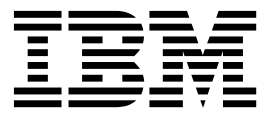IBM Predictive Customer Intelligence
Version 1.x

Next Best Action for Telecommunications Call Centers 1.0

IBM

Product Information

This document applies to IBM Predictive Customer Intelligence Version 1.0.1 and may also apply to subsequent releases.

Contents

Introduction

IBM® Predictive Customer Intelligence gives you the information and insight that you need to provide proactive service to your customers. The information can help you to develop a consistent customer contact strategy and improve your relationship with your customers.

IBM Predictive Customer Intelligence brings together, in a single solution, the ability to do the following tasks:

- Determine the best offer for a customer.
- Retain customers that are likely to churn.
- Segment your customers, for example, by family status and salary.
- Identify the most appropriate channel to deliver an offer, for example, by email, telephone call, or application.

This solution ensures that all interactions with customers are coordinated and optimized. IBM Predictive Customer Intelligence gives you the ability to sift quickly through millions of customers and know who to contact, when, and with what action.

The following steps define the process:

1. Understand the customer. Predictive modeling helps you to understand what market segments each customer falls into, what products they are interested in, and what offers they are most likely to respond to.
2. Define possible actions and the rules and models that determine which customers are eligible for which offers.
3. After the best action is identified, deliver the recommendation to the customer.

Audience

This guide is intended to provide users with an understanding of how the IBM Predictive Customer Intelligence solution works. It is designed to help people who are planning to implement IBM Predictive Customer Intelligence know what tasks are involved.

Finding information

To find product documentation on the web, including all translated documentation, access IBM Knowledge Center (www.ibm.com/support/knowledgecenter/SSCJHT_1.1.0).

PDF versions of the documents are available from the Predictive Customer Intelligence version 1.1 product documentation page (www.ibm.com/support/docview.wss?uid=swg27046802).

Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products. Some of the components included in the IBM Predictive Customer Intelligence have accessibility features.

IBM Predictive Customer Intelligence HTML documentation has accessibility features. PDF documents are supplemental and, as such, include no added accessibility features.

Forward-looking statements

This documentation describes the current functionality of the product. References to items that are not currently available may be included. No implication of any future availability should be inferred. Any such references are not a commitment, promise, or legal obligation to deliver any material, code, or functionality. The development, release, and timing of features or functionality remain at the sole discretion of IBM.

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Chapter 1. Next Best Action for Telecommunications Call Centers

Telecommunications providers are leaders in harnessing big data, for example: billing data, demographic data such as gender, age, and employment status, transaction history, call detail records, and call center records.

The key to success is bringing different data sources together, such as structured data, unstructured data, internal data, and external data, to create a profile of each customer. By constantly analyzing all of these information types, IBM Predictive Customer Intelligence provides you with insights that you can use to build a service that is fine-tuned to a customer's specific needs.

Next Best Action for Telecommunications Call Centers demonstrates how IBM Predictive Customer Intelligence can be used in the telecommunications industry to retain a dissatisfied customer:

Retain a dissatisfied customer

A call center agent uses the data in the call center application to do the following activities:

1. Recognize that the customer is dissatisfied through analysis of network traffic and call detail records.
2. See that the customer is high value.
3. See what actions and offers the customer is eligible for.
4. Proactively submit an action for a service level request to fix issues, and contact the customer with an offer.

Determine which offers customers receive based on profile and real-time data
Using IBM Campaign, the marketing manager determines which offers customers can receive based on their customer profile data and their real-time interaction data. For example, a new product inquiry, a complaint, or a data plan inquiry.

Determine the best offers for customers by creating business rules
Using IBM Analytical Decision Management, the business analyst creates business rules to determine which actions are valid for a customer. For example, you might create a rule that targets retention actions to customers with high network influence, high churn risk, and no open cases.

Predict churn, customer satisfaction, and propensity to respond to offers by creating predictive models
Using IBM SPSS® Modeler, a data modeler creates predictive models to predict the following factors:

- The customer's propensity to churn.
- The customer's satisfaction.
- The customer's propensity to respond to offers.

The results from these models are used in IBM Analytical Decision Management.

Retain a dissatisfied customer

Bill is the customer of a telecommunications firm and is experiencing excessive dropped calls and handset issues. This case study describes how IBM Predictive Customer Intelligence can be used to help to retain Bill, who is a high value customer.

This example demonstrates how IBM Predictive Customer Intelligence coordinates the telecommunications company's interactions with its customers, ensuring that customers are contacted at the right time, through the right channel, and with the best possible actions. It uses the following architecture: The call center application connects directly to IBM Enterprise Marketing Management (EMM) by using the IBM EMM API.

Customer profile

Bill is a professional architect and a small business owner. He is married but with no children. He has a single mobile account with the telecommunications provider that he uses both for business and personal use.

Bill is an extensive social and mobile application user. He does extensive web browsing and makes many telephone calls.

Bill is a high value customer, one the company wants to retain. However, Bill is dissatisfied. Analysis of network traffic and call detail records show that Bill recently had a number of dropped calls, he called a competitor's call center, and he has two hardware issues with his phone.

Carolyn, a call center agent initiates an outbound call to Bill. She opens her Customer Relationship Management (CRM) software and looks at Bill's profile. From a dashboard interface, she sees three alerts that require her attention:

- Bill is eligible for support.
- He is eligible for offers.
- Bill is at great risk of leaving the company.
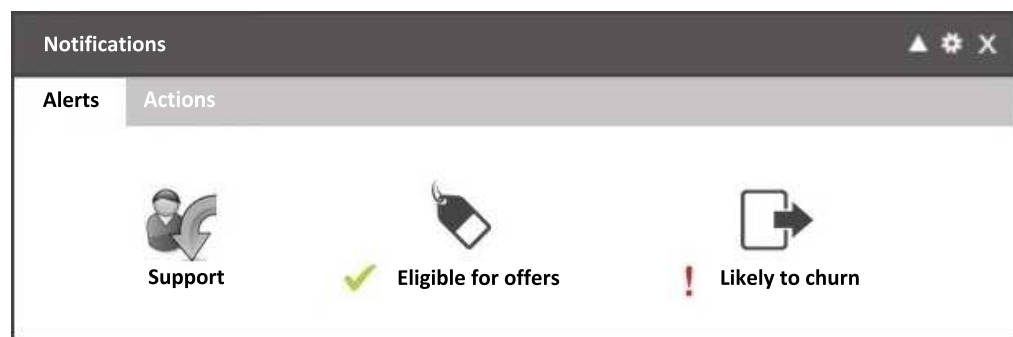
Figure 1. Dashboard notifications that shows alerts

Carolyn can also see some metrics for Bill. The data is provided by IBM SPSS predictive models and displayed in IBM Cognos® Business Intelligence reports:

- His churn score is High.
- Customer Satisfaction is Low.
- Customer Lifetime Value is High.

- Social Influence is High.

Figure 2. Dashboard profile that shows metrics

These metrics indicate that Bill is a valuable and influential customer who is at risk of leaving.

Carolyn can see that Bill has a history of issues with his phone. She can see through real-time sentiment analysis of Twitter feeds that Bill is experiencing problems with dropped calls, which he has not yet reported to the service center. Real-time detection of dropped calls is causing the dropped call indicator to reach a critical threshold, which the agent sees identified.

Bill is not happy with his current phone. The company needs to intervene to retain Bill as a customer.

