    select
        *
    from ${APP}.dwt_activity_topic
)old
full outer join
(
    select
        id,
        activity_name,
        order_count,
        payment_count
    from ${APP}.dws_activity_info_daycount
    where dt='$do_date'
)new
on old.id=new.id;
```

```
insert overwrite table ${APP}.dwt_area_topic
select
    nvl(old.id,new.id),
    nvl(old.province_name,new.province_name),
    nvl(old.area_code,new.area_code),
    nvl(old.iso_code,new.iso_code),
    nvl(old.region_id,new.region_id),
    nvl(old.region_name,new.region_name),
    nvl(new.order_day_count,0),
    nvl(new.order_day_amount,0.0),
    nvl(new.order_last_30d_count,0),
    nvl(new.order_last_30d_amount,0.0),
    nvl(new.payment_day_count,0),
    nvl(new.payment_day_amount,0.0),
    nvl(new.payment_last_30d_count,0),
    nvl(new.payment_last_30d_amount,0.0)
from
(
    select
        *
    from ${APP}.dwt_area_topic
)old
full outer join
(
    select
        id,
        province_name,
        area_code,
        iso_code,
        region_id,
        region_name,
        sum(if(dt='$do_date',order_count,0)) order_day_count,
        sum(if(dt='$do_date',order_amount,0.0)) order_day_amount,
        sum(if(dt='$do_date',payment_count,0)) payment_day_count,
        sum(if(dt='$do_date',payment_amount,0.0)) payment_day_amount,
        sum(order_count) order_last_30d_count,
        sum(order_amount) order_last_30d_amount,
        sum(payment_count) payment_last_30d_count,
        sum(payment_amount) payment_last_30d_amount
    from ${APP}.dws_area_stats_daycount
    where dt>=date_add('$do_date',-30)
    group by id,province_name,area_code,iso_code,region_id,region_name
)new
on old.id=new.id;
"

$hive -e "$sql"
```

2）增加脚本执行权限

```
[atguigu@hadoop102 bin]$ chmod 777 dws_to_dwt.sh
```

3）执行脚本导入数据

```
[atguigu@hadoop102 bin]$ dws_to_dwt.sh 2020-03-11
```

4）查看导入数据

```
hive (gmall)>
select * from dwt_uv_topic limit 5;
select * from dwt_user_topic limit 5;
select * from dwt_sku_topic limit 5;
select * from dwt_coupon_topic limit 5;
select * from dwt_activity_topic limit 5;
```

第 8 章 数仓搭建-ADS 层

8.1 设备主题

8.1.1 活跃设备数（日、周、月）

需求定义：

日活：当日活跃的**设备数**

周活：当周活跃的**设备数**

月活：当月活跃的**设备数**

1）建表语句

```
hive (gmall)>
drop table if exists ads_uv_count;
create external table ads_uv_count(
    `dt` string COMMENT '统计日期',
    `day_count` bigint COMMENT '当日用户数量',
    `wk_count`  bigint COMMENT '当周用户数量',
    `mn_count`  bigint COMMENT '当月用户数量',
    `is_weekend` string COMMENT 'Y,N 是否是周末,用于得到本周最终结果',
    `is_monthend` string COMMENT 'Y,N 是否是月末,用于得到本月最终结果'
) COMMENT '活跃设备数'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_uv_count/';
```

2）导入数据

```
hive (gmall)>
insert into table ads_uv_count
select
    '2020-03-10' dt,
    daycount.ct,
    wkcount.ct,
    mncount.ct,
    if(date_add(next_day('2020-03-10','MO'),-1)='2020-03-10','Y','N') ,
    if(last_day('2020-03-10')='2020-03-10','Y','N')
from
(
    select
        '2020-03-10' dt,
        count(*) ct
    from dwt_uv_topic
    where login_date_last='2020-03-10'
)daycount join
(
    select
        '2020-03-10' dt,
        count (*) ct
    from dwt_uv_topic
    where login_date_last>=date_add(next_day('2020-03-10','MO'),-7)
    and login_date_last<= date_add(next_day('2020-03-10','MO'),-1)
) wkcount on daycount.dt=wkcount.dt
join
(
    select
       '2020-03-10' dt,
       count (*) ct
    from dwt_uv_topic
    where        date_format(login_date_last,'yyyy-MM')=date_format('2020-03-
10','yyyy-MM')
)mncount on daycount.dt=mncount.dt;
```

3）查询导入结果

```
hive (gmall)> select * from ads_uv_count;
```

8.1.2 每日新增设备

1）建表语句

```
hive (gmall)>
drop table if exists ads_new_mid_count;
create external table ads_new_mid_count
(
    `create_date`     string comment '创建时间' ,
    `new_mid_count`   BIGINT comment '新增设备数量'
)  COMMENT '每日新增设备信息数量'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_new_mid_count/';
```

2）导入数据

```
hive (gmall)>
insert into table ads_new_mid_count
select
    login_date_first,
    count(*)
from dwt_uv_topic
where login_date_first='2020-03-10'
group by login_date_first;
```

3）查询导入数据

```
hive (gmall)> select * from ads_new_mid_count;
```

8.1.3 沉默用户数

需求定义：

沉默用户：只在安装当天启动过，且启动时间是在 7 天前

1）建表语句

```
hive (gmall)>
drop table if exists ads_silent_count;
create external table ads_silent_count(
    `dt` string COMMENT '统计日期',
    `silent_count` bigint COMMENT '沉默设备数'
)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_silent_count';
```

2）导入 2020-03-20 数据

```
hive (gmall)>
insert into table ads_silent_count
select
```

```
    '2020-03-15',
    count(*)
from dwt_uv_topic
where login_date_first=login_date_last
and login_date_last<=date_add('2020-03-15',-7);
```

3）查询导入数据

```
hive (gmall)> select * from ads_silent_count;
```

8.1.4 本周回流用户数

需求定义：

本周回流用户：上周未活跃，本周活跃的设备，且不是本周新增设备

1）建表语句

```
hive (gmall)>
drop table if exists ads_back_count;
create external table ads_back_count(
    `dt` string COMMENT '统计日期',
    `wk_dt` string COMMENT '统计日期所在周',
    `wastage_count` bigint COMMENT '回流设备数'
)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_back_count';
```

2）导入数据：

