

HBase Demo

---- big data query

Lu Fang-yi

items

Architecture & Software Technology

Demo Show – step by step

Architecture & Software Technology

Architecture

Web

HBase

Hadoop

Iaas

Software Technology

Struts2
+ExtJs3.0

hbase-0.90.3

hadoop-0.20.2
1 master node + 2 slave nodes

Cloudstack3.0.2

A Big Data Query System based on HBase

--demo show step by step

Step 1

创建虚拟集群 (1 master + 2 slave)

CloudStack interface showing the 'Instances' page. The 'lfy-hbaseMaster' instance is selected. The right pane displays the 'NICs' tab for the selected instance, showing details for 'NIC 1 (Default)' with an IP address of 120.219.120.25.

Display name
lfy-hbaseSlave2
lfy-hbaseSlave
lfy-hbaseMaster

NICs	
NIC 1 (Default)	
IP Address	120.219.120.25
Type	Shared
Gateway	120.219.105.10
Netmask	255.0.0.0
Is Default	Yes

Close-up of the 'Instances' list showing 'lfy-hbaseSlave' selected. The right pane shows the 'NICs' tab for the selected instance, displaying details for 'NIC 1 (Default)' with an IP address of 120.219.120.26.

Display name
lfy-hbaseSlave2
lfy-hbaseSlave
lfy-hbaseMaster

NICs	
NIC 1 (Default)	
IP Address	120.219.120.26
Type	Shared

Close-up of the 'Instances' list showing 'lfy-hbaseSlave2' selected. The right pane shows the 'NICs' tab for the selected instance, displaying details for 'NIC 1 (Default)' with an IP address of 120.219.120.23.

Display name
lfy-hbaseSlave2
lfy-hbaseSlave
lfy-hbaseMaster

NICs	
NIC 1 (Default)	
IP Address	120.219.120.23
Type	Shared

Step 2

安装Hadoop

```
hadoop@Master:~ - Xshell 4
File Edit View Tools Window Help
New Reconnect
1 hadoop-hbaseMaster x 2 hadoop-hbaseSlave 3 hadoop-hbaseSlave2
[hadoop@Master ~]$ hostname -i
120.219.120.25
[hadoop@Master ~]$ jps
4255 HMaster
3514 JobTracker
4497 Jps
3275 NameNode
3442 SecondaryNameNode
[hadoop@Master ~]$ vim /usr/hadoop/conf/hdfs-site.xml
```

```
<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl" href="
<!-- Put site-specific property overrides here -->
<configuration>
  <property>
    <name>dfs.replication</name>
    <value>2</value>
  </property>
</configuration>
~
~
~
```

Hadoop NameNode Master.H x

120.219.120.25:50070/dfsnode1ist.jsp?whatNodes=LIVE

NameNode 'Master.Hadoop:9000'

Started: Mon Oct 28 21:50:26 CST 2013
Version: 0.20.2, r911707
Compiled: Fri Feb 19 08:07:34 UTC 2010 by chrisdo
Upgrades: There are no upgrades in progress.

[Browse the filesystem](#)
[Namenode Logs](#)
[Go back to DFS home](#)

Live Datanodes : 2

Node	Last Contact	Admin State	Configured Capacity (GB)	Used (GB)	Non DFS Used (GB)	Remaining (GB)	Used (%)	Used (%)	Remaining (%)	Blocks
Slave	1	In Service	15.84	0	10.21	5.63	0	<div></div>	35.57	17
Slave2	1	In Service	15.84	0	10.2	5.64	0	<div></div>	35.59	17

Hadoop. 2013.

Step 3

安装HBase

Master: Master.Hadoop:60000

Local logs, Thread Dump, Log Level

You are currently running the HMaster without HDFS append support enabled. This may result in data loss. Please see the [HBase wiki](#) for details.