Actions

Carolyn looks up at the Notification area at the top of her CRM screen to see the available Actions for Bill.
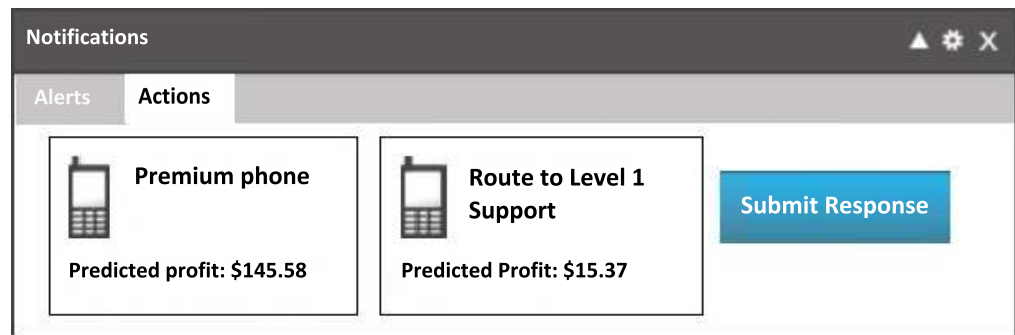
Figure 3. Notifications area that shows actions

The second action is a proactive service request that can be submitted by Carolyn on behalf of Bill. This action addresses the dropped call issue that Bill experienced. Carolyn selects the support action and clicks **Submit Response**.

Carolyn tells Bill that she is submitting a Level 1 service request on his behalf to fix the dropped call issues that he experienced. She tells him that the issues will be fixed immediately so that he can continue to have uninterrupted service. Bill is impressed that his service provider detected the issue without him calling in to report it, and took proactive steps to have the dropped call issues fixed.

Due to Bill's recent hardware issues, Carolyn also offers Bill a free upgrade to a premium phone. Bill readily accepts the offer of a new phone.

After Carolyn submits his response, Bill's scores are updated. His Churn score now shows a reduced risk. It is now at 55%, which is down from the previous 75%. Both his Satisfaction and Customer Lifetime Value scores increased.

Figure 4. Dashboard profile that shows updated metrics

Optimization of offers

You can further optimize offers. Following on from the previous example, connect the call center application to IBM Analytical Decision Manager, and then connect Analytical Decision Manager to your existing IBM EMM campaigns by using the External learning connector.

The External learning connector provides different offers for Bill, under the same circumstances. He is offered:

- Route to Level 1 support.
- Initiate Network Service Request.

These options are less expensive to the Telecommunications company, but are equivalent in reducing churn and increasing satisfaction.

Offer optimization workflow

The following steps demonstrate how IBM Predictive Customer Intelligence determines the offers to be presented to Bill by using the External Learning connector.

1. Open customer profile

Carolyn, the call center agent, types Bill's phone number in the Customer Relationship Management (CRM) system and clicks **Search**.

2. Obtain actions and alerts

The CRM system passes a set of parameters to the IBM Enterprise Marketing Management (EMM) Interact Web Service as a request using the Interact API. The Interact web service outputs the offers.

3. Personalize offers

The Interact web service passes a set of parameters including the offers to the IBM SPSS Scoring Service using the External Learning connector. The External Learning connector returns a score for each offer to the call center agent system.

4. Reorder offers

The CRM system sorts the list of offers using the score. The CRM system then calls the IBM SPSS Scoring Service with the list of offers and other

customer parameters using the Scoring Service API. An IBM Analytical Decision Management model is activated.

5. **Get more offers**

   IBM Analytical Decision Management issues new offers to the CRM system through the IBM SPSS Scoring Service. The offers are displayed in the CRM system.

6. **Run reports**

   The CRM launches the report that is generated by IBM Cognos Business Intelligence.

7. **Submit customer response**

   Carolyn presents the offers to Bill, and clicks **Submit Response** when he accepts.

8. **Re-run models**

   The call center agent system passes a set of parameters to the IBM SPSS Scoring Service as a request using the Scoring Service API. The IBM SPSS web service re-runs the applicable models and outputs the parameters of the model results. Bill's customer profile is updated in the database.

9. **Obtain actions and alerts**

   The CRM system passes a set of parameters to the Interact web service as a request using the Interact API. The Interact web service outputs the offers. If there are no further actions, the process stops here. If there are any further actions and alerts, the process goes back to the Personalize offers step.

Define the offers that customers of a telecommunication company can receive

Monica is a marketing manager who is responsible for defining her company's marketing strategy. She determines which offers individual customers can receive based on their customer profile data and their real-time interaction data.

Customer profile data and real-time data

The customer profile data can include the following:

- Customer behavioral data, call, and text volume, products owned, contract details.
- Customer demographic information and contact preferences.
- Predictive model scores.
- Social data.
- Sentiment.
- Prior transactions and campaign responses.

Real-time data can be found in the context of the current call, such as a new product inquiry, a complaint, or a data plan question.

The campaign

Monica creates a campaign that is named Telco Call Center Campaign by using IBM Campaign, part of the IBM Enterprise Marketing Management (EMM) suite.

The Telco Call Center Campaign contains offers to be presented within the call center application. The details of the offer vary based on individual customer characteristics. The results of the offer, whether accepted or rejected, are recorded in the customer's interaction history, and that information can be used for follow-up marketing offers and campaigns.

Customers are segmented into categories in real time, based on the context of the call, real-time scoring, and the campaign's business rules.

For example, you might have a flowchart with a decision node that assigns customers to five categories:

- `HighValue`
- `ProductInquiry`
- `Complaint_LowValue`
- `Complaint_HighValue`
- `CloseAccount`

In this example, customers are assigned to the `HighValue` segment if they have a customer lifetime value ratio greater than 0.7.

Each segment is assigned specific offers. Offers can be enabled or disabled by the marketer as the marketing strategy changes.

The `HighValue` customers qualify for the following potential offers:
- Premium phone.
- Premium data plans.
- Premium family plan.
- A second line at no cost.

Offer eligibility criteria for customers is based on calculations that use the real-time customer data and offer definition attributes.

After each offer is evaluated, there might be more offers eligible than there is time or space to present. For example, a customer is eligible for three offers, but you want to present only the top two offers. In this case, the offers would be presented based on the marketer's score values. The marketer's score can be based on a calculation of an expression by using customer and offer attributes, a real-time learning algorithm, or a combination of these methods.

Determine the best offers for telecommunications customers by creating business rules

Alex is a business analyst. He uses IBM Analytical Decision Management to bring together his company's business rules, predictive models, and optimizations to determine the best possible offer for a customer.

Alex creates business rules to determine which actions are valid for any single customer. Some examples of what you might set up business rules for are shown in the following list:
- Retention
- Billing
- Service

- Support
- Marketing

The telecommunications company has a retention campaign. Alex targets retention actions to customers with high network influence, high churn risk, and no open cases.

Offers are allocated so that the first offer in the list that applies is presented to the customer.

For example, customers are offered a premium phone if the following is true:
- Offer1 equals premium phone. This value was assigned by IBM Enterprise Marketing Management.
- Current_Offer does not equal premium phone. The current offer is what was on record in the customer's profile, generated from the last time an offer was made to the customer. You do not want to offer the same thing to a customer twice.
- The association model is a segmentation model that determines whether a customer is a promoter or a detractor, and whether the customer is amenable to offers.

If a customer qualifies for multiple offers, these offers can be prioritized.

You can set the maximum number of offers (**Max number of offers**) to be presented to each customer, for example, two.

You can apply an optimization equation to each action that is valid for a customer. The aim in the example is to pick the top two actions. When the equation is applied, the actions with the highest two scores are presented to the customer.

RESPONSE PROPENSITY * (REVENUE + (LOYALTY * (CHURN * FUTURE REVENUE)))

The equation contains the following key attributes:
- Propensity to respond to the offer.
- Revenue the offer would bring in.
- How much impact the action would have on customer loyalty and churn.
- Predicted future revenue.

Not all data needs to come from rules that are created in IBM Analytical Decision Management. Some data can be defined elsewhere and imported into Analytical Decision Management. The key is to bring the intelligence together in one place and to orchestrate the final decision within a single application:
- Predictive models can be built in another tool by a data miner.
- Marketing campaigns and offers can be defined by a marketer.
- Data can be made available in the right form for modeling and deployment by an information architect.

For more information, see the IBM Analytical Decision Management Application User's Guide (www.ibm.com/support/knowledgecenter/SS6A3P_8.0.0/com.ibm.spss.dm.userguide.doc/configurableapps/user_overview_container.htm).

