



Data Mining Deployment Guide

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1

What's New in This Release

What's New in Data Mining Deployment Guide, Version 7.7.1 Rev A

Table 1 lists topics in this version of the documentation to support Release 7.7.1 of the software.

Table 1. New Product Features in Data Mining Deployment Guide, Version 7.7.1 Rev A

Topic	Description
"About Siebel Data Mining Workbench" on page 10	Connecting to analytics data sources requires installation of an instance of the analytics ODBC driver on the Siebel Data Mining Workbench client.
"About Siebel Miner" on page 10	Connecting to analytics data sources requires installation of an instance of the analytics ODBC driver on the Siebel Miner server.
"Process of Configuring Siebel Analytics for Real-Time Deployment" on page 27	Added content on column data types for the Probability and Score columns provided by predictive models.
"Example of Using the Data Mining Subject Area" on page 38	Using analytics metadata that joins batch score records to Account, Contact, or Product entities requires that the ID column of the batch score records matches the ROW_WID of these entities.

What's New in Data Mining Deployment Guide, Version 7.7.1

Table 2 lists topics in this version of the documentation to support Release 7.7.1 of the software.

Table 2. New Product Features in Data Mining Deployment Guide, Version 7.7.1

Topic	Description
"Overview of Siebel Data Mining Installation" on page 9	This chapter gives an overview of general installation requirements for the Siebel Data Mining products.
"Setting Up a Modeling Environment with Siebel Data Mining" on page 13	This chapter shows how to set up a Siebel Data Mining modeling environment with Siebel Analytics as the underlying data source.
"Deploying Real-Time Scoring with Siebel Data Mining" on page 19	This chapter explains how to configure Siebel Analytics and Siebel operational applications for deploying predictive models in real-time scoring scenarios. Real-time scoring is the process of scoring a single customer (or other entities like Account and Household) on demand in an operational application (such as Siebel Call Center).
"Setting Up Batch Scoring with Siebel Data Mining" on page 31	This chapter explains how to configure and use Siebel Answers for deploying predictive models in batch scoring scenarios. Batch scoring is the process of scoring a group of customers (or other entities like Account and Household) in a single batch run, and using those scores for further analysis with Siebel Analytics and driving segmentation with Siebel Marketing.

NOTE: Chapters 4 through 6 use the example of a wireless service provider managing customer churn with the help of predictive analytics. Using predictive analytics to pursue business objectives other than churn management follows a very similar setup and configuration process.

2

Introduction to Data Mining Deployment Guide

This guide serves two purposes:

- It gives an overview of Siebel Data Mining products and acts as a prerequisite and installation reference for the following products:
 - Siebel Data Mining Workbench
 - Siebel Miner (including the Siebel Data Mining Engine)
 - Siebel Intelligent Interaction Manager

NOTE: For step-by-step instructions on installing Siebel Data Mining Workbench and Siebel Miner software, see the *KnowledgeStudio User Guide* and the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf*.

- It explains the various deployment options of predictive data mining models for batch and real-time scoring. Those sections detail the configuration steps necessary to use predictive models for both discovering knowledge and driving intelligent interactions at customer touchpoints.

This guide illustrates two options for installing and deploying Siebel Data Mining software:

- **Siebel Analytics Stand-Alone**—Stand-alone configuration is for users of Siebel Analytics only. It is assumed that Analytics stand-alone users do not operate Siebel operational applications (such as Siebel Call Center).
- **Siebel Analytics Applications**—This integrated configuration assumes that users operate Siebel Analytics with Siebel operational applications and will install the Siebel Data Warehouse. These users can use prebuilt subject areas for data mining to analyze batch scores and drive marketing segmentation, or use Intelligent Interaction Manager and the Siebel Data Mining Engine to build real-time scoring applications.

NOTE: The Siebel Data Warehouse is also referred to as the Siebel Relationship Management Warehouse.

This guide is primarily useful to people whose title or job description matches one of the following:

Database Marketers	Persons who build and use predictive data mining models.
Marketing Specialists	Persons who define and use applications driven by predictive model insights.
Siebel Application Developers	Persons who plan, implement, and configure Siebel applications driven by predictive model insights, possibly adding new functionality.
Siebel Application Administrators	Persons responsible for planning, setting up, and maintaining Siebel applications, possibly adding new functionality.

NOTE: Refer to the particular section of this document that applies to the particular option you have chosen. For example, Siebel Analytics Applications users preparing data for modeling with Siebel Miner would see ["Data Preparation for Siebel Analytics Applications and Siebel Miner Users"](#) in Chapter 4, ["Setting Up a Modeling Environment with Siebel Data Mining."](#)

This document assumes some familiarity with basic concepts of data mining and predictive modeling.

3

Overview of Siebel Data Mining Installation

This chapter covers general installation instructions for the Siebel Data Mining products. It includes the following topics:

- “About Siebel Data Mining Components” on page 9
- “About Siebel Data Mining Workbench” on page 10
- “About Siebel Miner” on page 10
- “About Siebel Data Mining Engine” on page 10
- “About Intelligent Interaction Manager” on page 10

NOTE: This chapter does not provide specific instructions on using Siebel Data Mining Workbench or Siebel Miner. To do specific data mining modeling tasks with them, see the *KnowledgeStudio User Guide* and the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf*.

About Siebel Data Mining Components

The four primary components of Siebel Data Mining integrate into the overall Siebel Analytics and Siebel operational applications environment, as shown in [Figure 1 on page 9](#).