```
hive (gmall)>
insert into table ads_back_count
select
    '2020-03-15',
    concat(date_add(next_day('2020-03-10','MO'),-7),'_',
date_add(next_day('2020-03-15','MO'),-1)),
    count(*)
from
(
    select
        mid_id
    from dwt_uv_topic
    where login_date_last>=date_add(next_day('2020-03-10','MO'),-7)
    and login_date_last<= date_add(next_day('2020-03-10','MO'),-1)
    and login_date_first<date_add(next_day('2020-03-10','MO'),-7)
)current_wk
left join
(
    select
        mid_id
    from dws_uv_detail_daycount
    where dt>=date_add(next_day('2020-03-10','MO'),-7*2)
    and dt<= date_add(next_day('2020-03-10','MO'),-7-1)
    group by mid_id
)last_wk
on current_wk.mid_id=last_wk.mid_id
where last_wk.mid_id is null;
```

3）查询结果

```
hive (gmall)> select * from ads_back_count;
```

8.1.5 流失用户数

需求定义：

流失用户：最近 7 天未活跃的设备

1）建表语句

```
hive (gmall)>
drop table if exists ads_wastage_count;
create external table ads_wastage_count(
    `dt` string COMMENT '统计日期',
    `wastage_count` bigint COMMENT '流失设备数'
)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_wastage_count';
```

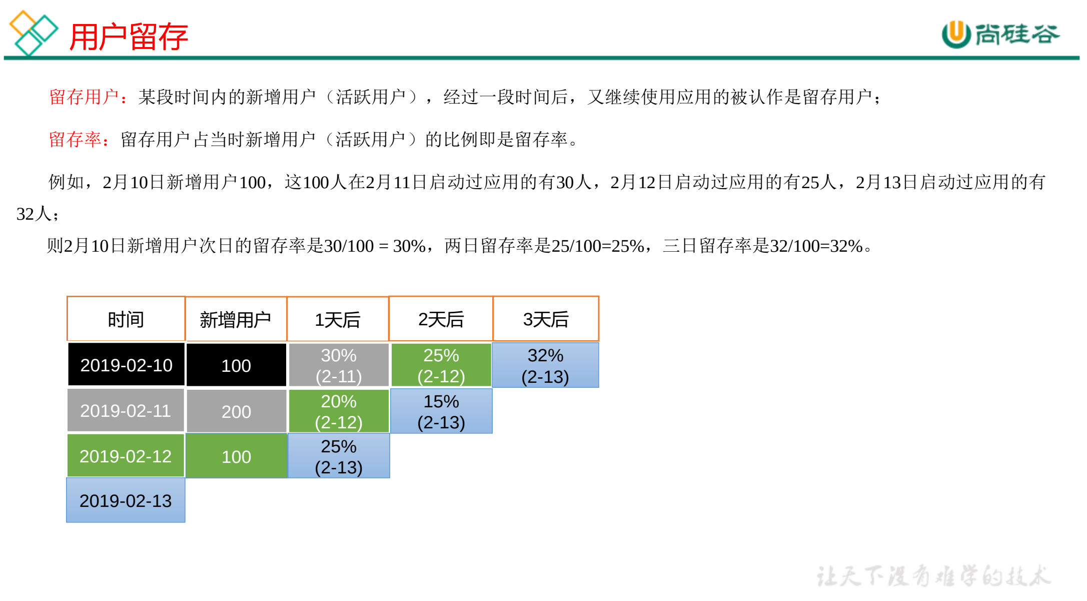
2）导入 2020-03-20 数据

```
hive (gmall)>
insert into table ads_wastage_count
select
     '2020-03-20',
     count(*)
from
(
    select
        mid_id
    from dwt_uv_topic
    where login_date_last<=date_add('2020-03-20',-7)
    group by mid_id
)t1;
```

3）查询结果

```
hive (gmall)> select * from ads_wastage_count;
```

8.1.6 留存率



用户留存

尚硅谷

留存用户：某段时间内的新增用户（活跃用户），经过一段时间后，又继续使用应用的被认作是留存用户；

留存率：留存用户占当时新增用户（活跃用户）的比例即是留存率。

例如，2月10日新增用户100，这100人在2月11日启动过应用的有30人，2月12日启动过应用的有25人，2月13日启动过应用的有32人；

则2月10日新增用户次日的留存率是30/100 = 30%，两日留存率是25/100=25%，三日留存率是32/100=32%。

时间	新增用户	1天后	2天后	3天后
2019-02-10	100	30% (2-11)	25% (2-12)	32% (2-13)
2019-02-11	200	20% (2-12)	15% (2-13)	
2019-02-12	100	25% (2-13)		
2019-02-13				

让天下没有难学的技术

1）建表语句

```
hive (gmall)>
drop table if exists ads_user_retention_day_rate;
create external table ads_user_retention_day_rate
(
     `stat_date`          string comment '统计日期',
     `create_date`        string  comment '设备新增日期',
     `retention_day`      int comment '截止当前日期留存天数',
     `retention_count`    bigint comment  '留存数量',
     `new_mid_count`      bigint comment '设备新增数量',
     `retention_ratio`    decimal(10,2) comment '留存率'
)  COMMENT '每日用户留存情况'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_user_retention_day_rate/';
```

2）导入数据

```
hive (gmall)>
insert into table ads_user_retention_day_rate
select
    '2020-03-10',--统计日期
    date_add('2020-03-10',-1),--新增日期
    1,--留存天数
    sum(if(login_date_first=date_add('2020-03-10',-1) and login_date_last='2020-03-
10',1,0)),--2020-03-09 的 1 日留存数
    sum(if(login_date_first=date_add('2020-03-10',-1),1,0)),--2020-03-09 新增
    sum(if(login_date_first=date_add('2020-03-10',-1) and login_date_last='2020-03-
10',1,0))/sum(if(login_date_first=date_add('2020-03-10',-1),1,0))*100
from dwt_uv_topic

union all

select
    '2020-03-10',--统计日期
    date_add('2020-03-10',-2),--新增日期
    2,--留存天数
    sum(if(login_date_first=date_add('2020-03-10',-2) and login_date_last='2020-03-
10',1,0)),--2020-03-08 的 2 日留存数
    sum(if(login_date_first=date_add('2020-03-10',-2),1,0)),--2020-03-08 新增
    sum(if(login_date_first=date_add('2020-03-10',-2) and login_date_last='2020-03-
10',1,0))/sum(if(login_date_first=date_add('2020-03-10',-2),1,0))*100
from dwt_uv_topic

union all

select
    '2020-03-10',--统计日期
    date_add('2020-03-10',-3),--新增日期
    3,--留存天数
    sum(if(login_date_first=date_add('2020-03-10',-3) and login_date_last='2020-03-
10',1,0)),--2020-03-07 的 3 日留存数
    sum(if(login_date_first=date_add('2020-03-10',-3),1,0)),--2020-03-07 新增
    sum(if(login_date_first=date_add('2020-03-10',-3) and login_date_last='2020-03-
10',1,0))/sum(if(login_date_first=date_add('2020-03-10',-3),1,0))*100
from dwt_uv_topic;
```

3）查询导入数据

