

IBM Predictive Customer Intelligence
Version 1.0.1

*Proactive Customer Relationship
Management for Energy and Utilities
1.0*

IBM

Note

Before using this information and the product it supports, read the information in "Notices" on page 31.

Product Information

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

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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 subscribers 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 (<http://www.ibm.com/support/knowledgecenter>).

You can also access PDF versions of the documentation from the IBM Predictive Customer Intelligence web page (www.ibm.com/support/docview.wss?uid=swg27041723).

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. Proactive Customer Relationship Management for Energy and Utilities

Energy and utilities organizations have the challenge of finding, producing, and delivering energy and other natural resources efficiently due to decreasing resources. In a highly competitive industry, energy and utility organizations manage high costs and must comply with stringent regulatory policies.

IBM Predictive Customer Intelligence can be used by energy and utility organizations to retain customers and increase customer satisfaction by proactively resolving customer issues. IBM Predictive Customer Intelligence can also help you to identify areas for cross-sell and up-sell across all lines of business.

Retain customers

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

1. See the customer's energy usage to verify whether the customer is on the most appropriate contract for their needs.
2. See the customer's level of social network influence.
3. See what actions and offers the customer is eligible for.

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 who are receptive home owners, who have a home over a specific size, and where energy usage exceeds a baseline.

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:

- Customer satisfaction.
- The probability that customers will miss payments.
- The probability that customers will need a demand response program. A demand response program is where customers reduce their energy use at times of peak demand to save money.
- The most profitable Rate Plan.

The results from these models are used in IBM Analytical Decision Management to create business rules.

Industry accelerator artifacts

The IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator includes the following artifacts.

IBM Cognos® Business Intelligence reports

PCI_EU_CRM_CognosContent.zip

PCI_EU_CRM_FMPProject.zip

PCI_Images.zip

The following reports are included:

- Billing reports
- Case Detail reports
- Profile reports:
 - Dials report (Key performance indicators for a customer)
- Usage reports
- IBM PCI Energy and Utilities Dashboard
- PCI Energy and Utilities Workspace
- Churn Analysis Dashboard
- Churn Analysis report

The reports are described in Chapter 4, “Industry accelerator reports,” on page 23.

IBM Analytical Decision Management applications and templates

PCI_EU_CRM_App.zip

Predictive models

PCI_EU_CRM_CDS_Archive.pes

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

The following predictive models are included:

- ChurnPrediction.str
- Credit Rating Model.str
- Demand Response Program Acceptance.str
- Energy_Efficiency.str
- Offer Acceptance Propensity.str
- Recommended Rate Plan.str
- Satisfaction.str
- Satisfaction_EU.str
- Savings_Potential.str
- Segmentation_EU.str
- Sentiment.str
- Sustainability.str

The Predictive Models are described in “Predictive models in the Proactive Customer Relationship Management for Energy and Utilities industry accelerator” on page 16.

IBM DB2® database

PCI_EU_CRM_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 Proactive Customer Relationship Management for Energy and Utilities 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 Proactive Customer Relationship Management for Energy and Utilities industry accelerator database file is `PCI_1.0_EU_CRM\Database\PCI_EU_CRM_Data.zip`.
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_EU_CRM\Analytics\Applications\PCI_EU_CRM_App.zip
 - Template: PCI_1.0_EU_CRM\Analytics\Templates\EnergyandUtilities.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 **Energy and Utilities**.
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 Proactive Customer Relationship Management for Energy and Utilities industry accelerator file is PCI_1.0_EU_CRM\Analytics\PCI_EU_CRM_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 EUTIL 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]
EUTIL=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:

```
[EUTIL]
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=EUTIL
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.


```
[EUTIL]
Database=EUTIL
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 Proactive Customer Relationship Management for Energy and Utilities industry accelerator IBM Cognos content file is `PCI_1.0_EU_CRM\BI\PCI_EU_CRM_CognosContent.zip`.