Build predictive models for a telecommunications company

David, the data scientist (or data engineer), builds models using IBM SPSS Modeler to make the following predictions for a customer:

- The propensity to churn.
- Customer satisfaction.
- The propensity to respond to offers.

The scores, segments, and results from these models are used as inputs within IBM Analytical Decision Management by Alex, the business analyst, as he creates business rules.

This is an example of a model that uses data from a corporate database to compute a churn score from 0-100% for each customer.
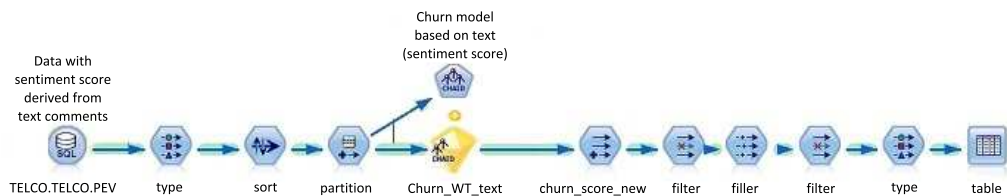
Figure 5. A model that computes churn scores for customers

This is an example of an Association model. An Association model determines whether a customer is a promoter or a detractor, and whether the customer is amenable to offers.
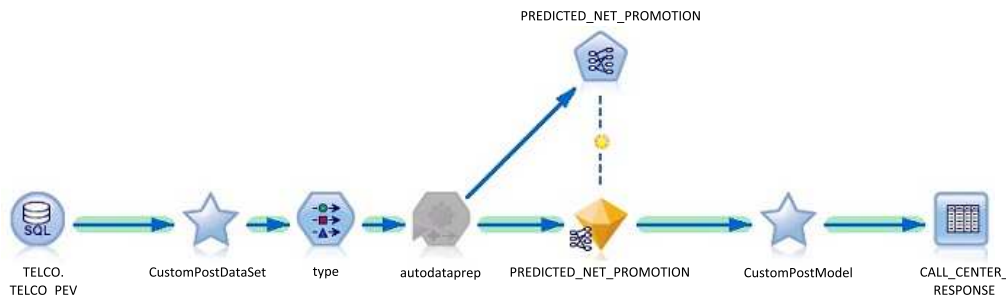
Figure 6. Example of an Association model

For more information, see "Next Best Action for Telecommunications Call Centers predictive models" on page 22.

Industry accelerator artifacts

The IBM Predictive Customer Intelligence Next Best Action for Telecommunications Call Centers industry accelerator includes the following artifacts.

IBM Cognos Business Intelligence reports

PCI_Telco_CallCenter_CognosContent.zip

PCI_Telco_CallCenter_FMProject.zip

PCI_Images.zip

The following reports are included:
- Billing reports
- Case Detail reports
- Profile reports:
  - Dials report
  - Social Network Chart report
- Usage reports

The reports are described in Chapter 4, "Industry accelerator reports," on page 29.

IBM Analytical Decision Management applications and templates

`PCI_Telco_CallCenter_App.zip`

For more information, see "Models in IBM Analytical Decision Management" on page 26

Predictive models

`PCI_Telco_CallCenter_CDS_Archive.pes`

The individual stream files that are contained in the `pes` file are available in the `Streams` folder.

The following streams are included:
- `AssociationModel.str`
- `Churn Prediction.str`
- `ExternalLearning.str`
- `ResponsePropensity.str`
- `Satisfaction.str`
- `UnicaCampaignOffers.str`

The Predictive Models are described in "Next Best Action for Telecommunications Call Centers predictive models" on page 22.

IBM DB2® database
`PCI_Telco_CallCenter_Data.zip`

Extend the accelerator with the IBM Predictive Customer Intelligence Usage Report

Optionally, you can monitor the effectiveness of your solution by using the IBM Predictive Customer Intelligence Usage Report. The IBM Predictive Customer Intelligence Usage Report displays the number of offers that are presented to customers and can be configured to show the number of offers that are accepted and rejected.

You can download the IBM Predictive Customer Intelligence Usage Report from IBM AnalyticsZone (www.ibm.com/analyticszone).

Chapter 2. Industry accelerator installation

The Next Best Action for Telecommunications Call Centers industry accelerator is for use with IBM Predictive Customer Intelligence.

The industry accelerator package contains the following parts:

- IBM DB2 databases.
- IBM Analytical Decision Management templates and applications.
- IBM SPSS project streams, models, and rules.
- IBM Cognos Business Intelligence reports and Framework Manager models and packages.
- Images for IBM Cognos Business Intelligence reports.

To install the industry accelerator, you must perform the following steps:

1. Download the industry accelerator from IBM AnalyticsZone (www.ibm.com/analyticszone).
2. Create the sample databases on the data node computer.
3. Install the Analytical Decision Management templates and applications on the Predictive Analytics node.
4. Import the SPSS project streams, models, and rules on the Predictive Analytics node.
5. Configure the data view for SPSS models on the Predictive Analytics node.
6. Install the IBM Cognos Content on the Business Intelligence node.

Industry accelerator prerequisites

Before you install the industry accelerator, you must have a fully configured environment.

You must have administration rights and have the ability to copy files between computers.

Download the industry accelerator

You must download the IBM Predictive Customer Intelligence accelerators from IBM AnalyticsZone.

Procedure

1. Go to IBM AnalyticsZone (www.ibm.com/analyticszone).
2. Click **Downloads**, and under **Predictive Customer Intelligence Accelerators**, click **View all PCI downloads**.
3. Click **More details** for the accelerator that you want to download.
4. If you are not signed in, click **Sign In to Download**.

   You must enter your IBM ID. If you do not have an IBM ID, you must register to create one.
5. Click **Download**.
6. Go to the directory where you downloaded the industry accelerator.
7. Decompress the file.

Creating the database

To use the IBM Predictive Customer Intelligence industry accelerator, you must create a database.

You run one script to create the database, and then run another script to populate the database.

Procedure

1. Copy the industry accelerator database content file from the computer where you downloaded them to the data node computer:

   The Next Best Action for Telecommunications Call Centers industry accelerator database file is `PCI_1.0_Telco_CallCenter\Database\PCI_Telco_CallCenter_Data.zip`. A database that is named `TELCO` is created.

2. On the data node computer, decompress the file.

3. On Microsoft Windows operating systems, do the following steps:

   a. Log on to the data node computer as the DB2 instance owner user.

   b. Go to the folder where you decompressed the industry accelerator content files.

   c. In the uncompressed folder, double-click `Install_DB.bat`.

   d. Double-click `Load_Data.bat`.

4. On Linux operating systems, do the following steps:

   a. Log on to the data node computer as **root** user.

   b. Open a terminal window, and go to the directory where you decompressed the industry accelerator content files.

      Note: If you copied the content files to the home directory for the **root** user, you might have to move the files to another directory that is not in the **root** home directory so that you can run the scripts.

   c. Type the following command to change the permissions for the files:

      `chmod -R 755 *sh`

   d. Change to the database instance owner. For example, `su db2inst1`

   e. In the uncompressed folder, run `sh ./Install_DB.sh`.

   f. Run `sh ./Load_Data.sh`.

What to do next

Verify that the tables are created and the data is successfully loaded into the input tables by checking the `out.log` file.

On Microsoft Windows operating systems, the log file is in the industry accelerator name folder. On Linux operating systems, the log file is in the `db2inst1` home folder.

Search for "rows were rejected" in the log file. The value should be zero, if it is not, there are data load issues.

Installing Analytical Decision Management templates and applications

The IBM Predictive Customer Intelligence industry accelerator includes IBM Analytical Decision Management templates and applications. You must copy the template and application files to the Predictive Analytics node computer.

Procedure

1. Log on to the Predictive Analytics node computer.
2. From the computer where you downloaded the industry accelerator files, copy the Analytical Decision Management applications and templates files.
   - Application: `PCI_1.0_Telco_CallCenter\Analytics\Applications\` `PCI_Telco_CallCenter_App.zip`
   - Template: `PCI_1.0_Telco_CallCenter\Analytics\Templates\` `TelcoCallCenter.xml`

   Copy the files to the `Applications` or `Templates` folder as appropriate on the Predictive Analytics node computer.