```
hive (gmall)>select * from ads_user_retention_day_rate;
```

8.1.7 最近连续三周活跃用户数

1）建表语句

```
hive (gmall)>
drop table if exists ads_continuity_wk_count;
create external table ads_continuity_wk_count(
    `dt` string COMMENT '统计日期,一般用结束周周日日期,如果每天计算一次,可用当天日期',
    `wk_dt` string COMMENT '持续时间',
    `continuity_count` bigint COMMENT '活跃次数'
)
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_continuity_wk_count';
```

2）导入 2020-03-20 所在周的数据

```
hive (gmall)>
insert into table ads_continuity_wk_count
select
    '2020-03-10',
    concat(date_add(next_day('2020-03-10','MO'),-
7*3),'_',date_add(next_day('2020-03-10','MO'),-1)),
    count(*)
from
(
    select
        mid_id
    from
    (
        select
            mid_id
        from dws_uv_detail_daycount
        where dt>=date_add(next_day('2020-03-10','monday'),-7)
        and dt<=date_add(next_day('2020-03-10','monday'),-1)
        group by mid_id

        union all

        select
            mid_id
        from dws_uv_detail_daycount
        where dt>=date_add(next_day('2020-03-10','monday'),-7*2)
        and dt<=date_add(next_day('2020-03-10','monday'),-7-1)
        group by mid_id

        union all

        select
            mid_id
        from dws_uv_detail_daycount
        where dt>=date_add(next_day('2020-03-10','monday'),-7*3)
        and dt<=date_add(next_day('2020-03-10','monday'),-7*2-1)
        group by mid_id
    )t1
    group by mid_id
    having count(*)=3
)t2
```

3）查询

```
hive (gmall)> select * from ads_continuity_wk_count;
```

8.1.8 最近七天内连续三天活跃用户数

1）建表语句

```
hive (gmall)>
```

```
drop table if exists ads_continuity_uv_count;
create external table ads_continuity_uv_count(
    `dt` string COMMENT '统计日期',
    `wk_dt` string COMMENT '最近 7 天日期',
    `continuity_count` bigint
) COMMENT '连续活跃设备数'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_continuity_uv_count';
```

2）写出导入数据的 SQL 语句

```
hive (gmall)>
insert into table ads_continuity_uv_count
select
    '2020-03-12',
    concat(date_add('2020-03-12',-6),'_','2020-03-12'),
    count(*)
from
(
    select mid_id
    from
    (
        select mid_id
        from
        (
            select
                mid_id,
                date_sub(dt,rank) date_dif
            from
            (
                select
                    mid_id,
                    dt,
                    rank() over(partition by mid_id order by dt) rank
                from dws_uv_detail_daycount
                where dt>=date_add('2020-03-12',-6) and dt<='2020-03-
12'
            )t1
        )t2
        group by mid_id,date_dif
        having count(*)>=3
    )t3
    group by mid_id
)t4;
```

3）查询

```
hive (gmall)> select * from ads_continuity_uv_count;
```

8.2 会员主题

8.2.1 会员主题信息

1）建表

```
hive (gmall)>
drop table if exists ads_user_topic;
create external table ads_user_topic(
    `dt` string COMMENT '统计日期',
    `day_users` string COMMENT '活跃会员数',
    `day_new_users` string COMMENT '新增会员数',
    `day_new_payment_users` string COMMENT '新增消费会员数',
    `payment_users` string COMMENT '总付费会员数',
    `users` string COMMENT '总会员数',
    `day_users2users` decimal(10,2) COMMENT '会员活跃率',
    `payment_users2users` decimal(10,2) COMMENT '会员付费率',
    `day_new_users2users` decimal(10,2) COMMENT '会员新鲜度'
) COMMENT '会员主题信息表'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_user_topic';
```

2）导入数据

```
hive (gmall)>
insert into table ads_user_topic
select
    '2020-03-10',
    sum(if(login_date_last='2020-03-10',1,0)),
    sum(if(login_date_first='2020-03-10',1,0)),
    sum(if(payment_date_first='2020-03-10',1,0)),
    sum(if(payment_count>0,1,0)),
    count(*),
    sum(if(login_date_last='2020-03-10',1,0))/count(*),
    sum(if(payment_count>0,1,0))/count(*),
    sum(if(login_date_first='2020-03-10',1,0))/sum(if(login_date_last='2020-
03-10',1,0))
from dwt_user_topic
```

3）查询数据

```
hive (gmall)> select * from ads_user_topic;
```

8.2.2 漏斗分析

统计“首页->购物车->下单->支付”的转化率

思路：统计各个行为的人数，然后计算比值。

1）建表语句

```
hive (gmall)>
drop table if exists ads_user_action_convert_day;
create external  table ads_user_action_convert_day(
    `dt` string COMMENT '统计日期',
    `total_visitor_m_count`  bigint COMMENT '总访问人数',
    `cart_u_count` bigint COMMENT '加入购物车的人数',
    `visitor2cart_convert_ratio` decimal(10,2) COMMENT '访问到加入购物车转化率',
    `order_u_count` bigint     COMMENT '下单人数',
    `cart2order_convert_ratio`  decimal(10,2) COMMENT '加入购物车到下单转化率',
    `payment_u_count` bigint     COMMENT '支付人数',
    `order2payment_convert_ratio` decimal(10,2) COMMENT '下单到支付的转化率'
 ) COMMENT '用户行为漏斗分析'
row format delimited  fields terminated by '\t'
location '/warehouse/gmall/ads/ads_user_action_convert_day/';
```

2）数据装载

```
hive (gmall)>
insert into table ads_user_action_convert_day
select
    '2020-03-10',
    uv.day_count,
    ua.cart_count,
    cast(ua.cart_count/uv.day_count as  decimal(10,2)) visitor2cart_convert_ratio,
    ua.order_count,
    cast(ua.order_count/ua.cart_count as  decimal(10,2)) visitor2order_convert_ratio,
    ua.payment_count,
    cast(ua.payment_count/ua.order_count as  decimal(10,2)) order2payment_convert_ratio
from
(
    select
        dt,
        sum(if(cart_count>0,1,0)) cart_count,
        sum(if(order_count>0,1,0)) order_count,
        sum(if(payment_count>0,1,0)) payment_count
    from dws_user_action_daycount
where dt='2020-03-10'
group by dt
)ua join ads_uv_count uv on uv.dt=ua.dt;
```

3）查询加载数据