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

The report images file is `PCI_1.0_EU_CRM\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 the industry accelerator to the computer where you installed IBM Cognos Framework Manager, and decompress the file.
The Energy and Utilities industry accelerator Framework Manager file is compressed in PCI_1.0_EU_CRM\BI\PCI_EU_CRM_FMPProject.zip.
The usage report functional accelerator Framework Manager file is compressed in PCI_1.0_PCIReports_Usage\BI\PCI_PCIReports_Usage_FMPProject.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 EUTIL 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 EUTIL, 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 EUTIL.
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 EUTIL.

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_EU_CRM_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 content** 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 that you are interested in, such as incoming claims. 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. For example, you might have a corporate-wide policy to exclude customers with poor credit or payment histories from future mortgage campaigns. 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).

Predictive models in the Proactive Customer Relationship Management for Energy and Utilities industry accelerator

A number of predictive models are provided in the IBM Predictive Customer Intelligence Inject Next Best Action Recommendations into every Insurance Call Center Interaction industry accelerator.

The following models form the basis of the predictive models in the industry accelerator:

Churn Prediction

`ChurnPrediction.str` predicts a customer's propensity to seek another provider.

Credit Rating Model

Credit Rating Model.str predicts the probability that customers will miss payments.

Demand Response Program Acceptance

Demand Response Program Acceptance.str predicts the probability that customers will need demand response programs.

Offer Acceptance Propensity

Offer Acceptance Propensity.str predicts the likelihood of each customer accepting various offers.

Recommended Rate Plan

Recommended Rate Plan.str recommends the most profitable Rate Plan.

Savings Potential

Savings_Potential.str identifies a customer's energy savings potential.

Sustainability

Sustainability.str identifies a customer's awareness of sustainable energy options.

Satisfaction

Satisfaction.str determines the satisfaction score for customers based on customer call center records and sentiment score.

Satisfaction_EU.str enters data for a customer's **SATISFACTION_SCORE** if it is empty.

Segmentation

Segmentation_EU.str classifies customers into different segments.

Sentiment

Sentiment.str determines the sentiment score for customers based on social media information, such as Twitter.

Energy efficiency

Energy_Efficiency.str enters data for a customer's **CUSTOMER_LIFE_TIME_VALUE_RATIO** if it is empty.

Predict churn

Churn is defined as a customer's propensity to leave their current energy and utilities provider. The Churn prediction model uses information such as customer demographic data, consumption behavior data, complaints, standard yearly energy usage for the past seven years, property characteristics, and the customer's sentiment score.

The example stream for predicting churn in the IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator is named ChurnPrediction.str.

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

- Demographic data, such as age, gender, education, marital status, employment status, income, and home ownership status.
- Customer energy and utilities consumption behavior data, such as if a customer owns an electric vehicle and if a customer uses photovoltaics.
- Complaints, such as the number of open and closed complaints.

- Property characteristics, such as building type, the year it was built, building surface area, and building volume.
- Standard yearly energy usage for the past seven years.

A Neural Networks algorithm produces the churn propensity score. The algorithm predicts a target based on one or more inputs by finding unknown and possibly complex patterns in the data. The algorithm learns by examining individual records, generating a prediction for each record, and adjusting the weights whenever it makes an incorrect prediction. This process is repeated many times, and the algorithm continues to improve its predictions until one or more of the stopping criteria is met. The model also shows which predictors are most important to predict churn; for example, the most important predictors might be Sentiment Score, Customer Lifetime Value (CLTV), and the Number of Open Complaints.

Predict credit rating

The Credit Rating model predicts the credit rating and the probability that customers will miss payments.

The example stream in the IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator is named `Credit Rating Model.str`.

The Credit Rating model uses a TwoStep model to classify customers based on credit history, annual income, ownership, family members, and so on. Then, a logistic regression algorithm is applied to read payment history and customer classification to evaluate the customers' ability to pay their bills.

Predict the need for demand response program assistance

The Demand Response Program Acceptance model predicts the probability that customers will need demand response programs.

The example stream in the IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator is named `Demand Response Program Acceptance.str`.

A C5.0 algorithm reads the history of demand response programs and customer demographic information. The algorithm uses this information to predict whether customers will need demand response programs assistance in the future.