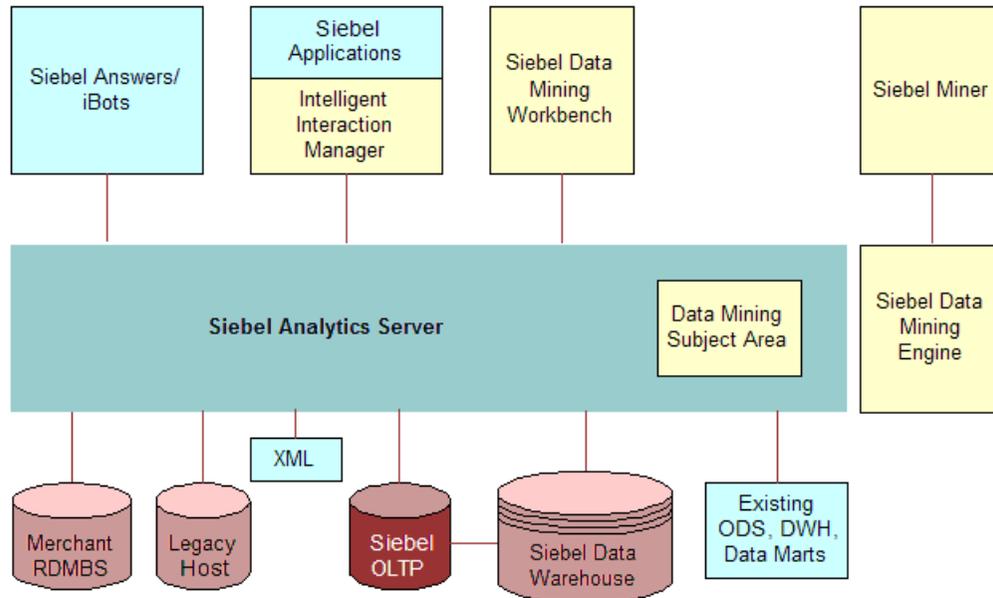


Figure 1. Siebel Data Mining Architecture

About Siebel Data Mining Workbench

Siebel Data Mining Workbench employs data mining techniques for descriptive and predictive modeling packaged in a Microsoft Office-style working environment. It features wizards for model creation and support for testing and validation purposes. Data sources for model training and execution are accessible through a single logical data access point in Siebel Analytics. For instructions on installing Siebel Data Mining Workbench software, see the *KnowledgeStudio User Guide* on the *Siebel eBusiness Third-Party Bookshelf*.

NOTE: To connect to analytics data sources, you must install an instance of the analytics ODBC driver on the client running Siebel Data Mining Workbench.

About Siebel Miner

Siebel Miner is a thin-client data mining application that allows subject matter experts to train and execute preconfigured data mining models through the use of templates. Siebel Miner allows business users to use data mining capabilities by following best practices embedded in these templates. It also provides an interface to the Siebel Data Mining Engine.

Siebel Miner uses a relational database to store repository metadata and batch scores. Siebel Analytics provides prebuilt metadata that exposes the Siebel Miner repository for ad-hoc analysis or for use in Siebel Marketing. For example, users of Siebel Marketing can use batch scores as segmentation criteria. In order to use the prebuilt data mining subject area in Siebel Analytics, the relational database component of Siebel Miner needs to be installed in the Siebel Data Warehouse. For instructions on installing Siebel Miner software, see the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf*.

NOTE: Users with access to the Template Editor functionality in Siebel Miner must have Siebel Data Mining Workbench installed on their client machines. To connect to analytics data sources, you must install an instance of the analytics ODBC driver on the server running Siebel Miner.

About Siebel Data Mining Engine

Siebel Data Mining Engine is the server-side component of Siebel Miner that trains and executes data mining models. It serves as a cross-platform engine for batch scoring and real-time scoring in operational applications. All data sources for model training and execution purposes are accessible through a single logical access point in Siebel Analytics.

The Siebel Data Mining Engine is automatically installed as a server component of Siebel Miner.

About Intelligent Interaction Manager

Intelligent Interaction Manager is a Siebel business service through which Siebel eBusiness Applications trigger the execution of data mining models in real time by the Siebel Data Mining Engine.

Siebel Intelligent Interaction Manager allows Siebel operational applications to access Siebel Analytics data. Installation of Siebel Intelligent Interaction Manager requires version 7.5.3.2 of Siebel operational applications or higher. If you are running a previous version of Siebel operational applications and Siebel Tools, consult your Siebel administrator about upgrading to version 7.5.3.2.

4

Setting Up a Modeling Environment with Siebel Data Mining

This chapter covers setting up a modeling environment for users of Siebel Data Mining Workbench or Siebel Miner. It includes the following topics:

- “Modeling with Siebel Data Mining” on page 13
- “Identifying Data Mining Data Sources” on page 14
- “Preparing Data for Data Mining Modeling” on page 14
- “Building Measures with Siebel Analytics” on page 15
- “Training Data Mining Models” on page 16
- “Choosing a Representative Data Sample for Modeling” on page 17

NOTE: This chapter does not provide specific instructions on using Siebel Data Mining Workbench or Siebel Miner. To do specific data mining modeling tasks with these two products, see the *KnowledgeStudio User Guide* and the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf*.

This chapter uses the example of a wireless service provider managing customer churn with the help of predictive analytics. Using predictive analytics to pursue business objectives other than churn management follows a very similar setup and configuration process.

Modeling with Siebel Data Mining

To set up a predictive and descriptive modeling environment, perform the following tasks, as shown in [Figure 2 on page 13](#):

- Identify your data sources
- Prepare your data
- Build your measures
- Define and train your data mining model

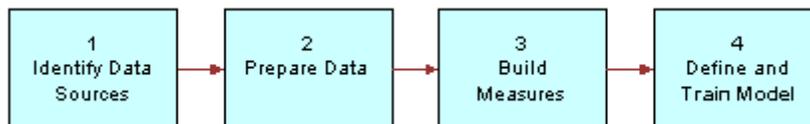


Figure 2. Siebel Data Mining Workbench and Siebel Miner Modeling Process

Identifying Data Mining Data Sources

Before your organization builds descriptive or predictive models, it must clearly articulate the business objectives and requirements of using data mining. These business requirements will determine what data is needed for modeling and will include the constraints that drive a closed-loop data mining process from modeling through deployment and performance measurement back to modeling.

Start by identifying all data sources that contain information relevant to your immediate data mining task. Choosing the right data sources is a crucial step in the entire data mining process. Look for data that captures information which might be helpful in building a meaningful model. Initially, more data is better, even data with uncertain predictive power. Most data mining techniques like Decision Trees and Neural Networks, are quite good at handling irrelevant or redundant data. Be aware that modeling is an iterative process; you can always ignore data in later stages of the data mining process.

Example of Data Mining Data Source Identification

In the churn management example, the wireless service provider has identified the reduction of customer churn rate as its business objective for using data mining. The provider wants to build predictive models of customer behavior that identify customers in danger of ending their relationship with the provider by taking their business to competitors. The company plans to use data from past churners and non-churners to analyze the root causes for customer churn and train a predictive churn model. It plans to generate churn propensity scores to drive marketing segmentation, devise retention campaigns, and deploy a predictive churn model in its Siebel Call Center for real-time churn propensity scoring. To model customer churn behavior, the provider has identified customer profile data from the Siebel Data Warehouse and transactional data plus third-party demographic data from an existing data mart as relevant data sources.

Siebel Analytics serves as a single logical data source. It lets you connect to several data sources without the need for data transformation and merging. The wireless service provider not only accesses the Siebel Data Warehouse through Siebel Analytics, but also its customer ledger database and a demographic data mart.

To use Siebel Analytics as your single data source for data mining, the client running Siebel Data Mining Workbench or Siebel Miner needs to set up an ODBC DSN pointing to Siebel Analytics. See the *Siebel Analytics Server Administration Guide* for details on installing the Siebel Analytics ODBC client software and configuring a Siebel Analytics ODBC DSN.

Preparing Data for Data Mining Modeling

This process involves leveraging Siebel Analytics to prepare data for modeling purposes. For most data mining techniques, you need to define a single customer mining record (CMR) table. This table encapsulates all model input variables, including independent variables and, in case of predictive modeling, a dependent or target variable.