Master Attributes

Attribute Name	Value	Description
HBase Version	0.90.3, r1100350	HBase version and svn revision
HBase Compiled	Sat May 7 13:31:12 PDT 2011, stack	When HBase version was compiled and by whom
Hadoop Version	0.20.2, r911707	Hadoop version and svn revision
Hadoop Compiled	Fri Feb 19 08:07:34 UTC 2010, chrisdo	When Hadoop version was compiled and by whom
HBase Root Directory	hdfs://Master.Hadoop:9000/hbase	Location of HBase home directory
Load average	1	Average number of regions per regionserver. Naive computation.
Zookeeper Quorum	Slave2.Hadoop:2222, Slave.Hadoop:2222	Addresses of all registered ZK servers. For more, see zk.ams .

Catalog Tables

Table	Description
-.ROOT-	The -.ROOT- table holds references to all .META. regions.
.META.	The .META. table holds references to all User Table regions

User Tables

Region Servers

Address	Start Code	Load
Slave.Hadoop:60030	1382968470029	requests=0, regions=1, useHeap=25, maxHeap=997
Slave2.Hadoop:60030	1382968470065	requests=0, regions=1, useHeap=26, maxHeap=997
Total: servers: 2		requests=0, regions=2

Load is requests per second and count of regions loaded

```
hadoop@Master: /usr/hadoop/hbase0903/conf - Xshell 4
File Edit View Tools Window Help
New Folder Reconnect
1 hadoop-hbaseMaster 2 hadoop-hbaseSlave 3 hadoop-hbaseSlave2

[hadoop@Master conf]$ pwd
/usr/hadoop/hbase0903/conf
[hadoop@Master conf]$ vim hbase-site.xml

<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
/**
 * Copyright 2010 The Apache Software Foundation
 *
 * Licensed to the Apache Software Foundation (ASF) under one
 * or more contributor license agreements. See the NOTICE file
 * distributed with this work for additional information
 * regarding copyright ownership. The ASF licenses this file
 * to you under the Apache License, Version 2.0 (the
 * "License"); you may not use this file except in compliance
 * with the License. You may obtain a copy of the License at
 *
 * http://www.apache.org/licenses/LICENSE-2.0
 *
 * Unless required by applicable law or agreed to in writing, software
 * distributed under the License is distributed on an "AS IS" BASIS,
 * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
 * See the License for the specific language governing permissions and
 * limitations under the License.
 */
-->
<configuration>
  <property>
    <name>hbase.rootdir</name>
    <value>hdfs://Master.Hadoop:9000/hbase</value>
  </property>
  <property>
    <name>hbase.cluster.distributed</name>
    <value>true</value>
  </property>
  <property>
    <name>hbase.zookeeper.property.clientPort</name>
    <value>2222</value>
  </property>
  <property>
    <name>hbase.zookeeper.quorum</name>
    <value>Slave.Hadoop,Slave2.Hadoop</value>
  </property>
  <property>
    <name>hbase.zookeeper.property.dataDir</name>
    <value>/home/hadoop/zookeeper</value>
  </property>
</configuration>
~
```