```
hive (gmall)> select * from ads_user_action_convert_day;
```

8.3 商品主题

8.3.1 商品个数信息

1）建表语句

```
hive (gmall)>
drop table if exists ads_product_info;
create external table ads_product_info(
    `dt` string COMMENT '统计日期',
    `sku_num` string COMMENT 'sku 个数',
    `spu_num` string COMMENT 'spu 个数'
) COMMENT '商品个数信息'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_product_info';
```

2）导入数据

```
hive (gmall)>
insert into table ads_product_info
select
    '2020-03-10' dt,
    sku_num,
    spu_num
from
(
    select
        '2020-03-10' dt,
        count(*) sku_num
    from
        dwt_sku_topic
) tmp_sku_num
join
(
    select
        '2020-03-10' dt,
        count(*) spu_num
    from
    (
        select
            spu_id
        from
```

```
          dwt_sku_topic
      group by
          spu_id
   ) tmp_spu_id
) tmp_spu_num
on
   tmp_sku_num.dt=tmp_spu_num.dt;
```

3）查询结果数据

```
hive (gmall)> select * from ads_product_info;
```

8.3.2 商品销量排名

1）建表语句

```
hive (gmall)>
drop table if exists ads_product_sale_topN;
create external table ads_product_sale_topN(
   `dt` string COMMENT '统计日期',
   `sku_id` string COMMENT '商品 ID',
   `payment_amount` bigint COMMENT '销量'
) COMMENT '商品个数信息'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_product_sale_topN';
```

2）导入数据

```
hive (gmall)>
insert into table ads_product_sale_topN
select
   '2020-03-10' dt,
   sku_id,
   payment_amount
from
   dws_sku_action_daycount
where
   dt='2020-03-10'
order by payment_amount desc
limit 10;
```

3）查询结果数据

```
hive (gmall)> select * from ads_product_sale_topN;
```

8.3.3 商品收藏排名

1）建表语句

```
hive (gmall)>
drop table if exists ads_product_favor_topN;
create external table ads_product_favor_topN(
   `dt` string COMMENT '统计日期',
   `sku_id` string COMMENT '商品 ID',
   `favor_count` bigint COMMENT '收藏量'
) COMMENT '商品收藏 TopN'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_product_favor_topN';
```

2）导入数据

```
hive (gmall)>
insert into table ads_product_favor_topN
select
   '2020-03-10' dt,
   sku_id,
    favor_count
from
    dws_sku_action_daycount
where
    dt='2020-03-10'
order by favor_count desc
limit 10;
```

3）查询数据

```
hive (gmall)> select * from ads_product_favor_topN;
```

8.3.4 商品加入购物车排名

1）建表语句

```
hive (gmall)>
drop table if exists ads_product_cart_topN;
create external table ads_product_cart_topN(
    `dt` string COMMENT '统计日期',
    `sku_id` string COMMENT '商品 ID',
    `cart_count` bigint COMMENT '加入购物车次数'
) COMMENT '商品加入购物车 TopN'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_product_cart_topN';
```

2）导入数据

```
hive (gmall)>
insert into table ads_product_cart_topN
select
    '2020-03-10' dt,
    sku_id,
    cart_count
from
    dws_sku_action_daycount
where
    dt='2020-03-10'
order by cart_count desc
limit 10;
```

3）查询数据

```
hive (gmall)> select * from ads_product_cart_topN;
```

8.3.5 商品退款率排名(最近 30 天)

1）建表语句

```
hive (gmall)>
drop table if exists ads_product_refund_topN;
create external table ads_product_refund_topN(
    `dt` string COMMENT '统计日期',
    `sku_id` string COMMENT '商品 ID',
    `refund_ratio` decimal(10,2) COMMENT '退款率'
) COMMENT '商品退款率 TopN'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_product_refund_topN';
```

2）导入数据

```
hive (gmall)>
insert into table ads_product_refund_topN
select
    '2020-03-10',
    sku_id,
    refund_last_30d_count/payment_last_30d_count*100 refund_ratio
from dwt_sku_topic
order by refund_ratio desc
limit 10;
```

3）查询数据

```
hive (gmall)> select * from ads_product_refund_topN;
```

8.3.6 商品差评率

1）建表语句

```
hive (gmall)>
drop table if exists ads_appraise_bad_topN;
create external table ads_appraise_bad_topN(
    `dt` string COMMENT '统计日期',
    `sku_id` string COMMENT '商品 ID',
    `appraise_bad_ratio` decimal(10,2) COMMENT '差评率'
) COMMENT '商品差评率 TopN'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_appraise_bad_topN';
```

2）导入数据

```
hive (gmall)>
insert into table ads_appraise_bad_topN
select
    '2020-03-10' dt,
    sku_id,
appraise_bad_count/(appraise_good_count+appraise_mid_count+appraise_bad_coun
t+appraise_default_count) appraise_bad_ratio
from
    dws_sku_action_daycount
where
    dt='2020-03-10'
order by appraise_bad_ratio desc
limit 10;
```

3）查询数据

```
hive (gmall)> select * from ads_appraise_bad_topN;
```

8.4 营销主题（用户+商品+购买行为）

8.4.1 下单数目统计

需求分析：统计每日下单数，下单金额及下单用户数。

1）建表语句

```
hive (gmall)>
drop table if exists ads_order_daycount;
create external table ads_order_daycount(
    dt string comment '统计日期',
    order_count bigint comment '单日下单笔数',
    order_amount bigint comment '单日下单金额',
    order_users bigint comment '单日下单用户数'
) comment '每日订单总计表'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_order_daycount';
```

2）导入数据

```
hive (gmall)>
```

```
insert into table ads_order_daycount
select
    '2020-03-10',
    sum(order_count),
    sum(order_amount),
    sum(if(order_count>0,1,0))
from dws_user_action_daycount
where dt='2020-03-10';
```

3）查询数据

```
hive (gmall)> select * from ads_order_daycount;
```

8.4.2 支付信息统计

每日支付金额、支付人数、支付商品数、支付笔数以及下单到支付的平均时长（取自 DWD）

1）建表

```
hive (gmall)>
drop table if exists ads_payment_daycount;
create external table ads_payment_daycount(
    dt string comment '统计日期',
    order_count bigint comment '单日支付笔数',
    order_amount bigint comment '单日支付金额',
    payment_user_count bigint comment '单日支付人数',
    payment_sku_count bigint comment '单日支付商品数',
    payment_avg_time double comment '下单到支付的平均时长，取分钟数'
) comment '每日订单总计表'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_payment_daycount';
```

2）导入数据