Data Preparation for Siebel Analytics Applications and Siebel Miner Users

Siebel Analytics and the Siebel Data Warehouse provide prebuilt metadata for data mining purposes. It includes a data mining subject area that exposes various Siebel Miner repository data entities. The metadata provided also connects batch scores generated with Siebel Miner to Siebel entities like Customer, Product and Asset. This allows you to analyze batch scores in depth with Siebel Analytics and use batch scores as criteria for marketing segmentation.

Define your problem-specific CMR table with Siebel Analytics. The Siebel Data Warehouse and Analytics applications include a large number of predefined measures that are useful for building your CMR. Siebel Analytics ships with a sample CMR named Customer Churn in the data mining subject area. See the *Siebel Analytics Server Administration Guide* for details on configuring Analytics metadata.

Siebel Answers is a Web-based, ad-hoc query tool that can analyze, format, and display data visible to the Analytics server. You can use Siebel Answers to gain insight into variable distributions, and to identify outliers and correlations. See the *Siebel Analytics User Guide* for details on using Siebel Answers.

Data Preparation for Siebel Data Mining Workbench Users

In addition to examining data quality with the help of Siebel Answers, you can use Siebel Data Mining Workbench to reveal statistical characteristics of model input variables. Use the profiling and visual exploration functionalities of Siebel Data Mining Workbench to evaluate variable characteristics, including a number of unique values, missing values, average, standard deviation, minimum, maximum, medians, and quartiles. See the *KnowledgeStudio User Guide* in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf* for details.

Example of Data Mining Modeling Data Preparation

In the churn management example, the wireless service provider uses basic customer and account profile information already present in the Siebel Data Warehouse, and enriches the CMR by adding cell phone usage information and third-party demographic data from its existing data mart. The provider uses both Siebel Answers and Siebel Data Mining Workbench to identify variables with a high count of missing values and unexpected distributions, and decides to discard these variables for modeling purposes.

Building Measures with Siebel Analytics

In most cases, the existing raw content available in your data sources is not enough to build rich, meaningful data mining models. A customer mining record should include industry- and problem-specific measures that are derived from existing information sources. Use Siebel Analytics to derive measures with predictive power that describe customer behavior with relevance to your immediate data mining task. Choose from a variety of functions to build derived measures in Siebel Analytics.

Building Measures for Siebel Analytics Applications Users

NOTE: This information applies to both Siebel Miner and Siebel Data Mining Workbench users.

There are predefined measures in the Siebel Data Warehouse that you can use as a basis for building additional measures and enhancing your CMR. The Siebel Data Warehouse provides a prebuilt repository of measures tailored to industry-specific customer and business analytics needs.

Example of Building Measures with Siebel Analytics

To build a churn model, the wireless service provider needs to derive measures that capture cell phone usage patterns. Based on the source variable—Minutes Used—in the physical layer of Siebel Analytics, the provider derives a new variable—%Change in Minutes Used—in the business layer of Siebel Analytics. See the *Siebel Analytics Server Administration Guide* for details on defining metadata to build meaningful measures.

Training Data Mining Models

Once your CMR is exposed in the presentation layer of Siebel Analytics, you can start building data mining models. Use Siebel Data Mining Workbench or Siebel Miner to build and train models. Your immediate data mining task will guide the choice of modeling technique. Point Siebel Data Mining Workbench and Siebel Miner to the Siebel Analytics Server as a data source, and select your CMR table for data import. See the *KnowledgeStudio User Guide* and the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf* for details on creating and training data mining models.

Training Models for Siebel Data Mining Workbench Users

Data Mining models are stored in the file system of your client machine running Data Mining Workbench. Siebel Data Mining Workbench also allows you to export predictive models in PMML file format. (PMML—Predictive Modeling Markup Language—is an emerging standard for representing data mining models in a vendor-independent XML format.) For real-time scoring purposes, save the predictive model file in a file directory that is accessible to the Siebel Analytics Server. For details on setting up Siebel Analytics to access PMML files for real-time scoring, see [Chapter 5, "Deploying Real-Time Scoring with Siebel Data Mining."](#) If you use both Siebel Data Mining Workbench and Siebel Miner, you can exchange predictive models between the two applications. For details on exporting and importing predictive models, see the *KnowledgeStudio User Guide* and the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf*.

Training Models for Siebel Miner Users

Siebel Miner stores models both in its file directory and its repository database. For real-time scoring purposes, save the predictive model file as a PMML file in a directory that is accessible to the Siebel Analytics Server. For details on setting up Siebel Analytics to access a PMML file for real-time scoring, see [Chapter 5, "Deploying Real-Time Scoring with Siebel Data Mining."](#) If you use both Siebel Data Mining Workbench and Siebel Miner, you can exchange predictive models between the two applications. For details on exporting and importing predictive models, see the *KnowledgeStudio User Guide* and the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf*.

Choosing a Representative Data Sample for Modeling

For model training purposes, you should always use a representative data sample. A representative sample is sufficient to capture the inherent patterns and rules in the data. Depending on your objectives and the immediate modeling task, try to limit the size of your modeling data (involving training, test and validation) to a few thousand records. Because data mining is an iterative and interactive discovery process, several models often need to be trained and validated. An excessively large data set for model training increases the time needed to build models and unnecessarily slows down the overall data mining process. The size of your training data set will determine your hardware requirements. See the *KnowledgeStudio User Guide* and the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf*, and *Release Notes* on Siebel SupportWeb, for details and guidance on choosing a suitable hardware configuration for modeling purposes.

5

Deploying Real-Time Scoring with Siebel Data Mining

This chapter covers deployment of real-time scoring with Siebel Data Mining. It includes the following topics:

- “Real-Time Scoring with Siebel Data Mining” on page 19
- “Deploying a Predictive Model in Real Time” on page 20
- “Defining Requirements for Real-Time Deployment” on page 20
- “Process of Configuring Siebel Operational Applications for Real-Time Deployment” on page 21
- “Process of Configuring Intelligent Interaction Manager for Real-Time Deployment” on page 23
- “Process of Configuring Siebel Analytics for Real-Time Deployment” on page 27
- “Process of Testing Siebel Analytics Configuration for Real-Time Deployment” on page 28
- “Deploying Siebel Analytics Real-Time Configuration” on page 29

This chapter uses the example of a wireless service provider managing customer churn with the help of predictive analytics. Using predictive analytics to pursue business objectives other than churn management follows a very similar setup and configuration process.

Real-Time Scoring with Siebel Data Mining

In real-time deployment scenarios, model input values are fed into a predictive model to produce a score in real time. The predictive model is executed on demand by a Siebel operational application. The choice between deploying a predictive model for real-time or batch scoring depends on your business requirements. Some factors to consider include the following:

- Level of criticality of having access to real-time versus batch scores
- Volatility of the data feeding into the model
- Volatility of model scores

NOTE: Currently, the real-time deployment option is available only on configurations that run Siebel Analytics on a Windows platform. Future releases of Siebel Data Mining will support additional platforms.