Step 4

HBase 表设计

表名: gltable

列族: gl

列修饰符: 详见下表

```
hadoop@Master:/usr/hadoop/hbase0903/bin - Xshell 4
File Edit View Tools Window Help
New [Icons] Reconnect [Icons]
1 hadoop-hbaseMaster x 2 hadoop-hbaseSlave 3 hadoop-hbaseSlave2
[hadoop@Master bin]$ ./hbase shell
HBase Shell; enter 'help<RETURN>' for list of supported commands.
Type "exit<RETURN>" to leave the HBase Shell
Version 0.90.3, r1100350, Sat May 7 13:31:12 PDT 2011

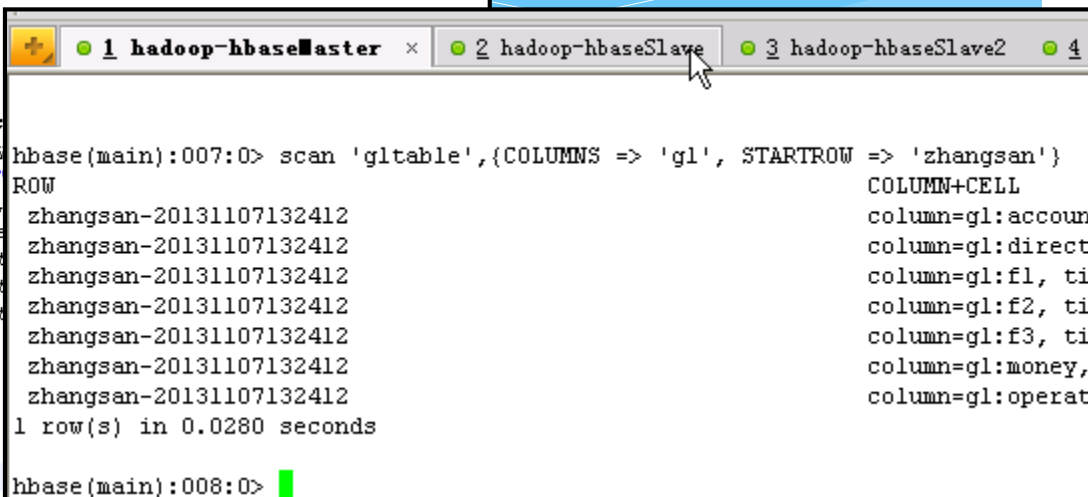
hbase(main):001:0> create 'gltable','gl'
```

Row Key	Column Family : gl						
	Qualifier						
account-operatetime	account	direction	money	operatetime	f1	f2	f3
注: 设计复合行键, 便于按帐户名和时间段进行快速查询	帐户名	发生方向	发生金额	发生时间	其它字段	其它字段	其它字段

Step 5

插入模拟数据

```
/**
 * 插入数据
 * @param tableName
 */
public static void insertData(String tableName) {
    HTablePool pool = new HTablePool(configuration, 1000);
    HTable table = (HTable) pool.getTable(tableName);
    Put put = new Put("zhangsan-20131107132412".getBytes());
    put.add(Bytes.toBytes("g1"), Bytes.toBytes("account"), Bytes.toBytes("zhangsan"));
    put.add(Bytes.toBytes("g1"), Bytes.toBytes("operatetetime"), Bytes.toBytes("20131107132412"));
    put.add(Bytes.toBytes("g1"), Bytes.toBytes("direction"), Bytes.toBytes("info"));
    put.add(Bytes.toBytes("g1"), Bytes.toBytes("money"), Bytes.toBytes("115"));
    put.add(Bytes.toBytes("g1"), Bytes.toBytes("f1"), Bytes.toBytes("taobao"));
    put.add(Bytes.toBytes("g1"), Bytes.toBytes("f2"), Bytes.toBytes("20120705154318"));
    put.add(Bytes.toBytes("g1"), Bytes.toBytes("f3"), Bytes.toBytes("20120705154318"));
    try {
        table.put(put);
    } catch (IOException e) {
        e.printStackTrace();
    }
}
```



The screenshot shows a terminal window with multiple tabs. The active tab is '2 hadoop-hbaseSlave'. The terminal output shows the result of a scan operation on the 'g1table' with columns 'g1'. The output is a table with 1 row and 2 columns: 'COLUMN+CELL' and 'COLUMN+CELL'. The row contains the values 'zhangsan-20131107132412' and 'zhangsan-20131107132412'. The scan took 0.0280 seconds.

```
hbase(main):007:0> scan 'g1table',{COLUMNS => 'g1', STARTROW => 'zhangsan'}
ROW
zhangsan-20131107132412
zhangsan-20131107132412
zhangsan-20131107132412
zhangsan-20131107132412
zhangsan-20131107132412
zhangsan-20131107132412
zhangsan-20131107132412
zhangsan-20131107132412
1 row(s) in 0.0280 seconds
hbase(main):008:0>
```