A demand response program encourages customers to reduce their energy use at times of peak demand to save money or gain incentives.

Predict offer acceptance propensity

The Offer Acceptance Propensity model predicts the likelihood that a customer will accept various offers based on the historical response to offers by customers with similar characteristics.

The example stream in the IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator is named `Offer Acceptance Propensity.str`.

The data that is used for predicting offer acceptance propensity is classified in the following categories:

- Demographic data, such as education, social class, and income level.
- Property characteristics, such as building type, year it was built, building surface area, and building volume.
- Standard yearly energy usage for the past seven years.
- Offer profit for different offers.

An auto classifier is used to predict whether a customer is likely to accept an offer. The algorithm with the highest rank on Lift is chosen. The target is either a 1, indicating the customer will churn, or 0, meaning they will not. The outputs of the predictive model, including the 1 or 0 indicator, and the corresponding level of confidence are used to calculate the offer acceptance propensity.

Recommend the right rate plan

The Recommended Rate Plan model in the IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator recommends the most profitable rate plan.

The example stream is named `Recommended Rate Plan.str`.

Average usage is considered by customer, and the bill amount is calculated for all available rate plans. The current rate plan bill totals are compared with all other rate plan bill totals, and from this comparison, the most profitable rate plan is selected.

Understand customer energy and utilities savings potential

The savings potential model is used to categorize customers by their energy savings potential into high, medium, and low potential.

The example stream in the IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator is named `Savings_Potential.str`.

The data is classified in the following categories:

- Demographic data, such as education, social class, and income level.
- Property characteristics, such as building type, year it was built, building surface area, and building volume.
- Standard yearly energy usage for the past seven years.

An auto cluster model runs a K-Means algorithm and a Two Step Cluster algorithm. The model chooses the better quality clustering method to slot customers into one of three groups. By analyzing the savings potential attributes' distribution for each cluster, each customer group is assigned a high, medium, or low savings potential. A Logistic Regression algorithm reads the savings potential attributes to predict which savings potential level a customer will be in the future.

Understand customer energy and utilities sustainability

This customer segmentation model predicts the customer's level of awareness of sustainable energy options.

The example stream in the IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator is named `Sustainability.str`.

The data is classified in the following categories:

- Demographic data, such as education, social class, and income level.
- Life style survey data, such as if a customer is using green energy.
- Charitable donation information.

An auto cluster model runs a K-Means algorithm and a Two Step Cluster algorithm. The model chooses the better quality clustering method to slot customers into one of three groups. By analyzing the input attributes' distribution for each cluster, each customer group is assigned a high, medium, or low awareness. A Logistic Regression algorithm reads the sustainability attributes to predict which level of awareness a customer will be in the future.

Understand customer sentiment

The Sentiment model in the IBM Predictive Customer Intelligence Proactive Customer Relationship Management for Energy and Utilities industry accelerator determines customer sentiment.

The example stream in the industry accelerator is named `Sentiment.str`.

An IBM SPSS Text Analytics model mines unstructured data to establish the customer sentiment. The data comes from social media sources such as Twitter. The data is categorized into areas such as outages, power line issues, customer service, and bill issues. A sentiment score is determined, based on the set of categories that is defined in the Text Analytics node.

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.

Dashboards and reports for energy sustainability and savings potential analysis

The dashboards show two key customer segments that are derived from the predictive models: Energy sustainability and savings potential. Energy sustainability is a rating of a customer's awareness of green energy options. Savings potential identifies customers who might be able to reduce their energy

consumption. The dashboard can be used to help energy and utility companies run effective marketing campaigns for these key customer segments by identifying where the campaign profit is. There are two dashboard reports and four list reports.

IBM PCI Energy and Utilities Dashboard

This is an Active Report, a self-contained IBM Cognos Business Intelligence application, that lets you browse and explore data offline on a desktop or mobile device.