Scenario for Deploying Real-Time Scoring

This topic gives two examples of how you may deploy real-time scoring. You may use it differently, depending on your business model.

- A company wants to drive intelligent decisioning in real time at the customer touchpoint, such as churn prediction in the Siebel Call Center. In this case, the user of the application triggers the execution of a predictive model as he or she updates or enters new customer information relevant to the predictive model.
- Customer information can change without an organization's immediate involvement and knowledge. In this case, a company might want to deploy a workflow process that detects changes in customer information. This workflow process triggers the execution of a predictive model and, depending on the resulting score, initiates corresponding action steps. These steps might include countermeasures such as offering rebates or gifts to potential churners.

This chapter assumes that you are following the first scenario. For details on configuring Siebel Workflow processes as mentioned in the second scenario, see *Siebel Business Process Designer Administration Guide*.

Deploying a Predictive Model in Real Time

To deploy a predictive model in real time, perform the following tasks, as shown in [Figure 3 on page 20](#):

- Define your requirements
- Configure your Siebel application
- Configure your Analytics application
- Test your configuration
- Deploy your configuration

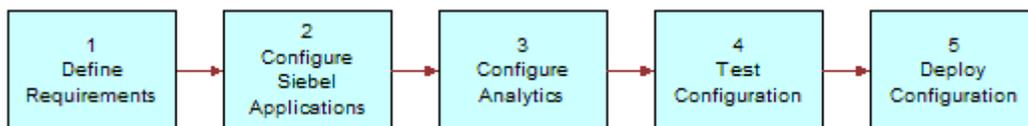


Figure 3. Predictive Model Real-Time Deployment Process

Defining Requirements for Real-Time Deployment

Defining the requirements for real-time deployment involves identifying where, when and how the predictive model will be triggered to produce a score on demand.

- First, identify the application, screen, view, applet and business component that will expose the score from the predictive model.

- Next, decide which event will trigger the execution of the predictive model. Here, it is assumed that the model is triggered automatically as the user enters or updates customer information that serves as inputs to the model. In this case, you need to define which model input variables are determined by the user of the application and which are read from a data source.
- Finally, define the actions that need to be taken based on the score returned by the model. For example, an elevated churn propensity score could trigger a SmartScript that directs the call center agent to take immediate counter measures. See *Using Siebel Tools* and *Siebel SmartScript Administration Guide* for details.

Example of Defining Requirements for Real-Time Deployment

In the wireless service provider example, the company needs to display the customer's churn propensity in the customer dashboard of Siebel Call Center. For configuration purposes, it identifies the following elements:

- Siebel Call Center
- Contact screen
- Contact Detail view
- Contact Dashboard applet
- Contact business component

Also, the predictive churn model of the wireless service provider depends on various customer profile attributes. If the call center agent changes any of these attributes, that triggers the execution of the predictive churn model in real time.

Process of Configuring Siebel Operational Applications for Real-Time Deployment

After you have defined the requirements for your real-time deployment, use Siebel Tools to configure both the identified Siebel objects and Intelligent Interaction Manager to handle the model trigger. Depending on the number and complexity of measures defined in Siebel Analytics as independent model variables, as well as the number of expected concurrent trigger users of your real-time application, consider prefetching these Analytics measures before the trigger event takes place, to guarantee adequate response times.

You can either prefetch Analytics measures into run-time memory upon identifying a customer, or store scheduled batch-generated measures into the Siebel OLTP database. The choice depends on various factors:

- If the model needs to be triggered shortly after the customer has been identified, prefetching model input values from Analytics at run time is not feasible.

- Storing Analytics measures in the OLTP database may impose some administrative overhead and also requires additional storage space. If a sufficient time lag exists between identifying the customer and executing the model, this period may be used to access model inputs from Siebel Analytics in real time, and hold these values temporarily in memory until the model trigger takes place. In most cases though, calculating Analytics measures in real time is not an option.

The rest of this section assumes that all input variables have been committed to business component fields before calling the model.

The following steps show how to configure a Siebel operational application (such as call center) for real-time scoring of a predictive model using calculated fields. An alternative approach using eScripting is described in [Chapter 6, "Setting Up Batch Scoring with Siebel Data Mining."](#)

To configure an application for real-time scoring

- 1 Using Siebel Tools, create two new calculated fields on the business component that expose the real-time score.
 - The first field will hold a Siebel Analytics logical SQL statement that will fetch the real-time score. A model is essentially treated as a table in a database.
 - The second field will hold the real-time score returned by Siebel Analytics.
- 2 In the first calculated field that will hold the Siebel Analytics logical SQL, enter a statement with the following syntax:

```
'SELECT <Score Column> FROM <Model Subject Area>
WHERE <Model Input Variable 1> = [Business Component Field 1]
AND <Model Input Variable 2> = [Business Component Field 2]
AND <Model Input Variable 3> = [Business Component Field 3]
...
AND <Model Input Variable n> = [Business Component Field n]'
```

In this example, an SQL statement fetches a churn propensity score through Siebel Analytics. The new calculated field is called Churn Model SQL and belongs to the business component Contact. The SQL statement might look like this:

```
'SELECT ChurnPropensity FROM ChurnModel
WHERE Age = ''+[Age]+'''
AND Gender = ''+[Sex]+'''
AND '% Change Min Used' = ''+[ % Change Minutes]+'''
AND '# Time Plan Changed' = ''+[ # Plan Changes]+''''
```

The preceding example shows the proper use of escape characters to concatenate string and field values. For details on how the Churn Model subject area in Siebel Analytics invokes the predictive model and fetches the score, see ["Process of Configuring Siebel Analytics for Real-Time Deployment" on page 27.](#)

- 3 In the second calculated field that will eventually store the real-time score, enter the following expression:

```
InvokeServiceMethod("IIM", "ExecuteQuery", "Username='<Siebel Analytics  
Generic user>', Password='<password>', DSN='<Analytics ODBC DSN>',  
Query=[Field holding logical SQL]", QueryResult)
```

<Analytics ODBC DSN> must be created on the machine running the Siebel Server and it must point to the Siebel Analytics Server that is connected to the predictive model.

Following standard Siebel Tools usage directions, expose the field that will hold the score in the applet of your choice.

Process of Configuring Intelligent Interaction Manager for Real-Time Deployment

Intelligent Interaction Manager (IIM) is a configurable business service in Siebel Tools that establishes the link between Siebel operational applications and Siebel Analytics. It sends the Siebel Analytics logical SQL to the Siebel Analytics Server, receives a result back and stores it in an output property set. This business service can be invoked through all the means that are typically supported within the Siebel infrastructure. Its primary use is to be invoked as a calculation within a calculated field in a Siebel Business component. This allows analytics information to display within Siebel operational applications in context.