插入以下模拟数据


帐户	发生方向	发生金额	发生时间	F1	F2	F3
lfy	taobao	115	20120207123125	info	info	info
lfy	taobao	115	20121210135709	info	info	info
xhh	baidu	328	20120705154318	info	info	info
xhh	google	527	20120913091834	info	info	info
xhh	taobao	822	20121001143453	info	info	info
xhh	sina	717	20130810182547	info	info	info
xhh	taobao	649	20130827152734	info	info	info
zhangsan	google	327	20131107132412	info	info	info

注：发生时间

20120207123125即2012年02月07日 12:31:25

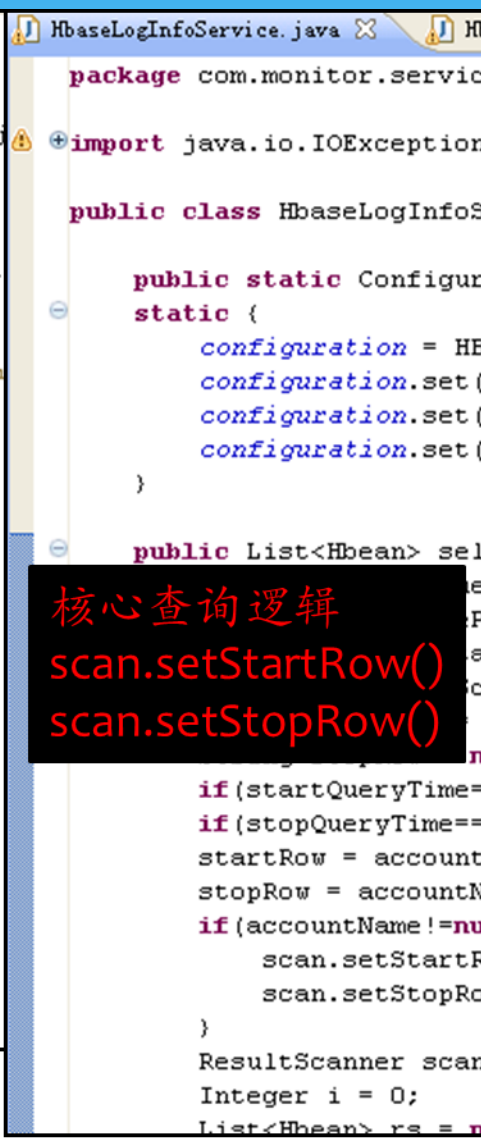
Step 6

Java Web代码实现




The diagram shows the project structure of a Java web application. The root is 'bigdata', which contains a 'src' directory. Inside 'src', there are several packages: 'com.monitor.action' (containing 'HbaseLogInfoAction.java'), 'com.monitor.bean' (containing 'Hbean.java'), 'com.monitor.service' (containing 'HbaseLogInfoService.java'), 'log4j.properties', and 'struts.xml'. There are also 'JRE System Library [com.sun...]', 'Java EE 5 Libraries', 'Referenced Libraries', 'hbaselib', and 'WebRoot'. Under 'WebRoot', there is an 'app' directory containing 'monitor' (with 'css') and 'hbase1.js'. At the bottom, there are 'META-INF', 'WEB-INF', and 'index.jsp'.

工程结构
Struts2框架



The code editor shows the 'HbaseLogInfoService.java' file. It starts with a package declaration 'package com.monitor.service' and an import 'import java.io.IOException'. The main class is 'HbaseLogInfoService'. It has a 'public static Configuration' field and a 'static' block that initializes 'configuration' with 'HBaseConfiguration.get()' and sets 'setHbaseURL()' and 'setHbaseUsername()'. There is a 'public List<Hbean> select()' method that uses 'ResultScanner scan' and 'Integer i = 0' to query data. The code is partially visible, showing the beginning of the 'select()' method.