   On Microsoft Windows operating systems, the default locations are `C:\Program Files\IBM\SPSS\Deployment\6.0\Server\components\decision-management\Applications` and `C:\Program Files\IBM\SPSS\Deployment\6.0\Server\components\decision-management\Templates`.

   On Linux operating systems, the default locations are `/opt/IBM/SPSS/Deployment/6.0/Server/components/decision-management/Applications` and `/opt/IBM/SPSS/Deployment/6.0/Server/components/decision-management/Templates`.
3. Decompress the files in the `Applications` folder.
4. In a browser, go to the IBM Analytical Decision Management launch page: `http://`*analytics_node_name*`:`*port_number*`/DM`

   If you used the default values, the *port_number* is 9080.
5. Enter the log in credentials.
6. Click **Add application**, and select **Telco Call Center**.
7. Click **Save**.

Importing IBM SPSS project streams, models, and rules

IBM SPSS project streams, models, rules, and other artifacts are contained in a repository export file (.pes) for the IBM Predictive Customer Intelligence industry accelerator. If you want to modify or view these artifacts, you must copy the export file to the computer where IBM SPSS Collaboration and Deployment Services Deployment Manager is installed, and open the file.

Procedure

1. From the computer where you downloaded the industry accelerator, copy the `.pes` file to the computer where IBM SPSS Collaboration and Deployment Services Deployment Manager is installed.

   The Next Best Action for Telecommunications Call Centers industry accelerator file is `PCI_1.0_Telco_CallCenter\Analytics\` `PCI_Telco_CallCenter_CDS_Archive.pes`.
2. In IBM SPSS Collaboration and Deployment Service Deployment Manager, right-click **Content Repository**, and click **Import**.
3. Browse to the `.pes` file.
4. Select the following options:
   - **Resolve conflicts globally**
   - **Add new version of target item or rename source item**, **Use labels from source**.
   - **Continue import even if some objects cannot be imported due to locking conflicts**.

- **Resolve Invalid Version Conflicts**, **Import**.
- **Resource Definitions, Recommended - Import if there are no Duplicate ID conflicts or Duplicate Name conflicts**.

5. Click **OK**.

Results

Content folders and resource definitions are added to the repository alongside any existing content.

Configuring the data view for IBM SPSS models

To configure the data view, IBM SPSS Modeler must be connected to the IBM Predictive Customer Intelligence industry accelerator database through an ODBC data source connection.

If your IBM Predictive Customer Intelligence environment uses the IBM SPSS Modeler client logged in to a Modeler server, perform the steps on the Predictive Analytics node computer (where IBM SPSS Modeler Server is installed).

If your IBM Predictive Customer Intelligence environment uses the IBM SPSS Modeler Client in a stand-alone environment, perform the steps on the client computer where IBM SPSS Modeler client is installed.

Procedure

1. Catalog the database on the client computer.
   a. Click **Start** > **IBM DB2** > **DB2COPY1 (Default)** > **DB2 Command Window - Administrator**.
   b. Enter the following command to catalog the database node:

      `db2 catalog tcpip node NODE_NAME remote data_node_name server PORT_NUMBER`

      NODE_NAME can be any value. *PORT_NUMBER* is 50000 by default.
   c. Enter the following command to catalog the PCI database:

      `db2 catalog database TELCO at node NODE_NAME authentication server`

      You must use the same *node_name* that you used in the **db2 catalog database** command.
2. Create an ODBC DSN to point to the industry accelerator database. The database account that is provided in the ODBC connection must be the same user that was used for creating the tables.

   Tip: On Microsoft Windows operating systems, in the Windows Control Panel, select **Administrative Tools** and click **Data Sources**. Click the **System DSN** tab.

Configuring ODBC for IBM SPSS Modeler Server on Linux operating systems

To use an ODBC data source with IBM SPSS Modeler Server on a Linux operating system, you must configure the environment.

Procedure

1. Stop the IBM SPSS Modeler Server.
2. Go to the /root/SDAP71 directory.

   The driver files are installed as part of the IBM Predictive Customer Intelligence Server deployment.

3. Run the `setodbcpath.sh` script to update the ODBC path in the scripts.
4. Edit the `odbc.sh` script to add the definition for ODBCINI to the bottom of the script. For example:

```
ODBCINI=/usr/spss/odbc/odbc.ini; export ODBCINI
```

ODBCINI must point to the full file path of the `odbc.ini` file for IBM SPSS Modeler. The `odbc.ini` file lists the ODBC data sources that you want to connect to. A default `odbc.ini` file is installed with the drivers.

5. In the `odbc.ini` file, add the data source and specify the driver in the [ODBC Data Sources] section of the file.

For example, add the data source as:

```
[ODBC Data Sources]
TELCO=IBM DB2 ODBC Driver
```

6. In the `odbc.ini` file, create an ODBC data source connection for the industry accelerator database.

For example, include the following content:

```
[TELCO]
Driver=/opt/ibm/db2/V10.1/lib64/libdb2o.so
DriverUnicodeType=1
Description=IBM DB2 ODBC Driver
ApplicationUsingThreads=1
AuthenticationMethod=0
BulkBinaryThreshold=32
BulkCharacterThreshold=-1
BulkLoadBatchSize=1024
CharsetFor65535=0
#Database applies to DB2 UDB only
Database=TELCO
DefaultIsolationLevel=1
DynamicSections=200
EnableBulkLoad=0
EncryptionMethod=0
FailoverGranularity=0
FailoverMode=0
FailoverPreconnect=0
GrantAuthid=PUBLIC
GrantExecute=1
GSSClient=native
HostNameInCertificate=
IpAddress=IP_Address_of_DB_server
KeyPassword=
KeyStore=
KeyStorePassword=
LoadBalanceTimeout=0
LoadBalancing=0
LogonID=db2inst1
MaxPoolSize=100
MinPoolSize=0
Password=password
PackageCollection=NULLID
PackageNamePrefix=DD
PackageOwner=
Pooling=0
ProgramID=
QueryTimeout=0
ReportCodePageConversionErrors=0
TcpPort=50000
TrustStore=
TrustStorePassword=
UseCurrentSchema=0
ValidateServerCertificate=1
WithHold=1
XMLDescribeType=-10
```

Note: You must use the driver library `libdb2o.so` with IBM SPSS Modeler.

Ensure that you set `DriverUnicodeType=1` to avoid buffer overflow errors when you connect to the database.

7. If you are using the 64-bit version of IBM SPSS Modeler Server, define and export LD_LIBRARY_PATH_64 in the `odbc.sh` script:

```
if [ "$LD_LIBRARY_PATH_64" = "" ]; then
LD_LIBRARY_PATH_64=<library_path>
else
LD_LIBRARY_PATH_64=<library_path>:$LD_LIBRARY_PATH_64
fi
export LD_LIBRARY_PATH_64
```

Where `<library_path>` is the same as for the LD_LIBRARY_PATH definition in the script that was initialized with the installation path. For example, `/usr/spss/odbc/lib`.

Tip: You can copy the `if` and `export` statements for LD_LIBRARY_PATH in the `odbc.sh` file, append them to the end of the file. Then, replace the LD_LIBRARY_PATH strings in the newly appended `if` and `export` statements with LD_LIBRARY_PATH_64. Here is an example of the `odbc.sh` file for a 64-bit IBM SPSS Modeler Server installation:

```
if [ "$LD_LIBRARY_PATH" = "" ]; then
  LD_LIBRARY_PATH=/usr/spss/odbc/lib
else
  LD_LIBRARY_PATH=/usr/spss/odbc/lib:$LD_LIBRARY_PATH
fi
export LD_LIBRARY_PATH
if [ "$LD_LIBRARY_PATH_64" = "" ]; then
  LD_LIBRARY_PATH_64=/usr/spss/odbc/lib
else
  LD_LIBRARY_PATH_64=/usr/spss/odbc/lib:$LD_LIBRARY_PATH_64
fi
export LD_LIBRARY_PATH_64
ODBCINI=/usr/spss/odbc/odbc.ini; export ODBCINI
```

Ensure that you export LD_LIBRARY_PATH_64, and define it with the `if` loop.