The **Overview** tab shows the charts and key metrics that provide a high-level overview of the customer base, including the number of customers, energy consumption, and profit margin. You can view the charts by different categories, such as Age Group, Income Level, Education, Employment, or Lifestyle using a slider control. The tab includes the following information:

- The **Key Metrics** table displays the customer count, energy usage (in kW/h), total billed amount, and average profit margin for the reporting month. A graphic indicates the direction in which the measure is trending.
- A row of line charts shows the progression of some of the key metrics: Usage (kWh), Billed Amount and Profit Margin over six months by the selected category.
- Two treemap charts display the distribution of customers in the key customer segments by the selected category.

The **Usage** tab compares the consumption behavior in the key customer segments. The tab includes the following information:

- Vertical bar charts compare the peak and off-peak usage in the last year between the segment groups.
- Stacked charts compare the average, minimum, and maximum daily usage averaged by month over the last 12 months. The chart can be analyzed by the segment groups using a drop-down filter.

The **Campaign** tab shows past campaign receptiveness in the key customer segments. The tab includes the following information:

- Vertical bar charts compare the Actual Campaign Profit and the Predicted Campaign Profit between the segment.
- Vertical bar charts compare the Average Actual Campaign Profit and the Average Predicted Campaign Profit between the segment.
- Horizontal bar charts shows the Actual Campaign Profit and Profit Margin by segment.

The **Offer** tab shows the most profitable campaign offers and how well they have been received in the past. The tab includes the following information:

- A Bubble chart shows the relationships between an Offer's Profit Margin, Actual Campaign Profit, and Offer Accepted Rate. The chart can be analyzed by the segment groups using a drop-down filter.
- Vertical bar charts compare the offer's Profit Margin by segment.

A global Age Group filter is available to restrict customers to the selected age groups in all of the tabs. An Offer filter is available to restrict the offers in the **Offer** tab. Use the filter icon at the top of the dashboard to show and hide the filter area.

PCI Energy and Utilities Workspace

The IBM Predictive Customer Intelligence Energy and Utilities Workspace is an interactive dashboard that is intended to be used while connected to live data. It provides more flexibility in the information that is displayed on the reports than the offline dashboard. The workspace consists of the same tabs and charts as the IBM Predictive Customer Intelligence Energy and Utilities Dashboard. There are more global filters, such as Income Level, Education, Employment, and Lifestyle Category, to help you analyze the results.

Three detailed list reports can be drilled to from the treemap charts in the **Overview** tab:

- Top Payment Customer List shows the top N list of customers with the highest billed amount.
- Top Profit Margin Customer List shows the top N list of customers with the highest profit margin.
- Top Usage Customer List shows the top N list of customers with the highest energy usage.

You can drill-through to the Customer Offers detail list report from these reports to show the offers that a selected customer has already received.

The four list reports can also be run as stand-alone.

Dashboards and reports to analyze customers at risk of churn

The analysis of customers at risk of churn helps energy and utility companies identify individuals from a large pool of customers who are at risk of leaving the utility company for another provider. The analysis also helps you identify characteristics that can influence churn.

Churn Analysis Dashboard

This is an Active Report, a self-contained IBM Cognos Business Intelligence application, that lets you browse and explore data offline on a desktop or mobile device.

This report has a static bar chart and a bubble chart. The bar chart shows the top 10 most important predictors as determined by the Churn Prediction model. The bubble chart shows the relationship of the churn score and the predictors. You can choose different pre-defined predictor dimensions and measures. And you can restrict the customers with a specific churn score percentage using a slider control.

Churn Analysis report

The Churn Analysis report is intended to be used while connected to the data directly.

This report provides more flexibility in the information that is displayed on the report, and can drill-through to a detailed list report. The report consists of the same charts and features as the Churn Analysis Dashboard.

You can drill-through to the Top Customers at Risk of Churn List report from the bubble chart to show the top N customers who are likely to churn. This report can also be run as a stand-alone report.

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 Energy and Utilities industry accelerator IBM Cognos Framework Manager file is `PCI_EU_CRM_FMPProject\IBM PCI Energy and Utilities Model.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

Log files can help you troubleshoot problems by recording the activities that take place when you work with a product.

Error messages

The first indication of a problem is often an error message. Error messages contain information that can be helpful in determining the cause of a problem.

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