```
hive (gmall)>
insert into table ads_payment_daycount
select
    tmp_payment.dt,
    tmp_payment.payment_count,
    tmp_payment.payment_amount,
    tmp_payment.payment_user_count,
    tmp_skucount.payment_sku_count,
    tmp_time.payment_avg_time
from
(
    select
        '2020-03-10' dt,
        sum(payment_count) payment_count,
        sum(payment_amount) payment_amount,
        sum(if(payment_count>0,1,0)) payment_user_count
    from dws_user_action_daycount
    where dt='2020-03-10'
)tmp_payment
join
(
    select
        '2020-03-10' dt,
        sum(if(payment_count>0,1,0)) payment_sku_count
    from dws_sku_action_daycount
    where dt='2020-03-10'
)tmp_skucount on tmp_payment.dt=tmp_skucount.dt
join
(
    select
```

```
        '2020-03-10' dt,
        sum(unix_timestamp(payment_time)-
unix_timestamp(create_time))/count(*)/60 payment_avg_time
    from dwd_fact_order_info
    where dt='2020-03-10'
    and payment_time is not null
)tmp_time on tmp_payment.dt=tmp_time.dt
```

3）查询数据

```
hive (gmall)> select * from ads_payment_daycount;
```

8.4.3 品牌复购率

1）建表语句

```
hive (gmall)>
drop table ads_sale_tm_category1_stat_mn;
create external table ads_sale_tm_category1_stat_mn
(
    tm_id string comment '品牌 id',
    category1_id string comment '1 级品类 id ',
    category1_name string comment '1 级品类名称 ',
    buycount   bigint comment  '购买人数',
    buy_twice_last bigint  comment '两次以上购买人数',
    buy_twice_last_ratio decimal(10,2)  comment  '单次复购率',
    buy_3times_last   bigint comment   '三次以上购买人数',
    buy_3times_last_ratio decimal(10,2)  comment  '多次复购率',
    stat_mn string comment '统计月份',
    stat_date string comment '统计日期'
)   COMMENT '复购率统计'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_sale_tm_category1_stat_mn/';
```

2）数据导入

```
hive (gmall)>
with
tmp_order as
(
    select
        user_id,
        order_stats_struct.sku_id sku_id,
        order_stats_struct.order_count order_count
    from dws_user_action_daycount lateral view explode(order_detail_stats) tmp
as order_stats_struct
    where date_format(dt,'yyyy-MM')=date_format('2020-03-10','yyyy-MM')
),
tmp_sku as
(
    select
        id,
        tm_id,
        category1_id,
        category1_name
    from dwd_dim_sku_info
    where dt='2020-03-10'
)
insert into table ads_sale_tm_category1_stat_mn
select
    tm_id,
    category1_id,
    category1_name,
    sum(if(order_count>=1,1,0)) buycount,
    sum(if(order_count>=2,1,0)) buyTwiceLast,
    sum(if(order_count>=2,1,0))/sum( if(order_count>=1,1,0)) buyTwiceLastRatio,
    sum(if(order_count>=3,1,0))  buy3timeLast  ,
    sum(if(order_count>=3,1,0))/sum(                  if(order_count>=1,1,0))
buy3timeLastRatio ,
    date_format('2020-03-10' ,'yyyy-MM') stat_mn,
    '2020-03-10' stat_date
from
(
    select
        tmp_order.user_id,
        tmp_sku.category1_id,
        tmp_sku.category1_name,
        tmp_sku.tm_id,
        sum(order_count) order_count
    from tmp_order
    join tmp_sku
    on tmp_order.sku_id=tmp_sku.id
    group                                                                  by
tmp_order.user_id,tmp_sku.category1_id,tmp_sku.category1_name,tmp_sku.tm_id
)tmp
group by tm_id, category1_id, category1_name
```

8.4 地区主题

8.4.1 地区主题信息

1）建表语句

```
hive (gmall)>
drop table if exists ads_area_topic;
create external table ads_area_topic(
    `dt` string COMMENT '统计日期',
    `id` bigint COMMENT '编号',
    `province_name` string COMMENT '省份名称',
    `area_code` string COMMENT '地区编码',
    `iso_code` string COMMENT 'iso编码',
    `region_id` string COMMENT '地区ID',
    `region_name` string COMMENT '地区名称',
    `order_day_count` bigint COMMENT '当天下单次数',
    `order_day_amount` decimal(20,2) COMMENT '当天下单金额',
    `payment_day_count` bigint COMMENT '当天支付次数',
    `payment_day_amount` decimal(20,2) COMMENT '当天支付金额'
) COMMENT '地区主题宽表'
row format delimited fields terminated by '\t'
location '/warehouse/gmall/ads/ads_area_topic/';
```

2）数据装载

```
hive (gmall)>
insert into table ads_area_topic
select
    '2020-03-10',
    id,
    province_name,
    area_code,
    iso_code,
    region_id,
    region_name,
    order_day_count,
    order_day_amount,
    payment_day_count,
    payment_day_amount
from dwt_area_topic;
```

3）查看结果

```
hive (gmall)> select * from ads_area_topic;
```

8.5 ADS 层导入脚本

1）在/home/atguigu/bin 目录下创建脚本 dwt_to_ads.sh

```
[atguigu@hadoop102 bin]$ vim dwt_to_ads.sh
```

在脚本中填写如下内容

```
#!/bin/bash

hive=/opt/module/hive/bin/hive
APP=gmall
# 如果是输入的日期按照取输入日期；如果没输入日期取当前时间的前一天
if [ -n "$1" ] ;then
    do_date=$1
else
    do_date=`date -d "-1 day" +%F`
fi

sql="
insert into table ${APP}.ads_uv_count
select
    '$do_date' dt,
    daycount.ct,
    wkcount.ct,
    mncount.ct,
    if(date_add(next_day('$do_date','MO'),-1)='$do_date','Y','N') ,
    if(last_day('$do_date')='$do_date','Y','N')
from
(
    select
        '$do_date' dt,
        count(*) ct
    from ${APP}.dwt_uv_topic
    where login_date_last='$do_date'
)daycount join
(
    select
        '$do_date' dt,
        count (*) ct
    from ${APP}.dwt_uv_topic
    where login_date_last>=date_add(next_day('$do_date','MO'),-7)
    and login_date_last<= date_add(next_day('$do_date','MO'),-1)
) wkcount on daycount.dt=wkcount.dt
join
(
    select
        '$do_date' dt,
        count (*) ct
    from ${APP}.dwt_uv_topic
    where                                  date_format(login_date_last,'yyyy-
MM')=date_format('$do_date','yyyy-MM')
)mncount on daycount.dt=mncount.dt;