8. Configure IBM SPSS Modeler Server to use the driver. Edit `modelersrv.sh` and add the following line immediately below the line that defines SCLEMDNAME:

`. <odbc.sh_path>`

Where odbc.sh_path is the full path to the `odbc.sh` file.

For example: `. /usr/spss/odbc/odbc.sh`

Ensure that you leave a space between the first period and the file path.

9. Save `modelersrv.sh`.

10. Configure the IBM SPSS Modeler Server to use the ODBC wrapper named `libspssodbc_datadirect.so`.

   a. Go to the `/usr/IBM/SPSS/ModelerServer/16.0/bin` directory.

   b. Remove the existing `libspssodbc.so` soft link by using the following command:

   `rm -fr libspssodbc.so`

   c. Link the new wrapper to `libspssodbc.so` by using the following command:

   `ln -s libspssodbc_datadirect_utf16.so libspssodbc.so`

11. Configure the db2cli.ini file in `<db2 instance home>`/sqllib/cfg/db2cli.ini to add the sections for each database.

```
[TELCO]
Database=TELCO
Protocol=TCPIP
DriverUnicodeType=1
Port=50000
Hostname=ip or hostname
UID=username
PWD=password
```

12. Save odbc.ini.

What to do next

To test the connection, do the following steps:

1. Restart IBM SPSS Modeler Server.
2. Connect to IBM SPSS Modeler Server from a client.
3. Add a database source node to the canvas.
4. Open the node and verify that you can see the data source names that you defined in the odbc.ini file.

For additional information and troubleshooting tips for connecting to data sources, see the SPSS Modeler documentation (www.ibm.com/support/knowledgecenter/SS3RA7_16.0.0)

Deploy the IBM Cognos content

For IBM Cognos Business Intelligence, you must catalog the database, create a data source connection, and then deploy the content files for the IBM Predictive Customer Intelligence industry accelerator.

Moving the IBM Cognos content

You must copy the IBM Cognos content for the IBM Predictive Customer Intelligence industry accelerator to the appropriate locations in your IBM Cognos installation to be able to deploy the content.

Procedure

1. Copy the IBM Cognos content from the computer where you downloaded the industry accelerator to the *Cognos_Install_location*\Deployment folder on the Business Intelligence node computer.

   The Next Best Action for Telecommunications Call Centers industry accelerator IBM Cognos content file is PCI_1.0_Telco_CallCenter\BI\PCI_Telco_CallCenter_CognosContent.zip.

2. Decompress the IBM Cognos report image file where you downloaded the industry accelerator.

   The report images file is PCI_1.0_Telco_CallCenter\BI\PCI_Images.zip.

   Note: If you are installing more than one accelerator, you do not have to replace the images. The PCI_Images.zip files contains all of the images that are used in all of the accelerator reports.

3. Copy the PCI_Images folder to the *Cognos_Install_location*\webcontent folder on the Business Intelligence node computer.

   You should have *Cognos_Install_location*\webcontent\PCI_Images folder that contains report image files.

4. Copy the IBM Cognos Framework Manager model files from the computer where you downloaded theindustry accelerator to the computer where you installed IBM Cognos Framework Manager, and decompress the file.

   The Telecommunications Call Center industry accelerator Framework Manager file is compressed in `PCI_1.0_Telco_CallCenter\BI\ PCI_Telco_CallCenter_FMProject.zip`.

5. If you want to edit the Framework Manager models, you must catalog the industry accelerator database on the computer where you installed Framework Manager.

   a. Click **Start** > **IBM DB2** > **DB2COPY1 (Default)** > **DB2 Command Window - Administrator**.

   b. Enter the following command to catalog the database node:

      `db2 catalog tcpip node NODE_NAME remote data_node_name server PORT_NUMBER`

      `NODE_NAME` can be any value. `PORT_NUMBER` is 50000 by default.

   c. Enter the following command to catalog the PCI database:

      `db2 catalog database TELCO at node NODE_NAME authentication server`

      You must use the same *node_name* that you used in the **db2 catalog database** command.

Creating a data source connection to the industry accelerator database

You must create a data source connection to the IBM Predictive Customer Intelligence industry accelerator database.

Procedure

1. Open a web browser.
2. Go to the IBM Cognos BI portal URL. For example, go to `http://bi_node_name/ibmcognos/`.
3. On the **Welcome** page, click **Administer IBM Cognos Content**.
4. Click the **Configuration** tab, and click **Data Source Connections**.
5. Click the **New Data Source** button.
6. In the **Name** box, type `TELCO`, and then click **Next**.
7. In the connection page, select **IBM DB2**, ensure that **Configure JDBC connection** is selected, and click **Next**.
8. In the **DB2 database name** field, type `TELCO`.
9. Leave **DB2 connect string** blank.
10. Under **Signons**, select both **Password** and **Create a signon that the Everyone group can use**, and then type the user ID and password for the DB2 instance owner user that you used to create the database, and click **Next**.

    Tip: To test whether the parameters are correct, click **Test the connection**. After you test the connection, click **OK** to return to the connection page.
11. In the **Server name** box, enter the name or IP address of your data node computer.
12. In the **Port number** box, enter the DB2 port number. The default is 50000.
13. In **Database name**, type `TELCO`.

    Tip: To test whether the parameters are correct, click **Test the connection**. After you test the connection, click **OK** to return to the connection page.

14. Click **Finish**.

Deploy the IBM Cognos reports

You must deploy the IBM Predictive Customer Intelligence industry accelerator reports using IBM Cognos Administration.

Procedure

1. Open a web browser.
2. Go to the IBM Cognos BI portal URL. For example, go to `http://bi_node_name/ibmcognos/`.
3. On the **Welcome** page, click **Administer IBM Cognos Content**.
4. On the **Configuration** tab, click **Content Administration**.
5. On the toolbar, click the **New Import** button.
6. In the **Deployment Archive** pane, select deployment archive, and click **Next**.

   The deployment archive is named `PCI_Telco_CallCenter_CognosContent`.
7. In the **Specify a name and description** pane, accept the default or enter a new name, and click **Next**.
8. In the **Select the public folders and directory dontent** pane, select all of the packages in the table, leave the **Options** as default, and click **Next**.

   Note: Ensure that the **Disable after import** option is cleared.
9. In the **Specify the general options** pane, accept the defaults, and click **Next**.
10. On the **Review the summary** page, click **Next**.
11. On the **Select an action** page, select **Save and run once**, and click **Finish**.
12. On the **Run with options** page, accept the defaults, and click **Run**, and then click **OK**.
13. Select **View the details of this import after closing this dialog** and click **OK**.
14. In IBM Cognos Administration, click the **Home** button.

    The content is available in **Public Folders** > **PCI Industry Accelerators 1.0**.

Copying the industry accelerator license files to each computer

After you install the industry accelerator, you must copy the `license` folder to each computer on which you use the IBM Predictive Customer Intelligence industry accelerator.

Important: Do not rename the folders or files.

Procedure

Copy the `license` folder from the folder where you decompressed the industry accelerator to each computer on which an IBM Predictive Customer Intelligence component is installed. For example, copy the folder and contents so that you have a `C:\IBM\PCI_IndustryAccelerators\1.0\license` folder on Microsoft Windows operating systems or an `/opt/IBM/PCI_IndustryAccelerators/1.0/license` folder on Linux operating systems on each node computer.
The folder contains the license files. The folder should exist on each server and client node computer.

Chapter 3. Predictive models

Use IBM Predictive Customer Intelligence models to predict what is likely to happen in the future, based on patterns from past data.