核心查询逻辑
scan.setStartRow()
scan.setStopRow()

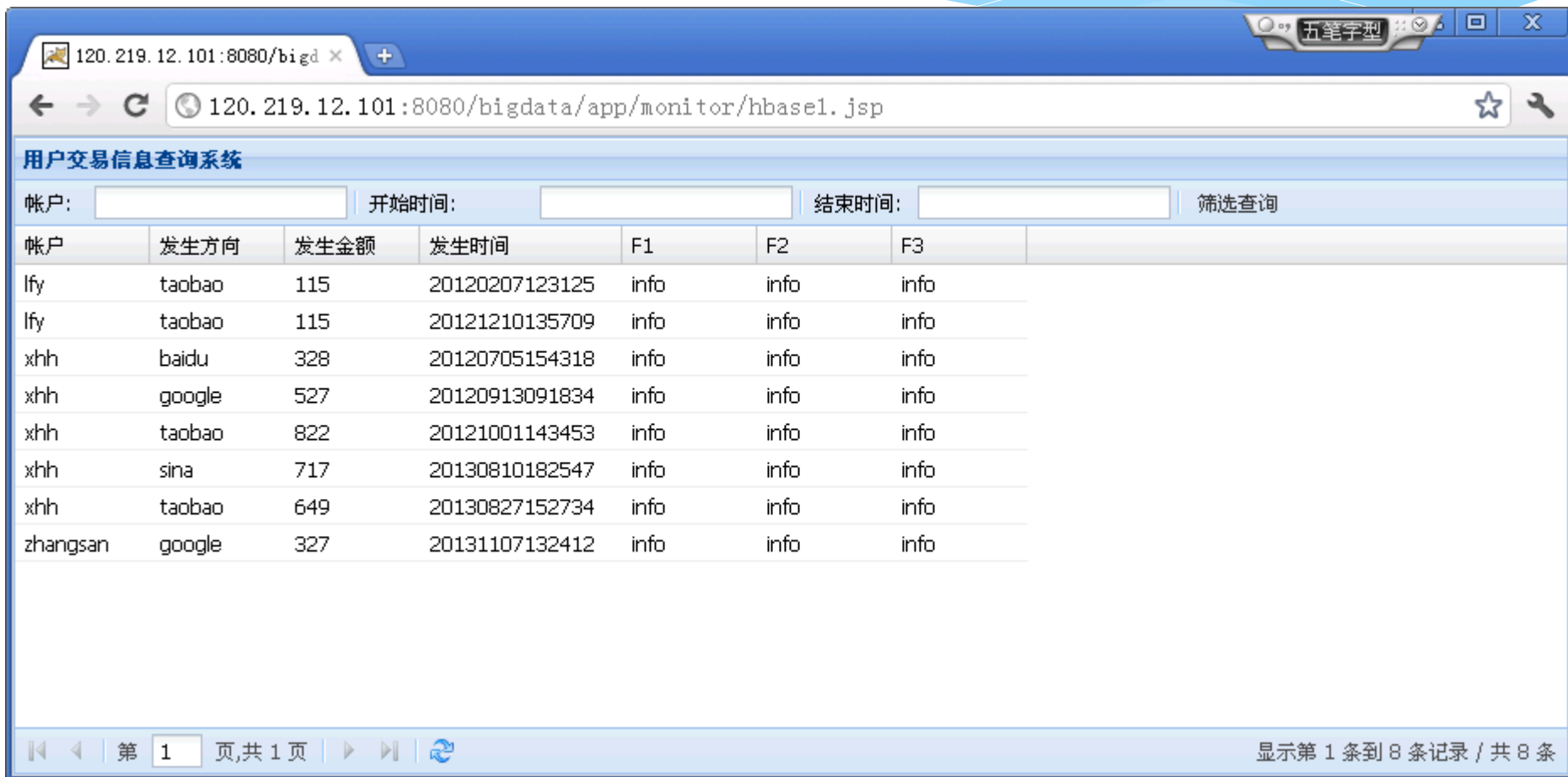


The code editor shows the 'hbase1.js' file. It contains a 'var ErrorMain' variable initialized with 'Ext.create('Ext.grid.Panel', ...)' and a 'columns' array. The 'columns' array has four items: 'text: "帐户"', 'text: "发生方向"', 'text: "发生金额"', and 'text: "发生时间"'. Each item has properties like 'width', 'dataIndex', 'sortable', and 'hidden'.