insert into table ${APP}.ads_new_mid_count
select
    login_date_first,
    count(*)
from ${APP}.dwt_uv_topic
where login_date_first='$do_date'
group by login_date_first;

insert into table ${APP}.ads_silent_count
select
    '$do_date',
    count(*)
from ${APP}.dwt_uv_topic
where login_date_first=login_date_last
and login_date_last<=date_add('$do_date',-7);

insert into table ${APP}.ads_back_count
select
    '$do_date',
    concat(date_add(next_day('$do_date','MO'),-7),'_',
date_add(next_day('$do_date','MO'),-1)),
    count(*)
from
(
    select
        mid_id
    from ${APP}.dwt_uv_topic
    where login_date_last>=date_add(next_day('$do_date','MO'),-7)
    and login_date_last<= date_add(next_day('$do_date','MO'),-1)
    and login_date_first<date_add(next_day('$do_date','MO'),-7)
)current_wk
left join
(
    select
        mid_id
    from ${APP}.dws_uv_detail_daycount
    where dt>=date_add(next_day('$do_date','MO'),-7*2)
    and dt<= date_add(next_day('$do_date','MO'),-7-1)
    group by mid_id
)last_wk
on current_wk.mid_id=last_wk.mid_id
where last_wk.mid_id is null;

insert into table ${APP}.ads_wastage_count
select
     '$do_date',
     count(*)
from
(
    select
        mid_id
    from ${APP}.dwt_uv_topic
    where login_date_last<=date_add('$do_date',-7)
    group by mid_id
)t1;

insert into table ${APP}.ads_user_retention_day_rate
select
    '$do_date',--统计日期
    date_add('$do_date',-1),--新增日期
    1,--留存天数
    sum(if(login_date_first=date_add('$do_date',-1)                    and
login_date_last='$do_date',1,0)),--$do_date 的 1 日留存数
    sum(if(login_date_first=date_add('$do_date',-1),1,0)),--$do_date 新增
    sum(if(login_date_first=date_add('$do_date',-1)                    and
login_date_last='$do_date',1,0))/sum(if(login_date_first=date_add('$do_date'
,-1),1,0))*100
from ${APP}.dwt_uv_topic

union all

select
    '$do_date',--统计日期
    date_add('$do_date',-2),--新增日期
    2,--留存天数
    sum(if(login_date_first=date_add('$do_date',-2)                           and
login_date_last='$do_date',1,0)),--$do_date 的 2 日留存数
    sum(if(login_date_first=date_add('$do_date',-2),1,0)),--$do_date 新增
    sum(if(login_date_first=date_add('$do_date',-2)                           and
login_date_last='$do_date',1,0))/sum(if(login_date_first=date_add('$do_date'
,-2),1,0))*100
from ${APP}.dwt_uv_topic

union all

select
    '$do_date',--统计日期
    date_add('$do_date',-3),--新增日期
    3,--留存天数
    sum(if(login_date_first=date_add('$do_date',-3)                           and
login_date_last='$do_date',1,0)),--$do_date 的 3 日留存数
    sum(if(login_date_first=date_add('$do_date',-3),1,0)),--$do_date 新增
    sum(if(login_date_first=date_add('$do_date',-3)                           and
login_date_last='$do_date',1,0))/sum(if(login_date_first=date_add('$do_date'
,-3),1,0))*100
from ${APP}.dwt_uv_topic;
insert into table ${APP}.ads_continuity_wk_count
select
    '$do_date',
    concat(date_add(next_day('$do_date','MO'),-
7*3),'_',date_add(next_day('$do_date','MO'),-1)),
    count(*)
from
(
    select
        mid_id
    from
    (
        select
            mid_id
        from ${APP}.dws_uv_detail_daycount
        where dt>=date_add(next_day('$do_date','monday'),-7)
        and dt<=date_add(next_day('$do_date','monday'),-1)
        group by mid_id

        union all

        select
            mid_id
        from ${APP}.dws_uv_detail_daycount
        where dt>=date_add(next_day('$do_date','monday'),-7*2)
        and dt<=date_add(next_day('$do_date','monday'),-7-1)
        group by mid_id

        union all

        select
            mid_id
        from ${APP}.dws_uv_detail_daycount
        where dt>=date_add(next_day('$do_date','monday'),-7*3)
        and dt<=date_add(next_day('$do_date','monday'),-7*2-1)
        group by mid_id
    )t1
    group by mid_id
    having count(*)=3
)t2;

insert into table ${APP}.ads_continuity_uv_count
select
    '$do_date',
    concat(date_add('$do_date',-6),'_','$do_date'),
    count(*)
from
(
    select mid_id
    from
    (
        select mid_id
        from
        (
            select
                mid_id,
                date_sub(dt,rank) date_dif
            from
            (
                select
                    mid_id,
                    dt,
                    rank() over(partition by mid_id order by dt) rank
                from ${APP}.dws_uv_detail_daycount
                where dt>=date_add('$do_date',-6) and dt<='$do_date'
            )t1
        )t2
        group by mid_id,date_dif
        having count(*)>=3
    )t3
    group by mid_id
)t4;
insert into table ${APP}.ads_user_topic
select
    '$do_date',
    sum(if(login_date_last='$do_date',1,0)),
    sum(if(login_date_first='$do_date',1,0)),
    sum(if(payment_date_first='$do_date',1,0)),
    sum(if(payment_count>0,1,0)),
    count(*),
    sum(if(login_date_last='$do_date',1,0))/count(*),
    sum(if(payment_count>0,1,0))/count(*),

sum(if(login_date_first='$do_date',1,0))/sum(if(login_date_last='$do_date',1
,0))
from ${APP}.dwt_user_topic;