For example, models can predict the following situations:

- How likely it is that a customer will churn in the next quarter.
- Whether a customer will be a promoter of a service, or a detractor
- How valuable the customer is in terms of future revenue

Models can be used in the same way as business rules. However, while rules might be based on corporate policies, business logic, or other assumptions, models are built on actual observations of past results, and can discover patterns that might not otherwise be apparent. While business rules bring common business logic to applications, models lend insight and predictive power. The ability to combine models and rules is a powerful feature.

Model data sources

You or the administrator need to specify the data sources to use in the IBM Predictive Customer Intelligence solution for modeling, analysis, simulation and testing, and scoring.

Use IBM Analytical Decision Management to plan the model and to decide which data sources to use. You need the following types of data in the modeling process:

Historical or analytical data
> To build the model, you need information about what to predict. For example, if you want to predict churn, you need information about customers such as their complaints history, number of months since they upgraded their plan, sentiment score, demographic history, and estimated income. This is often referred to as historical data or analytical data, and it must contain some or all of the fields in the project data model, plus an additional field that records the outcome or result that you want to predict. This extra field is used as the target for modeling.

Operational or scoring data
> To use the model to predict future results, you need data about the group or population in which you are interested. This is often referred to as operational data or scoring data. The project data model is typically based on this data.

You can use the following types of data sources:

- A database that supports ODBC, such as IBM DB2.
- An Enterprise View that is defined in IBM SPSS Collaboration and Deployment Services.
- A file that is used by IBM SPSS Statistics, such as a text file (txt), or a comma separated file (csv).

When you add a new data source, map all of its fields to ensure compatibility with the project data model. For example, if the project data model requires a field named purchase with values Yes and No for the measurement level flag, then any

data source that you use must have a compatible field. If the field names are not identical, they can be mapped accordingly. Note that the input and associated mapped field must have the same data type.

You can characterize the information that each data field represents. Define a measurement level to determine how a given field is used in business rules, models, or other applications.

You can derive additional fields or attributes for the application by using the expression manager. For example, if you use banking data, you may want to create an expression that shows the ratio between a customer's income and the number of loan accounts that the customer has. Expressions are always numeric with a measurement of Continuous; this cannot be changed.

To enforce corporate-wide policies, use global selections to choose the records to include or exclude from processing by the application. Global selections can be particularly effective when used in combination with shared rules. Shared rules are saved as separate objects that can be used by multiple applications. If the shared rule changes, all applications that use the rule can then be updated.

Data mining that uses IBM SPSS Modeler focuses on the process of running data through a series of nodes. This is referred to as a stream. This series of nodes represents operations to be performed on the data, while links between the nodes indicate the direction of data flow. Typically, you use a data stream to read data into IBM SPSS Modeler, run it through a series of manipulations, and then send it to a destination, such as a table or a viewer.

For example, to open a data source, you add a new field, select records based on values in the new field, and then display the results in a table. In this example, your data stream would consist of the following nodes:
- Variable File node, which reads the data from the data source
- Derive node, which adds the new calculated field to the data set
- Select node, which uses the selection criteria to exclude records from the data stream
- Table node, which displays the results of your manipulations on screen

For more information about these features, see the IBM SPSS Modeler Help (www.ibm.com/support/knowledgecenter/SS3RA7_16.0.0/ com.ibm.spss.modeler.help/clementine/entities/clem_family_overview.htm).

Next Best Action for Telecommunications Call Centers predictive models

A number of predictive models are provided in the IBM Predictive Customer Intelligence Next Best Action for Telecommunications Call Centers industry accelerator.

The following models form the basis of the predictive models in the Next Best Action for Telecommunications Call Centers industry accelerator:

Churn model
> The Churn model (`Churn Prediction.str`) is used to predict customers who are likely to churn from the current list of active customers.

Customer Satisfaction model

The Customer Satisfaction model (`Satisfaction.str`) uses the net promoter score to determine satisfaction.

Association model

The Association model (`AssociationModel.str`) profiles customers into groups with similar demand characteristics.

Response Propensity model

The Response Propensity model (`ResponsePropensity.str`) determines the correct channel to use to reach the customer. It also determines the probability that the customer will respond.

External Learning model

The External Learning Model (`ExternalLearning.str`) predicts the likelihood that a customer will accept a particular offer. It bases that likelihood on the past responses for customers with similar characteristics.

Unica Campaign Offers model

The Unica Campaign Offers model (`UnicaCampaignOffers.str`) is a report of previous offers received by a customer.

Churn prediction model

Churn is the measurement of subscribers who ended their contract or services. The objective of the churn prediction model in the IBM Predictive Customer Intelligence Next Best Action for Telecommunications Call Centers industry accelerator is to predict the customers that are likely to churn from the current list of active customers.

The inputs for the example churn prediction model are complaint history, number of months since the customer upgraded the plan, sentiment score, customer demographic history, and estimated income. The example stream for predicting churn is named `Churn Prediction.str`.
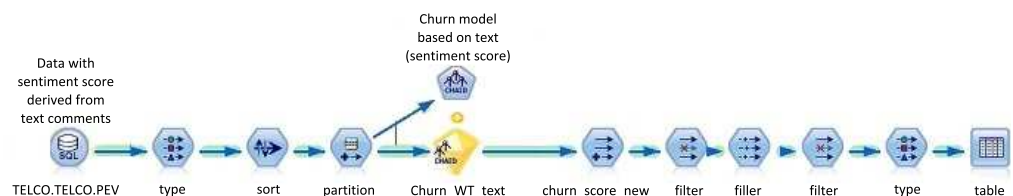

Figure 7. A model that computes churn scores for customers

Data preparation for churn prediction starts with aggregating all available information about the customer. The data that is obtained for predicting the churn is classified in the following categories:

- Transaction and billing data, such as the kind of services that are subscribed and average monthly bills.
- Demographic data, such as gender, education, and marital status.
- Behavior data, such as complaints data and price plan migration data.
- Usage data, such as the number of calls and the number of text messages sent.

Data is filtered for modeling in two stages:

1. Data not relevant to some customers.
2. Variables that do not have adequate predictive significance.

A CHAID algorithm is used to predict churn. A CHAID algorithm generates decision trees. A decision tree model is selected over logistic regression because the rules that come out of the decision tree help to understand the root cause of churn better.

The sentiment score is derived from the customer comments text and is an important predictor of churn. Sentiment score considers both the current sentiment score and historical sentiment score.

Other important predictors that are identified during the data understanding and modeling phase are estimated income, number of open complaints, number of closed complaints, time since the last plan upgrade, and the education level of the customer.

Along with the probability of churn, the propensity to churn is calculated by the model. The propensity to churn is widely used in the IBM Analytical Decision Management application. The rule explanation and rule description nodes map the rule identifier number that is generated by the model to the explanation of the rule in English.

Customer satisfaction model

Customer satisfaction in the IBM Predictive Customer Intelligence Next Best Action for Telecommunications Call Centers industry accelerator is determined by the Net Promoter Score (NPS).

The Net Promoter Score is based on the perspective that every company's customers can be divided into three categories:
- Promoters are loyal enthusiasts who keep buying from a company and urge their friends to do the same.
- Passives are satisfied but unenthusiastic customers who can be easily wooed by the competition.
- Detractors are unhappy customers who are trapped in a bad relationship with the company.

The Net Promoter Score is obtained by asking a set of customers a single question: "How likely is it that you would recommend our company to a friend or colleague?" Customers are asked to answer on a 0 - 10 rating scale. Based on the score that they provide, they are categorized as Promoter (if the score is 9 or 10), Passive (if the score is 7 or 8), or Detractor (if the score is 6 or less).

The objective of the Net Promoter Score model is to identify the distinguishing characteristics of the customers who fall into the three categories. The net promoter score model is then used to predict which category a customer would fall into, without asking the question "How likely is it that you would recommend our company to a friend or colleague?" This model helps to dynamically track the change in the Net Promoter Score of a customer.