界面代码
ExtJs3.0

Step 7

测试1：访问界面（列出所有记录）



120.219.12.101:8080/bigdata/app/monitor/hbase1.jsp

用户交易信息查询系统

帐户: 开始时间: 结束时间: 筛选查询

帐户	发生方向	发生金额	发生时间	F1	F2	F3
lly	taobao	115	20120207123125	info	info	info
lly	taobao	115	20121210135709	info	info	info
xhh	baidu	328	20120705154318	info	info	info
xhh	google	527	20120913091834	info	info	info
xhh	taobao	822	20121001143453	info	info	info
xhh	sina	717	20130810182547	info	info	info
xhh	taobao	649	20130827152734	info	info	info
zhangsan	google	327	20131107132412	info	info	info

第 1 页,共 1 页

显示第 1 条到 8 条记录 / 共 8 条

Step 7

测试2：查询某帐户的所有交易信息

120.219.12.101:8080/bigd x

120.219.12.101:8080/bigdata/app/monitor/hbase1.jsp

用户交易信息查询系统

帐户: lfy 开始时间: 结束时间: 筛选查询

帐户	发生方向	发生金额	发生时间	F1	F2	F3
lfy	taobao	115	20120207123125	info	info	info
lfy	taobao	115	20121210135709	info	info	info

第 1 页, 共 1 页

显示第 1 条到 2 条记录 / 共 2 条

Step 7

测试3：查询帐户在某时间之后的所有交易信息

120.219.12.101:8080/bigdata/app/monitor/hbase1.jsp

用户交易信息查询系统

帐户: 开始时间: 结束时间:

帐户	发生方向	发生金额	发生时间	F1	F2	F3
xhh	taobao	822	20121001143453	info	info	info
xhh	sina	717	20130810182547	info	info	info
xhh	taobao	649	20130827152734	info	info	info