insert into table ${APP}.ads_user_action_convert_day
select
    '$do_date',
    uv.day_count,
    ua.cart_count,
    cast(ua.cart_count/uv.day_count         as                decimal(10,2))
visitor2cart_convert_ratio,
    ua.order_count,
    cast(ua.order_count/ua.cart_count          as                  decimal(10,2))
visitor2order_convert_ratio,
    ua.payment_count,
    cast(ua.payment_count/ua.order_count        as                 decimal(10,2))
order2payment_convert_ratio
from
(
    select
        dt,
        sum(if(cart_count>0,1,0)) cart_count,
        sum(if(order_count>0,1,0)) order_count,
        sum(if(payment_count>0,1,0)) payment_count
    from ${APP}.dws_user_action_daycount
where dt='$do_date'
group by dt
)ua join ${APP}.ads_uv_count uv on uv.dt=ua.dt;
insert into table ${APP}.ads_product_info
select
    '$do_date' dt,
    sku_num,
    spu_num
from
(
    select
        '$do_date' dt,
        count(*) sku_num
    from
        ${APP}.dwt_sku_topic
) tmp_sku_num
join
(
    select
        '$do_date' dt,
        count(*) spu_num
    from
    (
        select
            spu_id
        from
            ${APP}.dwt_sku_topic
        group by
            spu_id
    ) tmp_spu_id
) tmp_spu_num
on
    tmp_sku_num.dt=tmp_spu_num.dt;
insert into table ${APP}.ads_product_sale_topN
select
    '$do_date' dt,
    sku_id,
    payment_amount
from
    ${APP}.dws_sku_action_daycount
where
    dt='$do_date'
order by payment_amount desc
limit 10;
insert into table ${APP}.ads_product_favor_topN
select
    '$do_date' dt,
    sku_id,
    favor_count
from
```

```
    ${APP}.dws_sku_action_daycount
where
    dt='$do_date'
order by favor_count desc
limit 10;
insert into table ${APP}.ads_product_cart_topN
select
    '$do_date' dt,
    sku_id,
    cart_count
from
    ${APP}.dws_sku_action_daycount
where
    dt='$do_date'
order by cart_count desc
limit 10;
insert into table ${APP}.ads_product_refund_topN
select
    '$do_date',
    sku_id,
    refund_last_30d_count/payment_last_30d_count*100 refund_ratio
from ${APP}.dwt_sku_topic
order by refund_ratio desc
limit 10;
insert into table ${APP}.ads_appraise_bad_topN
select
    '$do_date' dt,
    sku_id,
appraise_bad_count/(appraise_good_count+appraise_mid_count+appraise_bad_coun
t+appraise_default_count) appraise_bad_ratio
from
    ${APP}.dws_sku_action_daycount
where
    dt='$do_date'
order by appraise_bad_ratio desc
limit 10;
insert into table ${APP}.ads_order_daycount
select
    '$do_date',
    sum(order_count),
    sum(order_amount),
    sum(if(order_count>0,1,0))
from ${APP}.dws_user_action_daycount
where dt='$do_date';
insert into table ${APP}.ads_payment_daycount
select
    tmp_payment.dt,
    tmp_payment.payment_count,
    tmp_payment.payment_amount,
    tmp_payment.payment_user_count,
    tmp_skucount.payment_sku_count,
    tmp_time.payment_avg_time
from
(
    select
        '$do_date' dt,
        sum(payment_count) payment_count,
        sum(payment_amount) payment_amount,
        sum(if(payment_count>0,1,0)) payment_user_count
    from ${APP}.dws_user_action_daycount
    where dt='$do_date'
)tmp_payment
join
```

```
(
    select
        '$do_date' dt,
        sum(if(payment_count>0,1,0)) payment_sku_count
    from ${APP}.dws_sku_action_daycount
    where dt='$do_date'
)tmp_skucount on tmp_payment.dt=tmp_skucount.dt
join
(
    select
        '$do_date' dt,
        sum(unix_timestamp(payment_time)-
unix_timestamp(create_time))/count(*)/60 payment_avg_time
    from ${APP}.dwd_fact_order_info
    where dt='$do_date'
    and payment_time is not null
)tmp_time on tmp_payment.dt=tmp_time.dt;
with
tmp_order as
(
    select
        user_id,
        order_stats_struct.sku_id sku_id,
        order_stats_struct.order_count order_count
    from          ${APP}.dws_user_action_daycount         lateral          view
explode(order_detail_stats) tmp as order_stats_struct
    where date_format(dt,'yyyy-MM')=date_format('$do_date','yyyy-MM')
),
tmp_sku as
(
    select
        id,
        tm_id,
        category1_id,
        category1_name
    from ${APP}.dwd_dim_sku_info
    where dt='$do_date'
)
insert into table ${APP}.ads_sale_tm_category1_stat_mn
select
    tm_id,
    category1_id,
    category1_name,
    sum(if(order_count>=1,1,0)) buycount,
    sum(if(order_count>=2,1,0)) buyTwiceLast,
    sum(if(order_count>=2,1,0))/sum( if(order_count>=1,1,0)) buyTwiceLastRatio,
    sum(if(order_count>=3,1,0))  buy3timeLast  ,
    sum(if(order_count>=3,1,0))/sum(                   if(order_count>=1,1,0))
buy3timeLastRatio ,
    date_format('$do_date' ,'yyyy-MM') stat_mn,
    '$do_date' stat_date
from
(
    select
        tmp_order.user_id,
        tmp_sku.category1_id,
        tmp_sku.category1_name,
        tmp_sku.tm_id,
        sum(order_count) order_count
    from tmp_order
    join tmp_sku
    on tmp_order.sku_id=tmp_sku.id
    group                                                                      by
tmp_order.user_id,tmp_sku.category1_id,tmp_sku.category1_name,tmp_sku.tm_id
)tmp
group by tm_id, category1_id, category1_name;
insert into table ${APP}.ads_area_topic
select
    '$do_date',
    id,
    province_name,
    area_code,
    iso_code,
    region_id,
    region_name,
    order_day_count,
    order_day_amount,
    payment_day_count,
    payment_day_amount
from ${APP}.dwt_area_topic;
"

$hive -e "$sql"
```

第 9 章 Azkaban 调度

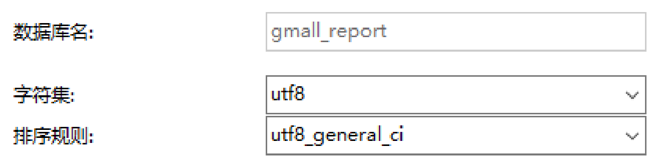
9.1 Azkaban 部署

详见：尚硅谷大数据技术之 Azkaban

尚硅谷大数据技术之Azkaban.docx

9.2 创建 MySQL 数据库和表

（1）创建 gmall_report 数据库



数据库名:	gmall_report
字符集:	utf8
排序规则:	utf8_general_ci

注:SQL 语句

```
CREATE DATABASE `gmall_report` CHARACTER SET 'utf8' COLLATE 'utf8_general_ci';
```

（2）创建表

1）创建用户主题表