Before configuring IIM, follow the usual instructions for declaring a business service in Siebel Tools. Alternatively, you can use an existing declaration of IIM named Analytics Connection, which ships preconfigured with Siebel 7.7.

To configure IIM

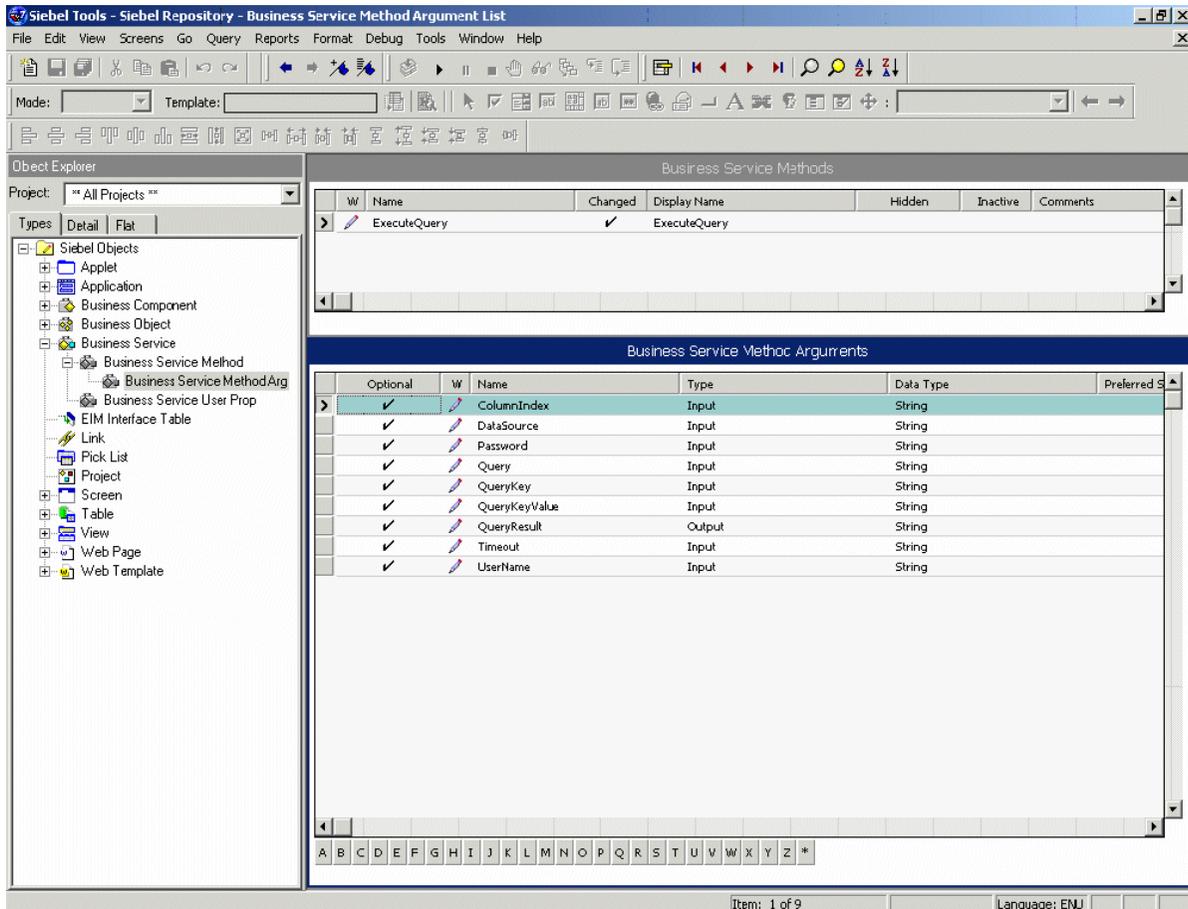
- 1 In Siebel Tools, navigate to the Business Service section and create a new record.
- 2 Select the following values in the columns in the record:
 - For Name, select IIM
 - For Class, select CSSMeasExprEditorServiceYou can choose any string for the Name and the Display Name columns.
- 3 Select the Business Service Method tab in the left-side pane and create a new record.
- 4 Specify ExecuteQuery in the Name and Display Name columns.

- 5 Click the Business Service Method Arg object under the Business Service Method object and create the new records in the following table as business service arguments.

Name	Data Type	Type	Description
DataSource	String	Input	An ODBC DSN pointing to Siebel Analytics
UserName	String	Input	Name of a valid Siebel Analytics user
Password	String	Input	Password for UserName
Query	String	Input	Described in Step 2 of " Process of Configuring Intelligent Interaction Manager for Real-Time Deployment " on page 23
QueryKey	String	Input	Not used for real-time deployment
QueryKeyValue	String	Input	Not used for real-time deployment
ColumnIndex	String	Input	Not used for real-time deployment
Timeout	String	Input	Timeout for the request fetching the real-time score
QueryResult	String	Output	Holds the return value

An example of the Business Service Method Arguments screen is shown in the following figure.

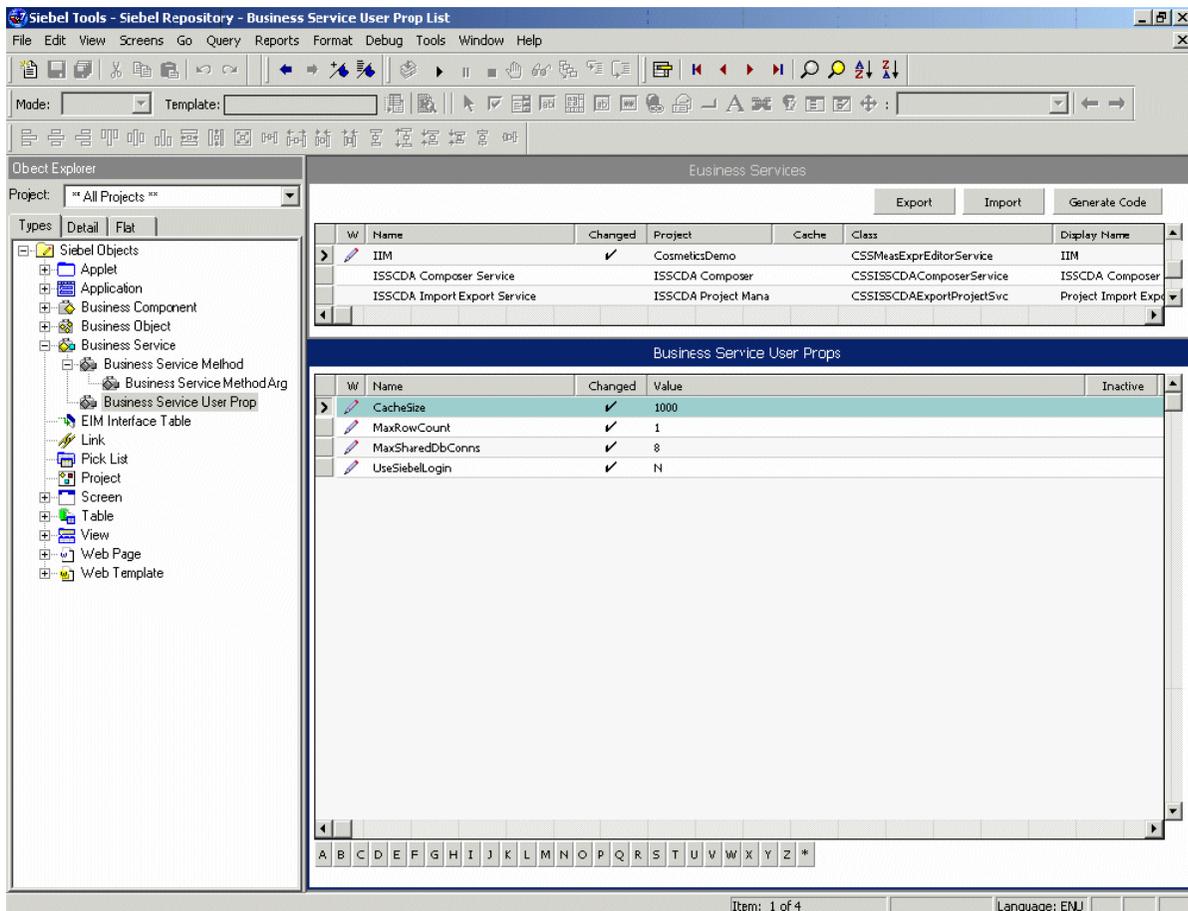
Deploying Real-Time Scoring with Siebel Data Mining ■ Process of Configuring Intelligent Interaction Manager for Real-Time Deployment