The example stream for identifying the Net Promoter Score is named `Satisfaction.str`.
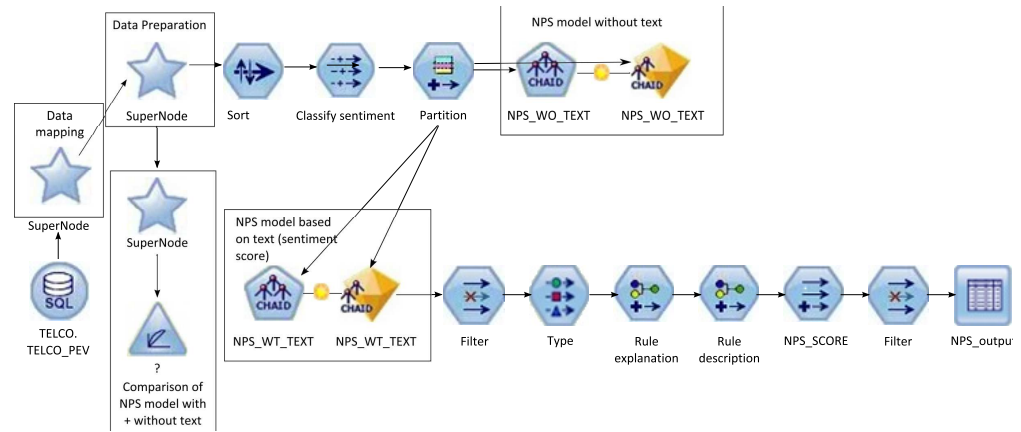
Figure 8. Stream for identifying customer satisfaction

Historical data comes from a sample of customers who answered the question. Customers for whom there is no score are considered to be operational data, whose satisfaction group needs to be predicted for the first time. The Customer Satisfaction model can be used to predict scores for customers who do not have a net promoter score.

The sentiment score, along with the number of open complaints, employment status, and estimated income, are identified to be the key variables that affect the prediction of satisfaction group. The sentiment score is focused on capturing the negative sentiments across various attributes, such as network and service. A sentiment score of zero means that the customer has not expressed any negative sentiment. A sentiment score of two means that the customer has expressed negative sentiment in two predefined categories. Six categories were defined, and so the maximum sentiment score is 6.

The sentiment score that is used in the example database is an average value of the most recent sentiment score calculated and the previous sentiment score of the same customer. Where a customer expressed negative sentiment on a single category, and then expressed multiple positive comments, the sentiment score would be mildly negative, although close to zero. For the purposes of satisfaction modeling, to avoid categorizing the customer as mildly negative, sentiment scores less than 0.6 are rounded to zero.

Assign offers based on association

An Association model is used to assign the right offer to a customer in the IBM Predictive Customer Intelligence Next Best Action for Telecommunications Call Centers industry accelerator. It uses the customer's segment (for example, Platinum) and predicted net promoter score group (for example, Promoter) to determine an offer (for example Phone Plan).

Segmentation is the process of profiling customers into groups with similar demand characteristics. The example stream for profiling customers is named `AssociationModel.str`.

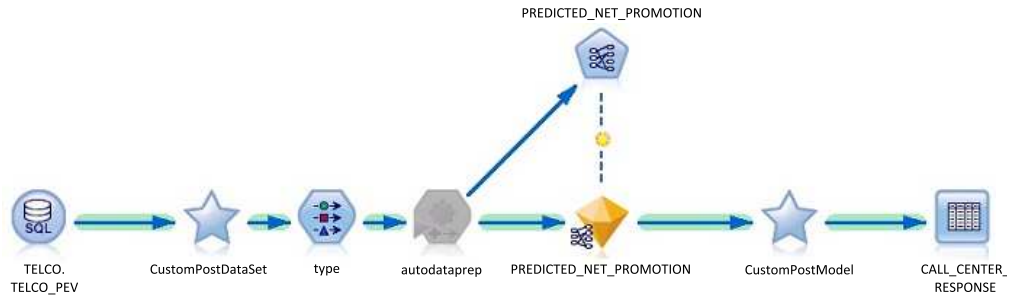The following diagram shows an example association model.

Figure 9. Association model for the Next Best Action for Telecommunications Call Centers industry accelerator

Target offers to customers with the response propensity model

It is important to target offers to the correct customers, through the correct channel. The IBM Predictive Customer Intelligence Next Best Action for Telecommunications Call Centers industry accelerator Response Propensity model determines the correct channel to reach the customer and the probability that the customer will respond.

The example stream for determining response propensity is named ResponsePropensity.str.
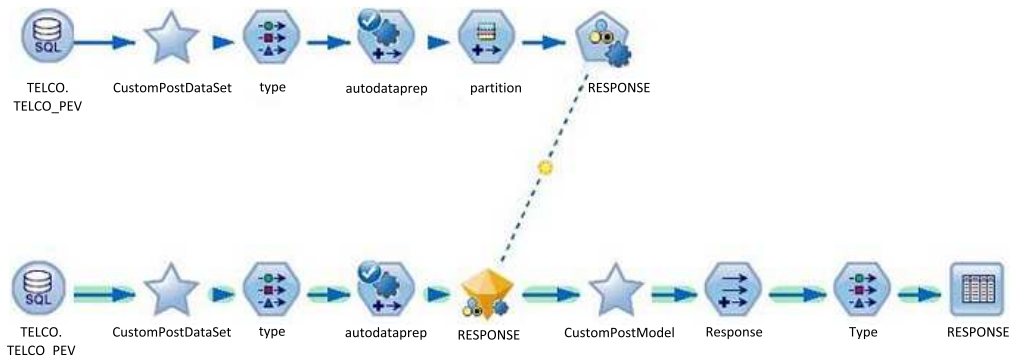

Figure 10. Response propensity model

You can use the results of this model to target customers who are likely to respond because they are above a certain threshold, or ignore customers who are likely to result in a minimum profit.

The input for the model is customer demographic information, billing history, customer lifetime value, churn score, net promoter score, and tenure.

The customer's previous offer response data can be used as the input for the current model. The historical data on which interaction points the customer has responded to an offer is taken and the model is trained based on that data.

Models in IBM Analytical Decision Management

In IBM Analytical Decision Management, you can combine the IBM Predictive Customer Intelligence Next Best Action for Telecommunications Call Centers industry accelerator predictive models with rules to allocate offers in accordance

with your business goals. You do this by combining selection and allocation rules that are based on the output from predictive models.

There are two main steps:
- Define and allocate offers to determine which offers a customer is eligible for.
- Prioritize offers to determine which offers a customer receives.

Training predictive models

Predictive models must be trained to determine which data is useful and which data is not needed. When a model gives you accurate predictions, you are ready to use the predictive model for real-time scoring.

You use a training data set to build the predictive model and a test set of data to validate the model that was created with the training set.

Models must be retrained periodically with new data sets to adjust for changing behavior patterns. For information about using IBM SPSS Modeler, see IBM SPSS Modeler Help (www.ibm.com/support/knowledgecenter/SS3RA7_16.0.0/com.ibm.spss.modeler.help/clementine/entities/clem_family_overview.htm?lang=en).

Scoring a model

To score a model means to apply it to some data in order to obtain a result or prediction that can be used as input to decisions.

Depending on the application, the scoring results can be written to a database table or flat file, or used as inputs to the segment, selection, and allocation rules that drive decisions in an application.

For more information, see IBM SPSS Collaboration and Deployment Services Deployment Manager User's Guide (www.ibm.com/support/knowledgecenter/SS69YH_6.0.0/com.spss.mgmt.content.help/model_management/thick/scoring_configuration_overview.html).

Create business rules

For IBM Predictive Customer Intelligence, you use IBM Analytical Decision Management to bring together your company's business rules, predictive models, and optimizations.

Using IBM Analytical Decision Management, the insights gained through predictive modeling can be translated to specific actions.

You can combine predictive models with rules to allocate offers in accordance with business goals. This is done by using a combination of selection and allocation rules that are based on the output from predictive models.

The steps that you take are:

Define possible actions
 If a customer is not happy with a service, what should you do about it.