```
DROP TABLE IF EXISTS `ads_user_topic`;
CREATE TABLE `ads_user_topic`  (
  `dt` date NOT NULL,
  `day_users` bigint(255) NULL DEFAULT NULL,
  `day_new_users` bigint(255) NULL DEFAULT NULL,
  `day_new_payment_users` bigint(255) NULL DEFAULT NULL,
  `payment_users` bigint(255) NULL DEFAULT NULL,
  `users` bigint(255) NULL DEFAULT NULL,
  `day_users2users` double(255, 2) NULL DEFAULT NULL,
  `payment_users2users` double(255, 2) NULL DEFAULT NULL,
  `day_new_users2users` double(255, 2) NULL DEFAULT NULL,
  PRIMARY KEY (`dt`) USING BTREE
) ENGINE = InnoDB CHARACTER SET = utf8 COLLATE = utf8_general_ci
ROW_FORMAT = Compact;
```

2）创建地区主题表

```
DROP TABLE IF EXISTS `ads_area_topic`;
CREATE TABLE `ads_area_topic`  (
  `dt` date NOT NULL,
  `id` int(11) NULL DEFAULT NULL,
  `province_name`  varchar(255)  CHARACTER  SET  utf8  COLLATE
utf8_general_ci NULL DEFAULT NULL,
  `area_code`   varchar(255)   CHARACTER   SET   utf8   COLLATE
utf8_general_ci NULL DEFAULT NULL,
  `iso_code`   varchar(255)   CHARACTER   SET   utf8   COLLATE
utf8_general_ci NOT NULL,
  `region_id` int(11) NULL DEFAULT NULL,
  `region_name`  varchar(255)  CHARACTER  SET  utf8  COLLATE
utf8_general_ci NULL DEFAULT NULL,
  `order_day_count` bigint(255) NULL DEFAULT NULL,
  `order_day_amount` double(255, 2) NULL DEFAULT NULL,
  `payment_day_count` bigint(255) NULL DEFAULT NULL,
  `payment_day_amount` double(255, 2) NULL DEFAULT NULL,
  PRIMARY KEY (`dt`, `iso_code`) USING BTREE
) ENGINE = InnoDB CHARACTER SET = utf8 COLLATE = utf8_general_ci
ROW_FORMAT = Compact;
```

3）其余 ads 层表（略）

9.3 Sqoop 导出脚本

1）编写 Sqoop 导出脚本

在/home/atguigu/bin 目录下创建脚本 hdfs_to_mysql.sh

```
[atguigu@hadoop102 bin]$ vim hdfs_to_mysql.sh
```

在脚本中填写如下内容

```
#!/bin/bash

hive_db_name=gmall
mysql_db_name=gmall_report

export_data() {
/opt/module/sqoop/bin/sqoop export \
--connect
"jdbc:mysql://hadoop102:3306/${mysql_db_name}?useUnicode=true&
characterEncoding=utf-8"  \
--username root \
--password 000000 \
--table $1 \
--num-mappers 1 \
--export-dir /warehouse/$hive_db_name/ads/$1 \
--input-fields-terminated-by "\t" \
--update-mode allowinsert \
--update-key $2 \
--input-null-string '\\N'    \
--input-null-non-string '\\N'
}

case $1 in
  "ads_uv_count")
     export_data "ads_uv_count" "dt"
;;
  "ads_user_action_convert_day")
     export_data "ads_user_action_convert_day" "dt"
;;
  "ads_user_topic")
     export_data "ads_user_topic" "dt"
;;
  "ads_area_topic")
     export_data "ads_area_topic" "dt,iso_code"
;;
   "all")
     export_data "ads_user_topic" "dt"
     export_data "ads_area_topic" "dt,iso_code"
     #其余表省略未写
;;
esac
```

关于导出 update 还是 insert 的问题

➢ --update-mode：

updateonly	只更新，无法插入新数据
allowinsert	允许新增

➢ --update-key：允许更新的情况下，指定哪些字段匹配视为同一条数据，进行更新而不增加。多个字段用逗号分隔。

➢ --input-null-string 和--input-null-non-string：

分别表示，将字符串列和非字符串列的空串和“null”转义。

官网地址：http://sqoop.apache.org/docs/1.4.6/SqoopUserGuide.html

```
Sqoop will by default import NULL values as string null. Hive is however using string \N to denote NULL values and therefore predicates dealing with NULL(like IS NULL) will not work correctly. You should append parameters --null-string and --null-non-string in case of import job or --input-null-string and --input-null-non-string in case of an export job if you wish to properly preserve NULL values. Because sqoop is using those parameters in generated code, you need to properly escape value \N to \\N:
```

Hive 中的 Null 在底层是以“\N”来存储，而 MySQL 中的 Null 在底层就是 Null，为了保证数据两端的一致性。在导出数据时采用--input-null-string 和--input-null-non-string 两个参数。导入数据时采用--null-string 和--null-non-string。

3）执行 Sqoop 导出脚本

```
[atguigu@hadoop102 bin]$ chmod 777 sqoop_export.sh
[atguigu@hadoop102 bin]$ sqoop_export.sh all
```

9.4 全调度流程

job 文件

gmall.zip

（1）mysql_to_hdfs.job

```
type=command
command=/home/atguigu/bin/mysql_to_hdfs.sh all ${dt}
```

（2）hdfs_to_ods_log.job

```
type=command
command=/home/atguigu/bin/hdfs_to_ods_log.sh ${dt}
```

（3）hdfs_to_ods_db.job

```
type=command
command=/home/atguigu/bin/hdfs_to_ods_db.sh all ${dt}
dependencies=mysql_to_hdfs
```

（4）ods_to_dwd_start_log.job

```
type=command
command=/home/atguigu/bin/ods_to_dwd_start_log.sh ${dt}
dependencies=hdfs_to_ods_log
```

（5）ods_to_dwd_db.job

```
type=command
command=/home/atguigu/bin/ods_to_dwd_db.sh all ${dt}
dependencies=hdfs_to_ods_db
```

（6）dwd_to_dws.job

```
type=command
command=/home/atguigu/bin/dwd_to_dws.sh ${dt}
dependencies=ods_to_dwd_db,ods_to_dwd_start_log
```

（7）dws_to_dwt.job

```
type=command
command=/home/atguigu/bin/dws_to_dwt.sh ${dt}
dependencies=dwd_to_dws
```

（8）dwt_to_ads.job

```
type=command
command=/home/atguigu/bin/dwt_to_ads.sh ${dt}
dependencies=dws_to_dwt
```

（9）hdfs_to_mysql.job

```
type=command
command=/home/atguigu/bin/hdfs_to_mysql.sh all
dependencies=dwt_to_ads
```