- 6 Next, click the Business Service User Prop object and create the following new user properties in the following table. The choice of user properties depends on your unique deployment requirements.

Name	Value	Description
CacheSize	100	The scores coming from Siebel Analytics can be cached on the Siebel Server. If the same entity is scored again, the results are returned without calculation.
MaxRowCount	1	The number of rows expected in every query result. Should be always set to 1.
MaxSharedDbConns	3	The maximum number of open connections to Siebel Analytics. This number depends on the anticipated number of concurrent requests. This is <i>not</i> the same as the number of simultaneous users.
UseSiebelLogin	N	Should be set to N for real-time scoring.

An example of the Business Service User Properties is shown in the following figure.



Process of Configuring Siebel Analytics for Real-Time Deployment

The predictive model must be connected to Siebel Analytics as an XML data source for real-time deployment. Whenever you add a new predictive model as an XML data source, you must restart the Analytics server to reload the model into memory. In a real-time deployment scenario, performance is the most important consideration. You will have to precalculate and load Analytics measures in extension columns of OLTP tables in your operational application that serve as inputs to a predictive model. This helps meet the highest availability and performance requirements. Consider Siebel Analytics cache seeding procedures to optimize the performance of your configuration. See the *Siebel Analytics Server Administration Guide* for details.

To configure Siebel Analytics metadata to invoke a predictive model in real time

- 1 Create a new data source in the physical layer and select XML Server in the data source definition of the source.

- 2 Create a new connection pool and select Default (XML) as the call interface. Name the connection pool Web Services Gateway.
- 3 Create a new table for each model that needs to be invoked. For a given table, create two sets of columns:
 - One set of columns will include all the input variables that the model expects.
 - The other set of columns will include two outputs, Score and Probability, which every predictive model provides.

For the first set of columns, make sure the names and data types of the columns match exactly with the names of the input variables as defined in your data mining model. (View the exact model definition in Data Mining Workbench or Siebel Miner.) The Probability column data type must be FLOAT. The Score column data type depends on the model:

- A discrete model requires a Score column of data type VARCHAR.
 - A continuous model requires a Score column of data type FLOAT.
- 4 Right-click on the table and select Properties. In the XML tab, select the DLL radio button and put the following string in the Search Utility field: `<Siebel Analytics Binary Directory>/SADataMining.dll "<Full Path name >/<File name of XML Model in PMML format>"`. For example, the search utility in the wireless service provider scenario might read as follows:
c:\SiebelAnalytics\bin\SADataMining.dll "c:\churnmodel.xml".
 - 5 Create a new business model in the Business Model layer for each data mining model. Then select the new physical table in Physical layer and drag the object onto the new business model. This will create two new logical tables. Rename the logical tables to `<Model>Dim` and `<Model>Fact`, respectively.
 - 6 Create a one-to-many Complex Join from the `<Model>Dim` to the `<Model>Fact` on any one of the available columns. This join is only necessary to enable the exposure of the model in the presentation layer.
 - 7 Create a new presentation layer catalog and drag the input variable columns from the `<Model>Dim` logical table and the score and probability columns from the `<Model>Fact` logical table into it.

Process of Testing Siebel Analytics Configuration for Real-Time Deployment

To test the Analytics metadata setup using Siebel Answers

- 1 Open your newly created catalog in Siebel Answers.
- 2 Select the two columns Score and Probability. For all the input variable columns, create filters that instantiate the model for scoring. For example, the resulting logical SQL might look like this:

```
SELECT Model.Score FROM ChurnModel WHERE Model.Gender = 'Male' AND
Model."Age Bucket" = '35 to 44' AND
Model."# Transactions per Month" = 5 AND
```

```
Model."Average Order Value" = 50.00 AND  
Model."Average Months as Customer" = 12.00 AND  
Model."Days Since Last Order" = 5.00
```

- 3 Verify the validity of your configuration by comparing the resulting scores with previously generated scores in Siebel Miner or Siebel Data Mining Workbench.

Because response time plays a crucial factor, test the expected concurrency and load configurations of your real-time scoring application.

Deploying Siebel Analytics Real-Time Configuration

After successful testing, deploy the configuration as follows:

- Move the configured application from your test or preproduction environment to your production system. (Be sure to have policies in place for model performance monitoring and maintenance.)
- Depending on the volatility of customer behavior patterns, you must regularly retrain and redeploy the predictive model. Deploy a retrained model by replacing the old XML model file with the new model file in the respective file system folder.
- After replacing the model file, restart the Siebel Analytics server to make the change effective.

6

Setting Up Batch Scoring with Siebel Data Mining

This chapter covers setting up batch scoring with Siebel Data Mining. It includes the following topics:

- “Deploying Batch Scoring with Siebel Data Mining” on page 31
- “Deploying a Predictive Model with Siebel Data Mining for Batch Deployment” on page 32
- “Defining Batch Scoring Requirements” on page 32
- “Setting Up a Batch Scoring Schedule” on page 33
- “Process of Configuring Siebel eBusiness Applications for Batch Deployment” on page 33
- “Process of Using eScript to Fetch Batch Scores” on page 34
- “Data Mining Subject Area in Siebel Answers” on page 36
- “Testing Batch Scoring in Siebel Analytics” on page 38

This chapter uses the example of a wireless service provider managing customer churn with the help of predictive analytics. Using predictive analytics to pursue business objectives other than churn management follows a very similar setup and configuration process.