Allocate offers
 Which types of customers are the best candidates for which offers.

Prioritize offers
> Prioritization determines which offers a customer receives.

For more information, see the IBM Analytical Decision Management Application User's Guide (www.ibm.com/support/knowledgecenter/SS6A3P_8.0.0/ com.ibm.spss.dm.userguide.doc/configurableapps/dms_define_rules.htm).

Deploy an application

You can deploy the IBM Predictive Customer Intelligence application to a testing environment or to a production environment, such as a call center or a website. You can also deploy it to contribute to batch processing.

You can deploy a stream in the IBM SPSS Modeler repository. A deployed stream can be accessed by multiple users throughout the enterprise and can be automatically scored and refreshed. For example, a model can be automatically updated at regularly scheduled intervals as new data becomes available.

For more information, see IBM SPSS Collaboration and Deployment Services (www.ibm.com/support/knowledgecenter/SS69YH_6.0.0/ com.spss.mgmt.content.help/model_management/_entities/ whatsnew_overview_thick.html?cp=SS69YH_6.0.0%2F5).

Chapter 4. Industry accelerator reports

An IBM Cognos Business Intelligence report is provided with the IBM Predictive Customer Intelligence industry accelerator.

You can customize the report by using IBM Cognos Report Studio. Report Studio is a report design and authoring tool. Report authors can use Report Studio to create, edit, and distribute a wide range of professional reports. For more information, see IBM Cognos Report Studio User Guide (www.ibm.com/support/knowledgecenter/ SSEP7J_10.2.1/com.ibm.swg.ba.cognos.ug_cr_rptstd.10.2.1.doc/ c_rs_introduction.html).

The metadata that the report displays comes from the package that is created in and published from IBM Cognos Framework Manager. The example Framework Manager project folder contains the compiled project file (`.cpf`). When you open the `.cpf` file, Framework Manager displays the modeled relationships of the data and the package definitions, which are made available to the reporting studios when published. You can modify the metadata for the report by using Framework Manager. For more information, see IBM Cognos Framework Manager User Guide (www.ibm.com/support/knowledgecenter/SSEP7J_10.2.1/ com.ibm.swg.ba.cognos.ug_fm.10.2.1.doc/c_ug_fm_introduction.html %23ug_fm_Introduction).

Available reports

The following IBM Predictive Customer Intelligence reports are available from the IBM Cognos Business Intelligence portal.

BillingReports
> The **Billing** report displays the customer billing history, calculated bill amount, and potential savings.

CaseDetailReports
> The **CaseReport** shows the open and closed case history of the customer: a bar chart that plots the case status per month, a list with detail case information and a list that shows social media posts.

ProfileReports
> The **Dials** report shows the analytics key performance indicators (KPIs) for a customer.
>
> For the Telecommunications call center sample only, the **SocialNetworkChart** report shows the social network chart for a customer ID.

UsageReports
> The **Usage** report shows the voice and data usage of the customer.

View IBM Predictive Customer Intelligence reports

You can view the IBM Predictive Customer Intelligence industry accelerator report in IBM Cognos Business Intelligence.

Procedure

1. Open a web browser.

2. Go to the IBM Cognos BI portal URL. For example, go to `http://bi_node_name/ibmcognos/`.

3. In the **IBM Cognos Welcome** page, click **IBM Cognos content**.

4. In the **Public Folders** tab, click: **PCI Industry Accelerators 1.0**.

   When you run some reports, you are prompted for a customer ID. Enter 21 as the customer ID, and click **Submit**.

Modify the data model

You use IBM Cognos Framework Manager to model the meta data for the IBM Predictive Customer Intelligence industry accelerator reports.

IBM Cognos Framework Manager is a meta data modeling tool that drives query generation for IBM Cognos software. A model is a collection of meta data that includes physical information and business information for one or more data sources.

For information on modifying or creating Framework Manager models, see the *IBM Cognos Framework Manager User Guide*. This is available from IBM Knowledge Center (www.ibm.com/support/knowledgecenter/SSEP7J_10.2.1/com.ibm.swg.ba.cognos.cbi.doc/welcome.html).

Procedure

1. Launch IBM Cognos Framework Manager.

2. Click **Open a Project** and browse to the location where you copied and decompressed the IBM Cognos Framework Manager model file.

   The Telecommunications Call Center industry accelerator IBM Cognos Framework Manager file is `PCI_Telco_CallCenter_FMProject\IBM PCI Telco Call Center.cpf`.

Appendix. Troubleshooting a problem

Troubleshooting is a systematic approach to solving a problem. The goal of troubleshooting is to determine why something does not work as expected and how to resolve the problem.

Review the following table to help you or customer support resolve a problem.

Table 1. Troubleshooting actions and descriptions

Actions	Description
A product fix might be available to resolve your problem.	Apply all known fix packs, or service levels, or program temporary fixes (PTF).
Look up error messages by selecting the product from the IBM Support Portal, and then typing the error message code into the **Search support** box (http://www.ibm.com/support/entry/portal/).	Error messages give important information to help you identify the component that is causing the problem.
Reproduce the problem to ensure that it is not just a simple error.	If samples are available with the product, you might try to reproduce the problem by using the sample data.
Ensure that the installation successfully finished.	The installation location must contain the appropriate file structure and the file permissions. For example, if the product requires write access to log files, ensure that the directory has the correct permission.
Review all relevant documentation, including release notes, technotes, and proven practices documentation.	Search the IBM Knowledge Center to determine whether your problem is known, has a workaround, or if it is already resolved and documented.
Review recent changes in your computing environment.	Sometimes installing new software might cause compatibility issues.

If the items in the table did not guide you to a resolution, you might need to collect diagnostic data. This data is necessary for an IBM technical-support representative to effectively troubleshoot and assist you in resolving the problem. You can also collect diagnostic data and analyze it yourself.

Troubleshooting resources

Troubleshooting resources are sources of information that can help you resolve a problem that you are having with an IBM product.

Support Portal

The IBM Support Portal is a unified, centralized view of all technical support tools and information for all IBM systems, software, and services.

The IBM Support Portal lets you access all the IBM support resources from one place. You can tailor the pages to focus on the information and resources that you need for problem prevention and faster problem resolution. Familiarize yourself

with the IBM Support Portal by viewing the demo videos (https://www.ibm.com/blogs/SPNA/entry/the_ibm_support_portal_videos).

Find the content that you need by selecting your products from the IBM Support Portal (http://www.ibm.com/support/entry/portal).

Before contacting IBM Support, you will need to collect diagnostic data (system information, symptoms, log files, traces, and so on) that is required to resolve a problem. Gathering this information will help to familiarize you with the troubleshooting process and save you time.

Service request

Service requests are also known as Problem Management Reports (PMRs). Several methods exist to submit diagnostic information to IBM Software Technical Support.

To open a PMR or to exchange information with technical support, view the IBM Software Support Exchanging information with Technical Support page (http://www.ibm.com/software/support/exchangeinfo.html).

Fix Central

Fix Central provides fixes and updates for your system's software, hardware, and operating system.

Use the pull-down menu to navigate to your product fixes on Fix Central (http://www.ibm.com/systems/support/fixes/en/fixcentral/help/getstarted.html). You may also want to view Fix Central help.

IBM developerWorks

IBM developerWorks® provides verified technical information in specific technology environments.

As a troubleshooting resource, developerWorks provides easy access to the most popular practices, in addition to videos and other information: developerWorks (http://www.ibm.com/developerworks).

IBM Redbooks

IBM Redbooks® are developed and published by the IBM International Technical Support Organization, the ITSO.

IBM Redbooks (http://www.redbooks.ibm.com) provide in-depth guidance about such topics as installation and configuration and solution implementation.

Software support and RSS feeds

IBM Software Support RSS feeds are a quick, easy, and lightweight format for monitoring new content added to websites.

After you download an RSS reader or browser plug-in, you can subscribe to IBM product feeds at IBM Software Support RSS feeds (https://www.ibm.com/software/support/rss).

Log files

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Error messages

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