第 1 页, 共 1 页

显示第 1 条到 3 条记录 / 共 3 条

Step 7

测试4：查询帐户在某时间之前的所有交易信息



120.219.12.101:8080/bigd x

120.219.12.101:8080/bigdata/app/monitor/hbase1.jsp

用户交易信息查询系统

帐户: xhh 开始时间: 结束时间: 201305 筛选查询

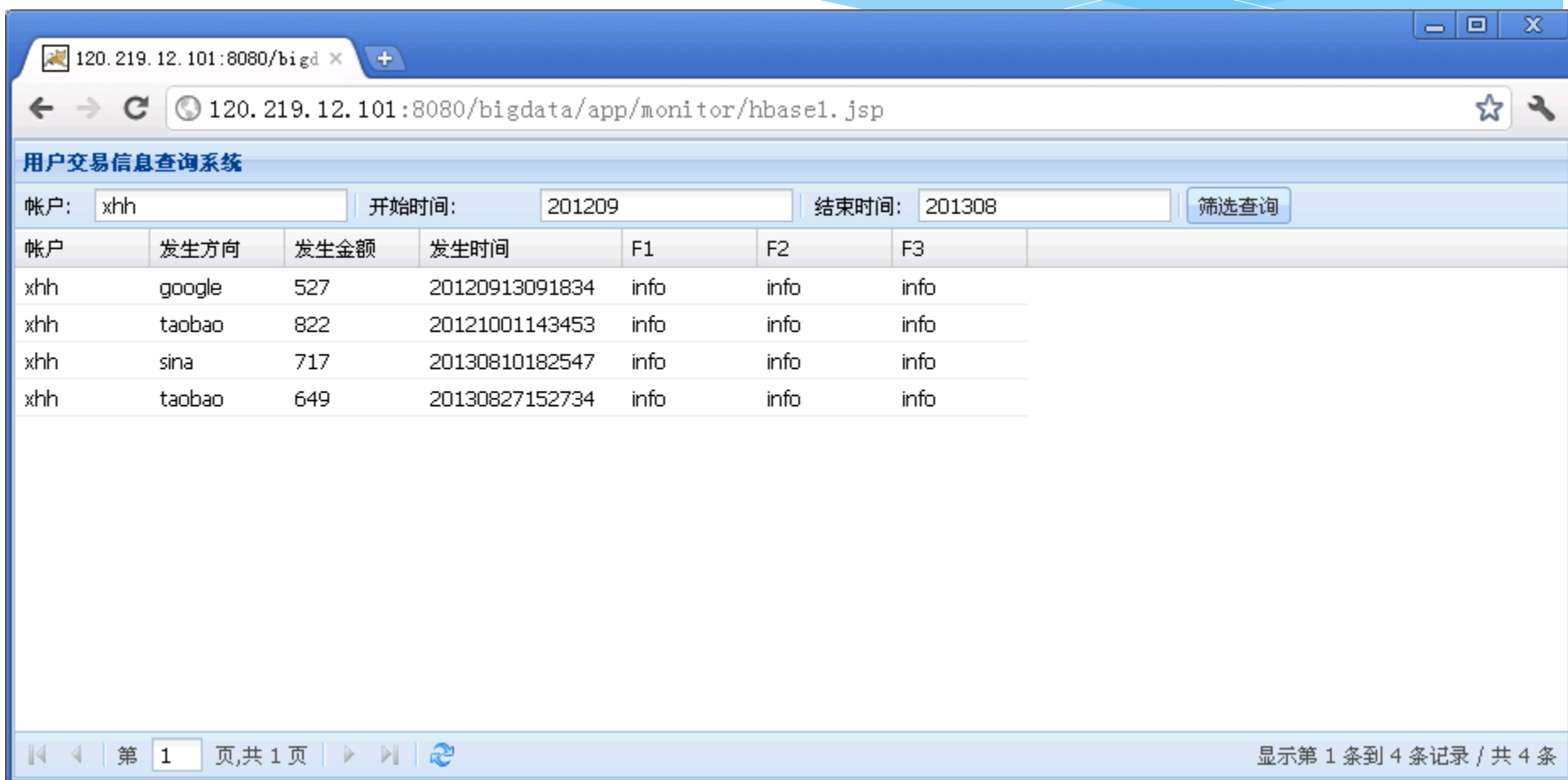
帐户	发生方向	发生金额	发生时间	F1	F2	F3
xhh	baidu	328	20120705154318	info	info	info
xhh	google	527	20120913091834	info	info	info
xhh	taobao	822	20121001143453	info	info	info

第 1 页,共 1 页

显示第 1 条到 3 条记录 / 共 3 条

Step 7

测试5：查询帐户在某时间段内的所有交易信息



120.219.12.101:8080/bigd x

120.219.12.101:8080/bigdata/app/monitor/hbase1.jsp

用户交易信息查询系统

帐户: 开始时间: 结束时间:

帐户	发生方向	发生金额	发生时间	F1	F2	F3	
xhh	google	527	20120913091834	info	info	info	
xhh	taobao	822	20121001143453	info	info	info	
xhh	sina	717	20130810182547	info	info	info	
xhh	taobao	649	20130827152734	info	info	info	

第 1 页,共 1 页

显示第 1 条到 4 条记录 / 共 4 条

Your Advice Are Appreciated!

Contact Me : 18795662287

Good Luck!