Deploying Batch Scoring with Siebel Data Mining

Batch scoring can be used for the following purposes:

- As a marketing segmentation driver
- As pure knowledge discovery
- As an alternative to real-time scoring in scenarios where predictive scores are known to change little over time

In batch deployment mode, scores for an entire group of customers or other entities are generated by executing a predictive model offline with Siebel Miner or Data Mining Workbench. The scores are stored and held persistent for later analysis or use by Siebel operational applications.

Batch-generated scores are normally stored directly in a relational database or can be written out to a flat file. Stored in the Siebel Data Warehouse, you can use scores to gain customer insight through analysis with Siebel Answers or as segmentation criteria in Siebel Marketing. In the wireless service provider example, the company would identify characteristics of customers with a high propensity to churn, and build target segments for retention campaigns based on churn propensity as a segmentation criterion.

The description of batch scoring in this chapter assumes that you are scoring customers. Depending on your requirements, you may want to score other entities like account or household. The instructions below are analogous for these entities. As a Siebel Analytics applications user, you need to add and modify metadata in Siebel Analytics to expose batch scores in the context of other Siebel entities. See the *Siebel Analytics Server Administration Guide* for details on metadata configuration.

Deploying a Predictive Model with Siebel Data Mining for Batch Deployment

To set up batch deployment of a predictive model, perform the following tasks, as shown in [Figure 4 on page 32](#):

- Define your requirements
- Set up a batch schedule
- Configure your Siebel applications
- Deploy the configuration

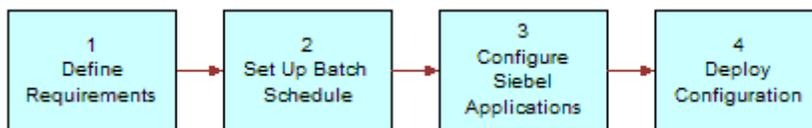


Figure 4. Predictive Model Batch Deployment Process

Defining Batch Scoring Requirements

Depending on how you intend to use batch scores, you must consider the following definitions:

- Where to store scores
- How often to update these scores
- Whether to schedule or manually execute batch score runs

Your options will vary depending on whether you are using Data Mining Workbench, Siebel Miner, or Data Mining Engine stand-alone to generate scores.

The degree of volatility of customer behavior determines the required frequency of retraining models and rescoreing your customer base. In industries where customer behavior evolves over time, batch scores can become out of date, and even the underlying predictive models of customer behavior can lose their predictive power. In this case, it is important to diligently monitor model performance and plan for the timely rescoreing and retraining of models.

Siebel eBusiness Applications can access batch scores in the Siebel Data Warehouse through Siebel Analytics to drive intelligent, proactive interactions at customer touchpoints. If you use batch scores as a substitute for real-time scoring or in combination with it, you need to identify which Siebel application, views, applets and business components will expose batch scores to the user.

Defining Batch Scoring Requirements for Siebel Miner and Siebel Analytics Applications Users

Stored in the Siebel Data Warehouse, batch scores are analyzed with Siebel Answers. For this purpose, Siebel Analytics provides prebuilt metadata that links batch scores to customer profile data and other data entities. In order to analyze batch scores in context of the Siebel Data Warehouse, the Siebel Miner repository database must be installed in the Siebel Data Warehouse. See the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf* for details on installation options.

Example of Defining Requirements for Batch Scoring Deployment

The wireless service provider uses Siebel Miner to generate weekly churn propensity scores for its entire customer base, and uses Siebel Marketing to create retention campaigns that target likely churners. The company also deploys a Siebel Call Center application that displays churn propensity scores in a customer dashboard to call center agents.

Setting Up a Batch Scoring Schedule

NOTE: This applies only to Siebel Miner and Siebel Data Mining Engine users.

Because customer profiles and behavior change over time, you must regularly score your customers. Depending on your requirements and configuration, there are options for scheduling batch scoring runs.

- Siebel Miner provides a command line executions functionality that allows you to run template tasks with a command issued from a UNIX shell or NT Command prompt. See the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf* for details.
- The Siebel Data Mining Engine provides a command-line interface. You can create both a UNIX shell and Windows scripts that use this interface to execute batch scoring runs. See *KnowledgeServer for UNIX* on the *Siebel eBusiness Third-Party Bookshelf* for detailed instructions and examples.

Process of Configuring Siebel eBusiness Applications for Batch Deployment

NOTE: This applies only to users of Siebel Analytics Applications.

In deployment scenarios where customer behavior changes little over time, you may choose to display batch scores in Siebel operational applications instead of generating scores in real time. If you decide to expose batch scores, like churn propensity, in a Siebel operational application, you must configure the respective Siebel objects to connect to Siebel Analytics.

NOTE: It is assumed that batch scores are stored in the Siebel Data Warehouse. See *Using Siebel Tools* for configuration details.

The following instructions explain how to access a batch score from Siebel Analytics and expose it in a business component.

To access a batch score from Siebel Analytics

- 1 Create two new calculated fields on the business component that will expose the batch score:
 - The first field will hold a logical Siebel Analytics SQL statement that will fetch the batch score.
 - The second field will hold the score itself. (You can call these two fields anything you like, but for these procedures they are called CField1 and CField2.)
- 2 In CField1, enter a logical SQL statement with the following syntax:

```
'SELECT <Score Column> FROM <Subject Area> where <Score Model Name> = <Model Name> and 'Contact or Prospect ID' = ''+[Contact ID]+''''
```

For example, to display a churn propensity score in the Contact applet of Siebel Call Center, the required SQL statement for the first new calculated field on the Contact business component might look like this:

```
'SELECT 'Customer Score' FROM 'Data Mining' where 'Score Model Name' = 'Churn Model 11-2003' and 'Contact or Prospect ID' = ''+[Contact ID]+''''
```

- 3 In CField2, enter the following expression:

```
InvokeServiceMethod("IIM", "ExecuteQuery",  
"Username='<Siebel Analytics user>', Password='<password>',  
DSN='<Analytics ODBC DSN>', Query=[CField2]", QueryResult)
```

<Analytics ODBC DSN> identifies an ODBC data source name for your Siebel Analytics Server with <Siebel Analytics user> and <password> as a valid user. You must set up this DSN on the machine running Siebel Server using an ODBC Data Source Administrator program. Refer to your operating system's user guide for complete instructions.

- 4 Expose CField2 in the Contact applet.
- 5 Set up the Intelligent Interaction Manager business service, as stated in the "[Process of Configuring Intelligent Interaction Manager for Real-Time Deployment](#)" section of [Chapter 5](#), "[Deploying Real-Time Scoring with Siebel Data Mining](#)."

Process of Using eScript to Fetch Batch Scores

Alternatively, instead of using two calculated fields, you can also use an eScript on the business component server event PreQuery() to connect to Siebel Analytics and fetch batch scores.

NOTE: The following instructions assume that you have used Siebel Miner to store the batch scores in the Siebel Data Warehouse. See *Using Siebel Tools* for configuration details.

To fetch batch scores using an eScript

- 1 Create a new field on the business component that will expose the batch score. (You can call this field anything you like, but for these procedures it is called DField.)
- 2 Modify the BusComp_PreQuery () event function of the business component as follows:

```
function BusComp_PreQuery ()
{
var svc = TheApplication().GetService("IIM");
var inputs = TheApplication().NewPropertySet();
var outputs = TheApplication().NewPropertySet();

inputs.SetProperty("UserName", "<Siebel Analytics user>");
inputs.SetProperty("Password", "<password>");
inputs.SetProperty("DataSource", "<Analytics ODBC DSN>");
inputs.SetProperty("ColumnIndex", "0");
inputs.SetProperty("Query", "SELECT Customer Score FROM Data Mining where
'Score Model Name' = <Model Name> and 'Contact or Prospect ID' = [Contact Id]");

svc.InvokeMethod("ExecuteQuery", inputs, outputs);

var mValue = outputs.GetProperty("QueryResult");

this.SetFieldValue("DField", mValue);

busComp.ExecuteQuery();
}
```

<Analytics ODBC DSN> identifies an ODBC data source name for your Siebel Analytics Server with *<Siebel Analytics user>* and *<password>* as a valid user. You must set up this DSN on the machine running Siebel Server using an ODBC Data Source Administrator program. See your operating system's user guide for details.

- 3 Expose DField in the Contact applet.
- 4 Set up the Intelligent Interaction Manager business service, as stated in the ["Process of Configuring Intelligent Interaction Manager for Real-Time Deployment"](#) section of [Chapter 5](#), ["Deploying Real-Time Scoring with Siebel Data Mining."](#)

Generating Batch Scores for Siebel Data Mining Workbench and Siebel Data Mining Engine Users

If you are using Siebel Data Mining Workbench or Siebel Data Mining Engine to generate batch scores, first you must import the batch scores from flat files to the Siebel Data Warehouse or any other relational database. If necessary, connect Siebel Analytics to the database. The basic steps of connecting Siebel operational applications to Siebel Analytics in order to expose batch scores are the same as the preceding instructions.

Deploying Configuration of Siebel Analytics for Batch Scoring

Verify that batch scores are generated correctly and stored in the correct destination. Siebel Miner users who store batch scores in the Siebel Data Warehouse can use Siebel Analytics to validate and analyze scores. If you have very large data sets with physical memory limitations based on whether you are using Siebel Miner, Siebel Data Mining Workbench, or Siebel Data Mining Engine stand-alone, you may have to split your data set into several smaller partitions before running batch runs. See the appropriate guides and release notes for limitations.

Example of Configuring Siebel Analytics for Batch Scoring Deployment

In the wireless service provider example, the company expects a distribution of churn scores that needs to be in line with its historic churn rate. Because the provider has experienced an annualized churn rate of 20%, it expects at least 20% of customers to have high churn scores. A significant deviation from the expected distribution is most often an indication of a flawed predictive model.

Data Mining Subject Area in Siebel Answers

NOTE: This section applies only to Siebel Miner and Siebel Analytics Applications users.

Stored in the Siebel Data Warehouse, batch scores are analyzed with Siebel Answers. For this purpose, Siebel Analytics provides prebuilt metadata that links batch scores to customer profile data and other Relationship entities. This metadata consists of a dedicated data mining subject area and additions to various subject areas that allows analysis of batch scores in the context of customer data. This data mining subject area exposes information residing in the Siebel Miner repository, including model metadata and scoring data. [Figure 5 on page 37](#) shows the contents of the data mining subject area.

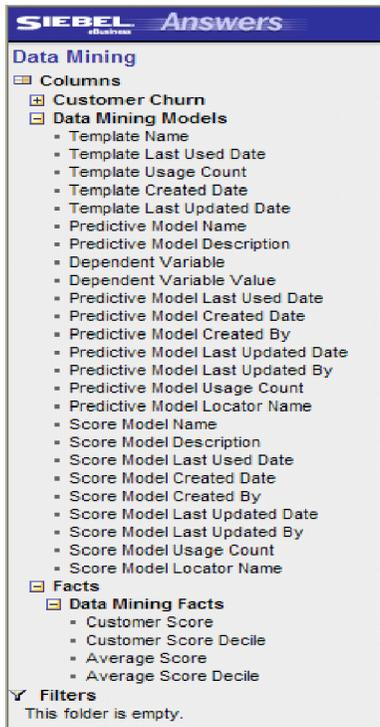


Figure 5. Siebel Data Mining Subject Area

The content of this subject area is also available in the following subject areas:

- Campaigns
- Campaigns Overview
- Consumers
- Consumers Overview
- Customers
- Customers Overview

Example of Using the Data Mining Subject Area

For example, in order to display the average churn score in relation to the customer profile attribute Marital Status:

- 1 Go to the Customers subject area.
- 2 Open the Contact or Prospect/Contact Profile table.
- 3 Select the Marital Status column.
- 4 Open the Data Mining Models table.
- 5 Select the Score Model Name column.
- 6 Add the filter "is equal to" <Churn Score Model Name>.
- 7 Remove the Score Model Name column.
- 8 Open the Facts/Data Mining Facts table.
- 9 Select the Average Score column.
- 10 Execute the Query.

In addition, the data mining demo subject area exposes data provided with Siebel Miner demo templates. See the Siebel Miner documentation in the Angoss folder on the *Siebel eBusiness Third-Party Bookshelf* for a description of demo data mining templates.

NOTE: To use the existing analytics metadata that joins batch score records to the Account, Contact, or Product entities, the ID column of batch score records must match the ROW_WID of these entities.

Testing Batch Scoring in Siebel Analytics

If you are exposing batch scores in a Siebel operational application, use Siebel Answers to test the correctness of the logical SQL statement before deployment. Siebel Answers tests the connection between the application and Siebel Analytics. See the *Siebel Analytics User Guide* for instructions on directly executing logical SQL statements in Siebel Analytics Answers.

After successful testing, deploy your configuration by activating scheduled batch runs and moving the configuration from your test and preproduction system to your production system. Once deployed, diligently monitor model performance and plan for timely rescoring and retraining of models. Monitoring the deviation of predicted propensities that deviate from observed outcomes is an indication of model performance. You can also use Siebel iBots and Siebel Delivers to create event-triggered notifications of changes in model performance. For example, the wireless service provider captures actual churn behavior and compares it against predicted behavior. If an increasing number of customers with a low predicted churn propensity start churning, the provider needs to either rescore his customers or reevaluate the predictive churn model.

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